Funding Proposal

FP172: Mitigating GHG emission through modern, efficient and climate friendly clean cooking solutions (CCS)

Nepal | Alternative Energy Promotion Centre (AEPC) | Decision B.30/03

23 November 2021
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Note to Accredited Entities on the use of the funding proposal template

- Accredited Entities should provide summary information in the proposal with cross-reference to annexes such as feasibility studies, gender action plan, term sheet, etc.
- Accredited Entities should ensure that annexes provided are consistent with the details provided in the funding proposal. Updates to the funding proposal and/or annexes must be reflected in all relevant documents.
- The total number of pages for the funding proposal (excluding annexes) **should not exceed 60**. Proposals exceeding the prescribed length will not be assessed within the usual service standard time.
- The recommended font is Arial, size 11.
- Under the GCF Information Disclosure Policy, project and programme funding proposals will be disclosed on the GCF website, simultaneous with the submission to the Board, subject to the redaction of any information that may not be disclosed pursuant to the IDP. Accredited Entities are asked to fill out information on disclosure in section G.4.

Please submit the completed proposal to:

fundingproposal@gcfund.org

Please use the following name convention for the file name:

“FP-[Accredited Entity Short Name]-[Country/Region]-[YYYY/MM/DD]”
### A. PROJECT/PROGRAMME SUMMARY

<table>
<thead>
<tr>
<th>A.1. Project or programme</th>
<th>A.2. Public or private sector</th>
<th>Public</th>
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<tr>
<td>If the funding proposal is being submitted in response to a specific GCF Request for Proposals, indicate which RFP it is targeted for. Please note that there is a separate template for the Simplified Approval Process and REDD+. Choose an item</td>
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<th>A.3. Request for Proposals (RFP)</th>
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<td>Check the applicable GCF result area(s) that the overall proposed project/programme targets. For each checked result area(s), indicate the estimated percentage of GCF budget devoted to it. The total of the percentages when summed should be 100%.</td>
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<th>A.4. Result area(s)</th>
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<td>Mitigation: Reduced emissions from:</td>
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<td>☐ Energy access and power generation:</td>
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<td>☐ Low-emission transport:</td>
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<td>☒ Buildings, cities, industries and appliances:</td>
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<td>Adaptation: Increased resilience of:</td>
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<th>A.6. Expected adaptation impact</th>
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<td>For multi-country proposals, please fill out annex 17.</td>
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<td>A.9. Project size</td>
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<td>A.10. Financial instrument(s) requested for the GCF funding</td>
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<td>☒ Grant 21,128,224 USD</td>
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<td>A.11. Implementation period</td>
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<td>Indicate the maximum number of years over which the impacts of the investment are expected to be effective. 24 Years</td>
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<td>A.13. Expected date of AE internal approval</td>
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<td>Refer to the AE’s safeguard policy and GCF ESS Standards to assess your FP category. C</td>
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<td>A.15. Has this FP been submitted as a CN before?</td>
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<td>A.17. Is this FP included in the entity work programme?</td>
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A.19. Complementarity and coherence

Does the project/programme complement other climate finance funding (e.g. GEF, AF, CIF, etc.)? If yes, please elaborate in section B.1.

Yes ☐
No ☒

A.20. Executing Entity information

If not the Accredited Entity, please indicate the full legal name of the Executing Entity (ies) and provide its country of registration and ownership type. Note that there can be more than one Executing Entity. Also indicate if an Executing Entity is the National Designated Authority. Refer to the definition of Executing Entity in the Accreditation Master Agreement.

Alternative Energy Promotion Center (AEPC)

A.21. Executive summary (max. 750 words, approximately 1.5 pages)

Provide an executive summary of the project/programme including:

1. Climate change problem

Nepal is highly vulnerable to climate change and is ranked as the 9th most affected country to climate change, as per Global Climate Risk Index 2020. Terai region of Nepal is the most affected region in the country compared to Hills and Mountains in terms of death toll due to disasters. Terai is bordered by Indian Gangetic plain in the south and the Churia Physiographic Region in the north.

Penetration of clean cooking solution technologies is very low in Terai. According to the 2011 census\(^1\), around 75% of entire country’s populations were using traditional biomass- 63% used fuel-wood, while 10.38% relied on cow dung (dung cake) and 21% used Liquefied Petroleum Gas (LPG), whereas, during the same period, 56% household in Terai used fuel-wood, 22% cow dung and 15% used LPG. Burning of solid fuels using traditional cook stoves (TCS)\(^2\), cause health problems and emit a massive amount of black carbon and GHGs (such as carbon dioxide, methane). Even though, fuel-wood consumption in Terai has remained fairly constant, LPG consumption is in increasing trend, as around 40% of the households are using it now. As per the Nepal Oil Corporation (NOC) import and sales report for FY 2019/20, Nepal imported and consumed 449063 MT of LPG. LPG has to be imported, it has negative macroeconomic impact in the country, due to widening trade deficit with India, and has made the country very susceptible to supply risk as well.

Nepal relies heavily on hydropower for its electricity generation, which is a clean and renewable energy source with no CO\(_2\) emissions. Currently it has installed capacity of around of 1278 MW electricity of which 95.7% is from hydroelectricity\(^3\). Nepal has enormous potential for hydro-electricity, touted around 83,000 MW and 80% of its population is connected to national grid\(^4\).Terai region has relatively better electricity access rate, compared to Hills and Mountains\(^5\). However, use of electricity for cooking has yet to pick up, as merely 0.08% of the target population relies on it\(^6\).

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\(^2\) TCS has efficiency of <10%. These stoves emits >18.3 g/MJ carbon monoxide and >1031 mg/MJ fine particulate matter. Example: three-stone fire


\(^6\) Baseline survey of Terai clean cooking program, 2019
2. Proposed interventions

To mitigate the impact of climate change and strengthen resilience of the most vulnerable communities to adapt to climate change, Alternative Energy Promotion Centre (AEPC) has proposed to implement the project “Mitigating GHG emission through modern, efficient and climate friendly clean cooking solutions (CCS)”. The main objective of the project is to surge use of Clean Cooking Solutions by instigating innovative concepts in Nepal of (i) bulk tendering via reverse auctioning for cost effectiveness (ii) output based financing for de-risking of investments and (iii) mainstreaming and capacitating local governments in renewable energy (RE) sector. These concepts have never been introduced in the country up to now and could be game changers in the clean cooking sector. The proposed project will collaborate with Nepal Electricity Authority (NEA) to explore and develop cost effective tariff structure incentivizing electric cooking for the households underpinned by the immense hydropower potential and support NEA in the upgradeation of electricity power supply in the project locations ensuring reliability, connectivity and system improvement. Additionally, this project actively aims to ensure effective women participation in each stage of value chain, and especially create jobs and volunteering opportunities for them. For the first time in Nepalese cookstove sector, it aims to generate women technical workforce.

The project aims to promote clean cooking solutions, such as Tier 3+ Improved Cooking Stoves (ICS), Biogas and Electric Cook Stoves (ECS) in 1,000,000 Households (HHs) of Terai region. It will be implemented in 22 districts of the Terai region, which also includes certain parts of the Churia. The project targets to switch 500,000 households from LPG and fuel-wood stoves to electric stoves; 490,000 households from loose biomass, dung cake and fuel wood to Tier 3+ ICS; and to introduce biogas system for 10,000 households that have sufficient livestock. Electric cooking is one of the potential clean cooking solutions for Nepal as 95.7% of electricity is from Hydro plants.

3. Climate impacts/benefits

The project will address specific barriers from transitioning traditional inefficient cooking practice to an efficient and climate friendly cooking solutions. Scaling up the government initiative on CCS, the proposed project aims at reducing an estimated 6.51 million tons of CO₂eq by bringing transformative change in cooking pattern with wider usage of modern clean cooking solutions via ECS, Tier 3+ ICS and biogas. Moreover, the project will have additional benefits such as improved health due to reduced indoor air pollution, time savings due to reduced fuel usage and more employment opportunities in clean cooking sector. There will be no CO₂ emissions as electricity from hydro will be used for cooking.

The project will also help to conserve fragile ecosystem of Churia, a source for fuel wood, by reducing deforestation and forest degradation due to reduced demand for fuel wood consumption. It is estimated that, Tier 3+ ICS can reduce fuel wood consumption by 30% on average and biogas and ECS will significantly reduce the use of fuel wood. In addition, more than 30% of reduction in indoor air pollution is expected by replacing TCS by Tier 3+ ICS, which will primarily benefit women and children as women

7Tier 3+ ICS has efficiency of ≥30%. These stoves emit≤7.2 g/MJ carbon monoxide and ≤218 mg/MJ fine particulate matter.

8The project is not linked with FAO project (Building a Resilient Churia Region in Nepal) as FAO targets the Central and Eastern Churia-Terai Region, few geographic area is overlapped. This projects targets to reach 1 Million HH (potential is more than 1.5 Million Households). So, the targeted households by the FAO project and AEPC will be different. Furthermore, AEPC will coordinate with FAO project for avoiding the duplication as the subsidy is mobilized through AEPC, the duplication will not happen.
will be a direct user of the stoves. In average, clean cookstoves can save more than 50% time used for fuel wood collection and preparing meal will be saved\(^9\), which can be utilized for other work and care for their families\(^{10}\). Besides, in cases where fertilizer needs to be purchased, the cost for fertilizers can be saved by using biogas slurry as fertilizer.


\(^{10}\) [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6480161/](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6480161/)
B. PROJECT/PROGRAMME INFORMATION

B.1. Climate context (max. 1000 words, approximately 2 pages)

Climate change problem: Describe the climate change problem the proposal is expected to address. Describe the mitigation needs (GHG emissions profile) and/or adaptation needs (climate hazards and associates risks based on impacts, exposure, and vulnerabilities) that the proposed interventions are expected to address. Also describe the most likely scenario (prevailing conditions or other alternative) that would remain or continue in the absence of the proposed interventions. Include baseline information. The methodologies used to derive such information, including the mitigation and adaptation needs, should be included in the feasibility study.

Context: In describing the mitigation and/or adaptation needs, briefly describe the target region/area of the proposed interventions including information on the demographics, economy, topography, etc.

Nepal is a landlocked country bordered by India and China. Topographically, it is divided into three ecological regions, namely Mountains, Hills and Terai (southern plains). Terai is bordered by the Indian Gangetic plain in the south and the Churia Physiographic Region in the north. The project will be implemented in 22 districts of the Terai region, including some parts of the Churia(Figure 1). Terai represents around 17% of the total land but its inhabitant represent about 50% of the country’s population. It has very fertile soil and thus is known as the country’s rice basket. It consists of dense forests—about 20.41% of total Terai area.

Access to clean energy cooking solutions is a massive problem for Nepal, including Terai. Nepal depends highly on traditional emissive energy sources, such as firewood, animal waste and crop residues for cooking purposes. According to the 2011 census, around 75% of the populations were using traditional biomass-63% used fuel wood, while 10.38% relied on cow dung (dung cake). This has not changed much over the last decade, as the recent report published by the World Bank in 2019, showed that still 73.5% of the households depend on firewood for cooking. Furthermore, majority of them are using highly in-efficient traditional cookstoves (TCS), which not only consume more fuel, thus putting more pressure on the forests, but also cause indoor air pollution. Burning of solid fuels using TCS (efficiency of 10%), cause health problems and emit a massive amount of black carbon and GHGs (such as carbon dioxide, methane).

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11The project is not linked with FAO project (Building a Resilient Churia Region in Nepal) as FAO targets the Central and Eastern Churia-Terai Region, few geographic area is overlapped. This projects targets to reach 1 Million HH (potential is more than 1.5 Million Households). So, the targeted households by the FAO project and AEPC will be different. Furthermore, AEPC will coordinate with FAO project for avoiding the duplication as the subsidy is mobilized through AEPC, the duplication will not happen
13FRA, 2014. Terai Forests of Nepal
16ibid
Household combustion is estimated to produce 25% of global emissions of black carbon, which is the second largest contributor to climate change after carbon dioxide (CO₂)\textsuperscript{17}. World Health Organization (WHO) estimates 8,700 deaths a year from indoor air pollution in Nepal.

In \textit{Terai}, as cow dung are more easily available and free to collect, households rely heavily on dung cake as cooking fuel; it is used by 25% of the population. This cooking pattern is typical to the \textit{Terai} region compared to other topography of the country as the dependence on dung cake in hills and mountains are at meager 0.1% and 0.4% respectively\textsuperscript{18}. Dung cake is the most polluting fuel for cooking, and therefore lies at the bottom of the energy ladder (Figure 2). Dung cakes are produced at the household level and burnt in traditional open fires or mud stoves, resulting in the emission of a dangerous cocktail of hundreds of pollutants to which women and young children are exposed daily.

\textsuperscript{17} WHO, 2016. Burning opportunity: Clean Household Energy for Health, Sustainable Development, and Wellbeing of Women and Children.\url{https://apps.who.int/iris/bitstream/handle/10665/204717/9789241565233_eng.pdf?sequence=1}

While TCS is predominantly used for cooking in the rural areas, Liquefied Petroleum Gas (LPG) is the most commonly used cooking technology in the urban areas. Due to smoke-free operation, flexibility in use and traditional kitchen practices dependent on this technology, there is a growing trend of LPG consumption. In 2011 census, around 21% of the entire populations were using it, while the 2019 World Bank survey showed its share had increased to 34.9%. LPG consumption is even higher in Terai region; it has increased from 15% at 2011\textsuperscript{19} to 40.25% at 2019\textsuperscript{20}.

Even though, LPG is a cleaner fuel compared to fuel wood and dung, as it does not produce smoke and contribute to indoor air quality, it is derived from fossil fuel, hence contributes to global GHG emissions. Moreover, LPG has to be imported from India. In 2018-19, Nepal imported 429,609 MT of LPG, which is a 270% increase since 2008/09\textsuperscript{21}. This over dependence on LPG import has put Nepal in a perilous situation, as it has not only widened the trade deficit\textsuperscript{22}, but has also made Nepal very susceptible to supply risk as experienced during the 2015 fuel crisis, when the supply of fossil fuels to Nepal from India was severely disrupted\textsuperscript{23}. Nepal must curtail its dependency on LPG in order to strengthen its economy and for its sovereignty.

Electricity is one big option that Nepal could rely on for its transition to clean cooking solution. Though Nepal has enormous potential for hydro electricity generation, which is touted to be around 83,000 MW, until couple of years back, Nepal was reeling under an acute power shortage that resulted in up to 16 hours of scheduled load shedding. As such, the environment was not conducive to promote electric cooking, despite the benefit it offers. However, now the time is ideal to intervene with electric cooking, as the country is officially free from load shedding\textsuperscript{24} and by 2028, Government of Nepal has envisioned to increase its electricity generation to 15,000MW; with the long awaited 456MW Upper Tamakoshi hydropower project set to be connected to the grid within 2020. Currently, nearly 95.7% of the total electricity generation is supplied by hydro power projects. With new addition of hydro projects the share

\textsuperscript{19}ibid
\textsuperscript{20}Baseline survey of Terai clean cooking program, 2019
\textsuperscript{21}http://noc.org.np/import
\textsuperscript{22}https://npc.gov.np/images/category/Nepals_Trade_Deficit1.pdf
\textsuperscript{23}https://kathmandupost.com/miscellaneous/2015/09/27/fuel-crisis-worsens
\textsuperscript{24}https://thehimalayantimes.com/business/nepal-is-totally-load-shedding-free/
of electricity would be cleaner. A simulation conducted by Nepal Electricity Authority, the state owned utility, shows that Nepal will be in the state of seasonal surplus by 2027 from which Nepal will be a pure exporter of power on RoY (Round-the-Year) basis\textsuperscript{25}. With an annual electricity consumption growth rate of 15\%, the country cannot use surplus power because it lacks energy-intensive industries and electric mass-transit systems.

At present, 80\% of populations of Nepal are connected to national grid. Terai has relatively high electricity access rate compared to Hills and Mountains\textsuperscript{26}. However, use of electricity for cooking has yet to pick up, as merely 0.08\% of the population relies on it\textsuperscript{27}. Electric stove will be provided to those households who have grid access. For those who are not connected to grid would be offered the facility of Tier 3+ ICS and biogas. As a consequence, there will be no CO\textsubscript{2} emissions as electricity from hydropower would be used for cooking. Therefore, GoN has been prioritizing programmes that increase national electricity consumption. Electricity Regulation Commission of Nepal has made reforms to the household electricity tariff rates by reducing the cost structure by 10\% so as to incentivize increase in use of electrical appliances\textsuperscript{28}. Nepal Electricity Authority has publicly requested to use the electric appliances in the kitchen as much as possible.

AEPC has conducted a user survey along 284 local governments among the 22 districts of Terai Region, spread across six Provinces, regarding the usage of cooking solutions\textsuperscript{29}. The survey provides baseline information on cooking solutions in the region. It shows that out of 2.7 million households in Terai region, 58.13\% use TCS, 3.26\% use biogas plant, 40.24\% use LPG, and 0.42\% use electric induction stoves. Through this project, AEPC has envisioned replacing 500,000 TCS and Tier 1 ICS by 10,000 domestic biogas plants and 490,000 Tier 3+ ICS. Similarly, it seeks to replace another 500,000 LPG users to electric cookstoves (ECS). Transitioning from TCS and LPG to more cleaner cooking solutions would reduce unsustainable consumption of fuel wood, cow dung and LPG, and also create demand to use electricity generated from its hydropower projects. However, these changes are less likely to occur on its own. TCS users are among the poorest and socially excluded groups.

Overall, HDI (Human Development Index) ranking for the Province, which encompasses most of the Terai region is very low\textsuperscript{30}. Furthermore, the target beneficiaries that the project aims to intervene on, the women, are disadvantaged on socio-economic fronts at BAU. For instance, estimated income (at PPP) reflects severe gender disparity (0.63 female to male ratio) in this region. Hence, affordability to switch to energy efficient technologies without external interventions remains a challenge.

In the absence of the project intervention, there would be no reduction in solid biomass and LPG consumption. This will further aggravate indoor air pollution and GHG emissions.

\textsuperscript{25}https://myrepublica.nagariknetwork.com/news/anxiety-of-surplus-electricity/
\textsuperscript{27}Baseline survey of Terai clean cooking program, 2019
\textsuperscript{28}https://myrepublica.nagariknetwork.com/news/nea-proposes-tariff-reduction-for-household-users
\textsuperscript{29}AEPC conducted a survey in 2019/20 to identify the baseline information on cooking solutions (fuel type and Stoves) from 284 local levels of the 22 districts of the Terai Region.
Related projects/interventions: Also describe any recent or ongoing projects/interventions that are related to the proposal from other domestic or international sources of funding, such as the Global Environment Facility, Adaptation Fund, Climate Investment Funds, etc., and how they will be complemented by this project/programme (e.g. scaling up, replication, etc.). Please identify current gaps and barriers regarding recent or ongoing projects and elaborate further how this project/programme complements or addresses these.

With the backdrop of ambitious campaign of Clean Cooking Solution for all (CCS4ALL) initiated in 2013, the Government of Nepal had endorsed Investment Prospectus for clean cooking solutions31 and Biomass Energy Strategy (BEST), 201732. BEST has the aim of attaining CCS4ALL in two stages i.e. by improved solutions of cooking by 2022 (no traditional way of cooking with open fire burning) and modern solutions of cooking with at least Tier 3+ level by 2030.

The Government of Nepal has announced the implementation of a multi-year programme: “Terai Clean Cooking Programme”, starting from the fiscal year 2019/20. Under this programme, traditional fuel such as animal dung cake will be replaced in 22 Districts of Terai, by Tier-3+ ICS, biogas and electric cooking. Despite many efforts by the Government of Nepal, a number of challenges and barriers continue to inhibit the transition towards a clean, modern and efficient cooking solution in the Terai region. Government of Nepal and External Development Partners (EDPs) have invested around 4.5 million USD for CCS in fiscal year 2018/201933. Predominantly, AEPC distributed mud ICS which had immediate positive impacts but in the long run its regards to its durability the mud ICS could not provide a long lasting impact. Promotion of electric cooking is a shift from existing renewable energy technologies that are under the current subsidy regime. In terms of the implementation arrangement the technology had been highly promoted but the vendors (private sector) had to create a market place which required massive investment and resources. Government and non-government agencies are implementing climate change initiatives in different parts of Nepal. GEF Small Grants Programme works with local communities in Nepal, to achieve global environmental benefits by addressing their local needs. The Nepal Small Grants Programme primarily contributes to Goal 7: Ensure Access to Affordable, Reliable, Sustainable and Modern Energy to All; Goal 13: Take Urgent Action to Combat Climate Change and its Impacts; and Goal 15: Protect, Restore and Promote Sustainable Use of Terrestrial Ecosystems, Sustainably Manage Forests, Combat Desertification and Halt and Reverse Land Degradation and Biodiversity Loss while also contributing to other goals. In relation to the project, the GEF SGP has supported in the installation of bio-gas, solar home and micro hydro systems, as well as solar tukis, rice husk stoves, Puxing biogas and ICSs—saving altogether 16,422 tonnes of carbon dioxide per year. Furthermore, the Ministry of Forests and Environment (MoFE) is implementing the Nepal Climate Change Support Program (NCCSP), with funding support from the UK Department for International Development (DFID) and the European Union (EU) in 14 districts of mid- and far-west Nepal. This project is under implementation with particular focus on the preparation and implementation of LAPAs. There are other projects such as the Community-based Flood Risk and GLOF Risk

Reduction Program, which has received funding from the Least Developed Countries (LDCs) Fund through the United Nations Development Program (UNDP), as the Global Environment Facility (GEF) implementing agency.

The proposed project is designed incorporating the lesson learnt from the past. The proposed project will create a market in it itself, thus providing the initial big boost to the CCS market. In terms of the project interventions, the project brings in the paradigm shift much required in the sector by introducing the innovative approaches of bulk tendering via reverse auctioning, output based financing and capacitating local governments while providing a boost to the CCS market which has seen the dearth of Tier 3+ ICS and Electric Cooking. Thus, the project will catalyze the sector and underpin the scale up in future post the project interventions.

The investment in CCS by the GoN focuses exclusively on distribution of technology. During the FY 2018/19 less than 2% of the entire budget spent on programs under CCS was spent on activities in line with capacity development and strengthening of supply chain. The consequences of that gap can be seen in lack of after sales capacity at the user level which ultimately affects in up-scaling and dissemination of CCS.

In a business-as-usual (BAU) approach for deployment of CCS technologies, AEPC sets annual target for technology deployment, fixes certain amount of subsidy for each technology for households and institutions located in different districts that are grouped in terms of remoteness. Then companies are shortlisted based on a set of qualification criteria to implement those targets- such shortlisted companies are called prequalified companies (PQ companies). PQ companies collect demand from households, and once verified by AEPC they install the system. After successful commissioning, PQ companies collect payment from households, and submit the installation completion form to AEPC at which point they qualify to claim the first installment of subsidy amount from AEPC. Finally, AEPC conducts sample based monitoring to release the final installment of the subsidy amount to the PQ companies. The bureaucratic and lengthy process of this BAU approach has made it difficult for AEPC to achieve its annual targets. Furthermore, since the specification and price of technology, and the subsidy amount are predetermined, there is no incentive for PQ companies to reduce the cost of technology or innovate better technology. To shift towards clean cooking, Nepal requires a multi-pronged approach. First, “increase the cost effectiveness by instigating the concept of bulk tendering via reverse auctioning” then “de risk the investment by introducing the output based financing”. Second, ensure quality assurance and adequate after sales service by strengthening the existing testing centers and expanding its services at the regional and local level. Third, local governments can play a crucial role in improving access to clean cooking solutions. Hence, their capacity needs to be developed.

Below mentioned point summarizes these barriers, as well as how the project will address them.

1. Socio-economic barriers

The main socio-economic barriers for transition to CCS include consumer’s limited awareness about benefits of CCS and subsidy policy on renewable energy and their low willingness to pay higher prices due to low economic levels of the household. Most of the LPG users are unaware of cost savings from using ECS. Likewise, TCS users are unaware about the health benefits of Tier 3+ ICS and
biogas. There is an existing subsidy provision for building domestic biogas, however many households are unaware of the subsidy scheme. In this context, users need more awareness raising and access to affordable financing to adopt CCS. Furthermore, household cooking is challenged from gender stereotyping that women are responsible for household chores.

The project will address the issue by bringing behavioral change among users by raising awareness about the cost and health benefits of ICS through campaigns and promotional activities. Also, the project will stress on gender parity and women empowerment. Within the project period of five years it will reach the number of 1 million households in the Terai region of Nepal, the five year period that focuses on pre and post purchase behavior enforcement will instigate and maintain the behavior change among the consumers of the Terai Region. The will ensure the acceptability of the proposed technologies. Post project interventions, beneficiaries are expected to switch to the proposed technologies on their accord given the change in behavior coupled with the intervention on value chain through awareness and promotional campaigns, promotion of emerging CCS technologies, training and support with enhanced repair and maintenance services and technology availability. This will create a virtuous cycle in the sector through which further interventions will be no longer required and the uptake of the technologies will follow a natural course given the benefits and the change in behavior.

2. Technological barriers

**Low level of technical knowledge and unavailability of technicians is another major constraint to shift towards CCS.** Very few stove designs are available in the country and consumers face a lack of choice in models. Dearth of Research and Development in developing models and products that meet user’s requirements is also a challenge. Currently there are not many manufacturers and vendors of Tier 3+ ICS and ECS in Nepal. They are being imported, mainly from India and China. There is no technical capacity in the community to manufacture advanced ICS. There is already limited technical workforce availability; the scene is further alarming on women’s involvement. At community level, capacity building, repair and maintenance training would eliminate such barrier.

The project will support capacity enhancement at community level, human resources, technical expertise and technology in the form of Tier 3+ ICS, biogas and ECS. In addition, the project will strengthen the existing testing center to ensure the quality of the stoves. As stated in GAP, the project will address gender issues on technological aspects.

**Access to grid electricity, quality of electricity power supply and voltage fluctuations** are other challenges to shift towards electric cooking. The quality of electricity power supply in different parts of the country including the Terai is still poor and should be upgraded. Electric cooking would be promoted in the grid-connected households exploring and introducing a cost effective tariff structure for household consumption. Nepal Electricity Authority, the state owned sole utility, is also a member of the AEPC board. In the short term, beneficiary selection will be a key process while disseminating the different types of technologies provisioned by the project. Electric Cooking will be mainly targeted based on the demand received from the Local level where in it is required to assure that the beneficiaries of ECS will have reliable electric supply. This will include selected clusters in rural settings, urban and peri-urban areas which will have the required infrastructure. As a corrective measure for short term, AEPC will provide beneficiary mapping to Nepal Electricity Authority (NEA) and NEA will be upgrading capacitors and conductors in the overloaded areas. Thus beneficiary selection process is the specific measures to ensure the electric supply is reliable at the downstream household level. In terms of the medium and
long term measures, AEPC will work with Nepal Electricity Authority on increasing distribution transformer size and improving distribution and transmission lines to control voltage fluctuations in the project area. Through the proposed project, the government will play a major role in setting up reliable infrastructure which will assure the wider usage of electric cooking among the household population. With vigorous technological reliability, electric cook stoves will diminish the usage of LPG in the country.

3. Financial Barriers

Most of the TCS users are among the poorest households, and they lack capital to switch to CCS technology. Furthermore, they are usually deprived of formal banking channel, hence do not have access to bank financing. Although few cooperatives provide loans for CCS at community level, the interest rate is too high for the poorest households. For extensive promotion of electric cooking, cost effective tariff structure needs to be introduced, which is also an ongoing policy of the Ministry of Energy, Water Supplies and Irrigation. As such, Electricity Regulatory Commission has revised the tariff structure with completely subsidized electricity to the low electricity consuming households consuming up to 10 units per month, 25 percent discount for those consuming up to 150 units per month and 15 percent discount to those consuming 250 units per month in electricity charges applicable from Fiscal Year 2020/21. The revision has been made to promote Electric Cooking in the households. A further cost effective tariff structure will be introduced in coordination with Nepal Electricity Authority analyzing the increment in the revenue due to addition of electric cooking loads to the distribution system during project implementation.

In addition, there is a high investment risk due to existing subsidy delivery mechanisms. Current subsidy delivery mechanism is a very bureaucratic and lengthy process that makes it difficult for the government to achieve big target in a short period. Bulk tendering via reverse auctioning would help to reduce the price of CCS through competition. Furthermore, Capital resources provided by Green Climate Fund (GCF), GoN and other possible development partners would help in addressing the financial barriers. Also, the procurement will follow bulk tendering via reverse auctioning (least cost based selection) approach for cost effectiveness and output based payment to de-risk the investment (detail has been included in section B3).

From the beneficiaries’ perspective, the targeted beneficiaries who shall be the poor households of the urban and peri urban areas for electric cookstoves and poor households of the rural area for the Tier 3+ ICS lack the financing to the purchase these clean technologies. Based on our analysis in terms of their portion of annual income to the amount that needs to be invested on the installation (CAPEX) and operation (OPEX), considering a conservative approach of with bare minimum cost allocation households with annual income level between $250 to $2000, the electric cookstoves without the subsidy support from the project will require between 5% to 32% of their annual income on the CAPEX and between 8% to 49% of their annual income on the OPEX over the five year period. The percentage of income level analysis has been presented as a separate annex and also in section D.6 of the funding proposal.

