

Country Action Plan (CAP) for Transforming the Cookstoves and Fuels Market in Nepal

Executive Summary | December 2022



Foreword

Surendra Lal Karna, Member, National Planning Commission, Nepal

lean cooking plays a critical role in meeting the Government of Nepal's (GoN) ambitious commitments and targets to mitigate climate change and, in parallel, achieve universal energy access.

Such that the National Planning Commission (NPC) has prioritized access to clean cooking in its 15th Development Plan, Sustainable Development Goals 7 targets, and Nationally Determined Contribution to achieve energy access, enhance energy security, and reduce reliance on imported energy for Nepal. The current five-year plan targets a minimum of one million electric stoves, upgraded electricity supply infrastructure, adjustment of electricity tariffs to support uptake, and the development of standards for electric cookstoves. The five-year plan further includes the promotion of 500,000 improved cookstoves, 200,000 household biogas digesters, and 20,000 metric tons of pellets and briquettes per year.

The Country Action Plan (CAP) highlights an actionable list of prioritized interventions to support Nepal's energy access goals, especially those related to the promotion of electric cooking towards meeting the ambitious targets set by the GoN. NPC is pleased to support the development of this critical report which provides valuable recommendations for the clean cooking sector,

We look forward to supporting CCA and other partners to work together on this critical issue and ensure Nepali citizens have access to clean and affordable cooking options.



Foreword

Madusudhan Adhikari, Executive Director, Alternative Energy Promotion Center

n Nepal, more than 68% of households still use traditional biomass such as fuelwood, agricultural residue, and animal dung for cooking. The dominant cooking fuel in urban households is liquefied petroleum gas (LPG), which is increasingly used by peri-urban and rural households. However, increasing imports of LPG simultaneously contribute to Nepal's national trade deficit, and with rising LPG prices, households increasingly pay more for this fuel. At the same time, Nepal's national electricity grid is becoming more reliable for households in Nepal to switch to electric cooking.

The Government of Nepal (GoN) has announced 2018–2028 as the Decade of Energy and Hydropower to realize the dream of Prosperous Nepal, Happy Nepali and intends to provide electricity access to every household by 2022/23 and promote electric cookstoves. Nepal also aims to achieve universal access to clean cooking by 2030 and is deeply committed to reducing dependence on traditional and imported energy.



The development of the Country Action Plan (CAP) in close collaboration between the Alternative Energy Promotion Center (AEPC) and the Clean Cooking Alliance (CCA) provides the GoN with an essential roadmap for accelerating the scale-up of clean cooking throughout the country. AEPC and CCA closely coordinated with the Ministry of Energy, Water Resources, Irrigation, National Planning Commission, and relevant government and non-government stakeholders to leverage their expertise and experience in designing a practical and holistic CAP.

AEPC looks forward to a strong collaboration with CCA and other partners toward CAP implementation and achieving the goals set by the GoN on clean cooking for long-term environmental, climate, livelihoods, and health impacts.

Foreword

Dr. Donee Alexander, Chief of Science and Learning Officer, Clean Cooking Alliance

he Government of Nepal (GoN) is committed to achieving universal access to clean cooking by 2030. To achieve this goal, the GoN has set ambitious targets, including ensuring that 25% of households nationwide adopt electric cooking by 2030.

Since 2018, the Clean Cooking Alliance (CCA) has worked closely with the GoN, providing tailored support to help them achieve their ambitious clean cooking access goals. CCA's work aids the GoN in accelerating the scale-up of clean cooking throughout the country and contributes to long-term environmental, climate, livelihood, and health impacts. Clean cooking, especially electric cooking, plays a critical role in meeting the GoN's ambitious commitments and targets to mitigate climate change and, in parallel, achieve universal energy access.

The CCA and the Alternative Energy Promotion Centre (AEPC) developed this Country Action Plan (CAP) to serve as a strategic and actionable roadmap for transforming the cookstoves and fuels market in Nepal, especially those related to the promotion of electric cooking. The National Planning Commission (NPC) also provided valuable support develop the CAP.

CCA would like to take this opportunity to congratulate AEPC for its strong leadership in the clean cooking sector. CCA looks forward to working with AEPC and other partners to make this CAP an actionable instrument that improves the quality of life of thousands of Nepali citizens through clean cooking action.



n Nepal, approximately 69% of households use biomass fuels and open fire stoves for cooking,¹ mainly due to the country's lack of natural petroleum resources and the ubiquitous availability of biomass. This negatively impacts the health of the country's population, contributes to environmental degradation and climate change, and disproportionately impacts the women and girls who bear the burden of fuel collection and meal preparation. Household air pollution (HAP) was responsible for an estimated 3.2 million deaths per year in 2020, including over 237,000 deaths of children under the age of 5.² In 2019, approximately 20,000 deaths and 650,000 disability-adjusted live years (DALYs) were associated with HAP exposure in Nepal.³ Furthermore, cooking with unsustainably harvested biomass contributes to forest degradation and climate change. Cooking over open fires or inefficient stoves releases short-lived climate pollutants, such as black carbon and methane, into the atmosphere contributing to climate change.

To address these critical concerns, the Government of Nepal (GoN) is committed to achieving universal access to clean cooking by 2030. Accordingly, the GoN has set ambitious targets for clean cooking adoption in the country in its Second Nationally Determined Contribution (NDC) plan as well as for attaining Sustainable Development Goal (SDG) 7 (Ensure access to affordable, reliable, sustainable, and modern energy for all). An overview of the prominent national targets, policies and plans addressing clean cooking are outlined in Figure 1.

Figure 1: Government of Nepal's main clean cooking goals and associated targets

Goals	 Renewable Energy Subsidy Policy Reduced dependence on traditional and imported energy Increased access to renewable energy Increased employment opportunities Improved livelihoods 	Ministry of Energy, Water Resources White Paper • 100% electric cooking adoption by 2028	Second Nationally Determined Contribution • Installation of 500,000 ICS by 2025 • 25% electric cooking adoption by 2030 • Installation of 200,000 new household biogas plants by 2025	 15th 5 Year Plan Ensure energy security by intensifying hydropower generation 20% electric cooking adoption by 2023/24 100% electricity access by 2023/24 	 SDG Status and Roadmap 99% households with access to electricity 30% reduction in firewood usage for cooking Limit use of liquified petroleum gas (LPG) to less than 40% of households
Incentives	 Subsidy for 40% total cost (varies according to technology and region) 	N/A	N/A	 Setting appropriate tariffs to encourage electric cooking Development of standards for electric cookstoves 	N/A
Remarks	 Continued government support needed for the electrification of the remaining 900,000 households Off-grid systems will be essential for rural areas 	 Nepal will require a massive ramp up investment for generation, transmission, and distribution infrastructure 	 Current commitments may only result in partial achievement of the targets 	 Lack of a reliable and high-quality power supply Weak power distribution Low power generation capacity 	• Electric cooking and higher-tier ICS adoption need to be scaled up to substitute wood and LPG usage

CAP Objective

In 2021, the Alternative Energy Promotion Centre (AEPC)⁴ and the Clean Cooking Alliance (CCA) launched the development of a *Country Action Plan (CAP) for Transforming the Cookstoves and Fuels Market in Nepal* to support Nepal's energy access goals, especially those related to the promotion of electric cooking.

The CAP aligns the GoN's clean cooking goals and targets with a clear and actionable list of prioritized interventions that are precise, practical, and aligned with sector actors who have a shared interest in scaling clean cooking in Nepal. These prioritized interventions focus on electricity, biomass or are fuel agnostic (i.e., applicable to electricity, biomass, and other clean cooking fuel types). The CAP provides a market-based roadmap to accelerate clean cooking in Nepal. In particular, the CAP:

- Provides a robust evidence base to inform policy recommendations and support the implementation of the GoN and other stakeholders' programs.
- Identifies the potential role of various stakeholders to support the GoN in delivering complementary programs.
- Articulates a clear path for the GoN and sector actors for accelerating the scale-up of clean cooking in the country.

The approach toward developing the CAP was outcome-oriented, articulating essential, feasible, and desirable actions to accelerate Nepal's large-scale transition to cleaner cooking solutions.