4. Institutional Barriers

After the promulgation of new constitution in 2015, Nepal has become a federal republic, with country being divided into seven Provinces. The old village development committees have been merged to
create rural municipalities, while new municipalities and metropolitan cities have also been created. In a nutshell, Nepal has now different governance modality, with newly formed Local Governments (LG) and Province Government (PG). The new constitution has given mandate to the Local Governments for development of Renewable Energy. However, they have weak institutional setup vis-à-vis renewable energy technologies. They also lack
- Technical and financial capacity,
- Awareness on the impact of clean energy,
- Dedicated human resources,
- Expertise and experience required for planning (energy plans), procuring (demand aggregation and bulk tendering approach), implementing and monitoring renewable energy technologies projects and programme.

The proposed project would empower LGs by heavily engaging them throughout the project implementation phase. The project will capacitate LGs and PGs to prioritize CCS promotion in their periodic and annual planning, formulating appropriate policies and mechanisms.

B.2. Theory of change (max. 1000 words, approximately 2 pages plus diagram)

Describe the theory of change and provide information on how it serves to shift the development pathway towards a low-emission and/or climate resilient direction. Provide the diagram of the theory of change (approximately 1 page).

Figure 3: Theory of Change

The theory of change should include any barriers (social, gender, fiscal, regulatory, technological,
financial, ecological, institutional, etc., as relevant) that need to be addressed. Use a results chain of inputs, activities, outputs, outcomes, and impact statements, and identify the how and why of causal relations to deliver the project’s expected results.

The primary problem that this project will address is **Increasing greenhouse emissions and indoor air pollution due to inefficient cooking practices**. This project aims to mitigate the problem by increasing climate resilience, through CCS. This will result in the shift of Nepal towards a low carbon development path with increased climate resilience and sustainable development.

While high dependence on biomass fuel using inefficient TCS and growing use of LPG is in increasing trend, the transition to CCS is challenging. The set of barriers and risks that might prevent the project objectives from being achieved are as following:

**B1. Inadequate capital investment and operational cost:** Most of the TCS users do not have access to banking facilities to borrow money. In the capital market, banks and financial institutions lack loan products for CCS technologies. Similarly, the CAPEX of tier 3+ ICS and biogas will be higher compared to the technology being replaced i.e. TCS. In case of ECS, the new consumers will need to purchase ECS utensils separately. The additional cost presented by switching over may prevent a user to adopt new CCS technology. The selection criteria for the given technologies and the subsidized rate for each of the technology will prompt users to switch to the technology and in the long run the project will help maneuver through the barrier by creating an enhanced awareness on the use and the benefits of the technology ensuring long lasting usage of the proposed technologies.

**B2. Technical and operational barrier pertaining to adoption of new CCS technology:** Despite the abundance of electricity, with linkage of many hydropower projects to the national grid, the quality of electricity on supply side is still weak in most areas of the country, which is a major barrier to self-propagate electric cooking in Nepal. As such, the currently available distribution system may not have the capacity to support additional load demand presented by ECS. Additionally, at household level, the electricity system will need to be upgraded for installing ECS; this will require additional time and capital on the user’s part.

**B3. Lack of technical and project implementation skill at sub-national institutions:** Most sub-national levels do not possess the technical capacity to envision and incorporating energy efficiency programmes in their annual energy plans. Likewise, the capacity may not be up to par for implementing projects of this scale.

**B4. Lack of awareness and limited access to CCS technology:** There are not enough information, marketing and promotion of Tier 3+ ICS and Electric Cook Stoves readily available for general public. Most of the TCS users are not aware of health benefits of Tier 3+ ICS solutions. Meanwhile, most of the LPG users are unaware of cost savings from Electric Cook Stoves. There is an existing subsidy for building domestic biogas, however many households are unaware of the subsidy scheme.

**B5. Lacking functional market approach for CCS:** Because of their relatively new introduction to the domestic consumers, currently there are not many manufacturers and suppliers of Tier 3+ ICS and Electric Cook Stoves in Nepal. Likewise, repair and maintenance centers, with limited skilled human
resources are sparse, ever more so in the context of rural areas where large portion of Tier 3+ ICS will be deployed. This may present a risk to consumers for adoption of CCS due to limitation of after sales services.

B6. Gender disparity in CCS value chain, and Inadequate opportunities and limited accessibility for women

Barriers to an equal representation up and down in value chain includes traditional social norms biased against women, poverty as a result of limited access to education, early marriage, limited asset ownership. Furthermore, women’s participation is limited to decision making and income generating activities, and technical workforce.

R1. Investment risk due to existing subsidy delivery mechanism: Current subsidy delivery mechanism is a very bureaucratic and lengthy process that makes it difficult for users to access it, hence, for the government to achieve big target in a short period.

The project activities are based on three major targets:

**Increasing access to CCS by deployment of proposed technologies**

1. **Deployment of CCS for scaling up the installation targets:** This activity involves procurement and deployment of CCS technologies with initial support to users which will directly increase access to CCS. Likewise, the activity will use revised procurement and payment delivery methods in bulk tendering via reverse auctioning and output based payment that will ensure reduced investment risks from vendor’s view. The activity will address B1 and R1.

**Strengthening quality assurance and enhancing product standards**

2. **Enhancing product standards, conducting assessments, surveys and analysis:** Within this activity national level technical standards and documents will be prepared for CCS technologies proposed in this project. The outputs of the project will address technical and operational issues pertaining to adoption of proposed CCS technology. Likewise, Project Implementation Unit (PIU) will also systematize procurement and subsidy delivery mechanisms as per project requirement. The activity will address B2 and R2.

3. **Strengthening quality assurance mechanisms:** The activity will mainly focus on strengthening testing facilities and developing quality assurance mechanisms for procurement of CCS technologies. The activity will address B2.

**Capacitating sub-national levels, enabling functional CCS market and increasing awareness of CCS at user level**

4. **Capacity development of sub-national institutions:** Through this activity, sub-national institutions will be capacitated to prioritize CCS promotion in their annual plans, formulating appropriate policies and mechanisms to achieve those targets. Likewise, the project will also assist local governments in preparing their energy master plans. The activity will address B3.
5. **Increasing awareness and outreach to enhance demand**: Multiple awareness campaigns and promotional activities regarding CCS and its benefits will be conducted targeted towards beneficiaries. This activity will address B4.

6. **Strengthening service centers, biomass manufacturers to provide quality and affordable clean cooking solutions**: The activity will majorly focus on strengthening CCS supply chain as well as capacity development through vocational training of local technology manufacturers, entrepreneurs and beneficiaries. The activity will address B5.

The project results that would be achieved by conducting the aforementioned activities are as following:

1. **Increase in proportion of households adapting CCS technology**: This indicates the total increase in no. of households shifting from their existing cooking technologies to proposed CCS.

2. **Increase affordability of CCS technology through bulk tendering via reverse auctioning approach**: Bulk tendering via reverse auctioning reduces the initial price of CCS in comparison to BAU model, which will in turn reduce the initial investment barrier by users in CCS.

3. **Quality assurance mechanism for CCS is operational**: National level standards on CCS will be strengthened; likewise, one central level testing facilities for CCS technologies will be strengthened.

4. **Database management through MIS as a national monitoring system**: MIS for real time data collection and demand aggregation will be developed at each LG.

5. **Household fully adapted CCS technologies with changed behavior**: The project targets 90% of the total households will continue the use of CCS technology.

6. **A supply chain mechanism for CCS is established and functional**: Local level CCS service centres will be supported for maintenance through dedicated vocational trainings to individuals.

7. **Sub national institutions facilitated CCS promotion at local and provincial level**: Each LG will be assigned a dedicated CCS facilitator and will be supported in creating dedicated energy units. Likewise, the project will support LGs in preparing energy master plans and assist in developing annual targets on CCS and promotion of other sustainable energy technologies.

8. **Enhanced environment for women’s engagement in top down value chain**: Institutional and managerial arrangement will be made during project formulation implementation, and monitoring & evaluation. Extensive use of GESI specialist during the project implementation period and gender sensitization training for project staff at all levels to maintain desired level of gender awareness will be done. Gender mainstreaming in all local and provincial institutional setup will assure increased employment and volunteering opportunities to women.

These envisioned project results will help in achieving following project level outcomes:

5.0 **Strengthened institutional and regulatory systems for low-emission planning and development** (Results linked to the outcome: 4, 6, and 7)

7.0 **Lower energy intensity of buildings, cities, industries and appliances** (Results linked to the outcome: 1, 2, 3 and 5)

The ultimate fund level impact that this project will achieve is:

3.0 **Reduced emission from buildings, cities, industries and appliances**

In order for the project to derive desired results from the proposed inputs and activities, the project is
based around following fundamental assumptions:

1. Bulk tendering via reverse auctioning enhances CCS quality, reduces costs and increases access to appropriate CCS technologies and services;
2. Local Government leads in developing Municipal Energy Plan (MEP) and promotes CCS with identifying demand linked with online management information system;
3. Output based financing mechanism ensures sustainable CCS services and de-risks government investments transcending from the current business as usual subsidy; and
4. Strengthened supply chain and behavioral change will lead to sustainable adoption of the CCS technology.

B.3. Project/programme description (max. 2000 words, approximately 4 pages)

Define the project/programme. Describe the proposed set of components, outputs and activities that lead to the expected Fund-level impact and outcome results. Components should reflect the project/programme level outcomes.

This should be consistent with the financing by component in section C.2, the results and performance indicators provided in section E.5, and the implementation timetable in annex 5.

The Project “Mitigating GHG emission through modern, efficient and climate friendly clean cooking solutions (CCS)”, financed by GCF grant and co-financed by Government of Nepal (via AEPC and LGs) will contribute to mitigate GHG emissions and strengthen the resilience of most vulnerable communities to adapt to climate change. The project will address specific barriers from transitioning traditional inefficient cooking practice to efficient and climate friendly cooking solutions. Scaling up the government initiative on CCS, the proposed project aims at reducing an estimated 6.51 million tons of CO₂eq by bringing transformative change in cooking pattern with wider usage of modern clean cooking solutions via ECS, Tier 3+ ICS and Biogas plants.

The project targets the poor households of the urban, peri-urban and rural area with electric cookstoves for the urban and peri urban poor households and Tier 3+ Improved Coostoves for the poor households in the rural setting. The project follows a bottom up approach in terms of identifying these households and providing the subsidy and clean technology. Clean technology and its access in the country are limited to more affluent households. These cleaner means of cooking stays at the affluent household for a longer period and trickle down slowly towards the households in the low level income category. The major reason for this sluggish transition is the income level of the poorer households and the percentage of their income required for investing in these technologies. Thus, the customer perceived value is at low level when it comes to clean technologies, further along with the subsidy the project will invest in the cost associated with the model which will ensure pre-purchase behavior enforcement and post purchase behavior enforcement among these households.

The project aims to surge use of Clean Cooking Solutions by instigating the concepts of (i) bulk tendering via reverse auctioning (least cost based selection) for cost effectiveness (ii) Output based financing for de-risking of investments and (iii) mainstreaming and capacitating local governments in the renewable energy (RE) sector. The project also intervenes to tackle existing gender related challenges. In order to remove the specific barriers as identified in section B1 and achieve its goal of replacing lower Tier cook stoves and fossil fuel in cooking sector with clean and renewable energy sources. The project focuses on three core components as listed below:
COMPONENT 1: SCALING UP THE DEPLOYMENT OF CLEAN COOKING TECHNOLOGIES THROUGH ACCELERATED INVESTMENT AND MARKET DEVELOPMENT

**Output 1.1:** 500,000 Electric Stoves, 490,000 Tier 3+ ICS and 10,000 biogas plants installed.
Under component 1, the proposed project will support growth of clean cooking solution in *Terai*.

**Activity 1.1.1: Development of Annual Procurement and Deployment plan**
Based on the demand aggregation of each three CCS technologies, a cluster wise deployment procedure will be prepared at regional or provincial level. Different bidding documents for all three CCS technologies will be prepared to procure the technologies through bulk tendering via reverse auctioning (Least Cost Selection Method). AE being a government entity adheres to the Public Procurement Act, 2007 (PPA) and Public Procurement Regulation, 2007 (PPR). The reverse auctioning model refers to the Least Cost Selection (LCS) Method of the PPR. LCS method ensures that technology in available in the most cost effective way. The reverse auction/LCS mechanism will follow the given structure for procurement of goods as the PPA/PPR.

![Figure: Least Cost Selection Process (LCS)](image)

**Activity 1.1.2: Procurement and Deployment of annual targeted number of CCS**
The project aims to deploy 490,000 Tier 3+ ICS, 10,000 Domestic Biogas Plants and 500,000 ECS over 5 years period. The beneficiary and technology will be selected by a two-step process: 1) eligibility criteria and 2) prioritization.

Eligibility criteria includes mandatory technical feasibility such as,

i. Cattle and livestock ownership for biogas,
ii. 15 Amp meter connection for ECS, and
iii. Fuel accessibility and affordability for ICS.

Prioritization will be made based on socio-economic vulnerability indicators scoring system (such as level of income, disability in the family, female headed households, single women, widows, indigenous people, and affordability factor). Further in terms of the beneficiary selection in case of the respective technologies, the following ecological and economical factors shall be taken in to consideration. The electric cookstoves is targeted towards the urban and peri-urban poor household of the Terai with the average annual income ranging between $250 to $2000. The income distribution has been further been presented in section D.4.

Similarly, project location and demand from LG will be subsidiary factors in beneficiary selection. Vendor selection will follow standard Public Procurement Process. Prequalified companies identified by AEPC for specific technologies will be the potential vendors. Least Cost based selection method as per Public Procurement Acts and Regulation will be adapted.

Furthermore, The selection criteria will be defined in detail during the project implementation stage while preparing the standard operating procedure/operational manual for the project. Following rationales have been linked with the type of technological intervention required:

- 0.5 Million ECS are targeted for households using LPG and fuel wood with reliable electricity access.
- 0.49 Million Tier 3+ ICS are targeted for households using loose biomass, dung cake and fuel wood with no or bad quality electricity access.
- Finally, 0.01 million biogas system are targeted for households having sufficient cattle/livestock and relying on agriculture sector.

Switching from the TCS to Biogas plant for a typical family requires an upfront capital, the subsidized rate, therefore lowers the burden on the household. Further, the longer lifespan of biogas plants adds tremendous value. The annual operational cost of biogas for the households with cattle and live stocks is significantly lower compared to the LPG. In fact our financial and economic analysis has no cost associated with fuel consumption for bio-gas technology as the targeted beneficiaries of biogas technology are envisioned to have cattle at home, therefore providing a free source of animal and agriculture residue. The biogas owners will have the added benefit of fertilizers. The health benefits and the efficiency factor when understood by the beneficiaries will trigger a widespread utilization and replication of the technology.

Similarly, in case TCS and ICS, TCS consumes more fuel (2500-3500 kg per annum) than ICS which consumes (1,200-1500 kg per annum). We have envisioned a higher scale of subsidized rate compared to biogas and electric cook stoves, considering that the targeted beneficiaries will be on the lower strata of financial and economic capabilities. A widespread utilization and replication of the technology will be triggered when beneficiaries understand the fuel wood consumption rate, health benefits and efficiency factor.

Domestic biogas is developed on site locally whereas electric cookstoves, tier 3+ ICS, and accessories of domestic biogas are imported. Pre-tax subsidies are provisioned to import ICS/ raw materials for ICS and Biogas accessories with custom duty discounted to 1%. In 2020, GON has reduced custom charges in induction cookstoves from 15% to 5%, promoting the use of ECS.
Out of the total 284 LGs in the 22 districts, the project targets 150 LGs selected based on demand of CCS. There are about 1.5 million households in the targeted 150 LGs. While selecting the beneficiary households, priority will be given to economically impoverished and socially excluded families, indigenous people, single women, female-headed households and widows.

The annual deployment target is given below:

<table>
<thead>
<tr>
<th>Technologies</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric Cook Stoves</td>
<td>50,000</td>
<td>100,000</td>
<td>135,000</td>
<td>135,000</td>
<td>80,000</td>
<td>500,000</td>
</tr>
<tr>
<td>Tier 3+ ICS</td>
<td>50,000</td>
<td>100,000</td>
<td>130,000</td>
<td>130,000</td>
<td>80,000</td>
<td>490,000</td>
</tr>
<tr>
<td>Domestic Biogas Plant</td>
<td>2,000</td>
<td>2,000</td>
<td>2,000</td>
<td>2,000</td>
<td>2,000</td>
<td>10,000</td>
</tr>
</tbody>
</table>

In addition to the annual deployment target, the unit cost and the funding proportions of each of the financiers is given below:

**Unit cost of the technologies and Cost sharing for technology ( Without GCF Support and before Reverse Auctioning )**

<table>
<thead>
<tr>
<th>SN</th>
<th>Technology</th>
<th>Unit Cost (USD)</th>
<th>GCF</th>
<th>AEPC</th>
<th>LGs</th>
<th>Beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tier 3+ ICS</td>
<td>$ 48.70</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>Biogas</td>
<td>$ 677.08</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100%</td>
</tr>
<tr>
<td>3</td>
<td>ECS</td>
<td>$ 47.92</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100%</td>
</tr>
</tbody>
</table>

The Procurement of CCS technologies for this project will follow the following process:

**Bulk Tendering via Reverse Auctioning (Least Cost Based Selection Method as per the Public Procurement Act/Public Procurement Regulation of Nepal):** The bulk tendering process will be inclusive and follow bottom up approach and follow the PPA/PPR. The LG level staffs will collect demand based on type of technologies required at household level and manage data through a Management Information System (MIS)\(^34\). MIS will automate the demand aggregation process. This will provide a clear picture of the type and number of technologies required at a particular LG. For the ease of CCS deployment, these demands would be pooled into different clusters, each cluster encompassing different LGs based on geographical convenience. The entire one million CCS deployment target would be broken down into various clusters. Clusters would be aligned to achieve the prescribed annual CCS deployment targets. The project targets have been determined to align with the country priorities. For instance, the Second NDC Nepal has priorities on the clean cooking sector that will be to ensure 15% of the total energy demand is supplied from renewable energy sources; in Residential cooking by 2030,

\(^34\) Detail on MIS is mentioned in Activity 2.2.2
ensure 25% of households use electric stoves by 2025, install 500,000 improved cook stoves, specifically in rural areas and by 2025, install an additional 200,000 household biogas plants.

In the event of variances in demands, this will be addressed at the Local Government Level. In case of variances, an informed guess can be made stating the overall demand from the LGs will be on the higher side. Here the beneficiary selection criteria will assess the demands and LGs can offer first come first serve basis with targeted reservations for inclusiveness. Detailed beneficiary selection criteria will be developed as the Standard Operating Procedure is prepared during the project implementation stage.

AEPC will then call for bulk tender via reverse auction as per PPA/PPR to procure the technologies, for each cluster. As there are three different technologies involved, separate tenders would be called for each of the technologies. Based on the demand received, clusters will be formed between LGs in terms of the geographical convenience. The exact formation of these clusters will be decided during the implementation stage and will basically be clusters based on the number of provinces. Further, the quantity for an optimum reverse auctioning price point will be assessed during the procurement. The procurement will be governed by the public procurement act and rules of the Government of Nepal. AEPC will abide by the public procurement rules and regulations to prepare the tender documents. Lowest bidders that comply with all the norms would be awarded the contracts.

The reverse auction approach is expected to bring down the cost of technology significantly, through competition and the economies of scale. It is estimated that the cost of the technologies will further go down by 20% after the proposed intervention. Furthermore, inclusive participation of consumers in choosing the requirement of technology before the auction, ensures quicker adoption and maximum utilization of the deployed CCS technologies.

### Unit cost of the technologies and Cost sharing for technology (With GCF Support and after Reverse Auctioning)

<table>
<thead>
<tr>
<th>SN</th>
<th>Technology</th>
<th>Unit Cost (USD)</th>
<th>GCF</th>
<th>AEPC</th>
<th>LGs</th>
<th>Beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tier 3+ ICS</td>
<td>$38.96</td>
<td>40%</td>
<td>40%</td>
<td>15%</td>
<td>5%</td>
</tr>
<tr>
<td>2</td>
<td>Biogas</td>
<td>$541.67</td>
<td>28%</td>
<td>48%</td>
<td>10%</td>
<td>14%</td>
</tr>
<tr>
<td>3</td>
<td>ECS</td>
<td>$38.33</td>
<td>10%</td>
<td>48%</td>
<td>19%</td>
<td>23%</td>
</tr>
</tbody>
</table>

Activity 1.1.3: Disbursement of initial 60% payment installment to the vendor upon delivery of CCS to respective municipalities

Mobilization advance amount not exceeding 20% will be provided to the vendors against bank guarantee at this stage. Additionally, the vendor must submit performance guarantee equivalent to at least 5% of the contract value as per the PPA/PPR prior to the contract signing. The performance guarantee will be tied to the quality of the technologies and covers all the technologies ensuring after sales services in the form of guarantees and warranties for the period of one year (defect liability
period). The 20% will be financed by the GCF and AE. A batch verification process will be triggered at this stage. The batch will be tested at the Renewable Energy Testing Station (RETS).

Immediately after the procurement and quality assurance, the technologies will be taken to the respective municipalities. And upon clearance letter from the municipalities, 40% will be disbursed to the vendors in coordination. A detailed SOP during the later stage can further elaborate on options of financing. The 60% financing from the LGs will be made once the technologies are available at the LG level.

Activity 1.1.4: Monitoring and Verification of Installed CCS units for Output Based Financing (OBF)

Output based financing is another breakthrough approach compared to the BAU process, wherein subsidies are being provided based on installation of the technologies. In the BAU scenario, the vendor was collecting demand and completing installations at households across the country. Post installation, the vendor was then claiming the applicable subsidy amount from AEPC. At this stage, the vendor was released total 90% of the subsidy amount. Post disbursement, AEPC conducted monitoring of the installed systems based on certain sample percentage and released the remaining 10% upon satisfactory assessment or else levied penalties in the cases of non-compliance. In this process, AEPC was minimizing its risk by demanding upfront capital from the vendors. However, it has failed to address the risk of non-utilization of the technology by the households after the installation. This BAU model also had another major ramification. As vendors were required to put upfront capital, they were bearing more risks. As such, they were reluctant to collect more demand, thus resulting in failure for AEPC to achieve their installation targets.

The proposed OBF approach would provide upfront capital for vendors, giving them leverage to service more households. Further, with final disbursement tied to the independent third party monitoring, major chunk of the payment would be released only after the verification of the technologies, which guarantees a quality assurance. This would create a win-win situation for both the vendors and AEPC.

The output based financing approach will have several mechanisms set in place. Firstly, the technical specification of the required technologies will be thoroughly tested. Mobilization advance amount not exceeding 20% will be provided to the vendors against bank guarantee at this stage. Immediately after the procurement, the technologies will be taken to the respective municipalities. And upon clearance letter from the municipalities, 40% will be disbursed to the vendors. At this stage, total disbursement not exceeding 60% will be provided to the vendor.

The vendors, then in coordination with LGs, will install CCS technologies at the identified households. Simultaneously, a separate third party monitoring process will be conducted parallel to distribution of the technologies wherein the third party will specifically assess appropriate percentage of total beneficiaries in terms of (i) technical parameters of the technologies along with its (ii) mitigation impact through replacement of fuel wood, dung cake and LPG and (iii) adaptation benefits in terms of vulnerable communities and remote areas, among others. The independent verifier will collect disaggregated data based on sub-categories such as gender income status and so on. The third party will be selected via procurement following the PPA/PPR. Request for proposal will be floated to all qualified firms. Once the third party monitoring is completed and confirmation received from the deployed system, final disbursement of 40% will be provided to the vendors. Hence, at this stage, the vendor will be paid 100%
of the total amount. AEPC’s experience with various renewable energy technologies including the solar home system, biogas and cookstoves that a substantial change is required in the existing payment approach. The 90-10% approach reduces the ownership of the vendors and does not bolsters the quality and reliability of the technologies, as almost the full payment is disbursed immediately post installation or dissemination. The output based financing approach will shift the paradigm from the existing 90 -10 % payment modality and create ownership of the vendors and engage them throughout the process.

In terms of the beneficiaries’ contribution to the project, this will be under the discretion of the LGs. The beneficiaries will either contribute during the installation or during the demand collection. The LGs can also opt for partial or full payments during the various stages. A detailed operational modality will be developed during the implementation of the project.

A pilot study conducted by GIZ/EnDev result based financing project35 clearly indicates the need of adequate capacity building activities for successful implementation of CCS project. To address this issue, the project has designed adequate number of capacity building activities. Another scope for improvement is to provide capital investment for the vendors as the limited fund available with them has been limiting their capacity to invest more. Hence, the project will provide up to 60% of advance payment to motivate the vendors.

COMPONENT 2: STRENGTHEN ENABLING ENVIRONMENT THROUGH SECTOR BASED ASSESSMENTS AND QUALITY ASSURANCE OF THE TECHNOLOGIES

Output2.1 Enhancing product standards, conducting assessments, surveys and analysis

- Municipal Energy Plan template prepared
- Standards on technical specifications of all three CCS technologies developed
- A robust quality assurance mechanism is in place

To achieve these outputs following activities will be performed.

Activity 2.1.1: Develop partnership agreement between AEPC, Province Governments, Local Government and other implementation Partners

AEPC will sign a Memorandum of Understanding (MoU) with PGs and LGs. AEPC will facilitate PGs to develop and reinforce policy and strategy in promoting CCS, and as well as support LGs in the project implementation. Similarly, AEPC will also sign MoU with Nepal Academy of Science and Technology (NAST)/Renewable Energy Test Station (RETS) and Nepal Bureau of Standards & Metrology (NBSM) to upgrade existing testing centre at central level, prepare standards and guidelines, and expand after-sales service centre at local level.

Activity 2.1.2: Update existing standards\textsuperscript{36} and set benchmarks for the technologies required for the project implementation

The existing standards on CCS will be analyzed and benchmarks will be set for the technologies required for project implementation. As standards on induction Stoves\textsuperscript{37}, ICS, and domestic biogas plants have been set previously, these standards will be reviewed and updated.

AEPC have developed an interim benchmark for solid biomass burning cook stoves “\textbf{Nepal Interim Benchmark for solid biomass cook stoves (NIBC, 2016)}”\textsuperscript{38}, in a close coordination with the Nepal Alliance for Clean Cookstoves (NACC) members, national and international experts, NBSM and other relevant stakeholders. It categorizes the solid biomass stoves in three different types i.e. chimney stove, chimneyless stove and forced draft stove. This document further needs to \textbf{categories the stoves in multitier i.e. Tier 0 to Tier 5 Stoves in terms of type of fuel used in particular stove, their efficiency, total emissions, indoor emissions, safety score, and durability}. As a part of the project activities, this document will be updated if needed, with rigorous interaction and consultative meetings with national stove testing laboratories, NACC, NBSM, and feedback from international practice updates on stove testing.

For ECS, the standard will be developed to cover different types of stoves, including induction, infrared, coil, etc. and their \textbf{specific standards on safety and performance, including efficiency, durability, and other performance metrics}. In collaboration with Nepal Electricity Authority (NEA), a further cost effective tariff structure for electric cooking will be introduced analyzing the increment in the revenue due to addition of electric cooking loads to the distribution system during project implementation and facilitation would be done to ensure quality of electric power supply in the terai referring the performance report of delivered technologies extracted from the Management Information System (MIS). Gender inclusive and diversity friendly boards will be formed in the formulation or upgradation of above mentioned normative and standardized tools.

It is to be noted that the NEA will not be involved in any of the procurement, financial arrangement, monitoring and evaluation including project oversight in this project. NEA’s role will be in the area of strengthening of electricity distribution system and improving the quality electricity supply in the areas where electric cookstoves will be deployed. The collaboration in fact will involve coordination between the AE and the NEA will be basically through the exchange of information. The project targets have been determined to align with the country priorities. Nepal’s SDG-7 targets to achieve the electrification rate of 99 percent and the Second NDC aims to strengthen transmission and distribution links to support up scaling of e-cooking, e-heating, e-transport and charging stations. Furthermore, the Second NDC Nepal has priorities on the clean cooking sector that will be to ensure 15% of the total energy demand is supplied from renewable energy sources; In Residential cooking by 2030, ensure 25% of households

\textsuperscript{36} Standards on Biomass Cookstoves is as per the National Interim Benchmark for Solid Biomass Cook Stoves,(NIBC, 2016) and National Standards for Household electrical appliances has been recently developed in coordination with Nepal Bureau of Standard and Metrology

\textsuperscript{37}\url{http://nbsm.gov.np/uploads/files/2_NS%2020Induction%20hobs_Safety_Particular%20Requirements.pdf}

use electric stoves by 2025, install 500,000 improved cook stoves, specifically in rural areas and by 2025, install an additional 200,000 household biogas plants. In terms of electric cooking and strengthening transmission, AEPC and NEA being public entities are entrusted by the Government of Nepal to achieve the respective targets. Hence, it is imperative that both the entities fulfill their respective responsibilities to achieve the targets. In 2015, when there was a shortage of cooking gas in the market, many depended on electricity to meet their demand for cooking resulting in an unexpected rise in electricity consumption which has overloaded the distribution system. It is critical to perform regular mapping of distribution systems based on their capacity, and load status in order avoid such situation. Urban and peri-urban areas where electricity consumption is generally low and load centres are often under loaded, are potential start points for the project. This is where the project activities conducted by AEPC will support the NEA. The AE will approach NEA in terms of providing information on upgrading transformers and improving distribution and transmission lines to upgrade and control voltage fluctuations in the project area. This will ensure that NEA are well-informed on the existing capacity and streamline their upgradation at the identified project location.

**Activity 2.1.3: Develop Municipal Energy Plan template by analyzing standards and formats**

The project will develop a Municipal Energy Plan template by analyzing existing standards and formats. The MEP will cover in detail the following aspects:

- Energy baseline situation Prerequisites and parameters for electric cooking
- Renewable energy resource inventory
- Opportunities and challenges
- Energy vision, mission and goal
- Strategies to reach the goal
- Energy intervention plan
- Annual target breakdown
- Estimated budget and financing source
- Estimated annual budget
- Time frame

The MEP design takes participatory model with sufficient stakeholder consultation, which primarily includes representatives from Indigenous community, women led enterprises and organizations, key LG officials, service-supply and service-demand stakeholders.

The household situation in terms of adequate infrastructure for ensuring reliable and prolonged application of electric cookstoves will be a key factor taken in to consideration. The existing household capacity is limited to five ampere and it will be critical to upgrade the capacity to 15 ampere to ensure electric cooking is feasible at the households. Furthermore, the additional demand will require enhancement of the existing transformers in the project location. Here, the project proponent will again collaborate with NEA and its regional offices along with LGs to ensure that the required infrastructures are in place. This is critical component of the project which will dismiss the rebound effect to LPG.

**Output 2.2 Strengthening quality assurance mechanisms**

_outputs:

- A supply chain mechanism for CCS is established and strengthened
- Management Information System database is set up at AEPC
At least one testing centre is strengthened at central level
Following activities will be performed to achieve the aforementioned outputs.

**Activity 2.2.1: Strengthening and establishing testing centre for ensuring the quality of the proposed technologies**

AEPC will strengthen the existing testing centre located at Nepal Academy of Science and Technology (NAST)/ Renewable Energy Test Stations (RETS) in Kathmandu. It will also collaborate with Nepal Bureau of Standards & Metrology (NBSM) and other relevant stakeholders to build standards and specifications for Tier 3+ Stoves and Electric Cooking Stoves. The collaboration will ensure gender sensitivity. The sub activities under this includes:

- Lab upgradation (entails equipment purchase and training) and improved testing service as per ISO standards for ECS, and upgradation of National Interim Benchmark of improved Cookstoves 2016 inline to tier based criteria and improved testing service
- Development of Electric Cookstoves and Tier 3+ICS standards on performance and safety in collaboration with National Entities, Local Governments, Universities, Agencies working in Clean Cooking Solutions through Seminars/ webinars/ symposiums. Relevant stakeholders including RETS, AEPC, LG, beneficiaries, sub-national institutions, suppliers, repair and maintenance service providers oriented on the developed standards and specifications of the technologies.

**Activity 2.2.2: Development of Management Information System as a national monitoring system with real time data collection from LGs**

Development of Management Information System is another critical element of the project wherein the demands from various LGs are recorded and aggregated, and the distribution/installation is regularly updated along with performance of the disseminated technologies. As AEPC is in process of developing a MIS accommodating local and provincial level, a fit gap analysis will be conducted of existing MIS and assess implementation of the modules required for the project implementation. In addition, training will be provided to LG personnel on real time data collection and operationalization of MIS. MIS will mainstream gender and sensitivity in data collection and its design.

**COMPONENT 3: EMPOWERING INSTITUTIONS, CAPACITATE SUPPLY CHAIN AND ENSURE INCREASED ACCESS TO CLEAN COOKING SOLUTIONS**

After almost three decade-long absence of locally elected representatives, the local level elections were conducted in 2017. Most of the Local Governments, and all of the Provincial Governments, are newly established, and lack skills and resources. They have very limited knowledge on renewable energy.

**Output 3.1: Capacity development of sub-national institutions**

Outputs:
- Municipal Energy Plan developed by at least 150 LGs
- 4 Energy Unit at Provincial level with 2 Officers (1 Technical and 1 Coordinator) and at least 150 CCS Mobilizer will be allocated at local level
- Demand aggregation and cost-effective reverse auction process introduced in MEP of local government with priority to CCS promotion

To achieve these outputs following activities will be performed.
Activity 3.1.1: Conduct national stakeholder consultation workshop between AEPC, PG and LG
AEPC will conduct gender inclusive national level stakeholder consultation workshop with PGs and LGs to plan their approach in Implementing project activities.

At provincial level, 4 energy units will be set up with 2 energy officers (1 technical officer and 1 CCS coordinator) at each province, preferentially women targeted. The technical officer will oversee the technical issues, support service providers and vendors, and the CCS coordinator will oversee project activities and coordinate planning at province or regional level. At LG level, the project will allocate at least one CCS mobilizer, preferentially women, in each local government and capacitate them to facilitate the project particularly for door to door awareness campaigns on benefits of CCS, collection of demands, type of the technologies required at household level and data management through the MIS. Also, a monitoring plan will be drafted at this stage for LGs to support monitoring CCS in their respective LGs.

Activity 3.1.2: Develop LG Municipal Energy Plan
Municipal Energy Plans would be developed to identify best available resources at local level for energy generation and to assess consumption pattern of households. The MEP design takes participatory model with sufficient stakeholder consultation, which primarily includes representatives from Indigenous community, women led enterprises and organizations, key LG officials, service-supply and service-demand stakeholders. MEPs will also be instrumental in indicating potential energy resources and in selecting appropriate technology options to implement clean cooking initiatives. This will create an environment wherein MEPs will become a critical element of the annual budgeting and planning process and hence ownership of clean cooking initiatives by the local governments. While preparing MEPs, complementarities will be ensured with other ongoing program/projects.

The process to prepare MEP include following nine steps:

Step 1: Identify Stakeholders to ensure a broad level of engagement from a cross-sector of energy players.
Step 2. Establish an Energy Sub-Committee Team to lead development of energy plan, and to implement the plan and monitor progress. Step 3. Develop Energy Baseline to provide a holistic and updated picture of the energy situation in a Municipality and assess the prerequisites for electric cooking
Step 5. Develop Activities in collaboration with the Project, NEA with its regional offices and other stakeholders ensuring inclusiveness to achieve the energy vision, mission and goal.
Step 6. Evaluate and Prioritize Activities to remain focused, resource-efficient and address immediate energy needs.
Step 7. Identify Funding Source to ensure smooth implementation of prioritized activities.
Step 8. Compile and Finalize the Plan to compile all information from all planning stages into a single plan document that will be approved by a Municipality Council.
Step 9. Implementation and Monitoring & Evaluation to implement a plan assesses the progress and formulates necessary modifications to ensure maximum impact.

Activity 3.1.3: Capacitating Local Governments and Provincial Governments
AEPC will capacitate LGs to prioritize CCS promotion in periodic and annual plans and to formulate appropriate policies and mechanisms. The project will coordinate with the Provincial Governments to create an enabling environment for the project at province level and will support the strengthening of capacity of the Provincial Governments to perform their coordination role.

Also, the project will assist LGs in placing dedicated personnel related to environment safeguard and gender in CCS projects and in conducting gender sensitive monitoring and evaluation. Besides conducting awareness campaigns for behavioral change, LGs will be capacitated in use of MIS for recording transaction values from demand generation to implementation. Further, resources supported through the project will be responsible for demand collection, establishing commitment mechanisms on beneficiaries’ side and regular support throughout the project implementation process. The training and promotional materials will be ensured to address gender-mainstreaming and will ensure that the information is gender-sensitive.

The project will build capacity of LGs to engage with their local Community based Forest User Groups to procure biomass at local level and process them locally to ensure swift and cheap supply of fuel for Tier 3+ ICS.

Activity 3.1.4: Annual national level review and consultation meeting
AEPC will collaborate with its outreach partners at the district or regional level to review the annual objectives and targets and improve MEP guidelines and project materials as required. Sex-disaggregated and gender relevant data used for correction of measures aiming to hold all partner accountable to gender equality will be collected and analysed. Then the GAP will be revised and reviewed annually.

Output 3.2: Increased awareness and outreach to enhance demand
Outputs:
- A total of 450 clean cooking champions identified, three at each local government
- 750 awareness campaigns conducted (Once in each LG per year for five years)
- Climate resilience of the people and community enhanced with the savings and awareness on climate change adaptation measures

Campaigns and promotional activities in coordination with PGs, LGs, community champions, non-government organizations and volunteers will ensure that the prospective users have increased awareness on the benefits, technology, services and financing of clean cooking solutions. The activities will include:

Activity 3.2.1: Mobilize clean cooking mobilizers in each LG
At least 150 CCS mobilizers, preferentially women will be mobilized in the project area. The CCS mobilizer will be trained to help in raising awareness on benefits of CCS, facilitate in bottom up need assessment and in designing bespoke technical assistance and capacity development programme for respective LGs.

The selection criteria for clean cooking mobilisers includes:
- Minimum of a year experience in community mobilization/campaign and renewable
energy will be given priority consideration
2. Experience in advocacy of health and socio-economic benefits with good understanding of the possibilities and tactics for influencing decision
3. Ability to communicate effectively with a wide range of audiences at local, provincial and national levels
4. Ability to build and maintain relationships with partner agencies and key contacts in the government, NGO and civil society.
5. Fluent Local language skills
6. Basic English language skills
7. Priority given to women for the role and will have at least equivalent gender representation

Activity 3.2.2: Development of training materials
The consultation workshop will be conducted at national level between corresponding ministries, Agencies, AEPC, LGs, beneficiaries, CCS champions, and local vendors and private sector service providers to identify the need and to develop materials/manual/guidelines on CCS awareness to local communities. Programme documents, training materials, promotional materials will be revised to ensure effective gender-mainstreaming, and that the information is gender-sensitive. This will include:
I. Development of extensions materials and guidelines for implementing CCS awareness in targeted project areas
II. Drafting mechanism to effectively address gender equality and supporting vulnerable communities through CCS

Activity 3.2.3: Identifying clean cooking champions
At local level, the project will identify 450 clean cooking champions (60% women targeted) (3 at each local government) who will be trained to provide installation, repair and maintenance services of the technologies and will also be the advocates of technologies. The champions will also provide support to CCS Mobilizers.
The approaches for identifying clean cooking champions includes:
1. Stakeholder mapping exercise will be carried out at local level to identify the relevant stakeholders such as local NGOs, Community Based Organizations (CBOs), Forest User Group (FUG), and Dalit Associations, female community health volunteers, etc. To make the selection process more participatory, an Interaction programme with such relevant stakeholders will be carried out and Terms of Reference (ToR) for clean cooking champions will be developed
2. Some clean cooking champions can be listed out from the MEP prepared by the Local Government.
3. In addition, the potential clean cooking champions can be identified during the demand collection for CCS.
4. Also, some potential clean cooking champions will be identified through the feasibility study.

Activity 3.2.4: Develop materials for awareness on CCS (in national and local languages) with its impact potential on livelihoods and support to vulnerable communities:
The project will develop awareness materials on national and local languages which will underpin the activity 3.2.5. The awareness materials will consist of information, education and communication materials on the benefits of CCS in financial savings, cleanliness, health benefits and drudgery
reduction compared to TCS. Awareness material will be in form of information on CCS through mass media (Local FM, Electronic media, Print Media, Social Media), consultation meetings, and distribution of leaflets, user manuals and door-to-door visit to educate and empower users.

**Activity 3.2.5 Campaigns and promotional activities in coordination with the PGs, LGs, community champions, NGOs and volunteers**

The project will support and empower users by CCS mobilizers and clean cooking champions for awareness raising on climate change impact, highlighting the benefits of CCS such as fuel saving, cleanliness, health benefits and drudgery reduction compared to TCS., by disseminating information on CCS developed by activity 3.2.4. The awareness programme will mainly focus on marginalized communities and households ensuring at least 60% of female participants. CCS mobilizers and champions will conduct behavioral change programme through awareness activities, Operation and Maintenance manuals and cooking guides using CCS.

AEPC would coordinate with NGO like Renewable Energy Confederation of Nepal (RECON), National Association of Community Electricity Users-Nepal (NACEUN) and Community Rural Electrification Entity (CREE) in electric cook stove awareness raising programme.

**Activity 3.2.6: Ameliorate awareness materials and guidelines**

AEPC will conduct annual national review and planning meeting with AEPC’s outreach partners at the district or regional level. At this stage, the awareness materials and guidelines will be improved if required.

**Output 3.3: Strengthening service centres, biomass manufacturers to provide quality and affordable clean cooking solutions**

**Outputs:**
- 24 number of trainings provided to beneficiaries in collaboration with Council for Technical Education and Vocational Training (CTEVT) institutions on repair and maintenance, biomass fuel processing, biogas installation, electrical safety and house wiring (training conducted at province level; one training per province per year from year 2 to year 5)
- 24 Province level trainings provided to service centres or providers in collaboration with CTEVT institutions (trainings conducted at province level; one training per province per year from year 2 to year 5)
- 4 provincial service centres established and strengthened
- 900 local service centres established and strengthened with at least six service centres established and strengthened at each Local Government

One of the major barriers for clean cooking sector growth is **inadequate technology and frail CCS supply chain industry**. The project aims to strengthen each element of CCS supply chain (production, distribution and after sales service), biogas installers, electrical wiring service providers, pellet industries, private investors, entrepreneurs and financial institutions.

**Activity 3.3.1: Capacity and training needs assessment**

AEPC will conduct national level stakeholder consultation workshops with AEPC/NAST/RETS/NBSM, beneficiaries, local manufacturers, vendors, financial institutions, LGs, training institutions (e.g. CTEVT)
and other relevant stakeholders to assess existing situation, capacity and training needs assessment of service centres for providing CCS services. Similarly, based on consultation with the participants, necessary changes will be made in existing training manuals and new training manuals and guidelines will be drafted to support local manufacturers.

Activity 3.3.2: Ameliorate project materials and guidelines
AEPC will conduct an annual national level coordination and sharing meeting with the project partners and review the progress, draw lesson and planning with AEPC’s outreach partners at district or regional level. At this coordination meeting, the project materials and guidelines will be improved.

Activity 3.3.3: Establish and strengthen service centres at provincial and local level
In collaboration with Nepal Academy of Science and Technology (NAST)/ Renewable Energy Test Stations (RETS), AEPC will strengthen the existing provincial service centres and capacitate them to work as AEPC focal point for their respective local service centres. In addition, the project will establish and strengthen 900 local service centres, with at least six service centres at each Local Government, and capacitate them to provide after sales services.

Activity 3.3.4: Conduct trainings to service centre operators and local manufacturers in collaboration with financial and CTEVT institutions
A total of 24 Province level trainings will be provided to service centres/providers in collaboration with CTEVT institutions. At each province (6 provinces), one training per year will be conducted for 4 years (from 2nd to 5th year). At least 50 persons will be trained at each training with total of 1200 persons trained by the end of the project.

Capacity development trainings will be provided at local level to the service providers, local manufacturers, mobile and other electric appliances repair centers and metal workshops to capacitate them in providing after sales service, domestic production and maintenance of CCS and strengthen the supply chain in coordination with CTEVT institutions. Besides, training on business performance and business continuity plan will be provided to manufacturers and service centres. Capacity development programme will be conducted to promote innovation and R&D. In case of ECS, a technical network will be created to minimize accident such as short circuit.

Activity 3.3.5: Conduct skills development training to CCS beneficiaries and vulnerable groups in collaboration with CTEVT at Province level
A total of 24 Province level trainings will be provided to CCS beneficiaries and vulnerable groups in collaboration with CTEVT institutions. At each province (6 provinces), one training per year will be conducted for 4 years (from 2nd to 5th year). At least 50 persons will be trained at each training with total of 1200 persons trained by the end of the project.

Training on making fuel for Tier 3+ ICS, repair and maintenance, biomass fuel processing, biogas installation, electrical safety and house wiring will be provided to CCS beneficiaries and vulnerable and disadvantaged groups (DAG). Training will be provided to women (electric cook stove users) on electrical safety and basic technical skills on using electric stoves to increases their confidence and the use of stove. Self-employment skilled training related to CCS and others as per the local demand will be provided to the most vulnerable people such as widows, single women, Female headed households,
minor ethnic groups, lower caste people (Dalit) and indigenous group (Janjati), ensuring at least 33% female participation.

**Activity 3.3.6: Strengthen existing regional level service centres under AEPC’s past CCS projects into fully operational province level service centres**

The existing regional level service centres developed as part of previous CCS programmes of Nepal, will be assessed and strengthened to function as province level service centres. The province level centres will be the focal technical point of contact for all local level service providers. These service centres will have the capacity to provide maintenance and repair services to CCS users as well as local service providers of all CCS technologies.

*Referring to the feasibility study, describe why this set of interventions was selected instead of alternative solutions and how the project/programme can help unlock the needed support in a sustainable manner. Also identify trade-offs of the selected interventions, if applicable.*

The proposed activities are demand driven and have been developed through consultations with the project target groups, beneficiaries and other relevant stakeholders.

AEPC has already implemented clean cooking technologies (biogas and ICS) in several areas of Terai. The set of proposed activities are defined based on experiences and learnings from the past. With a view of scaling up good practices and the tested models, more weightage have been provided on capacity development of Local Governments and after sales service activities, rather than just focusing on distribution of the technology. Furthermore, the proposed reverse auctioning via bulk tender would reduce the cost of technology in comparison to procurement via existing fixed rate subsidy.

Similarly, after the completion of project time period i.e. withdrawal of GCF funding after five year, at that stage the market for ICS, ECS and Bio gas plant will increase. The population will understand the beneficial aspects of the technology (i.e. both financial and technological benefits) which will increase the intake further. The provincial energy unit is part of the project management component. In the case of the one central level testing centre. Renewable Energy Testing Centre will be enhanced to ensure the quality assurance of the proposed technologies, especially in the case of the ECS. In the case service centers both provincial and local, this will be under the leadership of the private sector. The project will trigger a market enabled approach thus ensuring the sustainability of these service centers post the project interventions and will no further require additional support from other donors and the Government

*For Enhanced Direct Access (EDA) proposals and projects/programmes with financial intermediation (loans or on-granting), describe the selection criteria of the sub-project and types.*

**B.4. Implementation arrangements (max. 1500 words, approximately 3 pages plus diagrams)**

Provide a description of the project/programme implementation structure, outlining legal, contractual, institutional and financial arrangements from and between the GCF, the Accredited Entity (AE) and/or the Executing Entity (ies) (EE) or any third parties (if applicable) and beneficiaries.
Provide information on governance arrangements (supervisory boards, consultative groups among others) set to oversee and guide project implementation. Provide a composition of the decision-making body and oversight function, particularly for Enhanced Direct Access (EDA) proposals.

The institutional framework for this project will engage with a wide range of stakeholders, ensuring their sustained engagement from project design to implementation, and for monitoring and evaluation (M&E). AEPC will implement the project, in close collaboration with a wide range of stakeholders, including Local Governments and Private Sector. The project would be executed by and under the technical and administrative supervision of AEPC, following the Government of Nepal's rules and procedures regarding the acquisition of project services, supplies, and works. The project work plan and budget will be approved annually by the Government. The government’s budget process is stipulated by the Constitution of Nepal and has a fixed annual timeline for 15th day of the Nepali month Jestha (generally falls during the final days of the month May). Prior to the national budget speech, rigorous exercise is conducted at all levels of the government and among all the concerned government entities. The Ministry of Finance sets budget ceilings and negotiates with the respective line Ministry. There are no delays in the budgeting process and it will not affect the project implementation. Furthermore, the No Objection Letter from the Government of Nepal ensures that the project credibility and the government commitment.

AEPC will perform both functions of Accredited Entity (AE) and Executing Entity (EE) and will have a separate Project Implementation Unit to execute the project. A dedicated Project Implementation Unit will be set up at AEPC, and will be guided by a Project Management Committee. Four Provincial Project Management Unit will be established with two (one technical and one coordinator) staff at each unit. The associated costs for the activities are reflected under project management cost.

The project will engage with private sector, as a vendor, to provide CCS technologies and services, whereas Local Governments will play an important role in planning, demand collection, awareness raising for behavioral change and monitoring of the project.

The project will ensure a just and inclusive energy transition. It mainstreams the gender and equity aspect by uplifting the women of Terai Region to ensure their involvement in the technical and community outreach activities related to the project. The project aims to provide skill development training to disadvantaged groups, vulnerable communities, women group, single women to capacitate them in repair and maintenance of the cook stoves.

Ministry of Energy, Water Resources and Irrigation (MoEWRI): The MoEWRI is the line ministry of AEPC. It will provide policy guidance and strategic support. During inception phase of the project, MoEWRI will review and approve the Standard Operating Procedure prepared by AEPC for project implementation. It provides strategic guidance and coordination among various partners and stakeholders.

Compliance and Ethics Subcommittee: AEPC has a Compliance and Ethics Subcommittee, which provides complete oversight functions and ensures accountability of the project.

Project Management Committee: The committee will be chaired by AEPC Executive Director and its membership will include the head of each department of AEPC, and representatives from private sectors and technical institutions such as NAST and RETS. Member secretary will be the head of a
particular department of AEPC that manages the project. The management committee will ensure the collaboration among the partners and stakeholders that involve in project implementation.

**Project Implementation Unit /AEPC:** A dedicated PIU will be established within AEPC to oversee and manage the project. Under strategic guidance of the project management committee, PIU will be responsible for day-to-day management and monitoring of the project activities according to approved annual work plans and budgets. PIU will ensure that the results of the project are achieved. PIU will engage private service providers to provide services to the project beneficiaries in installation of CCS and after sales services. PIU will be responsible to provide technical and capacity development support to Local Governments. In the inception phase, the PIU will develop a detailed work plan and monitoring framework for the full project duration and get approval from competent authority. Further, PIU will develop guidelines and procedures required to implement the project effectively. These documents will outline the detailed implementation procedure of the project including roles of all responsible institutions and project stakeholders, including in terms of procurement, monitoring, reporting and auditing. The project would be executed by the PIU, following the Government of Nepal's rules and procedures regarding the acquisition of project services, supplies, and works.

**Provincial Project Management Unit:** The project area touches six Provinces of Nepal, however to optimize the resource allocation, only four Provincial project management unit will be established that shall cover all the local governments. One technical officer and one CCS coordinator would be deployed at each provincial project management unit. The technical officer will look after the technical issues, support service providers and the vendors, and the CCS coordinator will oversee the activities and coordinate planning at province or regional level. The province level staff will not be limited to only one province, but will also support nearby LGs of adjacent provinces. Provincial Governments will be responsible for coordination among provincial level stakeholders in implementing the project. The project will coordinate with the Provincial Governments in creating an enabling environment for the project at province level and will support in strengthening capacity of the Provincial Governments in performing their coordination role.

**Local Governments** (i.e. Municipalities/Rural Municipalities): Local Government plays a very important role in the project implementation. AEPC will identify at least 150 LGs for the deployment of CCS, where LGs would also contribute partially in funding the technologies to their respective households. Local Government will primarily be responsible for Municipal energy planning, CCS demand collection, raising awareness on benefits of CCS and monitoring of the project progress. At LG level, the project will allocate at least one CCS mobilizer in each local government They will collaborate with their respective LGs for the project implementation, and help LGs to develop their MEPs. Overall, LGs will be instrumental in supporting PIU to implement the project activities at the ground level.

**Vendors:** Vendors contracted through **bulk tendering and reverse auctioning process as per PPA/PPR**, will be responsible for providing services on CCS, particularly the distribution and installation of the CCS Unit and after sales services to the beneficiaries. The vendors interested to procure CCS technologies in the bulk tendering process will participate in tender calls of AEPC. The selected vendors then in coordination with LGs will set-up distribution and installation of the technologies as per the local demand. The supply chain will be formed in coordination with AEPC and LGs.
Internal and Third Party Monitoring Agency: Direct monitoring of delivery of CCS will be done by an internal monitoring mechanism formed at LGs level. An independent third party monitoring agency will be hired for outcome and impact monitoring. The third party will specifically assess and verify appropriate percentage of the total beneficiaries in terms of:

- The technical parameters of the CCS technologies,
- Quality and standard of the CCS technologies,
- Mitigation impact through replacement of fuel wood, dung cake and LPG and
- Adaptation benefits in terms of vulnerable communities and remote areas, among others.

Project Beneficiaries: The project beneficiaries are the ultimate target groups of the project and will receive services from private service providers and LGs on CCS technologies. Further, the beneficiaries will receive technical assistance and capacity development services that will help to reduce their vulnerability and build resilience to climate change impact through the time saving, health benefits, gender empowerment and increase in agricultural productivity by using cow dung as fertilizer, by replacing its use for cooking fuel. Further details of the project beneficiaries and the selection criteria have been defined in section B.3 Project and Program Description.

Figure 4: Project Implementation Modality
Provide information on the financial flows and implementation arrangements (legal and contractual) between the AE and the EE, between the EE or any third party and beneficiaries. For EEs that will administer GCF funds, indicate if a Capacity Assessment has been carried out. Where applicable, summarize the results of the assessment.

For financing the project, GCF will enter into the Funded Activity Agreement (FAA) with AEPC as an AE. As the Executing Entity is internal to AEPC, Legal agreement between AE and EE is not required. Government of Nepal's financial system, public procurement procedure and fund flow mechanism will be adopted for this project. As an accredited entity, AEPC will receive the fund from GCF as per the Nepal government procedures. A separate bank account will be opened for the project purpose and a separate financial management guideline will be developed for the transparent and effective management of the financial resources. The PIU will prepare annual work plan and budget, including a procurement plan, which will be approved by the Project Management Committee. Based on the approval of this plan, PIU will mobilize and release the fund according to the agreements/contracts to the service providers.
AEPC will call tender for each CCS technology and then will select a vendor for bulk purchase. An advance payment, not exceeding 20% of the total cost, will be provided to the vendor against bank guarantee as per PPA/PPR. Additionally, the vendor must submit performance guarantee equivalent to at least 5% of the contract value as per the PPA/PPR prior to the contract signing. The performance guarantee will be tied to the quality of the technologies and covers all the technologies ensuring after sales services in the form of guarantees and warranties for the period of one year (defect liability period). The performance bank guarantee has to be provided by the vendor and will be tied to the quality of the technologies and covers all the technologies ensuring after sales services in the form of guarantees and warranties for the period of one year. After the CCS technology will be deployed, the total amount not exceeding 60% will be disbursed to the vendor by AEPC, LG and beneficiary. However, AEPC will hold 40% of the final payment, which will only be paid after the independent third party monitoring and verification. The equity from the beneficiaries will form part of the technology payment. The portion of equity varies according to the technologies as indicated in section B.3, Component 1. The equity portion from the beneficiaries will be provided to the private sector after installation of the given technologies. The equity from the beneficiaries is not reflected in the total budget of the project.

Describe the experience and track record of the AE and EEs with respect to the activities (sector and country/region) that they are expected to undertake in the proposed project/programme

AEPC, under Ministry of Energy, Water, Resource and Irrigation, is the national focal agency for promotion of renewable energy technologies in Nepal. They have been implementing different programmes and projects under renewable energy portfolio with a focus on scaling up renewable energy technologies and achieving the objectives of the United Nations “Sustainable Development Goals” (SDGs) and “Sustainable Energy for All” (SE4All) initiatives while reducing dependence on traditional and imported energy by increasing access to renewable energy to improve the livelihoods of people and create employment opportunities, especially in rural areas.

AEPC is also a technical arm of the Ministry on climate change related activities. Established in 1996, AEPC was set up to promote the use of alternative/renewable energy technologies to meet the energy needs in Nepal. Mandated as the focal agency in the area of renewable promotion and energy
efficiency, AEPC's activities include renewable energy policy formulation and development, and implementation of projects. AEPC has implemented projects and programmes in the area of Climate change mitigation and adaptation, RE promotion and Low carbon economic development worth more than 328 million USD up until 2017.

AEPC has implemented several programmes and projects in coordination with various development partners. Some of the projects implemented up until 2017 are

1. Rural Energy Development Programme (REDP) - Phase I, II & III of 33 Million USD in collaboration with UNDP, World Bank
2. Biogas Support Programme (BSP) - Phase III, IV & V of 21 Million USD in collaboration with KfW, SNV
3. Energy Sector Assistance Programme (ESAP) - Phase I & II of 84 Million USD in collaboration with Denmark, Norway, KfW, DFID
4. Renewable Energy Project (REP) of 16 Million USD in collaboration with EU
5. Climate and Carbon Programme - Phase I & II of 1.54 Million USD in collaboration with DFID, SNV
6. Kabeli Transmission-REES of 1.2 Million USD in collaboration with World Bank and
7. National Rural and Renewable Energy Programme (NRREP) of 171 Million USD in collaboration with Denmark, Norway, WB, ADB, UNDP, UNCDF, SNV, GIZ, UNESCAP, DFID, KfW.

B.5. Justification for GCF funding request (max. 1000 words, approximately 2 pages)

Explain why the project/programme requires GCF funding, i.e. Why is the project/programme not currently being financed by public and/or private sector? Which market failure is being addressed with GCF funding? Are there any other domestic or international sources of financing?

The GCF funding is crucial in addressing the barriers in CCS sector in the demand and supply side: in terms of awareness, access to finance, regulatory frameworks, quality assurance of electric Stoves, ICS and biogas, strengthening supply chain, and empowering institutions to create an enabling environment for CCS in long-term.