The Clean Cooking Context in Nepal

According to the World Bank, Nepal's population is 79% rural and 21% urban as of 2021,⁵ with differences in cooking fuel use in urban and rural areas.⁶

Households in Nepal make choices of their preferred cooking methods based on various sociocultural and economic factors. Some key factors include:

 The urban vs. rural divide: Urban areas exhibit a much higher incidence of liquified petroleum gas (LPG) for cooking, with electric cooking slowly replacing LPG in urban areas. In 2020-2021, electric cookstoves imports increased fourteen-fold – a marked growth rate seen primarily in the urban market.⁷ Rural areas exhibit a predominant preference for biomass-based cooking options, with

Figure 2: Cooking fuel use distribution among rural and urban households in Nepal



LPG for cooking increasing among rural households over the past few years. Figure 2 depicts the different cooking fuel use distribution in rural and urban households. The proportion of people using LPG for cooking and heating increased from 18% in 2015 to 26.6% in 2018/19.⁸

- **Ecological regions:** The three ecological regions in Nepal consist of Mountains (35% of landmass), Hills (42% of landmass), and Terai (23% of landmass). Each region has representative cooking practices suited to its unique environmental and sociocultural conditions. For example, the Mountains region exhibits a larger share of metallic improved cookstoves (ICS), mainly because these cookstoves provide space heating for households.
- Accessibility: A significant share of Nepal's landmass is mountainous, with relatively low population density in the high-altitude areas. In such conditions, establishing supply chains and distribution networks can be a highcost and low-return endeavor.
- **Consumer awareness:** Stark differences persist in the level of consumer awareness about clean cooking solutions across Nepal.
- Willingness to pay: Based on income and wealth distribution in Nepal, urban households, on average, have a higher willingness to pay for clean cooking products. A recent study conducted by Modern Energy Cooking Services (MECS) found a positive correlation between household

income and expenditure on cooking fuel.⁹ This indicates that households with higher incomes are willing to spend more on cooking, implying that the clean cooking market is subject to changes in consumer demand based on changes in consumer income.

 Consumer considerations: Consumers rely on several considerations to make decisions on cooking methods.
 For example, time taken for cooking, ease of use, upfront cost, operating cost, availability of after-sales service, tradition, heat production, etc.

Accessibility of clean cooking products among consumers mainly depends on two factors:

- Perceived demand in the local area: Private sector players organize and invest in their supply networks primarily depending on the perceived demand and the cost to service the demand. For this reason, there is very little accessibility to metallic ICS in remote rural areas. Private sector players have to incur significant additional costs in supplying metallic ICS products in rural areas and, at the same time, have uncertain prospects for sales.
- Government and donor programs and schemes: The GoN and donors, (to a lesser extent, provincial and local governments) implement various programs for

distributing or incentivizing clean cooking across the country.

As shown in Figure 1 above, the GoN has adopted various goals and targets to promote clean cooking, especially electric cooking. In 2022, the GoN accelerated its efforts toward achieving these goals and targets as the Ministry of Energy, Water Resources, and Irrigation (MoEWRI) began drafting guidelines to promote electric cooking.¹⁰

Aligned with Nepal's ambition to ramp up electric cooking, the GoN is expanding the electricity network in the country. In recent years, there have also been substantive improvements in the energy supply, with the per capita electricity consumption increasing from 80 kWh in 2015 to 260 kWh in 2019. This exceeded the target of 230 kWh by 2018/19.11 However, power deficits and unreliable supply, poor grid infrastructure and stability, long lead times in developing hydropower resources, and concerns over the medium-term financial viability of the power sector are still hindering the spread of electric cooking in Nepal.¹² The Nepal Electricity Authority (NEA) aims to address some of these concerns by significantly enhancing the country's power distribution network to increase per capita consumption to 700 kWh by 2022-23.13 While electric cooking currently accounts for a small proportion of the market, it is expected to increase as the electricity grid reliability improves.

Figure 3: Steps required for determining the CAP high-priority interventions



Methodology

The CAP is based on a rigorous methodology, detailed feedback from forty-five stakeholder consultations, a validation workshop with forty stakeholders in Nepal, key insights from CCA-commissioned foundational research, and various activities by partner organizations in Nepal. Figure 3 shows the three steps followed for determining the CAP high-priority interventions.

The first step involved obtaining an initial list of interventions through an in-depth literature review of key GoN and ministries' policy and strategy documents, assessments, and reports by international donors, multilateral organizations, development organizations, and other stakeholders. Additionally, it involved consultations with forty-five stakeholders from the clean cooking sector in Nepal, including but not limited to representatives from the GoN, ministries and provincial governments, donors, development organizations, and non-governmental organizations (NGOs). The initial list of interventions was then categorized into four output areas: Finance (15 interventions), Enabling Environment (12 interventions), Supply (7 interventions), and Demand (13 interventions). The second step involved further classifying the Financing, Enabling Environment, Supply, and Demand interventions based on defined criteria to assess their potential impact and the effort required for implementation. The interventions with high impact potential and low effort for implementation were classified as Quick Wins. Interventions with high impact potential and high effort for implementation were classified as Transformational. Interventions with low impact potential and low effort for implementation were classified as Momentum Builders. Finally, interventions with low impact potential and high effort for implementation were categorized as Derailers.

The interventions falling under the Quick Wins and Transformational categories were considered as priority interventions that would need to be implemented for enabling market development and growth of Nepal's clean cooking sector in line with the GoN's goals and targets (Figure 4).

The third step involved validating the priority interventions (Quick Wins and Transformational interventions) based on inputs received from forty stakeholders in a workshop held in Kathmandu, Nepal. These stakeholders included representatives from the GoN, ministries and provincial governments, donors, development organizations, NGOs, and others. In this



Figure 4: CAP interventions classified and prioritized based on defined criteria

workshop, the participants shared their perspectives on all the identified priority interventions and provided inputs on why some of these interventions needed to be prioritized. The participants provided a rating against each intervention on impact and effort required for implementation. These ratings were collated and analysed to determine the final list of CAP high-priority interventions. Out of the initial list of interventions, 32 were selected as the CAP high-priority interventions.

High-Priority Interventions

As described above, the CAP high-priority interventions (Quick Wins and Transformational) are categorized into four output areas (Finance, Enabling Environment, Supply, and Demand). These high-priority interventions focus on electricity, biomass, or are fuel agnostic (i.e., applicable to electricity, biomass, and other fuel types). Tables 1-4 below enumerate the CAP high-priority interventions for each of the four output areas. Interventions currently being implemented or that have been implemented in the past (albeit on a small scale) have been marked by "▶ I" in the intervention description.

Table 1: High-priority CAP finance interventions

Tag	Strategic Category	Fuel Type	Intervention
F1	Quick Wins	Fuel agnostic	Introduce pay-as-you-go or low-cost equated monthly installment (EMI) schemes for consumers > I
F2	Transformational	Electricity, Biomass	Improve credit risk guarantee support to financial institutions for lending > I
F3	Transformational	Fuel agnostic	Leverage internet banking as a platform to disburse small consumer and business loans by banking and financial institutions (BFIs)
F4	Transformational	Fuel agnostic	Support banks, microfinance institutions (MFIs), cooperatives, and self-help groups (SHGs) in developing relevant financial products for households by providing adequate knowledge of the clean cooking market ► I
F5	Transformational	Electricity, Biomass	Attract foreign investments for the manufacturing of ICS and electric cookstoves
F6	Transformational	Electricity, Biomass	Improve Central Renewable Energy Fund (CREF) funding access for MFIs to support low-interest lending > I
F7	Quick Wins	Electricity, Biomass	Provide zero-interest capital to banks, MFIs, cooperatives, and SHGs to enable them to lend to micro, small, and medium enterprises (MSMEs) at a concessional interest rate
F8	Transformational	Electricity, Biomass	Provide market cover for clean cooking supply chain actors, including financial loss cover and buy-back guarantees • I

Table 1 continued

Tag	Strategic Category	Fuel Type	Intervention
F9	Transformational	Fuel agnostic	Introduce clean cooking as a specialized category under a regulatory framework to enable lending at lower rates
F10	Transformational	Fuel agnostic	Use challenge funds to scale up private sector participation by reducing upfront investment risks ► I
F11	Transformational	Fuel agnostic	Expand carbon financing and result-based financing for clean cooking initiatives • I
F15	Quick Wins	Electricity	Provide electricity tariff rebates for households using electric cooking • I