**Government of Nepal investment independently cannot address the climate change mitigation needs:** Nepal, with very limited resources, has not been effective in expediting finance for low carbon and climate resilient projects and programmes with its fiscal and monetary policy. On one hand, the financial sector of Nepal has not prioritized lending for this sector; on another hand, their hefty interest rates, up to 18% by cooperatives, have been detrimental in expanding CCS market in Nepal.

**GCF support will be noteworthy for empowering vulnerable communities:** Lower Tier users are willing to switch to Tier 3+ ICS, however they can’t afford to pay the capital requirement to switch to more expensive Tier 3+ ICS. They are very poor and most of them are from socially excluded groups. They do not have access to banking facilities to borrow money. In addition, there are no loan products for CCS technologies catered by the financial institutions. Therefore, the project provides financial support for the proposed CCS technologies, which will allow vulnerable user communities to transition to better CCS technologies with high returns.

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GCF investment will allow the creation of an inclusive CCS market and a supply chain ecosystem: There is a lack of appropriate financing mechanism to incentivize the private sector and de-risk their initial investment in renewable energy sector. The existing subsidies model, where the vendors (or PQ companies) has the task to collect demands door to door and invest 100% capital upfront, is not financially motivating and therefore, has not achieved good results. Hence, the proposed bulk tendering, which ensures a certain volume of demand, and output based financing that would spread the risk between the vendors and AEPC, would alleviate the confidence of vendors to invest more in the CCS market.

Currently there are not many manufacturers and vendors of Tier 3+ ICS and ECS in Nepal. Moreover, the existing ones are also concentrated in very few urban centres only. There are not many repair and maintenance centres either. There are not many trained skilled human resources. Hence, the GCF support is required to strengthen the supply chain ecosystem, so that the CCS technologies become easily available throughout the country, with well-functioning after sales service centres.

The combined investment support from GCF will help to achieve the GoN national targets in terms of CCS: Current subsidy delivery mechanism is a very bureaucratic and lengthy process, which makes it difficult for the government to achieve big targets in a short time. Furthermore, prequalified companies are responsible for identifying the households who need subsidy, and they have not been able to meet the national targets.

GCF support is instrumental in accelerating climate change mitigation and adaptation needs: Under BAU subsidy model, AEPC targets to install 20,000 ICS and 25,000 domestic biogas installations as per its annual plan[^1]. Moreover, it has no concrete program for deploying ECS. With this new approach of bulk tendering via reverse auction, CCS can reach 200,000 households annually, which will increase the pace of climate adaptation and mitigation.

Reverse auctioning (RA), ideally, escalates the supply base competition, which leads to lowered price for buyers. For instance, IEC certified, China-manufactured cookstove[^42] has an MRP of 21-22 USD\textsubscript{i} in China. The product incurs 5% customs duty & 13% VAT (and other logistic expenses) and has an MRP in the range of USD 33-40 landed in the Nepalese market. Further, the retail price for various brands of single hob 2000W induction cook stoves varies between USD 38-90 depending on the brand and quality of the product. Reduction in price for the end-user is expected between 15-20% with no compromise in the quality. Similarly, the Nepalese manufactured TIER 3 ICS having MRP of USD 7743 is reduced to USD 38 for end user in reference to Reverse Auctioning. As such, RA reduces the end-use pricing as winning bid effectively captures required quality and generates supply base competition.

The Project emphasizes increasing awareness for behavioral change that will lead to an increase in demands for CCS, which will cater to increase in investment from the private and banking sectors. GoN and beneficiaries will share about 60% of the cost of the project.

[^42]: IEC Certified 4 star rated Chinese Manufactured ‘AILIPU’ Single Hob 2000W Induction Cookstove
[^43]: Alternative Energy Promotion Centre Maximum Retail Price on Biomass Technologies
The financing from GCF not only support the implementation of low carbon and climate resilient technologies in every household cooking of Nepal but set a precedence by introducing an avant-garde implementation mechanism- reverse auctioning, output based financing, renewable energy MIS and mainstreaming LGs role in the renewable energy. This will create a massive change in the business-as-usual process of financing renewable energy technologies in Nepal and the government will have a tried and tested model that can be replicated all over the country.

The project involves low risk and yet yields high return in terms of economic benefits for GCF in the form cost saved for cooking for beneficiaries, reduced carbon emissions, improved health and time saved for beneficiaries, as well as reduction in deforestation.

Explain why the proposed financial instruments were selected in light of the proposed activities and the overall financing package. i.e. What is the coherence between activities financed by grants and those financed by reimbursable funds? How were co-financing amounts and prices determined? How does the concessionality of the GCF financing compare to that of the co-financing? If applicable, provide a short market read on the prevailing of the pricing and/or financial markets for similar projects/programmes.

With regards to the selection of the financing instrument, during an activity related to the rehabilitation of earthquake affected biogas technology and distribution of small solar home system, AEPC have had a small scale experience with the bulk tendering process. The process though had proven beneficial, it could not be replicated due it’s nature associated with disaster risk recovery. Bulk tendering needs to be mainstreamed and the support from GCF will be crucial in instigating the process. The bulk tendering approach is a transition from existing financial mechanism such as subsidy given to beneficiaries and vendors. In terms of reverse auctioning, as mentioned in the FP, the process needs to be aligned with the Public Procurement Act/Regulation (PPA/PPR) of the country. Hence for the alignment with the PPA/PPR, reverse auctioning aligns with the least cost based selection process. Least cost based selection process will ultimately ensure the technology is procured from the lowest bidder. This will create a competitive environment that will result in better valued products attracting more consumers to adopt CCS.

Both of the processes were chosen to ensure creation of a market place for the vendors and better control over the technology in terms of quality assurance. Bulk tendering will mean that the technologies will be procured at a singular cost. The marketing for the vendor is done by the government which means no additional overheads for the vendors. The output based payment approach ensures the cost recovery at the final stage which results in vendor engagement throughout the process and reliability and sustainability of the proposed technologies. Furthermore, the successful implementation of the financing instrument will result in a replication of the process in the other technologies such as solar home systems. This will create an impact at an unprecedented scale.

In the fiscal year 2018/19, AEPC conducted CCS programmes worth $4.58 million wherein approximately 98% budget was allocated for technology deployment. Through this project, AEPC will address the shortcomings in implementation of CCS programmes of BAU approach by reducing the resource limitation. By conducting activities for accelerating climate change mitigation and adaptation needs, creating a market and supply chain ecosystem, mitigating the risk of implementing an innovative...
approach, implementing innovative approaches of demand aggregation and mainstreaming LGs proposed in the project. The remaining GAP identified was $20 million dollars. The internal capacity of AEPC can absorb this grant without stressing the internal working mechanisms.

The co-financing amount is based on the expected annual budget available to AEPC from MOEWRI/GoN for conducting programmes on CCS in BAU scenario, $4.58 million budget was AEPC’s spending in fiscal year 2018/19 and $5 million was allocated in fiscal year 2019/20 for conducting CCS related programmes and maximum achievable financial leverage possible due to GCF’s concessionality and the project. The current modality of financing of $20,958,901 by AEPC as co-financing and $21,127,474 grant by GCF was derived based on the experience of AEPC and its partnership with development partners. AEPC has allocated 93% of its project budget contribution in component 1, in contrast to around 52% of GCF’s project share. Meanwhile, AEPC seeks contribution entirely from the GCF grant on the components 2 and 3, i.e. 100% investment done by GCF for these two components. Therefore, co-financing contribution is maximum for technology deployment whereas, GCF support will be fully utilized for strengthening the supply chain capacity and capacity of the local government to create the enabling environment.

Justify why the level of concessionality of the GCF financial instrument(s) is the minimum required to make the investment viable. Additionally, how does the financial structure and the proposed pricing fit with the concept of minimum concessionality? Who benefits from concessionality?

As of now, the annual budget plan doesn’t include any form of activities/programmes for dissemination of electric and Tier 3+ cook stoves, therefore, this project will also help AEPC in leveraging maximum finance required to promote these CCS technologies in Nepal which has never been directly done before by GoN. Without GCF concessionality and the project, CCS promotion in Nepal would follow BAU scenario, i.e. major focus on only deployment of technologies as opposed to minimum efforts on ensuring project sustainability, establishing sound CCS market and supply chain and capacity building at all beneficiary levels.

AEPC has allocated the maximum budget it can contribute to the project as co-financing. Additionally, 14.37% ($7,065,442) of the project budget is shared by LGs as co financing based on LG’s allocated budget for CCS. Therefore, the minimum required financial structure to transition from BAU to currently planned project was identified as $21.12 million. The pricing structure also falls in line with the concept of minimum concessionality because the identified grant amount from GCF is the minimum required amount that would enable AEPC to assess additional financial leverage for promotion of electric and tier 3+ cook stoves.

Concessionality will stimulate the market since lower tier users can’t afford the switch without the subsidy, whereas LPG users need a strong market sign aligned via subsidy to make the switch. Since above 80% of the budget is allocated for the deployment of the technology, this will go directly to the beneficiaries. AEPC and Local Government will benefit by creating an enabling environment and empowered institutions, while the vendors will benefit from supply chain and market development.

In your answer, please consider the risk sharing structure between the public and private sectors, the barriers to investment and the indebtedness of the recipient. Please reference relevant annexes, such as the feasibility study, economic analysis or financial analysis when appropriate.
The project involves low risk and yet yields high return for GCF investments. GoN will be supporting roughly 60% of the total cost as grant and equity. This model ensures the use of grant as a cost reduction and risk reduction instrument to incentivize customers using LPG or TCS to switch to CCS technology. Vendors who bid for bulk tendering will need a bank guarantee that provides a risk reduction cushion for AEPC so quality products are made available and delivered to the customers. The payment method is scheduled in three tranches with one year time frame for vendors who provides the technology and installs them, provides risk management on behalf of AEPC, while ensuring quality assurances and project implementation guarantees.

In terms of beneficiaries, The project will capacitate the local service centers and trained them to ensure sustainability in the long term. Initially a market will be created by the project and subsequently the market will sustain itself due to the initial push. Nepal has witnessed these phenomena in different sectors including hydropower, solar and clean cooking solution. Hydropower development stood still for a prolonged period and has started gaining massive traction in the recent years. These sectors need an initial financing push which has proven to sustain itself in the long run. As per our Financial and Economic Analysis, in case of Traditional Cook Stove and ICS, although NPR 50 and NPR 20 has been taken as the monthly cost fuel wood for TCS and ICS. In practice very few households actually buy firewood in rural areas of Nepal, and most of the households collect it rather than buying from the market. Therefore, a market price for firewood is non-existent for most of the households. TCS and ICS beneficiaries usually source firewood from community forests free of cost. Therefore, a meager figure has been associated to fuel wood costs that accounts for labor for fuel collection. This also indicates the sustainability of the project when beneficiaries are aware of the health and economic benefits of the Tier 3+ in compare to TCS.

The investment from the individuals though not reflected in the total budget of the project, however we are expecting contribution ranging from 7 to 20% from the users based on the type of technologies. The Tier 3+ ICS is where we expect low user contribution as these are targeted towards the vulnerable communities while ECS will be targeted for urban communities and thus demanding higher user contribution. The barriers to investment and indebtedness will not pose a major concern as the cost of technologies Tier 3+ ICS and ECS will be on an average of USD 38 per technology. The cost of utensils for the ECS which shall be borne by the beneficiaries has been considered in the Financial Analysis. An upfront cost of $16.67 (NPR 2000) has been considered that will include all basic utensils required by a typical household for e-cookstoves. ECS will be disseminated in the urban household of terai region which will have capacity to purchase the utensil.

B.6. Exit strategy and sustainability (max. 500 words, approximately 1 page)

Explain how the project/programme sustainability (financial, institutional, social, gender equality, environmental) will be ensured in the long run after project closure, including how the project’s results and benefits will be sustained.

In terms of the electric cookstoves targeted to the most vulnerable with an annual income ranging between USD 250 to USD 2000, we have performed sensitivity analysis considering various scenarios based on the requirement and consumption at the beneficiary level. Taking in to the consideration that the households will require minimum level of utensils and electricity consumption stays low, the financial analysis shows an IRR of 39% with payback period of 2.15 years without external interventions. Furthermore, with household opting for additional utensils thus increasing repair and maintenance along with electricity consumption our financial analysis shows IRR of 3% with payback period of 4.57 years without external intervention. Here the cost benefit analysis definitely shows financial sustainability post
project implementation compared to the existing LPG used for cooking. In terms of Tier 3+ICS targeted for the poor rural households of the country, the decrease in fuel-wood consumption by 30% compared to traditional cookstoves and open burning would generate positive cash from the very first year to the beneficiaries. Though the cumulative cash flow remains negative due to the CAPEX requirement for the Tier 3+Stoves, our economic analysis shows that with the additional health benefit, the technology can deliver an Internal Rate of Return of 16% with payback period of 3.30 years to the beneficiaries. The additional project benefits of improved indoor air quality and with more than 50% time saved on fuel collection that mostly affects the women and children will instigate and maintain the transformation towards clean cooking technologies. Furthermore, the project with the implementation of reverse auctioning will reduce the price of the proposed technologies by 20%. As a result, Tier 3+ ICS and ECS will be available in the market at an average rate USD 38.00 per technology and biogas at an average rate of USD 542. The government. As per the Financial Ordinance, 2078 (2021), pre-tax subsidies are provisioned to import ICS/ raw materials/accessories for ICS and Biogas accessories with custom duty discounted to 1%. In 2020, GON has reduced custom charges in induction cookstoves from 15% to 5%, promoting the use of ECS. The custom duty has been further decreased in 2021 and currently stands at 1% in case of ECS. The national budget for fiscal year 2021/2022 indicates addition of 1,629 MW of electricity to the national grid by completing Upper Tamakoshi, Rasuwasagadi, Upper Sanjen, Madhya Bhotekoshi and small and medium projects promoted by private investors. In addition to the import incentives on the clean cooking solutions, the national budget 2021/22 has further provisioned electricity tariff incentives with arrangement of free electricity to households consuming up to 20 units of electricity and 50 percent waiver on households using up to 50 units of electricity per month. These financial incentives and cost benefit analysis ensures the financial sustainability of the project. AEPC will further work with NEA to introduce cost effective tariff structure for electric cooking, which will speed up the transition from LPG to ECS. LPG is the third most imported item by Nepal with about $300 million dollars spent a year. Hence, switching from LPG to electric cooking will reduce trade deficit and also provide energy security for Nepal, thus, directly contributing to Nepal's sustainable development.

The proposed CCS project is designed with close coordination and consultations with relevant government stakeholders to ensure ownership and sustainability of the project. The project will continue after GCF investments as it aligns with key national policies and is one of the key priority programmes of the Government of Nepal. The Second NDC of Nepal has set up the following quantitative targets in terms of Residential Cooking (i) By 2030, ensure 25% of households use electric stoves as their primary mode of cooking (ii) By 2025, install 500,000 improved cookstoves, specifically in rural areas and (iii) By 2025, install an additional 200,000 household biogas plants and 500 large scale biogas plants (institutional/industrial/ municipal/community). The 15th five-year plan of the National Planning Commission envisions the expansion of renewable energy for multipurpose use. It has prioritized promotion of biogas, ICS, gasifier, bio briquettes and ECS. Likewise, Nepal is a signatory of SDGs, which envisions CCS for all by 2030. The White Paper, 2018 prepared by the Ministry of Energy, Water Resources and Irrigation envisions “Electric Stoves in every house” and likewise aims to generate 15,000 MW of electricity by 2028 44, of which 10,000 MW would be consume internally, justifying government’s efforts in promoting electric cooking. NEA has been reforming the tariff structure for its consumer base that will ultimately create a conducive environment for electricity consumption at affordable rates for users. This indicates that with successful intervention of the policies and programmes set by the government, surge in adoption of electric cooking would grow, as reliability and affordability of electricity supply gets better.

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The project will support domestic production of Tier 3+ ICS, Biogas, ECS and pellets. The Stoves/fuel will be produced locally using local work force and materials, which is an important factor for long-term sustainability of the project. Besides, the project will prioritize multi fuel type Tier 3+ ICS that uses locally

44White Paper 2018; (clause 55, pg. 24); Ministry of Energy, Water Resources and Irrigation, Government of Nepal
available materials. Technical assistance and capacity development component will help beneficiaries to produce the fuel locally and mobilize community managed forest user groups to bring down the cost of raw materials such as biomass, woodchip, husk, etc. The project will also help in reducing production cost of CCS technologies, with a scaled up market.

The project will address existing barriers in promotion of CCS to poorest households by improving access for vulnerable communities and providing support and training on repair and maintenance of proposed technologies to women and marginalized groups to ensure inclusive sustainability of the project. There are several local NGOs working in clean cooking sector. The project shall collaborate to mobilize their resources in awareness campaigns and skill development trainings.

The project would strengthen and increase the number of after sales service centres, which will result in quicker repair and maintenance of CCS technologies. Skill development trainings for local manufacturers for domestic production of Tier 3+ ICS, biogas, repair centres, pellets, operation and maintenance service would build the necessary skilled human resources to run the CCS supply chain and after sales services. Accessible and affordable CCS options, with well-developed supply chain and after sales service would not only increase the CCS usage, but also minimize the rebound effect to TCS and LPG.

One of the major components of the project is to capacitate local and provincial governments to prioritize CCS promotion in their periodic and annual planning, formulating appropriate policies and mechanisms. Provincial Project Management Units will be established with the purpose to capacitate provinces in mainstreaming Renewable Energy Technologies. The PMU will be established within the Provincial Ministry of Physical Infrastructure and Development under its Water Resources, Irrigation and Energy Division’s Energy Branch. The project will be a concerted effort of the Government and the GCF. Hence, the project will enable the existing resources at the Energy branches to ensure the sustainability of the interventions of the project and strive towards reaching the national targets.

This will help in building required capacities, expertise, human resources, budget allocation and support directly in development of MEP for prioritizing CCS at local level perpetually.

The project will create a conducive environment in the CCS sector which ensures that bank and other financial institutions will develop appropriate loan products and explore opportunities to invest in the CCS sector during and post the project cycle, enhances long-term sustainability of the project. In the case of biogas, beneficiaries can approach several Micro Financing Institutions. The project will ultimately lead to a market led and enabled approach in the CCS sector coupled with conducive policies, wide spread availabilities of technologies and required resources, well capacitated CCS sector and extensive use of the proposed technologies. In addition, other ongoing energy related development projects, mainly GIZ/RERA45 and DFID/NREP46 projects, will also support private sector to develop CCS technologies by providing access to finance, e.g. via low interest rate loan and challenge fund. However, these projects are not directly linked with the proposed projects but contribute to the overall national renewable energy framework.

GoN is providing about 60% co-financing for the project, which indicates its strong desire to promote CCS in a longer term. Capacity enhancement of the government institutions, training, development of MEP and training modules on CCS and GHG mitigation will support the government to allocate and mobilize the required budget, and continue investment in clean cooking sector beyond the project closure.

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45 https://www.giz.de/en/worldwide/73840.html
46 https://www.nrepnepal.com/
In a nutshell, the project enables creation of user demand with improved reliability by addressing the major issues in terms of quality control and testing centre. The project will further develop local level value chain with targeted campaigns and promotional activities at the community level, thus ensuring that the value chain becomes systemic change and the potential users have increased level of awareness on the proposed technologies. With a strong country ownership and based on the financial and economic benefit of the technologies with additional import incentives both on the CAPEX and OPEX ensures the affordability of the proposed technologies.

Include information pertaining to the longer-term ownership, project/programme exit strategy, operations and maintenance of investments (e.g. key infrastructure, assets, contractual arrangements). In case of private sector, please describe the GCF’s financial exit strategy through IPOs, trade sales, etc.

The project beneficiaries and related stakeholders were well consulted during the project development phase to ensure their ownership in the project, which is key for successful implementation of the project and to sustain its outcome in the long run.

The project involves private service providers to deliver the CCS technologies and services through bulk tendering and reverse auctioning approach. With this, the CCS technologies and services will be made available to the beneficiaries and other interested users at an affordable price. Further, easy and affordable access of CCS technologies to users will increase the demand of CCS, which will attract more vendors in the sector, that would create a competitive environment, resulting in better products at cheaper rate, which could again attract more consumers to adopt CCS technology, thus creating a positive circular loop and ultimately ensuring the long term sustainability of the CCS market.

Provide information on additional actions to be undertaken by public and private sector or civil society as a consequence of the project/programme implementation for scaling up and continuing best practices.

As per the Constitution of Nepal, implementation of renewable energy programmes has been mandated to the Local Government. The project will directly work in formation of Municipal Energy Policy formulation, which will be an essential part for the sustainability and replicability of the project. Moreover, capacitating Local Governments will be instrumental in promoting and implementing renewable energy related projects and further set precedence on bulk procurement of renewable energy technologies.

The project will strengthen technical and institutional capacities of the sub-national government, introduce a cost effective mechanism of bulk purchase and reverse auction, set up a stringent technical due diligence process with output-based financing that can provide a governance-working model for other divisions of the governments of Nepal.

In terms to the price point, the proposed technologies ECS and Tier 3+ will be on an average of USD 38. The project will instigate the trend of using technologies with its known benefits. Behavioral change is one of the major proponents of the project. The post project financial sustainability will be secured by the market led approach. Further the consumers will be secured through price point, reliability and usability of the technologies.

In addition, AEPC will work in parallel on creation of loan products for larger technologies and special products for the vulnerable communities. Beside the regular government subsidy mechanism, AEPC has had various experience in implementing loan product including the (i) Micro Hydro Debt Fund (MHDF) with the overall objective to improve the access of the rural population to clean energy solution by providing credit for off-grid MHPs. (ii) Biogas Credit Fund with the objective of financing the loan via intermediate wholesale lending organizations and receiving non-government organizations, saving and credit cooperative and/or rural development banks (NGO/SCO/ RDBs) for granting sub-loans to those
farmers, who are not able to cover the cost of the biogas plant by their own. As of now, more than 300 LFIs/MFIs are involved to channel this credit to the biogas users. (iii) Challenge fund for various Renewable Energy Technologies.

### C. FINANCING INFORMATION

#### C.1. Total financing

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#### (b) Co-financing information

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Co- Financing:

Local Government: $7,065,442

The Local Government will contribute 14.37% ($7,065,442) of the total project budget as co-financing. This amount has been completely allocated as part of the Component 1 budget; the component wise budget share breakdown being 33% from GCF, 49% as co-financing from AEPC and 18% as co financing from LG.

A MoU between LG and AEPC will stipulate the co financing disbursement structure. The contributions from both AEPC and LG will be in the form of grant and not in-kind. The co-financing amount will be directly paid out by LG to private technology providers when the installation targets in the respective LGs are verified. These are the same targets that have been identified in Section B.3, Component 1. In terms of the co-financing, the amount of financing will be secured during the project implementation stage wherein Memorandum of Understanding will be signed with the Local governments. Out of the total 287 LGs in the Terai region, the project will be implemented on 150 LGs. AEPC will publicly call for MoUs with the Local Governments on the implementation of the project and financing requirement from LGs will be defined during the project implementation stage. Furthermore, the co financing letter from the LGs will be part of the MoUs and will be made available during the project implementation stage. The LGs will finance the technology portion of the project only. The amount that will be mobilized from the LGs will require the assistance of project management component of the project, thus
LGs financing is depicted as co-financing that contributes to the overall budget of the project.

C.2. Financing by component

Please provide an estimate of the total cost per component and output as outlined in section B.3. above and disaggregate by source of financing. More than one co-financing institution can fund a single component or output. Provide the summarized cost estimates in the table below and the detailed budget plan as annex 4.

<table>
<thead>
<tr>
<th>Component</th>
<th>Output</th>
<th>Indicative cost Options</th>
<th>GCF financing</th>
<th>Co-financing</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPONENT 1: SCALING UP THE DEPLOYMENT OF CLEAN COOKING TECHNOLOGIES THROUGH ACCELERATED INVESTMENT AND MARKET DEVELOPMENT</td>
<td>Output 1.1: 500,000 Electric Stoves, 490,000 Tier 3+ ICS and 10,000-biogas plants installed</td>
<td>$39,815,778.33</td>
<td>$13,249,026.11</td>
<td>Grants $26,566,752.23</td>
</tr>
<tr>
<td>COMPONENT 2: STRENGTHENING ENVIRONMENT THROUGH SECTOR BASED ASSESSMENTS AND</td>
<td>Output 2.1 Enhancing product standards, conducting assessments, surveys and analysis</td>
<td>$105,000</td>
<td>$105,000</td>
<td>Grants</td>
</tr>
<tr>
<td></td>
<td>Output 2.2 Strengthening quality assurance mechanisms</td>
<td>$395,000</td>
<td>$395,000</td>
<td>Grants</td>
</tr>
</tbody>
</table>

AEPC Co-financing: 19.5 Million USD
LG co-financing: 7.06 Million USD
| QUALITY ASSURANCE OF THE TECHNOLOGIES | | | | | |
|--------------------------------------|------------------|------------------|------------------|
| COMPONENT 3: EMPOWERING INSTITUTIONS, CAPACITATE SUPPLY CHAIN AND ENSURE INCREASED ACCESS TO CLEAN COOKING SOLUTIONS | Output 3.1: Capacity development of sub-national institutions | $650,000 | $650,000 | Grants |
| | Output 3.2: Increased awareness and outreach to enhance demand | $2,731,747.44 | $2,731,747.44 | Grants |
| | Output 3.3: Strengthening service centres, biomass manufacturers to provide quality and affordable clean cooking solutions | $2,996,700.83 | $2,996,700.83 | Grants |
| Compoment: Project Management Component | Establish and Operationalize Project Implementation and Management Units | $2,457,590.90 | $1,000,000.00 | Grants | $1,456,841 | Grants | AEPC |
| Indicative total cost(USD) | $49,151,818 | $21,128,224 | $28,023,593 |
This table should match the one presented in the term sheet and be consistent with information presented in other annexes including the detailed budget plan and implementation timetable.

In case of a multi-country/region programme, specify indicative requested GCF funding amount for each country in annex 17, if available.

C.3 Capacity building and technology development/transfer (max. 250 words, approximately 0.5 page)

C.3.1 Does GCF funding finance capacity building activities?  
Yes ☒  No ☐

C.3.2. Does GCF funding finance technology development/transfer?  
Yes ☒  No ☐

If the project/programme is expected to support capacity building and technology development/transfer, please provide a brief description of these activities and quantify the total requested GCF funding amount for these activities, to the extent possible.

Out of the total $21.12 million requested as GCF funding, $6,878,448.27 has been allocated for capacity building and technology transfer to strengthen enabling environment through sector based assessment and quality assurance of the technologies and empower sub-national institutions, capacitate supply chain and ensure increased access to clean cooking solutions. These activities will be conducted at the following levels:

**Local Government:** The project will build the capacity of LGs in promoting CCS technologies. AEPC will provide technical support in development and implementation of Municipal Energy Plans with focus to CCS. The institutional capacity of the LGs will be enhanced further with deploying CCS mobilizer in selected LGs to facilitate the development and implementation of the MEP. Training and exposure to LGs on demand collection, prioritization and monitoring system using MIS will also be provided by the project.

**Vendors:** The project will enhance the technical capacity of vendors, mainly for promoting CCS technologies and services including manufacturing and repairing. The project will strengthen capacity of supply chain industry such as, stove manufacturing companies, ECS service centres, biogas installers, electrical wiring service providers, pellet industry along with private investors, entrepreneurs and
financial institutions through guidance, training, and updates. In addition, training will be provided to local mobile and other electrical appliances repair centres, metal workshops, to capacitate them in providing after sales service for CCS. The project will provide training to private service providers on standards throughout the project period. AEPC will strengthen existing testing centre at central level to determine minimum technical standard and process to approve products based on the standard.

**Beneficiaries:** The project will create awareness amongst beneficiaries in the project areas as well as the country in the area of CCS and climate change adaptation. Skill development training will be provided to DAG, vulnerable community, women group, single women to capacitate them in repair and maintenance of the cook stoves.

**Provincial Government:** The project will strengthen the capacity of the Provincial government in performing their coordinating roles effectively and in creating an enabling environment for the project at province level.

### D. EXPECTED PERFORMANCE AGAINST INVESTMENT CRITERIA

This section refers to the performance of the project/programme against the investment criteria as set out in the GCF’s *Initial Investment Framework*.

#### D.1. Impact potential (max. 500 words, approximately 1 page)

Describe the potential of the project/programme to contribute to the achievement of the Fund’s objectives and result areas. As applicable, describe the envisaged project/programme impact for mitigation and/or adaptation. Provide the impact for mitigation by elaborating on how the project/programme contributes to low-emission sustainable development pathways. Provide the impact for adaptation by elaborating on how the project/programme contributes to increased climate-resilient sustainable development. Calculations should be provided as an annex. This should be consistent with section E.2 reporting GCF’s core indicators.

This project is aligned with the GoN’s vision to implement renewable energy and energy efficiency projects for climate change mitigation with multiple co-benefits involving vendors, PGs and LGs. Altogether, one million households located in 22 districts of Terai region will adopt CCS technologies- 490,000 Tier 3+ ICS, 10,000 Household Biogas, and 500,000 ECS respectively. As a result, the project will potentially reduce greenhouse gas emission by about 6.51 million tons of CO₂eq\(^{47}\) during the lifetime of the technologies implemented by replacing lower tier Stoves with Tier 3+ ICS and Biogas, and by replacing LPG cylinders with ECS. UNFCCC methodologies\(^{48}\) AMS I.C, AMS II.G and AMS I.E were used to estimate the amount of CO₂ that will be reduced by the project. The Emission Reduction will be monitored as per the requirements provided in the methodologies.

#### D.2. Paradigm shift potential (max. 500 words, approximately 1 page)

Describe the degree to which the proposed activity can catalyze impact beyond a one-off project or

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\(^{47}\) The estimation of the GHG emission reduction is provided in supporting annex (Annex 23).

\(^{48}\)[https://cdm.unfccc.int/methodologies/SSCmethodologies/approved](https://cdm.unfccc.int/methodologies/SSCmethodologies/approved)
programme investment. Describe the following, if applicable:

- Potential for scaling up and replication
- Potential for knowledge sharing and learning
- Contribution to the creation of an enabling environment
- Contribution to the regulatory framework and policies
- Overall contribution to climate-resilient development pathways consistent with relevant national climate change adaptation strategies and plans

Paradigm Shift in public procurement process: The project introduces concept of bulk tendering via reverse auctioning, along with an output based financing model. Bulk tendering is a relatively new concept in the context of public procurement of Nepal, especially when the tendering involves demands aggregation from multiple LGs. AEPC will procure the technologies in bulk via reverse auctioning method, thereby significantly reducing the cost of CCS technologies. The output based financing modality will incentivize the vendors by lowering their risk, engender multiple check and balance mechanisms to ensure quality assurance and de-risk project investment.

The bulk tendering with reverse auctioning model, coupled with output based financing, will transcend from the BAU subsidy delivery mechanism of GoN, creating a paradigm shift in the public procurement process that could be adopted by other government agencies too.

Paradigm Shift in implementation of technologies: The specification of these technologies will be precise during project implementation through component 2 and activities under output 2.1, “Enhancing product standards, conducting assessments, surveys and analysis”. The project, during its implementation stage, will identify the right technology. The projects baselines the technology on current available guidelines and standards for the biogas plants, such as the Nepal Interim Benchmark for Solid Biomass Cookstoves (NIBC, 2016). AEPC currently promotes biogas plants of different capacity, such as 2 cu m, 4 cu m, 6 cu m and 8 cu m plants, and the project mainstreams the innovative GGC 2047 and modified GGC 2047 designs.

Additionally, the project will also mainstream the use of Tier 3+ cookstoves (e.g. Forced Draft cookstove) and surge its penetration in the market, dominated by TCS. The cookstoves that the project intends to dispense will have high efficiency (greater than 45%), reduced PM emission (i.e. High Power PM emission to less than 41mg/MJd) and increased safety factors (greater than 95 Johnsons).

Furthermore, the Nepal Bureau of Standard and Metrology (NBSM) recently released standards for safety and performance for domestic electric appliances, including electric cookstoves. The project will develop and mainstream the standardization in regards to electric cookstoves. For instance, Renewable Energy Testing Station (RETS), the government agency, is aggressively working on enlarging its testing to implement testing procedure set by NBSM and IEC on electric cookstoves. In consequence, this will also incentivize the Nepalese private entities for the local manufacture. The project will extensively support these institutions in preparation of the technical guidelines and standards for the given technologies.

As such, the consequence and spillover the project creates will help paradigm shift in adopting new technologies and novel standardization. This will surge the penetration of electric cookstove in the market, nudge the local manufacture and production, and catalyze the standardization and testing
Scaling up of CCS technology: The project has huge potential for scaling up as this aligns with the GoN aim of attaining Clean Cooking Solutions for all by 2030. The project meets 98% target of the Second NDC of Nepal which aims to install 500,000 improved cookstoves, specifically in rural areas by 2025. Furthermore, as per the Second NDC of Nepal, currently, around 5% of households use electric induction stoves, either as their primary or secondary mode of cooking and it aims to ensure 25% of households use electric stoves as their primary mode of cooking by 2030. The project contributes significantly to the achieve the target on the use of electric stoves. Strengthened supply chain, expansion of the technologies promoted during the project, will proliferate across the country without external interventions even after the project period.

Graduation from TCS to Tier 3+ ICS is an innovative approach as they are more efficient, are value for money and have a high affordability quotient for the households. Electric cooking is a segment that has remained uncharted and unwieldy at times, as its adoption is very low. The shift towards electric cooking with the government aspiration of generating surplus electricity from hydropower will bring in the next generation cooking into practice.

In the areas of the country where LPG and biomass are being used extensively, it will transform the energy usage pattern of households creating an environment where the future generations will easily adopt CCS as a primary means of cooking. The financial and economic benefits coupled with import incentives on the proposed technologies will ensure that the targeted groups of vulnerable households shift from the traditional way of cooking. The projects enables demand creation and ensures a market led approach with improved reliability of the proposed technologies with standards and guidelines in place. This will also develop and underpin the local level value chain with extensive campaigns and promotional activities at the community level.

Contribution to CCS polices at sub-national level: Mainstreaming the LGs, this project aims to support in developing municipal energy plans and the overall project implementation. This will empower the LGs to develop and implement similar projects in the future, further it will have a domino effect with more LGs reaching out AEPC for technical support to develop MEPs and implement CCS deployment programmes. Major shifts will be seen across the LGs with their capacities enhanced in identifying available local energy resources and implementing projects related to renewable energy with expertise gained on CCS.

Potential for knowledge and learning: The project has potential for knowledge generation and sharing. It will provide empirical knowledge on bulk tendering, reverse auctioning and output based financing. Further, the use of a management information system, where data will be available from the stage of energy plans, demand collection to project implementation, can be utilized to assess the demands and result of such intervention and help plan accordingly.

LGs and local communities will learn a lot from the use of CCS as the project will create awareness on and access to CCS, inform the vulnerable people of benefits in terms of health and efficient systems. The project will hence increase the knowledge of Local Governments and the stakeholders about the impacts that efficient technologies can have on their daily lives.
Developing a model of Green Growth for Nepal: The project will contribute to low carbon development pathways consistent with Nepal's climate change adaptation policies, strategies and plans. Nepal's future economic model has to pursue renewable energy to run its kitchen. This project is a milestone in the direction. A successful execution of this project will be instrumental for Nepal to reinforce its power infrastructure and industrialization in that direction. Since this project is being conducted in Terai, which borders Nepal with India, a successful implementation can pave way for Nepalese companies and power producers to expand in neighboring India as well as Bangladesh.

D.3. Sustainable development (max. 500 words, approximately 1 page)

Describe the wider benefits and priorities of the project/programme in relation to the Sustainable Development Goals and provide an estimation of the impact potential in terms of:

- Environmental co-benefits
- Social co-benefits including health impacts
- Economic co-benefits
- Gender-sensitive development impact

The use of modern, efficient and clean cooking solutions will result in numerous sustainable development benefits. The project will contribute to several Sustainable Development Goals (SDGs), such as poverty reduction (SDG 1), lessening exposure to indoor air pollution (SDG 3), reducing drudgery for women in collecting wood fuel (SDG 5), improving access to affordable and clean energy (SDG 7) and reducing GHG emissions and strengthening the resilience of vulnerable communities to climate change (SDG 13). Besides, the project will also help in reducing pressure on the forest, thus, conserving the forest resources (SDG 15).

Environmental co-benefits: reduction of indoor air pollution and improve air quality, and reduction of forest degradation

The project will contribute in reduction of indoor pollution and improve air quality. On average, Tier 3+ ICS will reduce fuel wood consumption by 30%, and biogas and ECS will completely replace the use of fuel wood, thus reducing deforestation and forest degradation. This will help to conserve fragile ecosystem of Churia, which is a primary source of timber, fuel wood, fodder and other forest products for downstream communities in Terai.

In addition, the amount of cow dung replaced through Tier 3+ ICS can be used as organic manure, thus improving soil quality. Besides, using cow dung in domestic biogas plants will help to mitigate carbon emissions by converting methane into carbon dioxide.

Social co-benefits including health impacts: increased resilience through improved health

The use of clean cooking solutions promoted by this project will contribute in reduction of health risk caused by indoor air pollution because of improved household air quality, which will primarily benefit women and children. In total, more than 30% of reduction in indoor air pollution is expected by replacing the TCS with Tier 3+ ICS. WHO estimates the death of 8,700 people per year due to indoor air pollution in Nepal. A recent study shows the prevalence of productive cough, tearing of eyes, difficulty in
breathing, asthma, headache within cooking member of family who are involved in more than five years in kitchen.\textsuperscript{49} Introduction of CCS will help in reducing such adverse health impacts and in reducing deaths caused by indoor air pollution.

**Economic co-benefits: job creation, increased revenue from cost savings, time gained for income-generating activities and education, and country’s savings from LPG replacement**

Approximately, 2,400 people will be trained during the project period. A total of 1,200 trainings will be provided to service providers and local manufacturers, mobile and other electric appliances repair centres and metal workshops to capacitate them in providing after sales service, domestic production of CCS technologies, pellets and briquettes, as well as strengthen the supply chain. In addition, 1,200 training will be provided on making fuel for Tier 3+ ICS, repair and maintenance, biomass fuel processing, biogas installation, electrical safety and house wiring to CCS beneficiaries and vulnerable and disadvantaged groups (DAG). The training of stove repair and maintenance, electricians, and installers will create the much needed skilled human resources for the sector. The project would directly employ about 170 staffs, whereas it would create employment opportunities for approximately 3000 persons in the CCS sector.

Cost for fuel wood can be saved in households where fuel wood is purchased rather than collected. These savings can be used in livelihood enhancing activities such as education or for starting small businesses. In households where fuel is collected, the time spent on fuel wood collection can be saved and utilized for other income-generating activities and education. Besides, in cases where fertilizer needs to be purchased, the cost for fertilizers can be saved by using cow dung as fertilizer.

The LPG replacement will nurture the internal consumption of clean energy in line with the hydropower potential of the country and should significantly reduce the government’s trade deficit.\textsuperscript{50}

**Gender-sensitive development impact: reduced workload and exposure to indoor air pollution, time gained for income-generating activities and education, training and employment to women, impacts on revising traditional gender norms**

The project enhances women’s access and entitlement to benefits. Since the women have been the direct user of the cook stoves, it will benefit women by reducing their exposure to indoor air pollution, thereby improving their health. Also, the document ‘Gender responsive electric cooking in Nepal (Energia, 2021)’ has survey output of male beginning to participate in cooking and preparing snacks after the introduction of induction cookstoves in their households. This is changing gender norms of our society. Besides, reduction of fuel wood after the installation of more efficient stoves will reduce the workload of women to collect fuel wood, resulting in time saving that they can use for other productive activities such as getting an education, an employment or care for children or socialize, as per their preferences.\textsuperscript{51} More than 50% of the time will be saved via the proposed CCS. Further, the project


\textsuperscript{50}The trade deficit during the fiscal year 2018/19 amounted to approximately USD 12 billion, wherein the USD 323 million worth of LPG were imported in the same fiscal year.

creates equal footing for women by creating employment as CCS mobilizers, clean cooking champions, and technically trained women, who will be skilled enough to work in CCS sector, even after the project duration.

The project will be implemented based on the Gender Policy of AEPC and a gender assessment is provided along with this funding proposal (Annex 8).

### D.4. Needs of recipient (max. 500 words, approximately 1 page)

Describe the scale and intensity of vulnerability of the country and beneficiary groups and elaborate how the project/programme addresses the issue (e.g. the level of exposure to climate risks for beneficiary country and groups, overall income level, etc.). Describe how the project/programme addresses the following needs:

- Vulnerability of the country and/or specific vulnerable groups, including gender aspects (for adaptation only)
- Economic and social development level of the country and the affected population
- Absence of alternative sources of financing (e.g. fiscal or balance of payments gap that prevents government from addressing the needs of the country; and lack of depth and history in the local capital market)
- Need for strengthening institutions and implementation capacity

In Nepal, about 73.5% of population use biomass (fuel wood, cattle dung or agro waste) as their primary fuel source with traditional cook stoves. This inefficient choice of cook stove has resulted in increased greenhouse emissions, indoor air pollution and put pressure on the forest. The WHO has estimated 8,700 deaths a year from indoor air pollution in Nepal. Apart from biomass, a large portion of urban residents in Terai use LPG, which is derived from fossil fuel and emits greenhouse gas. In addition, LPG based cooking is a huge economic problem for Nepal stressing its budget deficit.

The TCS users are the most vulnerable community as they are among the poorest and socially excluded groups. 23.44% of the population in the Terai region survives under absolute poverty. Against this, 33% of the populations are disqualified to cross the threshold of human poverty. In addition, 25.9% Janjati (Indigenous group) and 38.2% Dalit population of Terai live under extreme poverty.

In Nepal, cooking is almost entirely carried out by women, requiring on average about four hours a day for cooking using TCS. Women in Nepal spend about 142 minutes to collect the fuel wood compared about 50 minutes on average for men.

The per capita income stood at US $ 1,004 (Rs 103,335) in the fiscal year 2018/19 and the main portion of income goes for sustaining livelihoods. In 2016, Nepal achieved a score of 0.148 according to the

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52 World Bank, 2019. NEPAL | Beyond Connections: Energy Access Diagnostic Report Based on the Multi-Tier Framework
multidimensional poverty index (MPI), with around 22.3% population vulnerable to Multidimensional Poverty (MP), 11.6% in severe MP, and 15% below income poverty line\textsuperscript{55}.

The Government of Nepal aims to graduate from a Least Developed Country to a Developing Country by 2022. To achieve this goal, it is committed to tackle poverty and implement measures to meet the SDGs, in addition to the national targets. The Human Development Index (HDI) ranking for Nepal is 147 out of 189 countries listed\textsuperscript{56}, which clearly indicates the socio economic challenges of Nepal.

**Economic and social development level of the country affected population**

Nepal being a LDC and one of the most vulnerable countries to climate change, the project aims to address the vulnerability and exposure to climate risk and takes into account the economic and social development level of the beneficiaries. The *Global Climate Risk Index 2021*, *Germanwatch* lists Nepal at the tenth position in the Long-Term Climate Risk Index (CRI) as the country most affected by extreme weather events from 2000-2019 with CRI score of 31.33. Nepal’s Terai region is most prone to natural disasters with devastating floods and extreme events triggered by climate change. In terms of economic and social development level, the average monthly income of the household in the Terai region as per the *A Survey of Nepali People in 2018*, *The Asia Foundation*, depict the following information.

<table>
<thead>
<tr>
<th>Average Monthly Household Income of Terai Region</th>
<th>Average Monthly Income</th>
<th>Annual Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less Than NPR. 2500 of 4.5% of sample population</td>
<td>NPR 2,500.00 $20.83 $250.00</td>
<td></td>
</tr>
<tr>
<td>NPR. 2501 to NPR. 9,999 of 19% of sample population</td>
<td>NPR 6,250.00 $52.08 $625.00</td>
<td></td>
</tr>
<tr>
<td>NPR. 10,000 to NPR.19,999 of 38% of sample population</td>
<td>NPR 14,999.50 $125.00 $1,499.95</td>
<td></td>
</tr>
<tr>
<td>NPR. 20,000 to NPR.39,999 of 27.9% of sample population</td>
<td>NPR 29,999.50 $250.00 $2,999.95</td>
<td></td>
</tr>
<tr>
<td>More than NPR.40,000 of 10.4% of sample population</td>
<td>NPR 40,000.00 $333.33 $4,000.00</td>
<td></td>
</tr>
</tbody>
</table>

**Absence of alternative sources of financing:**

Though the project has high mitigation impact, the current level of funding and irregular nature of development assistance has been a hindrance to promote CCS technologies among the most vulnerable group, coupled with perceived un-bankability of projects like these, as evident by the lack of bank loans and investment in the CCS sector. The sector lacks experience on implementing innovative business models, although the GoN is aware of the drawbacks of existing procedures, it cannot bear the overall risk of introducing a new mechanism in the sector. Hence, GCF funding will secure GoN co-financing for the project, which would not have happened in the business as usual process.

**Needs for strengthening institutions and implementation capacity:**

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\textsuperscript{55} Human Development Index Report, 2019 [http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/NPL.pdf](http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/NPL.pdf)

\textsuperscript{56} ibid
After almost three decades of hiatus, the LGs finally have locally elected representatives, after the election conducted in 2017. There are now 753 Local Governments in the country with no or limited knowledge of renewable energy technologies. The project would significantly contribute in strengthening sub-national governments and their implementation capacity. LGs lack the resources and technical skills to develop projects to mitigate climate change and raise awareness on benefits of electric cooking along with other CCS. The proposed project will capacitate the LGs to develop municipal energy plans and implement MIS on demand collection and aggregation, thus empowering them in the renewable energy sector. The proposed project has received support from the GCF in the form of Project development Technical Assistance to alignment of this project with the GCF investment framework.

D.5. Country ownership (max. 500 words, approximately 1 page)

Please describe how the beneficiary country takes ownership of and implements the funded project/programme. Describe the following:

- Existing national climate strategy
- Existing GCF country programme
- Alignment with existing policies such as NDCs, NAMAs, and NAPs
- Capacity of Accredited Entities or Executing Entities to deliver
- Role of National Designated Authority
- Engagement with civil society organizations and other relevant stakeholders, including indigenous peoples, women and other vulnerable groups

GoN has endorsed Investment Prospectus and Biomass Energy Strategy in 2017, with aim of attaining Clean Cooking Solutions for all in two stages i.e. by improved solutions of cooking by 2022 (no traditional way of cooking with open fire burning) and modern solutions of cooking with at least Tier 3+ level by 2030. The project supports Nepal’s Nationally Determined Contributions of reducing 50% fossil fuel dependency by 2050 and equipping households in rural areas with smokeless kitchen. Approved by the NDA, the project concept aligns with the GoN’s Terai Clean Cooking Programme and recently adopted Approach Paper for 15th Periodic Plan (2019/20 to 2023/24) that gives high priority to household biogas, ICS, and production of bio-briquette and pellets.

The climate change policy 2019, aims to contribute to socio-economic prosperity of the nation by building a climate resilient society. The policy has been introduced with the objective of providing policy guidance to various levels and thematic area to develop resilient society by reducing risk of climate change impacts. The policy have formulated strategies and working policies on different broad sectoral policy namely: Agriculture and Food security, Forest, Biodiversity and Watershed Conservation, Water Resource and Energy, Rural and Urban Habitats, Industry, Transport and Physical Infrastructure, Tourism and Natural and Cultural heritage, Health, Drinking Water and Sanitation, Disaster Risk Reduction and Management, Inter-thematic areas (Gender Equality and Social Inclusive, Livelihoods and Good Governance, Awareness Raising and Capacity Development, Research, Technology Development and Expansion and Climate Finance Management). In brief, the policy also targets to enhance climate change adaptation capacity of persons, families, groups and communities vulnerable to,

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57Nationally Determined Contributions; October, 2016; Ministry of Population and Environment, Government of Nepal
and at risk of, climate change; mobilize national and international financial resources for climate change mitigation and adaptation in equitable and just manner; mainstream gender equality and social inclusion (GESI) into climate change mitigation and adaptation programmes. To achieve its goal, low emission technologies and adaptation programmes will be incorporated in settlement development plans, which would mean CCS technology would be a key priority. Clean cooking solutions fit perfectly while designing these integrated settlement plans. The introduction of CCS technology in rural and urban habitat will significantly reduce the GHG emissions with shift from current practice of cooking. With implementation of this project, the project will be replicated in other locations and across other household renewable technologies including solar and bio energy. Nepal has recently submitted its Second NDC in December 2020 depicting its ambitious targets for the next decade to mitigate emissions and increase resilience of vulnerable communities to adapt to the impacts of climate change. The Second NDC Nepal has priorities on the clean cooking sector that will be to ensure 15% of the total energy demand is supplied from renewable energy sources; In Residential cooking by 2030, ensure 25% of households use electric stoves by 2025, install 500,000 improved cook stoves, specifically in rural areas and by 2025, install an additional 200,000 household biogas plants. The project help to change the perception toward CCS technology and create the environment for them to adopt CCS technology. Hence, this project will facilitate to incorporate CCS technology in settlement development plans and meet the target set by the NDC.

AEPC and local government will collaboratively develop framework, guidelines and procedures to call the vendors to provide access to affordable and accessible CCS technologies for beneficiaries. Further AEPC has been conducting several rounds of discussion with LGs and has even signed Memorandum of Understanding (MoUs) with some LGs on the implementation of renewable energy programme including the Terai Clean Cooking Programme.

The Ministry of Finance (MoF) is the National Designated Authority (NDA) of the Green Climate Fund. Nepal aims to enhance national ownership process beyond NDA; strategically and systematically build the national capacity at different levels to ensure that the knowledge and processes related to GCF mechanisms are transferred to diverse stakeholders and contribute to sustainable capacity building efforts.

The role of Nepal NDA are as follows:

1. Provide broad strategic oversight that is aligned to national priorities for developing the GCF country programme and communicating strategic country priorities to access GCF funding.
2. Convene national stakeholders, including the public and private sectors and civil society, via coordination, consultation, and multi-stakeholder forums to engage in raising awareness on GCF processes, capacity development needs, documenting lessons learnt, and facilitating opportunities for shared learning with other countries.
3. Facilitate the accreditation process for national institutions and provide ‘Nomination Letters’ to institutions (e.g. government, private sector and civil society organizations) for their application for the accreditation status under the GCF.
4. Facilitate the development of GCF funding proposals and the implementation of GCF funded projects/programmes in Nepal by engaging with accredited entities to align funding proposals with national strategic priorities.
5. Provide leadership on the deployment of readiness and preparatory support funding in Nepal.

The Second NDC Nepal has priorities on the clean cooking sector that will be to ensure 15% of the total energy demand is supplied from renewable energy sources; in Residential cooking by 2030, ensure 25% of households use electric stoves by 2025, install 500,000 improved cook stoves, specifically in rural areas and by 2025, install an additional 200,000 household biogas plants. The project help to change the perception toward CCS technology and create the environment for them to adopt CCS technology. Hence, this project will facilitate to incorporate CCS technology in settlement development plans and meet the target set by the NDC.
This project is in alignment with country priorities as clearly mentioned in the No Objection Letter granted from the NDA for the project. The project is a priority of the GoN and is linked to the Government led national initiative of Terai Clean Cooking Programme. The project will emphasize on adequate engagement of relevant stakeholders, which are aligned with national climate change priorities. This is a priority project for Nepal. Though the country programme is still under development, the Government of Nepal has indicated this project as a priority project for GCF-1. Govt of Nepal is providing about 60% co-financing to this project. The 15th five-year plan of the National Planning Commission envisions the expansion of renewable energy for multipurpose use. It has prioritized promotion of biogas, ICS, gasifier, bio briquettes and ECS. The second NDC which was submitted in December 2020 also highlight clean cooking sector as a priority, alongside, Nepal also a signatory of SDGs, envisions CCS for all by 2030. In addition to promoting clean cooking solutions this project also supports a strong capacity enhancement component to strengthen government institutions, provide training, development of Municipal Energy Plans and training modules on CCS and GHG mitigation; while helping government to allocate and mobilize the required budget, and continue investment in clean cooking sector beyond the project closure.

D.6. Efficiency and effectiveness (max. 500 words, approximately 1 page)

Describe how the financial structure is adequate and reasonable in order to achieve the proposal’s objectives, including addressing existing bottlenecks and/or barriers, and providing the minimum concessionality to ensure the project is viable without crowding out private and other public investments. Refer to section B.5 on the justification of GCF funding requested as necessary.

Nepal has not been able to effectively expedite climate financing for its low carbon and climate resilient programmes. There is also lack of appropriate financing mechanism to incentivize vendors and de-risk their investment in renewable energy sector.

The existing BAU subsidies model, where in the vendors have been carrying out the task of collecting demands door to door, and taking all financial risk by putting 100% capital upfront, has failed to drive enough participation from the vendors to achieve the CCS installation targets set by AEPC. The fund from GCF would help AEPC to pay 20% amount in advance as per PPA/PPR to vendors against bank guarantee, which would allow them to use leverage financing to install more CCS technologies, thus increasing the CCS deployment than in BAU scenario.

On the institutional side, the project would set precedence by introducing an avant-garde implementation mechanism: reverse auctioning, output based financing, renewable energy MIS and mainstreaming LGs role in the renewable energy. This will create a massive change in the business as usual process of financing renewable energy technologies in Nepal and the government will have a tried and tested model that can be replicated all over the country.

GCF grant will support achieving national targets and Nepal’s NDCs58 while curbing the usage of fossil based LPG and fuel wood for cooking. For a country which aims to generate surplus electricity in the near future and the residential sector as the primary consumer of energy in the country, proliferation of

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58 Nationally Determined Contributions; October, 2016; Ministry of Population and Environment, Government of Nepal
ECS will be a tipping point in creating a paradigm shift in the overall clean energy consumption scenario.

Successful implementation of the project could allow the replacement of LPG at a larger scale in the country. Bringing additional ties in the sector, the GCF grant will be utilized to remove barriers seen in the demand and supply side in terms of awareness, access to finance, regulatory frameworks, and quality assurance of Tier 3+ ICS, biogas and ECS.

The project involves low risk and yet yields high return for GCF investments as AEPC and LGs will be supporting approximately 60% of the total cost for promotion of clean cooking solutions as co-financing.

Appropriate implementation models, specially the reverse auctioning will be adopted to ensure the effective and sustainable operation of the system. Partnering with local governments and financial institutions will further strengthen the efficiency and effectiveness of the project.

The project directly ensures increased involvement of private sector as vendors by the creation of big and confirmed demand of CCS through the bulk purchase. Further, rapid awareness among the users will also ensure market growth of CCS, especially due to promotion of electric cooking.

Please describe the efficiency and effectiveness of the proposed project/programme, taking into account the total financing and mitigation/ adaptation impact the project/programme aims to achieve, and explain how this compares to an appropriate benchmark.

The project expects to reduce an estimated 6.51 million tons of CO₂eq with significant co-benefits in the area of health, environment, gender, social, and economy. The total per unit mitigation cost for the project is about 7.54 USD/tCO₂eq and 3.24USD/tCO₂eq of GCF fund. The USD 21.12 million of GCF grants will be combined with USD 28.02 million of co-finance from AEPC and LGs.

The use of the clean cooking solutions promoted by this project will contribute to the reduction of health risk caused by indoor air pollution because of improved household air quality, which will primarily benefit women and children. In total, more than 30% of reduction in indoor air pollution is expected by replacing the TCS by Tier 3+ ICS.

The project will be implemented based on the Gender Policy of AEPC and a gender assessment will be provided during the funding proposal stage. The project enhances women's access and entitlement to benefits by reducing their exposure to indoor air pollution thereby improving their health and increasing earning opportunities.

Please specify the expected economic rate of return based on a comparison of the scenarios with and without the project/programme.

Calculation of Economic Rate of Return (EIRR) is performed both from the project perspective and from the perspective of the beneficiaries and was based on monthly savings in fuel consumption due to transfer of cooking technology, health benefits due to reduction in indoor air pollution and global benefits in carbon savings from reduced GHG. Sensitivity analysis has been performed from the beneficiaries’ perspective considering the uncertainty surrounding technology cost and its associated cost that affects making an informed investing decision at the beneficiary level. Cash outflow from the beneficiary perspective in terms of the usage of utensils, cost of repair and maintenance, annual fuel cost will vary
upon households. In terms of the electric cookstoves, the analysis takes into considerations the different types and number of electromagnetic utensils required as per the varying food habit and different types of food items that needs to be cooked, the wholesale and retail price point of these utensils and house wiring, varying annual fuel consumption and repair and maintenance cost with an increased consumption of the technology. In terms of biogas, the analysis has been performed based on the varying frequency of the repair and maintenance required for the biogas plants. Furthermore, a household income percentage analysis has been performed to understand the effect of electric cookstoves (both CAPEX and OPEX) on the household income based on the different level of household income prevalent in the Terai region. In case of the project perspective, two case scenarios were evaluated; with and without GCF support. In the first scenario GCF support is introduced as grant support to the project i.e. to AE’s co-financing and LG’s co financing, however, without GCF support the model is based on BAU scenario.

BAU is based on the annual installation target achieved by AEPC in FY 2018/19 and assuming the same no. of CCS deployment for the next five-year, i.e. 11,750-biogas plant and 40,000 ICS implemented each year for the next five years. As the CCS projects under AEPC so far do not deploy ECS, the BAU scenario does not include it in the analysis. The total budget expended by AEPC to conduct CCS related activities that are in line with the proposed project was $4.5million in FY 2018/19.

EIRR in case of inclusion of GCF grant is at 39% as opposed to no returns with a negative NPV of $18.8million in the BAU scenario.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>With GCF Funding</th>
<th>Without GCF Funding (BAU Scenario)</th>
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<tbody>
<tr>
<td></td>
<td>Financial (FIRR)</td>
<td>Economic (EIRR)</td>
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<tr>
<td>Internal Rate of Return</td>
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<td>39%</td>
</tr>
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<td>Net Present Value (NPV)</td>
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<tr>
<td>Discounted Payback Period</td>
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<td>4.59</td>
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In case of the beneficiaries’ perspective, primarily three scenarios were taken in to consideration for each of the technologies while conducting the economic and financial analysis. Scenario 1: Without GCF Support and before Reverse Auctioning, Scenario 2: Without GCF Support and with Reverse Auctioning and Scenario 3: With GCF Support and with Reverse Auctioning.