Table 2: High-priority CAP enabling environment interventions

Tag	Strategic Category	Fuel Type	Intervention
E1	Transformational	Electricity	Ensure the quality of electric cookstoves and utensils by enforcing standards and implementing awareness raising activities and training programs ► I
E2	Transformational	Electricity	Improve the capacity of testing facilities for electric cookstoves and utensils and centralize their operations • I
E3	Quick Wins	Electricity, Biomass	Provide tax incentives to the supply chain actors of the clean cooking sector ► I
E4	Transformational	Electricity, Biomass	Improve the ease of doing business for entrepreneurs by creating a one-door policy to address issues around lengthy registration processes and high bureaucracy levels > I
E6	Transformational	Fuel agnostic	Encourage academia and private sector involvement to carry out adaptive research on carbon emission reductions, electricity demand-side management, and cost and efficiency improvement of clean cooking technologies > I
E7	Transformational	Electricity	Redirect budgets of provincial and local governments for households' electricity infrastructure upgrades to support electric cooking

Table 2 continued

Tag	Strategic Category	Fuel Type	Intervention
E8	Transformational	Fuel agnostic	Redirect the amount of LPG subsidy to promote other clean cooking solutions
E10	Transformational	Fuel agnostic	Lobby for support from local governments by including the clean cooking agenda in municipal action plans

Table 3: High-priority CAP supply interventions

Tag	Strategic Category	Fuel Type	Intervention
S1	Transformational	Biomass	Conduct research studies on the value drivers and supply chain environment for pellets and briquettes to assess its investment feasibility
S2	Quick Wins	Electricity, Biomass	Drive innovation in distribution models by using non-cooking product networks and local women to enable last-mile distribution of electric cookstoves and ICS • I
S3	Quick Wins	Electricity	Introduce innovative business models for electric cookstoves to attract the private sector ► I
S4	Transformational	Electricity, Biomass	Develop a robust after-sales repair and maintenance service network and introduce capacity-building programs for electric cookstoves > I
S6	Transformational	Electricity, Biomass	Introduce capacity-building programs for clean cooking manufacturers and provide entrepreneurial training to leverage wider private sector participation in the clean cooking sector ► I
S7	Transformational	Electricity	Provide incentives to manage peak loads due to increased adoption of electric cooking and monitor real-time energy use to mitigate households' fear of high electricity bills > I

Tag	Strategic Category	Fuel Type	Intervention
D1	Transformational	Electricity, Biomass	Drive awareness of clean cooking technologies based on user benefits, safety standards, and behavioral changes
D2	Quick Wins	Electricity, Biomass	Pilot try-before-you-buy schemes for households ► I
D3	Transformational	Electricity	Identify opportunities for micro-businesses that can be unlocked using electric cooking appliances ► I
D7	Transformational	Electricity	Promote electric cooking in urban and peri-urban regions, as individuals in these regions have a higher awareness of clean cooking technologies and better electricity access > I
D10	Quick Wins	Electricity	Provide matching subsidy to support upgradation of internal household wiring upgrades that will encourage the adoption of electric cooking
D13	Transformational	Fuel agnostic	Commission a study to understand consumer preferences, perceived value, and cost of clean cooking technologies, and analyze perspectives on technology reliability > I

Table 4: High-priority CAP demand interventions

Implementation Plans

The implementation plan for each CAP high-priority intervention involves completing a set of actions. Tables 5–8 include the implementation plan and associated actions for four of the CAP high-priority interventions (one intervention from each of the four output areas). Objectives of each of the sample interventions will be realized when they are implemented in coordination with other CAP-high priority interventions.

Each high-priority intervention's implementation plan includes the following:

• The "Supported by" section highlights the stakeholders who will support the execution of the interventions.

- The "Execution Approach" column comprises the actions that need to be conducted to implement the high-priority intervention. These activities are sequenced, meaning that the first listed activity must be completed before the second, then the third, etc.
- The "Responsible Stakeholder" column includes the stakeholder(s) who will have the prime accountability for carrying out each activity.
- A set of "Critical Success Factors" has been defined for each high-priority intervention. These factors are essential for the successful implementation of the intervention.
- The "Success Metrics" list includes key measures that can help determine the success of the intervention.