- The following are the outcomes of the EFA for each of the technologies for the three scenarios calculated at a discount rate of 12%.

1. Tier 3+ Cook stoves vs. Traditional Cook stoves
2. Electric Cook Stoves Vs. LPG

Given the need for utensils that are pre-requisite to induction cooking and that the market has a range of products with varied price points, the analysis need to consider different scenarios which depicts that the varying cost of utensils, house wiring, and annual fuel cost and repair/maintenance. Hence, a sensitivity analysis has been performed taken into the following considerations:

- Sensitivity Analysis Scenario One: (1) Applying a conservative approach wherein households will only purchase a single utensil and cost of house wiring considered when there is a bulk procurement, the cost stands at $33 that needs to be borne by the beneficiaries with (2) Electricity cost at NPR 1114 per month and (3) Assuming 2% of the CAPEX plus utensils in repair and maintenance.

- Sensitivity Analysis Scenario Two: (1) Applying the approach based on the varying food habits that requires different utensils, in this case a stainless steel pot and a 3 litre pressure cooker and the cost of house wiring at retail level, the cost stands at $66.67 that needs to be borne by the beneficiaries (2) Considering an increase in electricity tariff by 5% with increased usage (3) Assuming 5% of the CAPEX plus utensils in repair and maintenance as a result of increased usage.

- Sensitivity Analysis Scenario Three: (1) Further, expanding the range based on the varying food habits that requires different utensils, in this case a stainless steel pot, a 5 litre pressure cooker and a frying pan along with house wiring cost of $83.33 at retail level (2) Considering an increase in electricity tariff by 10% with increased usage (3) Assuming 10% of the CAPEX plus utensils in repair and maintenance as a result of increased usage.
<table>
<thead>
<tr>
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<th>Scenario 1</th>
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<th>Scenario 3</th>
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<td>39%</td>
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<td>$56.07</td>
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<td>Payback Period (Years)</td>
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### Sensitivity Analysis Scenario Two

<table>
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### Sensitivity Analysis Scenario Three

<table>
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<tr>
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<tr>
<td>Net Present Value (NPV)</td>
<td>$(24.29)</td>
<td>$(13.91)</td>
<td>$(14.71)</td>
</tr>
<tr>
<td>Payback Period (Years)</td>
<td>4.57</td>
<td>4.14</td>
<td>4.22</td>
</tr>
</tbody>
</table>
3. Biogas Vs. TCS

Given that the variation on the timeline required for repair and maintenance cost, a sensitivity analysis has been performed taken into the following considerations. The qualitative factor that relates to the availability of organic fertilizer and time saved on fuel collection due to the usage of biogas plant ensures further socio-economic benefits.

- Sensitivity Analysis Scenario One: (1) Annual Repair and maintenance.
- Sensitivity Analysis Scenario Two: (1) Repair and maintenance every fifth year.
- Sensitivity Analysis Scenario Three: (1) Repair and maintenance every seventh year

Sensitivity Analysis Scenario One:

<table>
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<th>Scenario 3</th>
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</thead>
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<tr>
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<td>-22%</td>
<td>-17%</td>
<td>-20%</td>
</tr>
<tr>
<td></td>
<td>-15%</td>
<td>-13%</td>
<td>-7%</td>
</tr>
<tr>
<td>Net Present Value (NPV)</td>
<td>$(89.71)</td>
<td>$(79.33)</td>
<td>$(80.13)</td>
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<tr>
<td></td>
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<tr>
<td>Payback Period (Years)</td>
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Sensitivity Analysis Scenario Two:

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</thead>
<tbody>
<tr>
<td>Internal Rate of Return</td>
<td>-</td>
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</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Net Present Value (NPV)</td>
<td>$(727.36)</td>
<td>$(618.66)</td>
<td>$(591.94)</td>
</tr>
<tr>
<td></td>
<td>$(483.24)</td>
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<td>$(15.57)</td>
</tr>
<tr>
<td>Payback Period (Years)</td>
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<td>-</td>
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Sensitivity Analysis Scenario Three:

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Rate of Return</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Net Present Value (NPV)</td>
<td>$(727.36)</td>
<td>$(618.66)</td>
<td>$(591.94)</td>
</tr>
<tr>
<td></td>
<td>$(483.24)</td>
<td>$(124.27)</td>
<td>$(15.57)</td>
</tr>
<tr>
<td>Payback Period (Years)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Tier3 + ICS definitely require the support as indicated by the result seen in scenario 3 compared to both the other scenarios. Both the scenarios without GCF funding questions the feasibility of the investment from the beneficiaries. Depending on the sensitivity factors, ECS shows varied level of return, thus it becomes important to assess these practical aspects of electric cooking while making justification regarding the financial incentive required for the beneficiaries. Furthermore, as household income plays an important role in making the investment decision, this has been further analysed from the lens of household income level and the percentage of capital and operational expenditure of electric cooking on the various ranges on income level at the Terai Region. The Household Income Percentage analysis has been presented as separate annex and the highlights of the analysis is presented in the following section related to FIRR. Hence, grant support is justified which will kick start the process and ECS will ultimately be the technology on which the country will cook in the coming days.

In terms of the biogas, the comparison has been done with both LPG and traditional cook stoves. Please see the Annex 3 for the comparison between LPG and Biogas. Given that the beneficiaries targeted by the project for biogas plant are the TCS users. Hence the emphasis is given on the Biogas vs. TCS category in this section. The EFA clearly substantiate the request for grant for biogas. The CAPEX is on the higher side which seeks for grant support for its feasibility. Scenario 3 with the GCF contribution still shows a deficit for investing on the technology from the end user perspective. Ultimately, on the OPEX with no fuel cost and longer duration biogas will create a long lasting impact.

In terms of the cost of disposal or revenue from the sale from the old cook stoves, we do not foresee neither the sale of the existing cookstoves nor any cost for disposal. TCS will be dismantled and the
proposed technologies will replace the existing cook-stoves. However, some level of stacking is expected in reality especially when it comes to LPG. This will be a gradual process as electricity becomes cheaper and convenient in the years to come. This has the potential to drive growth of the country in the direction as envisioned by the national commitments and plans.

Please specify the expected financial rate of return with and without the Fund’s support to illustrate the need for GCF funding to illustrate overall cost effectiveness.

The financial rate of return (FIRR) from a project perspective for the scenario with GCF is 31% with the NPV of $19,779,329.68 whereas the FIRR for scenarios for BAU has no returns with a negative NPV value of $38.6million. The financial rate of return from the beneficiary perspective has been presented in the earlier section.

The reduced returns in both financial and economic analysis for BAU scenario can be cited to the following reasons:

I. Procurement of technologies is done by traditional bidding methods or on a retail basis by the users. This in turn increases the initial CAPEX of CCS projects in the BAU scenario.

II. In BAU scenario, AEPC implements 11,750 domestic biogas plants and 40,000 ICS each year. Although domestic biogas plants provide higher economic benefits in terms of reduced GHG emissions and health benefits in comparison to both the technology it replaces and the technology it is being implemented together with; TCS and ICS respectively, the OPEX associated with domestic biogas is approximately 5 and 11 times higher than the latter technologies. This increase in financial OPEX renders negative financial returns for BAU scenario.

III. For almost the same amount of funding as in this proposed project, BAU fails to implement electric cooking in CCS promotion; the fuel savings and economic impacts from electric cooking is larger compared to other CC technologies. Meanwhile, effectiveness of the project without GCF support is an important factor to consider. Due to the resource limitation of AEPC, the BAU scenario would fail to invest in activities for accelerating climate change mitigation and adaptation needs, creating a market and supply chain ecosystem, mitigating the risk of implementing an innovative approach, implementing innovative approaches of demand aggregation and mainstreaming LGs proposed in the project. Likewise, GCF’s support allows promotion of higher Tier 3+ ICS and ECS, which otherwise BAU fails to do.

In case of ECS as mentioned earlier, the household level of income becomes a critical factor while making an investing decision. Especially to justify the level incentive to be provided to the beneficiaries, the analysis below presents the percentage of annual household income required to meet the capital and current expenditure of ECS. Since the targeted beneficiaries are the poor household of the urban and peri-urban areas, annual household income level between $250 to $2000 has been presented below based on the provision set out by the sensitivity analysis while conducting the economic and financial analysis (ECS Vs. LPG) from the beneficiary perspective: The sensitivity scenario with requirement of two utensils and wiring that leads to 5% increased in electricity cost and repair/maintenance has been presented below. The overall analysis has been presented as a separate annex Household Income % analysis.
CAPEX and OPEX % in terms of Average Household Income

### Economic and Financial Scenario 1: Without GCF Support and before Reverse Auctioning with Sensitivity Analysis Scenario One

<table>
<thead>
<tr>
<th>Year</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household Cumulative Net Cash Flow (CAPEX)</td>
<td>$(81.25)</td>
<td>$(48.74)</td>
<td>$(14.77)</td>
<td>$20.72</td>
<td>$57.82</td>
<td>$96.58</td>
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<tr>
<td>% of Annual Household Income</td>
<td>32.50%</td>
<td>19.50%</td>
<td>5.91%</td>
<td>8.29%</td>
<td>23.13%</td>
<td>38.63%</td>
</tr>
<tr>
<td>Households with income less than NPR. 2500 per month</td>
<td>32.50%</td>
<td>19.50%</td>
<td>5.91%</td>
<td>8.29%</td>
<td>23.13%</td>
<td>38.63%</td>
</tr>
<tr>
<td>Households with income between NPR. 2501 to NPR. 9,999</td>
<td>13.00%</td>
<td>7.80%</td>
<td>2.36%</td>
<td>3.32%</td>
<td>9.25%</td>
<td>15.45%</td>
</tr>
<tr>
<td>Households with income between NPR. 10,000 to NPR.19,999</td>
<td>5.42%</td>
<td>3.25%</td>
<td>0.98%</td>
<td>1.38%</td>
<td>3.85%</td>
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<tr>
<td>Household Cumulative Net Cash Flow (OPEX)</td>
<td>$112.79</td>
<td>$117.87</td>
<td>$123.17</td>
<td>$128.72</td>
<td>$134.51</td>
<td></td>
</tr>
<tr>
<td>% of Annual Household Income</td>
<td>0.00%</td>
<td>45.12%</td>
<td>47.15%</td>
<td>49.27%</td>
<td>51.49%</td>
<td>53.80%</td>
</tr>
<tr>
<td>Households with income less than NPR. 2500 per month</td>
<td>0.00%</td>
<td>45.12%</td>
<td>47.15%</td>
<td>49.27%</td>
<td>51.49%</td>
<td>53.80%</td>
</tr>
<tr>
<td>Households with income between NPR. 2501 to NPR. 9,999</td>
<td>0.00%</td>
<td>18.05%</td>
<td>18.86%</td>
<td>19.71%</td>
<td>20.59%</td>
<td>21.52%</td>
</tr>
<tr>
<td>Households with income between NPR. 10,000 to NPR.19,999</td>
<td>0.00%</td>
<td>7.52%</td>
<td>7.86%</td>
<td>8.21%</td>
<td>8.58%</td>
<td>8.97%</td>
</tr>
</tbody>
</table>

### Economic and Financial Scenario 3: With GCF Support and with Reverse Auctioning with Sensitivity Analysis Scenario One

<table>
<thead>
<tr>
<th>Year</th>
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<th>3</th>
<th>4</th>
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</thead>
<tbody>
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<td>$59.85</td>
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<td>$135.71</td>
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<tr>
<td>% of Annual Household Income</td>
<td>16.85%</td>
<td>3.85%</td>
<td>9.74%</td>
<td>23.94%</td>
<td>38.78%</td>
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<td>Households with income less than NPR. 2500 per month</td>
<td>16.85%</td>
<td>3.85%</td>
<td>9.74%</td>
<td>23.94%</td>
<td>38.78%</td>
<td>54.28%</td>
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<tr>
<td>Households with income between NPR. 2501 to NPR. 9,999</td>
<td>6.74%</td>
<td>1.54%</td>
<td>3.90%</td>
<td>9.58%</td>
<td>15.51%</td>
<td>21.17%</td>
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<td>0.64%</td>
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<td>$123.17</td>
<td>$128.72</td>
<td>$134.51</td>
<td></td>
</tr>
<tr>
<td>% of Annual Household Income</td>
<td>0.00%</td>
<td>45.12%</td>
<td>47.15%</td>
<td>49.27%</td>
<td>51.49%</td>
<td>53.80%</td>
</tr>
</tbody>
</table>
Households with income less than NPR. 2500 per month | 0% | 45.12% | 47.15% | 49.27% | 51.49% | 53.80%
Households with income between NPR. 2501 to NPR. 9,999 | 0% | 18.05% | 18.86% | 19.71% | 20.59% | 21.52%
Households with income between NPR. 10,000 to NPR. 19,999 | 0% | 7.52% | 7.86% | 8.21% | 8.58% | 8.97%

The income level and percentage of CAPEX and OPEX on the income level presents a stark picture that beneficiaries will require financial incentive to pursue clean cooking technology. Furthermore, as the requirement of utensils, annual electricity cost and repair/maintenance cost increases as per the different sensitivity analysis, the need to provide financial incentive to the beneficiaries becomes even more imperative.

It is to be further note that several qualitative factors exist that affects the investing decision from the beneficiary perspective. The following factors need to be taken in to consideration:

**Vulnerability to disruptions and Energy Security:** As Nepal has no internal supplies of petroleum or natural gas, its' vulnerability to disruptions in its supplies of imported fossil fuels is the principal reason why the project looks into ECS as a way of increasing national energy independence and ensuring national energy security. Energy demand in Nepal has increased for a decades, it has major impact in its economic, social and political developments. This energy situation will get worse in future, if actions are not taken in time. Hence, major intervention is required to overcome this present crisis. As per the BBC News on Nepal's forest under threat over fuel crisis59, during the supply constraint of the petroleum product and natural gas with the shortage in cooking gas and kerosene in Nepalese kitchens, this has suddenly increased the demand of firewood. Conservationist says that there was no choice left for the people to cut down trees despite having tradition of protecting the forest. This also led to a situation where in the price of LPG and petroleum product had increased to over 500% during the crisis.

Poverty and Income Level: The technology targets the poor households of urban and peri-urban area, The per capita income of the country was USD 1,085 in FY 2019/20 (MoF, 2020). Province 2 houses the largest number of multidimensional poor. A separate annex has been prepared taking in to consideration the portion of their income on the CAPEX and OPEX. As per the 2018 survey60, about 38.1% of household income of Terai region range between NPR 10,000 to 19,999 per month, followed by 27.9% income between NPR 20,000 to 39,999 per month, 19% income between NPR 2,501 to 9,999 per month, 10.4% income more than NPR 40,000 per month.

Remittance: It is expected that the employment sector will be negatively impacted by the COVID-19 pandemic, and the return of Nepali workers, mainly from Gulf countries, is projected to cause a 20% decline of remittances (CBS, 2020). About 20%–25% of the estimated 3 million Nepalese workers abroad are likely to return home, mainly because of two reasons: first, the work tenure of about 60 % of

60 A Survey of the Nepal People in 2018, School of Art, Kathmandu University, Interdisciplinary Analysts and The Asia Foundation 2019
the Nepalese workers is over and, second, a large number of workers have lost their jobs due to the pandemic (Mandal, May 21, 2020). This will affect the inflow of remittance in the country.

Please explain how best available technologies and practices have been considered and applied. If applicable, specify the innovations/modifications/adjustments that are made based on industry best practices

In collaboration with Nepal Academy of Science and Technology, Renewable Energy Test Stations, AEPC will strengthen the existing testing centers and expand its services at provincial level to determine minimum technical standard and process to approve the products based on the standard. This will ensure dissemination of pre-qualified technologies with internationally accepted standards and parameters.

The project will also provide training to private service providers on standards throughout the project period, set up MIS on testing center, place and operationalize independent thirty party monitoring agencies and set up coordination mechanisms at Province and LG level.
**E. LOGICAL FRAMEWORK**

This section refers to the project/programme’s logical framework in accordance with the GCF’s Performance Measurement Frameworks under the Results Management Framework to which the project/programme contributes as a whole, including in respect of any co-financing.

### E.1. Paradigm shift objectives

Please select the appropriated expected result. For cross-cutting proposals, tick both.

- ☒ Shift to low-emission sustainable development pathways
- ☐ Increased climate resilient sustainable development

### E.2. Core indicator targets

Provide specific numerical values for the GCF core indicators to be achieved by the project/programme. Methodologies for the calculations should be provided. This should be consistent with the information provided in section A.

#### E.2.1. Expected tonnes of carbon dioxide equivalent (t CO₂ eq.) to be reduced or avoided (mitigation and cross-cutting only)

<table>
<thead>
<tr>
<th></th>
<th>Annual</th>
<th>Lifetime</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>271,401 t CO₂ eq.</td>
<td>6,513,629 t CO₂ eq.</td>
</tr>
</tbody>
</table>

#### E.2.2. Estimated cost per t CO₂ eq.

<table>
<thead>
<tr>
<th></th>
<th>Total project financing</th>
<th>Requested GCF amount</th>
<th>Expected lifetime emission reductions</th>
<th>Estimated cost per t CO₂ eq. (d = a / c)</th>
<th>Estimated GCF cost per t CO₂ eq. removed (e = b / c)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>49,151,817 USD</td>
<td>21,128,224 USD</td>
<td>6,513,629 t CO₂ eq</td>
<td>7.54 USD / t CO₂ eq</td>
<td>3.24 USD / t CO₂ eq</td>
</tr>
</tbody>
</table>

#### E.2.3. Expected volume of finance to be leveraged by the proposed project/programme as a result of the Fund’s financing, disaggregated by public and private sources (mitigation and cross-cutting only)

<table>
<thead>
<tr>
<th></th>
<th>Total finance leveraged</th>
<th>Public source co-financed</th>
<th>Private source finance leveraged</th>
<th>Total Leverage ratio (i = f / b)</th>
<th>Public source co-financing ratio (j = g / b)</th>
<th>Private source leverage ratio (k = h / b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(f)</td>
<td>28,024,593 USD</td>
<td>28,024,593 USD</td>
<td>0</td>
<td>1.33</td>
<td>1.33</td>
<td>0</td>
</tr>
</tbody>
</table>

#### E.2.4. Expected total number of direct and indirect beneficiaries, (disaggregated by sex)

<table>
<thead>
<tr>
<th></th>
<th>Direct</th>
<th>Indirect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For a multi-country proposal, indicate the aggregate amount here and provide the data per country in annex 17.

#### E.2.5. Number of beneficiaries relative to total population (disaggregated)

<table>
<thead>
<tr>
<th></th>
<th>Direct</th>
<th>Indirect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### E.3. Fund-level impacts

Select the appropriate impact(s) to be reported for the project/programme. Select key result areas and corresponding indicators from GCF RMF and PMFs as appropriate. Note that more than one indicator may be selected per expected impact result. The result areas indicated in this section should match those selected in section A.4 above. Add rows as needed.

<table>
<thead>
<tr>
<th>Expected Results</th>
<th>Indicator</th>
<th>Means of Verification (MoV)</th>
<th>Baseline</th>
<th>Target</th>
<th>Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3.0 Reduced emissions from buildings, cities, industries and appliances</td>
<td>M3.1 Tonnes of carbon dioxide equivalent (t CO2 eq.) reduced or avoided - buildings, cities, industries, and appliances</td>
<td>Monitoring of verification reports from Independent Designated Operational Entity (DoE)</td>
<td>0</td>
<td>3,537,473 t CO2 eq</td>
<td>Applied methodologies(^61): UNFCCC methodologies(^62) AMS I.C, AMS II.G and AMS I.E are used for emission reduction calculation. Project lifetime: 24 yrs.(^63) Annual emission reductions: 271,401 t CO2 eq. Lifetime emission reductions: 6,513,629 t CO2 eq.</td>
</tr>
</tbody>
</table>

---

\(^61\) For electric cookstoves: AMS I.C. Thermal energy production with or without electricity, version 21, For Tier 3+ biomass based ICS: AMS II.G. - Energy Efficiency measures in thermal applications of non-renewable biomass (Version 11), For Biogas: AMS I.E. Switch from non-renewable biomass for thermal applications by the user (Version 10.1)

\(^62\) [https://cdm.unfccc.int/methodologies/SSCmethodologies/approved](https://cdm.unfccc.int/methodologies/SSCmethodologies/approved)

\(^63\) Emission reduction for the CCS technology implemented during the project period is calculated based on the life of the technology which is considered as 5 years for electric stoves and Tier 3+ ICS, and 20 years for Biogas. It is also accounted that the electric stoves and Tier 3+ ICS installed in 5th years of the project period will last till 9th year and biogas installed in 5th year of the project will last till 24th year. So, the emission reduction is calculated within the life span of 24 years considering the downtime factor as 0.8 conservatively.
Select the appropriate outcome(s) to be reported for the project/programme. Select key expected outcomes and corresponding indicators from GCF RMF and PMFs as appropriate. Note that more than one indicator may be selected per expected outcome. Add rows as needed.

<table>
<thead>
<tr>
<th>Expected Outcomes</th>
<th>Indicator</th>
<th>Means of Verification (MoV)</th>
<th>Baseline</th>
<th>Target</th>
<th>Assumption</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M5.0 Strengthened institutional and regulatory systems</strong></td>
<td>M5.1 Institutional and regulatory systems that improve incentives for low-emission planning and development and their effective implementation</td>
<td>Final evaluation report and Mid-term evaluation consisting of Monitoring and evaluation of Annual Project reports and Monitoring and evaluation of Annual Municipal reports</td>
<td># LG don’t have dedicated human resource for energy/climate change</td>
<td># All 150 CCS implemented LGs have dedicated CCS mobilizer. # MEP developed in all 150 CCS implemented LGs. An increase in access to CCS by 70% as a result of development of MEP and deployment of CCS mobilizer at Local level.</td>
<td># The CCS mobilizer will make users aware on benefits of using CCS which increases the willingness of users to use CCS. # LGs are willing to implement the municipal energy plans with focus on the CCS</td>
</tr>
</tbody>
</table>
| **M7.0 Lower energy intensity of buildings, cities, industries and appliances** | M7.1 Energy intensity/improved efficiency of buildings, cities, industries and appliances as a result of Fund support | Impact Assessment Report including Monitoring of verification reports from Independent Designated Operation Entity (DoE) Monitoring | 0 | # 5,002.80 TJ saved
Biogas: 280.80 TJ saved
Tier 3+ ICS: 3931.20 TJ saved
Electric cookstoves: 790.80 TJ saved | # 16,179.92 TJ saved
Biogas: 702.82 TJ saved
Tier 3+ ICS: 12841.92 TJ saved
Electric cookstoves: 2636 TJ saved | # Target HH will completely use new CCS provided for their cooking purposes |
### E.5. Project/programme performance indicators

The performance indicators for progress reporting during implementation should seek to measure pre-existing conditions, progress and results at the most relevant level for ease of GCF monitoring and AE reporting. Add rows as needed.

<table>
<thead>
<tr>
<th>Expected Results</th>
<th>Indicator</th>
<th>Means of Verification (MoV)</th>
<th>Baseline</th>
<th>Target</th>
<th>Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Database management through MIS as a national monitoring system</strong></td>
<td>#No. of (Management Information System) MIS with real time data collection developed at LGs</td>
<td>Monitoring report on the status of MIS implementation at LGs. Final evaluation report</td>
<td>0</td>
<td># All the 150 CCS implemented LGs have MIS database system for sex disaggregated data collection and as a result a reliable data source is accessible at municipal</td>
<td># LG take the ownership of the project and are capacitated to use MIS for data collection.</td>
</tr>
<tr>
<td>Increase affordability of CCS technology through bulk tendering via reverse auctioning approach</td>
<td># Percentage price reduction of CCS as compared to business as usual model</td>
<td>Annual Project Report and Mid term evaluation report</td>
<td># Bulk tendering via reverse auctioning is in place</td>
<td># Bulk tendering will reduce the cost of CCS technologies</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Increase in proportion of households adapting CCS technology</td>
<td>Final evaluation report and Midterm evaluation report and Impact Assessment Report</td>
<td>Monitoring of secondary data from the reports on baseline and targets published by the GoN such as Nepal Living Standard Survey</td>
<td># 1, 108,004HH LPG users</td>
<td># Demand side of the CCS is strengthened with increased awareness of the CCS</td>
<td></td>
</tr>
<tr>
<td></td>
<td># No. of HH with LPG shifted to electric stoves</td>
<td># 958,004 HH LPG users</td>
<td># 608,004HH LPG users</td>
<td># Reliable supply of grid is ensured</td>
<td></td>
</tr>
<tr>
<td></td>
<td># No. of HH with TCS shifted to biogas and Tier 3+ ICS</td>
<td># 11626 HH ECS users</td>
<td># 161,626 HH ECS users</td>
<td># Behavior change of HH towards the CCS.</td>
<td></td>
</tr>
<tr>
<td></td>
<td># 1,600,221 HH TCS users</td>
<td># 1,446,221 HH TCS users</td>
<td># 1,100,221 HH TCS users</td>
<td># Easy access to service centers for repair and maintenance of stoves</td>
<td></td>
</tr>
<tr>
<td></td>
<td># 89,983 HH biogas users</td>
<td># 93,983 HH biogas users</td>
<td># 99,983 HH biogas users</td>
<td># Users are oriented on safety measures on operating the stoves</td>
<td></td>
</tr>
<tr>
<td>Quality assurance mechanism for CCS is</td>
<td>Final evaluation report, Midterm evaluation</td>
<td># National standards on CCS updated</td>
<td># Updated national standards on CCS implemented</td>
<td># Government willingness to implement CCS standards</td>
<td></td>
</tr>
<tr>
<td></td>
<td># Standards on CCS strengthened</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>Report and Impact Assessment Report</td>
<td>#1 CCS testing centre strengthened at national level</td>
<td>#1 CCS testing centre strengthened at national level that provides additional and regular service to the users as per the demand.</td>
<td># Strengthened testing centre will provide additional and regular service as per the demand.</td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>------------------------------------</td>
<td>---------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td># No. of testing centres strengthened</td>
<td># Independent verification and third party monitoring is in place and operational</td>
<td># A gender inclusive, independent verification and third party monitoring agency is in place</td>
<td># At least 10% of the deployed CCS technologies verified through independent monitoring verification</td>
<td># Third party monitoring will be conducted annually for the HH where installation was conducted preceding year</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A supply chain mechanism for CCS is established and functional</th>
<th># No. of service centre strengthened at provincial level ensuring participation of women technicians</th>
<th># 4 service centre strengthened at provincial level</th>
<th># 4 service centre strengthened at provincial level</th>
<th># The province level service centres will coordinate and support in project implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td># No. of after sales service providers established and strengthened ensuring participation of women technicians</td>
<td>Annual Project Report Mid-term evaluation report and Impact Assessment Report Final evaluation report</td>
<td># 275 after sales service providers established and capacitated to provide continued after sales service.</td>
<td># 900 after sales service providers established and capacitated to provide continued after sales service.</td>
<td># Users will receive regular after sales service as per their requirement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
<td></td>
<td># Demand side of the CCS is strengthened with increased awareness of the CCS</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Subnational institutions facilitated CCS promotion at local and provincial level</th>
<th>Project annual report and Midterm evaluation report and Impact Assessment Report</th>
<th>Final evaluation report</th>
<th># No. of LGs with MEP</th>
<th># No. of LGS with dedicated CCS facilitator</th>
<th># No. of PGs with dedicated energy units</th>
<th># No. of clean cooking champions</th>
<th># Increased willingness to pay among the beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td># 38 LGs with MEP</td>
<td># 150 LGs with MEP dedicated CCS mobilizers (50% women)</td>
<td># 4 PGs with dedicated provincial project management units (50% women)</td>
<td># 450 clean cooking champions (60% women) mobilized at LGs</td>
<td># LGs and PGs provides supports in Project implementation</td>
<td># LGs are willing to develop and implement MEP</td>
<td># Concerned stakeholders proactively participate in the project</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Household fully adapted CCS technologies with changed behavior</th>
<th>Project annual reports Mid-term evaluation report and Impact assessment report</th>
<th>Final evaluation report</th>
<th># % of HH with continued use of CCS technology</th>
<th># No. of awareness campaigns and promotional activities</th>
<th># 120 gender friendly awareness campaigns and promotional</th>
<th># 450 clean cooking champions (60% women) mobilized at 150 LGs</th>
<th># Users proactively participate in the awareness campaigns</th>
</tr>
</thead>
<tbody>
<tr>
<td># 90% of HH with continued use of CCS technology</td>
<td># 300 gender friendly awareness campaigns and promotional activities</td>
<td># 90% of HH with continued use of CCS technology</td>
<td># Users proactively participate in the awareness campaigns</td>
<td># Awareness campaigns and training programs (gender</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| # 90% of HH with continued use of CCS technology | # 38 LGs with MEP | # 150 LGs with MEP dedicated CCS mobilizers (50% women) | # 4 PGs with dedicated provincial project management units (50% women) | # 450 clean cooking champions (60% women) mobilized at LGs | # LGs and PGs provides supports in Project implementation | # LGs are willing to develop and implement MEP | # Concerned stakeholders proactively participate in the project |</p>
<table>
<thead>
<tr>
<th>Economic, social and environmental co-benefit</th>
<th>activities</th>
<th>sensitized) will lead to behavior change of the users</th>
</tr>
</thead>
<tbody>
<tr>
<td># New Job creation in CCS sector</td>
<td>Project annual report, Final evaluation report and midterm evaluation report</td>
<td>0</td>
</tr>
<tr>
<td># Cost savings from the use of CCS</td>
<td>Project annual reports Mid-term evaluation report and Impact assessment report Final evaluation report Monitoring of secondary data from the reports on baseline and targets published by the GoN</td>
<td>0</td>
</tr>
<tr>
<td># Improvement in health and safety as a result of</td>
<td>Mid-term evaluation report and Impact assessment Baseline to be defined within the first year</td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Report Description</td>
<td>Monitoring of secondary data from the reports on baseline and targets published by the GoN</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Reduced indoor smoke report</td>
<td>Final evaluation report</td>
<td>Monitoring of secondary data from the reports on baseline and targets published by the GoN</td>
</tr>
<tr>
<td># Reduction in the use of traditional biomass as cooking fuel</td>
<td>Mid-term evaluation report and Impact assessment report</td>
<td>5.04 tonnes/HH/year&lt;sup&gt;64&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

**E.6. Activities**

All project activities should be listed here with a description and sub-activities. Significant deliverables should be reflected in the implementation timetable. Add rows as needed.

<sup>64</sup> [https://cdm.unfccc.int/filestorage/F/U/4/FU4LR8H6NWKXXVBTJO3MDYP9I75GSQ1/PoA-DD_9572_V17.pdf?t=NXd8cWY5MnNufDAU90cUTyuJJJ_vSVXLiJVU](https://cdm.unfccc.int/filestorage/F/U/4/FU4LR8H6NWKXXVBTJO3MDYP9I75GSQ1/PoA-DD_9572_V17.pdf?t=NXd8cWY5MnNufDAU90cUTyuJJJ_vSVXLiJVU)
<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Sub-activities</th>
<th>Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component 1:</td>
<td>Scaling up the deployment of clean cooking technologies through accelerated investment and market development</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Activity 1.1.1: Development of Annual Procurement and Deployment plan | Based on the demand aggregation of each three CCS technologies, a cluster wise deployment procedure will be prepared at regional or provincial level. Different bidding documents for all three CCS technologies will be prepared to procure the technologies through bulk tendering via reverse auctioning. The tendering process will be inclusive and bottom up that would allow variety of options for consumers, not limited to only one type of stove. Work plan for output based financing and third party monitoring and verification will be prepared prior to deployment of CCS technology. | # Development of cluster wise deployment procedure in relation to demand aggregation  
# Preparing bidding documents for procurement through Bulk Tendering via Reverse Auctioning  
# Preparing work plan for Output based financing and third party monitoring and verification | # At least 3 bids for each technology will be called each year. |
| Activity 1.1.2: Procurement and Deployment of annual targeted number of CCS | The project aims to deploy 490,000 Tier 3+ Improved cookstoves (ICS), 10,000 Domestic Biogas Plants and 500,000 (Electric cookstoves) ECS over 5 years’ time. The Procurement of CCS technologies for this project will follow the Bulk tendering via reverse auctioning and Testing of parameters adhering to prescribed standards  
# Cluster Based Deployment and Installation of CCS and after sales and repair & maintenance service | # Procurement of CCS through Bulk Tendering via Reverse Auctioning and Testing of parameters adhering to prescribed standards  
# 500,000 electric cook stoves  
# 490,000 Tier3+ ICS  
# 10,000 domestic biogas plant | |
<table>
<thead>
<tr>
<th>Activity 1.1.3: Disbursement of initial 60% payment installment to the vendor upon delivery of CCS to respective municipalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>reverse auctioning approach.</td>
</tr>
<tr>
<td>After signing contract with the vendor, an amount not exceeding 20% will be provided to the vendor against a bank guarantee as a mobilization advance. After the local government has received the CCS technology, the total amount, not exceeding 60%, will be disbursed to the vendor by AEPC, LG and beneficiary.</td>
</tr>
<tr>
<td># Independent field verification</td>
</tr>
<tr>
<td># LGs Verification</td>
</tr>
<tr>
<td># 1 Installation and commissioning report for the deployed CCS technologies</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Activity 1.1.4: Monitoring and Verification of Installed CCS units for Output Based Financing (OBF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>After the installation of the CCS technologies at households, third party will monitor and verify the technical parameters of the installed technologies. After the verification, AEPC will provide 40% of the remaining amount to the vendor through output based payment approach.</td>
</tr>
<tr>
<td># Assessment of beneficiaries in terms of (i) Technical parameters of installed technologies (ii) Mitigation Impact (iii) Adaptation Benefits through independent third party verification (iv) sex disaggregated socio-economic information</td>
</tr>
<tr>
<td># Monitoring and verification reports</td>
</tr>
<tr>
<td># At least 19, 19 and 5 third party monitoring and verification reports for ICS, Electric cookstoves and biogas respectively.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component 2: Strengthen enabling environment through sector based assessments and quality assurance of the technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output 2.1 Enhancing product standards, conducting assessments, surveys and analysis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Activity 2.1.1: Develop partnership agreement between AEPC, Province Governments, Local Government and other implementation Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEPC will sign GESI integrated-Memorandum of Understanding (MoU) with PGs and LGs and facilitate PGs to develop and reinforce policy and strategy in promoting CCS and support LGs in implementation of the project. Similarly, AEPC</td>
</tr>
<tr>
<td># Place MoU with the PGs and facilitate PGs to develop and reinforce policy and strategy in promoting CCS</td>
</tr>
<tr>
<td># Place MoU with all the LGs in promotion of CCS/implementation of the project</td>
</tr>
<tr>
<td># MoU with major project stakeholders</td>
</tr>
<tr>
<td># 150 MoUs placed with LGs</td>
</tr>
<tr>
<td># 6 MoUs placed with PGs</td>
</tr>
<tr>
<td>#At least 904MoUs</td>
</tr>
<tr>
<td>Activity 2.1.2: Update existing standards(^{65}) and set benchmarks for the technologies required for the project implementation</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>The existing standards on CCS will be analyzed and benchmarks will be set for the technologies required for project implementation. As standards on induction Stoves, ICS, and domestic biogas plants and have been set previously, these standards will be reviewed and updated, if needed. In collaboration with Nepal Electricity Authority (NEA), the project will facilitate to introduce cost effective tariff structure for electric cooking and facilitation would be done to ensure quality of electric power supply in the Terai.</td>
</tr>
<tr>
<td>NAST/RETS, NBSM, financial Institutions and private service providers in promotion of CCS</td>
</tr>
<tr>
<td>with private service providers</td>
</tr>
</tbody>
</table>

---

\(^{65}\) Standards on Biomass Cookstoves is as per the National Interim Benchmark for Solid Biomass Cook Stoves,(NIBC, 2016) and National Standards for Household electrical appliances has been recently developed in coordination with Nepal Bureau of Standard and Metrology
| Activity 2.1.3: Develop Municipal Energy Plan template by analyzing standards and formats | The project will develop MEP template based on participatory approach (includes representation from diverse representative groups) by analyzing standards and formats. | # Prepare energy baseline situation  
# Conduct renewable energy resource inventory  
# Identify opportunities and challenges and energy intervention Plan | # 1 MEP template |
| --- | --- | --- | --- |
| Output 2.2 | Strengthening quality assurance mechanisms | Lab upgradation and improved testing service as per ISO standards for ECS, and upgradation of National Interim Benchmark of improved Cookstoves 2016 in line to tier based criteria and improved testing service  
Training and capacity building to all relevant stakeholders (RETS, AEPC, LG, beneficiaries, sub-national institutions, suppliers, repair and maintenance service providers)  
Network building workshops with Local Governments, universities, Agencies working in Clean Cooking Solutions  
Knowledge development and dissemination through seminars/webinars/ | #One (1) Testing centre upgraded with facilities to test electric cook stoves and technologies proposed by the project.  
# 1 Central Level testing centre upgraded to accommodate the proposed technologies  
# Need assessment reports for providing testing facilities from center level in the seven (7) provinces  
# One (1) Standard on electric cook-stoves with safety and performance |
### Activity 2.2.2: Development of Management Information System as a national monitoring system with real time data collection from LGs

Development of Management Information System (MIS) is another critical element of the project wherein the demands from various LGs are recorded, aggregated and distribution/installation is regularly updated along with performance of the disseminated technologies. As AEPC is in the process of developing a MIS accommodating local and provincial level, a fit gap analysis will be conducted of existing MIS and assess the implementation of the modules required for the project implementation. MIS will ensure sex disaggregated socio economic data collection. In addition, training will be provided to LG level personnel on real time data collection and operationalization of MIS.

<table>
<thead>
<tr>
<th>Component 3:</th>
<th>Empowering institutions, capacitate supply chain and ensure increased access to clean cooking solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output 3.1:</td>
<td>Capacity development of sub-national institutions</td>
</tr>
<tr>
<td>Activity 3.1.1: Conduct national</td>
<td>AEPC will conduct a gender inclusive national level stakeholder</td>
</tr>
<tr>
<td>Activity 3.1.2: Develop LG Municipal Energy Plan</td>
<td></td>
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<td>------------------------------------------------</td>
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<tr>
<td>This will involve support in the development of municipal energy plans for identifying best available resources at local level for energy generation and consumption pattern of households. With the standards and formats developed during component 2, actual MEP will be prepared during this stage. The MEPs will also be instrumental in indicating potential energy resources that could be identified.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Stakeholder consultation workshop between AEPC, PG and LG</th>
</tr>
</thead>
<tbody>
<tr>
<td>consultation workshop with PGs and LGs to plan their approach in setting up an energy unit at regional/provincial and local level. The consultation workshop follows participatory approach with GESI integration and inclusion of diverse representative groups. At provincial level, 4 energy units will be set up with 2 energy officers. At LG level, the project will allocate at least one CCS facilitator in each local government and capacitate them to facilitate the project particularly for door to door awareness campaigns, collection of demands, type of the technologies required at the household level and data management through the MIS.</td>
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<table>
<thead>
<tr>
<th>Monitoring plan for LGs</th>
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</thead>
<tbody>
<tr>
<td># Drafting monitoring plan for LGs to support monitoring the CCS in their respective LGs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Monitoring plan for LGs</th>
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<tbody>
<tr>
<td># Monitoring plan for LGs</td>
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</table>

# MEP at 150 LGs
harnessed in the future. This will create an environment wherein MEPs will become a critical element of the annual budgeting and planning process.

<table>
<thead>
<tr>
<th>Activity 3.1.3: Capacitating Local Governments and Provincial Governments</th>
<th>AEPC will capacitate LGs to prioritize CCS promotion in periodic and annual plans, formulating appropriate policies and mechanisms.</th>
<th># Coordinate with the Provincial Governments in creating an enabling environment for the project at province level</th>
<th># 4 capacity assessment and strengthening report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity 3.1.4: Annual national level review and consultation meeting</td>
<td>AEPC will collaborate with its outreach partners at the district or regional level to review the annual objectives and targets and ameliorate MEP guidelines and project materials as required.</td>
<td># Collaborate with AEPC’s outreach partners at the district or regional level to review the annual objectives and targets</td>
<td># 1 Improved MEP guidelines</td>
</tr>
<tr>
<td>Output 3.2: Increased awareness and outreach to enhance demand</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity 3.2.1: Mobilize clean cooking mobilizers in each LG</td>
<td>At least 150 CCSmobilizers (50% women) will be mobilized in the project area. They will facilitate the project particularly for door to door awareness campaigns, collection of demands, type of the technologies required at the household level and data management through the MIS.</td>
<td># Prepare gender friendly ToR for clean cooking mobilizer</td>
<td># 1 CCS mobilization report of 150 CCS mobilizer at the LGs</td>
</tr>
<tr>
<td>Activity 3.2.2: Development of training materials</td>
<td>The consultation workshop will be conducted at national level between AEPC, LGs, beneficiaries, CCs champions, and local vendors and private sector service providers</td>
<td># Develop gender sensitive extensions materials and guidelines for implementing CCS awareness in targeted project areas</td>
<td># At least 3 Training manual on CCS</td>
</tr>
<tr>
<td><strong>Activity 3.2.3:</strong> Identifying clean cooking champions</td>
<td>to identify the need and develop materials/manual/guidelines on CCS awareness to local communities.</td>
<td>effectively address gender equality and supporting vulnerable communities through CCS</td>
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<tr>
<td>At local level, the project will identify 450 clean cooking champions (3 at each local government) who will be trained to advocate on the benefits of adopting clean cooking technology, provide training on CCS installment and use, and contribute to the local level decision-making process. Besides, they will also be trained to facilitate in bottom up need assessment and in designing bespoke technical assistance and capacity development programme for respective LGs.</td>
<td># Carry out stakeholder mapping exercise at local level to identify the relevant stakeholders and conduct inclusive interaction programme with such relevant stakeholders to develop Terms of Reference (ToR) for clean cooking champions.</td>
<td># 1 ToR of the clean cooking champions # 1 Report on campaign identification and mobilization of 450 Clean cooking champions at LGs</td>
<td></td>
</tr>
</tbody>
</table>

**Activity 3.2.4:** Develop materials for awareness on CCS (in national and local languages) with its impact potential on livelihoods and support to vulnerable communities:

The project will develop awareness materials on national and local languages which will underpin the activity 3.2.5. The awareness materials will consist of information, education and communication materials on the benefits of CCS in financial savings, cleanliness, health benefits and drudgery reduction compared to TCS. Awareness material will be in form of information on CCS through mass media (Local FM, Electronic media, Print Media, Social Media).

# Disseminate information on CCS through mass media (Local FM, Electronic media, Print Media, Social Media)

# Printing and publication of gender sensitive leaflets, user manuals and usage of various avenues of media for promotion of CCS

# Information, education and communication materials highlighting the benefits of the CCS such as Leaflets, user manuals, local FM, electronic media and print media.
<table>
<thead>
<tr>
<th>Activity 3.2..5</th>
<th>Campaigns and promotional activities in coordination with the PGs, LGs, community champions, NGOs and volunteers</th>
<th>The project will support and empower users by CCS mobilizers and clean cooking champions for awareness raising on climate change impact, highlighting the benefits of CCS such as fuel saving, cleanliness, health benefits and drudgery reduction compared to TCS by disseminating information on CCS developed by activity 3.2.4. The awareness programme will mainly focus on marginalized communities and households ensuring at least 60% of female participants. CCS mobilizers and champions will conduct behavioral change programme through awareness activities, Operation and Maintenance manuals and cooking guides using CCS.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity 3.2.6: Ameliorate awareness materials and guidelines</td>
<td>AEPC will conduct annual national review and planning meeting with AEPC’s outreach partners at the district or regional level. At this stage, the awareness materials and guidelines</td>
<td># Review and planning meeting with AEPC’s outreach partners at the district or regional level # Ameliorate awareness materials and guidelines if required</td>
</tr>
</tbody>
</table>
Output 3.3: Strengthening service centres, biomass manufacturers to provide quality and affordable clean cooking solutions

<table>
<thead>
<tr>
<th>Activity 3.3.1: Capacity and training needs assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEPC will conduct the national level stakeholder consultation workshop with AEPC/NAST/RETS/NBS M, beneficiaries, local manufacturers, vendors, financial institutions, LGs, training institutions (e.g. CTETV) and other relevant stakeholders to assess the existing situation, capacity and training needs assessment of the service centres for providing CCS services. Similarly, based on consultation with the participants, necessary changes will be made in existing training manuals and new training manuals and guidelines will be drafted to support local manufacturers.</td>
</tr>
<tr>
<td># Assess the existing situation, capacity and training needs assessment (TNA) of the service centres in providing services for CCS</td>
</tr>
<tr>
<td># Drafting gender sensitive training guidelines centered to local manufacturers and guidelines for providing skills training to beneficiaries</td>
</tr>
<tr>
<td># Familiarizing with existing training manual and making necessary changes based on consultation with the participants</td>
</tr>
<tr>
<td># At least 4 Training needs assessment report</td>
</tr>
<tr>
<td># At least 6 training guideline/manuals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Activity 3.3.2: Ameliorate project materials and guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEPC will conduct an annual national level coordination and sharing meeting with the project partners and review the progress, draw lesson and planning with the AEPC's outreach partners at the district or regional level. At this coordination meeting, the project materials and guidelines will be ameliorated if required.</td>
</tr>
<tr>
<td># Review the progress, draw lesson and planning with the AEPC's outreach partners at the district or regional level</td>
</tr>
<tr>
<td># Ameliorate project materials and guidelines if required</td>
</tr>
<tr>
<td># One (1) Annually published revised project materials and guidelines</td>
</tr>
</tbody>
</table>
### Activity 3.3.3: Establish and strengthen service centres at provincial and local level

In collaboration with Nepal Academy of Science and Technology (NAST)/ Renewable Energy Test Stations (RETS); AEPC will strengthen the existing provincial service centre and capacitate them to work as AEPC focal point for their respective local service centres; Local service centres will provide services to the CCS users.

- Develop subsidy model to support installing equipment for service centres
- Identify potential local CCS service providers
- Support in strengthening technical and institutional capacity of local service providers
- At least 4 province level service centres and 900 local service centres established in project area

### Activity 3.3.4: Conduct trainings to service centre operators and local manufacturers in collaboration with financial and Council for Technical Education and Vocational Training (CTEVT) institutions

Capacity development trainings will be provided to the service providers and local manufacturers, mobile and other electric appliances repair centers, metal workshops, at local level to capacitate them in providing after sales service, domestic production and maintenance of CCS and strengthen the supply chain in coordination with CTEVT institutions. Besides, training on business performance and business continuity plan will be provided to manufacturers and service centres. Capacity development programme will be conducted to promote innovation and R&D. In case of ECS, a technical network will be created to minimize accident such as short circuit.

- Gender inclusive training on the domestic production and maintenance of CCS; reuse and safe disposal of damaged/dysfunctional CCS units
- Gender inclusive training on business performance, business continuation plans and others of local partners and suppliers
- Conduct match making consultation sessions between local manufacturers, financial institutions, private investors, entrepreneurs
- 24 Training reports for service centre operators and local manufacturers in 5 years
- Contract agreement with CTEVT institutions
<table>
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<tr>
<th>Activity 3.3.5: Conduct skills development training to CCS beneficiaries and vulnerable groups in collaboration with CTEVT at Province level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training on making fuel for Tier 3+ ICS, repair and maintenance, biomass fuel processing, biogas installation, electrical safety and house wiring will be provided to CCS beneficiaries and vulnerable and disadvantaged groups (DAG). Training will be provided to women (electric cook stove users) on electrical safety and basic technical skills on using electric stoves to increases their confidence and the use of stove. Self-employment skilled training related to CCS and others as per the local demand will be provided to the most vulnerable people such as widows, single women, Female headed households, minor ethnic groups, lower caste people (Dalit) and indigenous group (Janjati), ensuring at least 33% female participation.</td>
</tr>
</tbody>
</table>
| # Training on biomass fuel processing, biogas installation, electrical safety and house wiring, production of pellets and use of bio slurry
# Self-employment skilled training to most vulnerable people (at least 33% female) related to CCS and others as per the local demand |
| Activity 3.3.6: Strengthen existing regional level service centres under AEPC's past CCS projects into fully operational province level service centres |
| The existing regional level service centres developed as part of previous CCS programmes of Nepal, will be assessed and strengthened to function as province level service centres. The province level centres will be the focal technical point of |
| # Support existing regional service centres |
| # 4 province level service centres established |
| # 24 training reports for CCS beneficiaries and vulnerable groups in 5 years |
contact for all local level service providers. These service centres will have the capacity to provide maintenance and repair services to CCS users as well as local service providers of all CCS technologies.

E.7. Monitoring, reporting and evaluation arrangements (max. 500 words, approximately 1 page)

Besides the arrangements (e.g. annual performance reports) laid out in AMA, please give a summary of the project/programme specific arrangements for monitoring and evaluation. Please provide the types of interim and final evaluations. Describe Accredited Entity (AE) project reporting relationships, including to the NDA/Focal Point and between AE and Executing Entity (EE) as relevant, identifying reporting obligations from the EE to the AE. This should relate to the frequency of reporting on project indicators, implementation challenges and financial status.

AEPC has set up a Monitoring and Quality Assurance (MQA) Unit within the Technical Support Component, which is responsible for setting up an output-based M & E system. One of the major tasks of the unit is to make regular assessment of progress against the set results and annual plans. It will also cover the monitoring of energy-related climate change as well as socio-economic impacts including Gender and Social Inclusion (GESI).

The MQA unit has been setting up necessary M&E systems and tools such as baseline, MIS, verification, reporting, review & feedback, progress tracking etc. toward instituting an output based M&E system. The output based M&E system will therefore be designed for detailing the operation of feedback mechanism including how it provides management information to different levels of PIU. AEPC also envisages developing an integrated web-based MIS as another vital instrument so that everyone interested will have easy access to the required information.
The basic building blocks of AEPC monitoring system are (a) quality-controlled tools to collect, process and analyze data (b) processes to structure monitoring cycles in every semester (c) roles and responsibilities describing who does what (d) knowledge management, for example, description of minimum data requirements, FAQs, etc.

The Operations Committee of AEPC having representation of AEPC management and Local Government representatives have monthly meetings to discuss the results and issues involved in the CCS programme. For the household energy component, AEPC will be responsible for day-to-day management and monitoring of the three components' activities and results, which are categorized into following five areas:

I. Aggregate Demand Collection Verification and Monitoring

1. AEPC will support Local Governments to strengthen their own demand collection from households, monitoring and evaluation systems to facilitate reporting and quality control. Aggregate demand collection will be collected and categorized for each of the 22 districts and their respective Local Governments.

II. Installation Verification and Monitoring

2. AEPC will conduct lab tests on the quality of Tier 3+ ICS, ECS and biogas during the bulk tendering via reverse auctioning process.

3. AEPC ensures that installation service providers are conducting those activities as per AEPC guideline through inspection by the monitoring team. During installation of CCS, installation service providers are required to maintain prescribed dimensions of CCS, maintain serial numbers, follow CCS installation guidelines and ensure proper usage of CCS. After installing CCS, installation service providers will have an agreement paper with GPS information of location of the household and a one year after-sales service warranty card to customers for repair and maintenance service.

4. Installation service providers are required to send one copy of customer agreement paper to AEPC regional offices. Then the installation service providers will enter the CCS installation data
using a web based software and submit disbursement requests to AEPC. We will have a GPS designated system with phone number backup in place to track daily installation data of various fields. The option of introducing this system would allow for automatic update of installation data in the database maintained at AEPC to avoid false claims. Using this technology, customer satisfaction feedback via text messaging would allow for an easy and cost-effective method for collecting customer feedback, thus ensuring enhanced accountability of the installation service providers for proper service delivery. To better assess customer feedback from clean cooking solutions, several IT based options for enhanced reporting and feedback will be explored for implementation for the project. After receiving disbursement requests from the installation service providers, AEPC inspects at least 10% of CCS submitted under each disbursement request. In case of 20% or more discrepancy in a particular cluster, AEPC excludes all CCS submitted under the disbursement request for that cluster.

5. **Monthly sales sheets** will then be communicated to AEPC regional offices. Monitoring officers will revise the sales information, verify and cross-check information, using plausibility checks and random spot checks using GPS tracker and mobile number. After accepting the data, they will be compiled and transmitted to the AEPC head office, which performs another set of verification and crosschecks. The data then become part of AEPC’s six-monthly progress reports. These reports inform AEPC’s multi-donor governing board meetings about the current status of target achievement and about areas that need attention.

6. At the province/regional level, the project will deploy at least two staffs, 1- technical and 1- coordinator. The technical staff will look after technical issues and support service centres and vendors and the coordinator will coordinate and monitor the project at province level. Quality Control under the programme, AEPC will establish an inspection team, a call center and a web-based software to keep track of each CCS installed under the programme.

### III. Project Midway Implementation Verification and Evaluation

AEPC will provide implementation status report (ISR), audit reports by AEPC, interim evaluation and project evaluation and operational committee reports of AEPC as part of monitoring, aide memoirs as part of the monitoring and evaluation reports after 24 months of the implementation of the project.

1. **Mid-term evaluation/review:** an independent mid-term review will be conducted in two and half year of the project implementation. It will focus on an overall review of AEPC’s programmatic approach, of project progress, performance and impact (environmental, social, gender), and of finances. The review will also focus on institutional, administrative and organizational set-up of the project. The mid-term review will be based on desk reviews and interviews with key staff and partners of all projects, and on field visits to two projects. This will evaluate the result of project in the areas of (i) reduction in the use of traditional biomass as cooking fuel (ii) improvement in health and safety as a result of reduced indoor smoke (iii) cost savings from the use of CCS (iv) new job creation in CCS sector (v) % of HH with continued use of CCS technology (vi) no. of awareness campaigns and promotional activities and its impact (vii) effectiveness of the Municipal energy plans and institutional arrangement to oversee energy at the provincial level (viii) switch to the proposed technologies, (ix) reduction in price of CCS with bulk tendering and reverse auctioning and (x) impact of MIS on the overall knowledge management system

2. The mid-term review will include recommendations for (1) any corrective actions if necessary (2) updates to the project design and (3) changes to the project monitoring approach. There will be
IV. Impact assessment

1. The project will assess the quality of access provided applying scientific methodology by developing multivariable impact assessment tools taking into account the transitional character as well as the complexity of improving access to Clean Cooking Solutions. Improving the cooking situation in the sense of CCS means: considering fuel quality or even switching fuel, improving cooking devices and cooking equipment, adjusting user behavior and cooking practices as well as increasing ventilation and modifying the kitchen. While some internationally discussed measurement approaches are mainly based on stoves and laboratory test results, the AEPC will evaluate quality and effects of access to cooking energy based on field-based approximations and household surveys.

2. Further impact studies will be conducted to assess CCS adoption and daily usage, and the subsequent actual reductions of fuel-wood use and LPG. This will be measured by developing and applying a kitchen performance tool kit pertaining to Nepali culinary culture of Terai, which is a field test used to evaluate CCS performance amongst the beneficiaries. It will be designed to assess actual impacts on household fuel consumption. Based on the fuel saving results, the real resulting GHG emission reduction can be calculated with the methodology applied in the GCF Impact Model. The emission reduction will be monitored annually.

3. AEPC will conduct market development/making scorecards to calculate sustainability of the project.

4. Project impact monitoring will be performed at the final year of the project period to assess appropriate percentage of the total beneficiaries in terms of mitigation impact through replacement of fuel wood, dung cake and LPG and adaptation co-benefit in terms of fuel and time savings

5. Regular internal evaluation of the PIU targets against completed work as well as yearly administrative tasks will be performed throughout the project period.

6. Further socio-economic co-benefits (including gender, income, job creation, or health aspects), as well as potential adaptation impacts will be assessed by household survey.

V. Independent Third Party Monitoring and Verification

AEPC will hire a third party independent agency to monitor and verify CCS technology installed at the household. This third party monitoring and verification would be conducted throughout the project period. They will do their monitoring and verification of the CCS technology against the already defined standard and procedure.

VI. Final evaluation

An independent final evaluation would be conducted within six months after the end of project period. It will focus on overall performance vs. indicators, impacts and finances, and on implementation and
effects of the recommendations given by the mid-term review. This will further present a final evaluation in the areas of (i) reduction in the use of traditional biomass as cooking fuel (ii) improvement in health and safety as a result of reduced indoor smoke (iii) cost savings from the use of CCS (iv) new job creation in CCS sector (v) % of HH with continued use of CCS technology (vi) no. of awareness campaigns and promotional activities and its impact (vii) effectiveness of the Municipal energy plans and institutional arrangement to oversee energy at the provincial level (viii) switch to the proposed technologies, (ix) reduction in price of CCS with bulk tendering and reverse auctioning and (x) impact of MIS on the overall knowledge management system. The results of final evaluation will be presented to the stakeholders after finalization of the project.

E. RISK ASSESSMENT AND MANAGEMENT

F.1. Risk factors and mitigations measures (max. 3 pages)

Please describe financial, technical, operational, macroeconomic/political, money laundering/terrorist financing (ML/TF), sanctions, prohibited practices, and other risks that might prevent the project/programme objectives from being achieved. Also describe the proposed risk mitigation measures. Insert additional rows if necessary.

For probability: High has significant probability, Medium has moderate probability, Low has negligible probability
For impact: High has significant impact, Medium has moderate impact, Low has negligible impact

Prohibited practices include abuse, conflict of interest, corruption, retaliation against whistleblowers or witnesses, as well as fraudulent, coercive, collusive, and obstructive practices

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<tr>
<th>Selected Risk Factor 1</th>
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<tr>
<td>Category</td>
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<tr>
<td>Governance</td>
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</table>

**Description**

Establishing clarity vis-à-vis GoN subsidies, GoN’s Terai Clean Cooking Programme and GCF Grant

**Mitigation Measure(s)**

Please describe how the identified risk will be mitigated or managed. Do the mitigation measures lower the probability of risk occurring? If so, to what level?

Clear demarcation on GoN subsidy support and GCF grant. The GCF project will have separate mechanism through bulk tendering and reverse financing options. A Special Bank Account will be opened in a bank to channel GCF and AEPC fund. The fund will ensure synergy, no duplication of subsidy using monitoring matrix such as name, address, house GPS coordinates, phone numbers and visual confirmation. The fund will adhere to GCF Project Guidelines.

Selected Risk Factor 2
<table>
<thead>
<tr>
<th>Category</th>
<th>Probability</th>
<th>Impact</th>
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<tbody>
<tr>
<td>Technical and operational</td>
<td>Medium</td>
<td>Medium</td>
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**Description**

Adherence to the Public Procurement Act and Regulation (PPR/PPA) while proceeding with Reverse Auctioning

**Mitigation Measure(s)**

AEPC being a public entity needs to align its procurements with the Public Procurement Act and Regulation. Careful consideration will be taken while instigating bulk tendering and reverse auctioning. The auctioning will ensure technical quality standards and product specification standards of biogas, Tier 3+ ICS, and ECS are met via NAST/RETS within the lowest price of bid offer.

**Selected Risk Factor 3**

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<thead>
<tr>
<th>Category</th>
<th>Probability</th>
<th>Impact</th>
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<tbody>
<tr>
<td>Technical and operational</td>
<td>Medium</td>
<td>Medium</td>
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</table>

**Description**

Lack of awareness on adoption of electric cook-stove amongst users/beneficiary perspectives

**Mitigation Measure(s)**

Awareness campaigns for the behavioral change for widespread use of electric cooking technologies will be provided. Furthermore, ECS with multiple cooking plates/burner options will be provided for beneficiaries willing to pay.

**Selected Risk Factor 4**

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<tr>
<th>Category</th>
<th>Probability</th>
<th>Impact</th>
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<tbody>
<tr>
<td>Human Capital</td>
<td>Medium</td>
<td>Medium</td>
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</table>

**Description**

Lack of technical and project implementation skill related to Renewable Energy at the LGs.

**Mitigation Measure(s)**

Local Governments will be heavily engaged throughout the project process with demand generation, use of MIS, project implementation support and monitoring and evaluation. AEPC will coordinate with the municipality for the formation of MEP to enhance the skills of their energy officers.

**Selected Risk Factor 5**

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<th>Category</th>
<th>Probability</th>
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### Selected Risk Factor 6

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<tr>
<th>Category</th>
<th>Probability</th>
<th>Impact</th>
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</thead>
<tbody>
<tr>
<td>Technical</td>
<td>Medium</td>
<td>Medium</td>
</tr>
</tbody>
</table>

**Description**

Quality of electricity supply in different parts of the country is still poor. Numerous distribution transformers were damaged, and the distribution network could not handle the additional load effectively.

**Mitigation Measure(s)**

The power system reliability and electrification information will be assessed with Nepal Electric Authority and AEPC.

### Selected Risk Factor 7

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<thead>
<tr>
<th>Category</th>
<th>Probability</th>
<th>Impact</th>
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<tbody>
<tr>
<td>Technical</td>
<td>Medium</td>
<td>Medium</td>
</tr>
</tbody>
</table>

**Description**

Supply Chain Risk

**Mitigation Measure(s)**

Biogas and ICS repair and maintenance service providers are available in the project areas however; there are limited services for Tier 3+ ICS and ECS. Capacity development trainings will be provided to the manufacturers, mobile and other electric appliances repair centers, metal workshops, at local level to capacitate them in providing after sales service and strengthen the supply chain in coordination with CTEVT institutions. The operation and maintenance expenses cost will be borne by the beneficiaries.

### Selected Risk Factor 8

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<tr>
<th>Category</th>
<th>Probability</th>
<th>Impact</th>
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**Description**

Lack of proper guidance for implementation of energy efficiency program

**Mitigation Measure(s)**

Municipal Energy Plan will be designed as such to incorporate energy efficiency programs with enhanced skills of municipal energy officers. Furthermore, energy efficiency guidelines will be incorporated within the AEPC working mechanisms and policy formulation at the centre.
Tier 3+ ICS requires pellets or very small size wood, meaning the households would have to further process their regular fuel wood to fit them into the Tier 3+ ICS, or they may have to buy pellets or wood chips, instead of using the fuel wood they usually collect for free. In either case, this may not result in cost saving or time saving, though emissions saving is there.

Mitigation Measure(s)

The project will focus on deploying the Tier 3+ ICS that uses locally available resources, wood chips and multiple fuel source. There will be no separate costs for woodchips, however may require users’ time to chip the firewood. For processed fuel, monthly minimum fuel costs are assumed to be lower in tier 3+ ICS than that required for Traditional Cookstoves. Since most of the potential beneficiaries of this project are members/users of community-based forestry, the project will facilitate to provide free or subsidized raw materials for Tier 3+ ICS in particular cases. In addition, the project will provide trainings and technical assistance to lower the fuel production cost.

Selected Risk Factor 9

<table>
<thead>
<tr>
<th>Category</th>
<th>Probability</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of fuel for tier3+ stove</td>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>

Description

The electric Stoves requires specific types of cooking utensils. Consumers will have to buy the utensils themselves, which may affect the switch from LPG to ECS.

Mitigation Measure(s)

The estimated cost of e-cooking technology i.e. Rs 4,600 ($38) is for cost of stove and basic house wiring upgradation. Although this estimation is on lower side in comparison to existing market rate, but because of bulk numbers we are expecting this cost on that level. The costs of utensils have not been considered in this estimation and it is expected as users’ contribution, means that users have to manage the utensils as per their own requirements.

Selected Risk Factor 10

<table>
<thead>
<tr>
<th>Category</th>
<th>Probability</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of fuel for tier3+ stove</td>
<td>Medium</td>
<td>Medium</td>
</tr>
</tbody>
</table>

Description

Power Intake: Cost of upgrading the electricity system at the household, e.g. from 5 amp to 15 amp to run the ECS
Basic upgradation costs e.g. for wiring, fuse change, miniature circuit breaker (MCB), have been incorporated in the estimated cost.

<table>
<thead>
<tr>
<th>Selected Risk Factor 11</th>
<th>Probability</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Money laundering/terrorist financing (ML/TF)</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

**Description**
Minimal risk of AML/CFT will be on the area of identification/details of the vendors

**Mitigation Measure(s)**
The fund will be mobilized and monitored through government organization. AEPC adheres to the (Asset (Money) Laundering Act 2008. AEPC will duly identify the relevant private parties through the KYC (Know your Customer) forms. Further as mentioned in the Act, AEPC will maintain records of amount transacted beyond the limit prescribed by Nepal Rastra Bank (NRB) at a single or in a series of transactions by a person, investigate and inquire any transactions which seem to be doubtful or transacted with the motive of assets laundering and inform the Financial Information Unit about the suspicious transactions.

<table>
<thead>
<tr>
<th>Selected Risk Factor 12</th>
<th>Probability</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prohibited Practices</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

**Description**
Risk related to prohibited practices including abuse, conflict of interest, corruption, retaliation against whistleblowers or witnesses, as well as fraudulent, coercive, collusive, and obstructive practices. This also includes risk associated with unauthorized, illicit and improper uses of the technologies.

**Mitigation Measures**
In terms of matters related to integrity and prohibited, AEPC has Compliance and Ethics Subcommittee and a Compliance Unit to oversee these matters. Trainings are planned on annual basis by the Unit to ensure that AEPC staffs have adequate knowledge on matters related to the area. Trainings related to procurement compliance and public integrity have been conducted in the past by the Unit. Furthermore, AEPC being a government entity is governed by the various national level acts and regulations (Asset (Money) Laundering Act 2008 specifically deals with money laundering and terrorist financing) and also internal regulation on Financial Discipline and Good Governance and Financial Mismanagement and Corruption Prevention Resource Book. In addition, the procedure for fraud reporting and investigation and grievance handling mechanism is duly followed by the Compliance and Ethics Sub-Committee and the Internal Grievance Handling Committee. The system allows report/register frauds and allegations through various means, procedures to conduct investigations, concluding investigations and findings. Similarly, the training will be provided to the project proponents by the Compliance Unit on the aforementioned Acts and Regulations on annual basis. The content of the training will be as per the national acts/regulations and also internal regulations and resource book that have been developed. The internal regulation and resource book comprises of procurement procedures, auditing procedures, internal control mechanism, disclosures, grievance management, fraud reporting and investigation procedure and risk management, *inter-alia.*

Furthermore, to avoid the illicit, improper and unauthorized use of any materials or procured under this
project, the project will have a dedicated accounting system with a special bank account to channel GCF and AEPC fund. The fund will adhere to GCF Project Guidelines and annual auditing procedures will be instilled to ensure that the project assets are used only for the intended purposes.

### Selected Risk Factor 13

<table>
<thead>
<tr>
<th>Category</th>
<th>Probability</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk of rebounds</td>
<td>Medium</td>
<td>High</td>
</tr>
</tbody>
</table>

**Description**

Chances of the beneficiaries of the stoves choose to prefer using old methods over new or underutilization of the stoves.

**Mitigation Measure(s)**

Nepal's vulnerability to disruptions in its supplies of imported fossil fuels is the principal reason why the government have looked into ways of increasing national energy independence. Since electric cooking is a high priority for the Government and the electricity generation in the country is showing a steady growth further incentives are bound to be rolled out for the promotion of electric cooking. Furthermore, the rebound to old methods will be mitigated due to the low operation and fuel cost of ECS compared to LPG. As the country is moving towards a steady supply of electricity from the hydropower projects, the consumers will prefer a cost effective alternative to cooking. In term of the TCS and Tier 3+ ICS, Tier 3+ is beneficial in terms of annual fuel cost compared to TCS. In addition, the socio-economic and health benefit of Tier 3+ are critical factor that lays as strong foundation for the continuity of the system. The project will address the issue by bringing behavioral change among users by raising awareness about the cost and other benefits of the technologies with campaigns and promotional activities, The project duration of five years also ensures that the change is instigated and maintained after project intervention. In addition, scaling up the community based outreach activities through the locals especially women and disadvantaged group as CCS mobilisers and behavior change activities including online/social media and radio messages, community events, publications (brochures and new articles), and direct communication, with beneficiaries will further mitigate the rebound effect. The capacity development of the supply chain through market strengthening have been embedded as different activities in the project. This will further ensure that there remains no gap at the local level including sales, operation and maintenance.

### Selected Risk Factor 14

<table>
<thead>
<tr>
<th>Category</th>
<th>Probability</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk of electrocution/fire incidents</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

**Description**

Safety issue with potential electrocution/fire incidents with the introduction of electric cookstoves at the household level.

**Mitigation Measure(s)**
Quality assurance and testing of the proposed technologies are critical proponent of the project. The technologies are required to adhere by the National Standards prepared by the National Bureau of Standard and Metrology that includes standards on General safety requirements on household and electrical appliances, specific safety requirements on induction hobs and specific safety requirements on hotplates. The technical specification provided as annex on the proposed technologies also includes installation requirement that includes standards on power socket, MCB, wiring and cord cover. Furthermore, the project has embedded activities that aim to provide training and awareness related to the electrical safety and house wiring to CCS beneficiaries as well as the supply chain.

F. GCF POLICIES AND STANDARDS

G.1. Environmental and social risk assessment (max. 750 words, approximately 1.5 pages)

Provide the environmental and social risk category assigned to the proposal as a result of screening and the rationale for assigning such category. Present also the environmental and social assessment and management instruments developed for the proposal (for example, ESIA, ESMP, ESMF, ESMS, environmental and social audits, etc.). Provide a summary of the main outcomes of these instruments. Present the key environmental and social risks and impacts and the measures on how the project/programme will avoid, minimize and mitigate negative impacts at each stage (e.g. preparation, implementation and operation), in accordance with GCF’s ESS standards. If the proposed project or programme involves investments through financial intermediations, describe the due diligence and management plans by the Executing Entities (EEs) and the oversight and supervision arrangements. Describe the capacity of the EEs to implement the ESMP and ESMF and arrangements for compliance monitoring, supervision and reporting. Include a description of the project/programme-level grievance redress mechanism, a summary of the extent of multi-stakeholder consultations undertaken for the project/programme, the plan of the Accredited Entity (AE) and EEs to continue to engage the stakeholders throughout project implementation, and the manner and timing of disclosure of the applicable safeguards reports following the requirements of the GCF Information Disclosure Policy and Environmental and Social Policy.

Describe any potential impacts on indigenous peoples and the measures to address these impacts including the development of an Indigenous Peoples Plan and the process for meaningful consultation leading to free, prior and informed consent, pursuant to the GCF Indigenous Peoples Policy.
Attach the appropriate assessment and management instruments or other applicable studies, depending on the environmental and social risk category as annex 6.

Environmental and social risk category: AEPC did not identify any significant adverse environmental and social risks and impacts of the project. The direct impacts are expected to be minor and would come mainly from site-specific impacts related to domestic biogas plants such as management of bio slurry, availability of water resources to operate the biogas plant and the disposal of damaged and obsolete cook stoves. The Environmental and Social Screening of the project based on the GCF and AEPC’s Environment and Social Policy, the project in principle is categorized as C, as the implementation of the project would have only minor and manageable negative impacts.

Environmental and social management plan: The accredited entity has provided an Environmental and Social Management Plan (ESMP) that identifies the potential unintended negative environmental impacts and risks of implementing CCS. The ESMP Institutional arrangement involved in safeguards related issues, their responsibilities, grievance redress mechanism and E & S monitoring. The ESMP also provides a brief description of negative impacts and risks from the project, and have suggested potential mitigation measures.

Environmental and social risks and impacts: The project focuses on “triple benefits” i.e. they reduce emissions contributing to mitigate global climate change, provide improved health and time savings for households and preserve forest and associated ecosystems. Introduction of CCS has a number of social benefits particularly benefitting women. Potential negative environmental impacts from the project implementation are limited to effective management of bio slurry from biogas plants.

The direct environmental and social risks from the project implementation is limited to effective management of bio slurry from biogas plants, disposal of damaged and obsolete cook stoves and availability of water resources to run the biogas plant. If the project is implemented in areas of low water availability, women have to travel longer distances to fetch water to run the biogas plant that has a direct impact on women's health and imposes high time burden particularly to women and girls. Measures to avoid the risk are included in ESMP.

Indigenous people: Ten indigenous nationalities are considered endangered in Nepal, of which 50 % are in Terai. Diverse indigenous groups are present in Terai, and Tharu is the biggest among them, representing 12 % of the Terai population. In Terai, there are different groups and speak Maithili, Bajjika, Bhojpuri, Awadhi, closely to north Indian dialects and refer themselves as Madhesi, which also makes up the majority of population in Terai region.

The major beneficiaries of the project are indigenous people as the project aims to enhance their adaptive capacity. Thus, the project is not expected to adversely affect the indigenous peoples or ethnic communities. Instead, the project will bring about positive impacts as it will contribute to resource conservation and reduce potential conflicts over resources.

Community health and safety: The project contributes to community health safety by reducing air pollution from using CCS as compared to traditional cooking systems. Use of clean energy sources will reduce the workload of women in collecting fuel wood and leads to better life and improved health conditions. End-user exposure risk, however needs to be monitored through field-testing to ensure that
exposure at the household level will not get worse.

**Indirect risks and impacts:** There are potential indirect risks and impacts of the project across the industry. The popularity and ease of the use of ICS may lead to more fuel and therefore contribute to increasing pressure on fuel wood. This will need to be monitored through the project’s impact evaluation that will regularly assess any changes in the fuel wood use in households.

**Stakeholder consultations:** In the course of developing the project, stakeholder consultations were held with the identified national and local stakeholders including sectoral ministries, Supply chain stakeholders, Gender and climate experts, private sector groups, academic and research centers. Throughout the process, these stakeholders expressed their views, expectations, concerns and recommendations for the proposed project. Over 150 people have been consulted through various workshops at national and sub national level. Further Stakeholder engagement activities are embedded in the project activities including stakeholder engagement plans and are provided in ESMP (Annex 4).

A **grievance redress mechanism** for the CCS project has been developed to ensure that complaints are adequately addressed in an effective and timely manner. Anyone who has a complaint or who is negatively impacted by the project is able to communicate their complaints or problems through the official mechanism. The Project GRC will be formed at Central/AEPC level. A detail of the grievance redress mechanism for the project is provided in ESMP (Annex 4).

**G.2. Gender assessment and action plan (max. 500 words, approximately 1 page)**

The proposal contains a comprehensive and thorough gender assessment, and therefore complies with the operational guidelines of GCF Gender Policy and Action Plan. It also includes a gender action plan to support implementation of issues identified in the gender assessment.

The gender assessment was done based on literature reviews, field survey and stakeholder consultations. This assessment provides in-depth information on the cooking sector with respect to gender. The gender assessment shows Nepal as a country with gender equality issues, however has policies made and in different phases of implementation. Cooking is almost entirely carried out by women, requiring on average about 4 hours a day for cooking using a traditional cooking Stoves66.

Women in Nepal spend about 142 minutes to collect the fuel wood whereas men spend only about 50 minutes67. Likewise, the study shows the involvement of women in collecting agricultural residue and cow dung is 70.2% whereas involvement of men is only 29.8%, this shows that in collecting of both fuel wood and biomass fuel involvement of women is much more than men68.

In Nepal, on average, there are 18.3 bharis (head loads of about 30 kg on average) of fuel wood

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collection per capita per year in Nepal. On average, a household spends 5.01 hours collecting one bhari of fuel wood\textsuperscript{69}. Although, there are act and policies to maintain gender equality but social norms still need to be addressed to achieve equality. AEPC has its own Gender equality and Social Inclusion Policy to improve living standard, increase employment as well as productivity of rural women and men, reduce dependency on traditional energy and attain sustainable development through integrating the alternative energy with the socio-economic activities of women and men in the rural communities but implementation is still a challenge.

Gender issues has been inline in most of the energy sector related programmes from the past. Financial privileges are supportive from the policy perspectives, but they haven’t been tapped efficiently. Interventions are required to change existing social norms. Political participations are progressive but limited. GESI mainstreaming has been completed in Provincial level. Process of GESI mainstreaming is ongoing in local level and will come into implementation in the subsequent years.

Energy-efficient modern clean cooking solutions (Tier 3+ ICS, biogas, Electric Stoves) have a potential to reduce exposure to smoke related health hazards, reduce the burden on women and children to collect fuel wood, and help the poor save money (when the fuel needs to be purchased).

The gender assessment indicates that women’s household work is a barrier to spending much more time engaging other income generating activities, spending more time studying or helping with school work and on entertainment and socializing or engage in the activities they prefer. The project is expected to have major positive impacts on addressing challenges faced by women by ensuring access to, use of Tier 3+ ICS to reduce the burden in collecting fuel wood, and provide women with income-earning opportunities. Also, it identifies employment opportunities for women as Clean Cook Stove mobilizers, Clean Cooking Champions and technically trained women to support maintenance and supply chain, and they will be skilled enough to work in CCS sector even after the project completion. Looking at this, the project has a potential to uplift women in different fronts.

The action plan provides corresponding actions to address the issues that have been identified. The gender focal point will be appointed to coordinate the implementation of gender action plan.

G.3. Financial management and procurement (max. 500 words, approximately 1 page)

Describe the project/programme’s financial management including the financial monitoring systems, financial accounting, auditing, and disbursement structure and methods. Refer to section B.4 on implementation arrangements as necessary.

Articulate any procurement issues that may require attention, e.g. procurement implementation arrangements and the role of the AE under the respective proposal, articulation of procurement risk assessment undertaken and how that will be managed by the AE or the implementing agency. Provide a detailed procurement plan as annex 10.

GoN financial system and procedures will be adopted for this project. In exercise of the power conferred by Section 13 of the Alternative Energy Promotion Centre (Development Committee) Formation Order, 2053 Alternative Energy Promotion Development Board has framed the framed Alternative Energy Promotion Centre Financial Discipline and Good Governance Regulation 2018. This regulation assigns

\textsuperscript{69} ibid
responsibility of operation and execution of financial and administrative duties and functions of the AEPC to the Executive Director. This regulation provides authority for AEPC to include grants in its budget.

The regulation assigns duty and responsibility to all the employees of the AEPC to support the Executive Director in the operation and execution of financial and administrative functions. The budgeting and planning of programmes and activities for the fiscal year shall be responsibility of the Executive Director.

Financial and other provisions related to security deposits on activities, projects and programs, fees, service charges, advance and settlement, preservation of current and fixed assets, auctions procedures, and granting pardons will be based on relevant guidelines and procedures of AEPC under this regulatory framework. In accordance with law, all the income received by AEPC will be deposited into the respective bank accounts. Director of finance will maintain the books of accounts of received incomes, submission of statement of income, ensuring audit and recording of the transactions.

Audit

AEPC will conduct quarterly internal audits in accordance with the Financial General Comptroller Office. The Office of Auditor General shall conduct the final audit of the project. If the findings of the internal and external audit depict loss to AEPC due to mislaid cash and kinds or an act of evasion, the Executive Director or the respective section head upon receiving such information shall recover the amount and based on the severity of the case may take departmental action.

Being government entity the annual audit of the AEPC is under the jurisdiction of the OAG. In addition, the annual external audits of the project will be carried out in accordance with Clause 17 of the Accreditation Master Agreement with GCF and internationally recognized accounting standard will be complied to.

Internal Control

The Compliance Unit of AEPC will serve the oversight function to ensure internal control at the institutional level. Compliance and Ethics Sub-committee shall do the oversight of the unit.

Procurement

APEC will follow the procurement system and procedure of the Government of Nepal. Application of Public Procurement Act (PPA) 2063 and Public Procurement Regulation (PPR) 2064. PPA/PPR shall be enforced in all aspects of the procurement processes with regards to securing products and services from any third parties by the Executing Entities (EEs) for funds received from GCF and other sources.

Procurement of goods services for the EEs generally includes assessing and appointing vendors, contracting and creating purchase orders and making payments. The EEs will procure goods and services from responsible vendors or contractors registered in VAT who possess the ability to provide the goods and services on time, quality product and a competitive price. In the case of the project, AEPC will fulfill the role of both AE and EE with distinct institutional setup. This implies that the procurement
procedure of the EE will also be governed by the PPA 2063 and PPR 2064. AEPC has also prepared a procurement guideline for executing entities\(^7\), 2018 which aligns with PPA/PPR and provides step by step procedure required for procurement of goods, services and works and acts as a simple procedure with following objectives:

- Maximize the value for money.
- Maximum Returns of public expenditures in an Economical and Rational manner by promoting competition, Fairness, Honesty, Accountability and Reliability in procurement processes.
- Ensure Good Governance by enhancing the managerial capacity of procurement of entities in procuring, or causing to be procured, construction work and procuring goods, consultancy services and other services by such entities and by ensuring the equal opportunity for producers, sellers, vendors, construction entrepreneurs or service providers to participate in public procurement processes without any discrimination.

As the Executing Entity is internal to AEPC, Legal agreement between AE and EE is not required. Government of Nepal's financial system, public procurement procedure and fund flow mechanism will be adopted for this project. As an accredited entity, AEPC will receive the fund from GCF as per the Nepal government procedures. A separate bank account will be opened for the project purpose and a separate financial management guideline will be developed for the transparent and effective management of the financial resources. The Project implementation unit will prepare annual work plan and budget, including a procurement plan, which will be approved by the Ministry. Based on the approval of this plan, PIU will mobilize and release the fund according to the agreements/contracts to the service providers.

The procurements will be undertaken by the EE. In terms of the oversight of the procurements. The preventive measures are taken with the applicability of the PPA/PPR for all the procurements made by the EE. The oversight of the planned procurement and risk assessment will be done by the Compliance and Ethics Sub-Committee and Compliance Unit of the AEPC. Compliance and Ethics Sub-committee is the oversight mechanism instilled at AEPC which directly report to the AEPC Board.

**Independent Third Party Monitoring and Verification**

AEPC will hire third party independent evaluators after annual deployment target is completed, to do the evaluation of demand, installation, implementation, impact, activities, output and outcome. Independent third party evaluators will do their evaluation against the already established standard and procedures which will be linked with the payment system to the service providers. This third party monitoring would be conducted throughout the project period.

**Output Based Financing**

The output based financing approach will have several mechanisms set in place. Firstly, the technical specification of the required technologies will be thoroughly tested with the testing centre as entailed by Component 1 of the project. Mobilization advance amount not exceeding 20% will be provided to the vendor against bank guarantee at this stage.

Immediately after the procurement, the technologies will be taken to the respective municipalities. Once the technologies reach the premises of the respective municipalities and upon the clearance letter from

the municipalities, disbursement not exceeding 60% will be provided to the vendor. This disbursement also settles the advance amount provided previously. Hence, at this stage, the vendor will be paid a total amount not exceeding 60%.

Once the third party monitoring is completed and confirmation received from the deployed system, final disbursement of 40% will be provided to the vendor. Hence, at this stage, the vendor will be paid the 100% of the total amount.

**G.4. Disclosure of funding proposal**

*Note: The Information Disclosure Policy (IDP) provides that the GCF will apply a presumption in favour of disclosure for all information and documents relating to the GCF and its funding activities. Under the IDP, project and programme funding proposals will be disclosed on the GCF website, simultaneous with the submission to the Board, subject to the redaction of any information that may not be disclosed pursuant to the IDP. Information provided in confidence is one of the exceptions, but this exception should not be applied broadly to an entire document if the document contains specific, segregable portions that can be disclosed without prejudice or harm.*

*Indicate below whether or not the funding proposal includes confidential information.*

☒ No confidential information: The accredited entity confirms that the funding proposal, including its annexes, may be disclosed in full by the GCF, as no information is being provided in confidence.

☐ With confidential information: The accredited entity declares that the funding proposal, including its annexes, may not be disclosed in full by the GCF, as certain information is being provided in confidence. Accordingly, the accredited entity is providing to the Secretariat the following two copies of the funding proposal, including all annexes:

- Full copy for internal use of the GCF in which the confidential portions are marked accordingly, together with an explanatory note regarding the said portions and the corresponding reason for confidentiality under the accredited entity’s disclosure policy, and

- Redacted copy for disclosure on the GCF website.

The funding proposal can only be processed upon receipt of the two copies above, if containing confidential information.
## H.1. Mandatory annexes

<table>
<thead>
<tr>
<th>Annex</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒ Annex 1</td>
<td>NDA no-objection letter(s) (<a href="#">template provided</a>)</td>
</tr>
<tr>
<td>☒ Annex 2</td>
<td>Feasibility study - and a market study, if applicable</td>
</tr>
<tr>
<td>☒ Annex 3</td>
<td>Economic and/or financial analyses in spreadsheet format</td>
</tr>
<tr>
<td>☒ Annex 4</td>
<td>Detailed budget plan (<a href="#">template provided</a>)</td>
</tr>
<tr>
<td>☒ Annex 5</td>
<td>Implementation timetable including key project/programme milestones (<a href="#">template provided</a>)</td>
</tr>
<tr>
<td>☒ Annex 6</td>
<td>E&amp;S document corresponding to the E&amp;S category (A, B or C; or I1, I2 or I3): (<a href="#">ESS disclosure form provided</a>)</td>
</tr>
<tr>
<td></td>
<td>☐ Environmental and Social Impact Assessment (ESIA) or</td>
</tr>
<tr>
<td></td>
<td>☒ Environmental and Social Management Plan (ESMP) or</td>
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<tr>
<td></td>
<td>☐ Environmental and Social Management System (ESMS)</td>
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<tr>
<td></td>
<td>☐ Others (please specify – e.g. Resettlement Action Plan, Resettlement Policy Framework, Indigenous People’s Plan, Land Acquisition Plan, etc.)</td>
</tr>
<tr>
<td>☒ Annex 7</td>
<td>Summary of consultations and stakeholder engagement plan</td>
</tr>
<tr>
<td>☒ Annex 8</td>
<td>Gender assessment and project/programme-level action plan (<a href="#">template provided</a>)</td>
</tr>
<tr>
<td>☒ Annex 9</td>
<td>Legal due diligence (regulation, taxation and insurance)</td>
</tr>
<tr>
<td>☒ Annex 10</td>
<td>Procurement plan (<a href="#">template provided</a>)</td>
</tr>
<tr>
<td>☒ Annex 11</td>
<td>Monitoring and evaluation plan (<a href="#">template provided</a>)</td>
</tr>
<tr>
<td>☒ Annex 12</td>
<td>AE fee request (<a href="#">template provided</a>)</td>
</tr>
<tr>
<td>☐ Annex 13</td>
<td>Co-financing commitment letter, if applicable (<a href="#">template provided</a>)</td>
</tr>
<tr>
<td>☒ Annex 14</td>
<td>Term sheet including a detailed disbursement schedule and, if applicable, repayment schedule</td>
</tr>
</tbody>
</table>

## H.2. Other annexes as applicable

<table>
<thead>
<tr>
<th>Annex</th>
<th>Description</th>
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<tbody>
<tr>
<td>☐ Annex 15</td>
<td>Evidence of internal approval (<a href="#">template provided</a>)</td>
</tr>
<tr>
<td>☒ Annex 16</td>
<td>Map(s) indicating the location of proposed interventions</td>
</tr>
<tr>
<td>☐ Annex 17</td>
<td>Multi-country project/programme information (<a href="#">template provided</a>)</td>
</tr>
</tbody>
</table>
☐ Annex 18  Appraisal, due diligence or evaluation report for proposals based on up-scaling or replicating a pilot project

☐ Annex 19  Procedures for controlling procurement by third parties or executing entities undertaking projects financed by the entity

☐ Annex 20  First level AML/CFT (KYC) assessment

☐ Annex 21  Operations manual (Operations and maintenance)

☒ Annex x  Other references

* Please note that a funding proposal will be considered complete only upon receipt of all the applicable supporting documents.