Table 5: Sample implementation plan for a CAP finance high-priority intervention

T	TRANSFORMATIONAL		
s	Supported by: AEPC, Center for Renewable Energy Fund (CREF)		
E	execution Approach		Responsible Stakeholder(s)
lc	lentify major lenders and enlist key concerns		CREF
E	stimate requirement of risk guarantee on a per transactio	on basis	CREF
Estimate total fund requirement and explore possibility of involving donor CREF agencies		CREF	
List lending activities to be supported through the credit risk guarantee mechanism, based on funding availability		CREF	
Organize a design workshop to develop an outline of the credit risk guarantee mechanism		AEPC	
Develop a governance structure and set up a credit risk guarantee mechanism based on the finalized structure		arantee	AEPC
Critical Success Factors: Success Metrics		Success Metrics:	
Funding availability Interest level an		nong lenders	
•	Effectiveness of mechanism design	Increase in lence after implement	ding activities at participating lenders Itation

Table 6: Sample implementation plan for a CAP enabling environment high-priority intervention

Intervention E1: Ensure the quality of electric cookstoves and utensils by enforcing standards and implementing awareness-raising activities and training programs: TRANSFORMATIONAL

Supported by: AEPC, Ministry of Energy, Water Resources and Irrigation (MoEWRI), Nepal Bureau of Standards and Metrology (NBSM), Ministry of Industry, Commerce and Supplies (MoICS)

Execution Approach		Responsible Stakeholder(s)
Assign clear responsibilities to stakeholders, including NBSM, AEPC, Renewable Energy Test Station, etc. across the quality assurance spectrum (e.g., standards development, compliance monitoring, certification, etc.)		MolCS
Devise approaches for standards enforcement		AEPC, MoICS
Identify ways to raise awareness on standards		NBSM, AEPC
Announce publicly and notify the private sector that the electric cooking standard will be made mandatory in the short term		MoICS
Establish a framework of incentives and penalties for private sector players once the standard is made mandatory		MoEWRI
Conduct consultation workshops with the private sector to understand their concerns and barriers, and work towards resolving them		AEPC
Critical Success Factors: Success Me		
Buy-in from relevant government agencies	 Proportion of p ability to compl standard being 	rivate sector players announcing ly with standard in the run-up to the made mandatory

Table 7: Sample implementation plan for a CAP supply high-priority intervention

Intervention S2: Drive innovation in distribution models by using non-cooking product networks and local women to enable last-mile distribution of electric cookstoves and ICS: QUICK WIN

Supported by: AEPC, Provincial and Local Governments, Federation of Nepalese Chambers of Commerce & Industry (FNCCI), Agricultural Cooperatives, Private Sector, Development partner

Execution Approach		Responsible Stakeholder(s)
Identify possible partnerships with energy-related businesses such as solar and biogas supply chains		FNCCI, AEPC
Identify possible ways of tie-ups with agricultural cooperatives to leverage the existing seed and fertilizer network		Agricultural Cooperatives, AEPC
Explore and identify best-fit last-mile distribution models for regions	or different	Development Partner, AEPC
Employ local women workforce as authorized sales agents distribution of clean cookstoves	s in the last-mile	Private Sector
Train the last-mile distributors for demand generation activities and for sales and marketing of clean cookstoves		Private Sector
Use customer management software like Angaza to grow last-mile distribution business and streamline costs		Private Sector
Critical Success Factors:	Success Metrics:	
Funding availabilityIdentification of best-fit last-mile distribution models	 Increase in in cl consumers in ri Increase in loca sales agents 	lean cookstove options for ural and urban regions al women participation as authorized

Table 8: Sample implementation plan for a CAP demand high-priority intervention

Intervention D7: Promote electric cooking in urban and peri-urban regions across provinces as these consumer segments have higher awareness levels and better electricity access: TRANSFORMATIONAL

Supported by: AEPC, Nepal Electricity Authority (NEA), Provincial and Local Governments, Development Partner, Civil Society

Execution Approach		Responsible Stakeholder(s)
Analyze regions with better electricity access and having spare distribution capacity to support electric cooking loads		NEA, AEPC
Identify adoption barriers of electric cooking for consumer	s in these regions	Provincial and Local Governments
Identify appropriate stakeholders in these regions for cond cooking awareness raising activities	lucting electric	AEPC, Development Partner, Civil Society
Conduct awareness raising activities to address adoption barriers and promote electric cooking		Development Partner, Civil Society
Critical Success Factors:	Success Metrics:	
 Involvement of local governments in awareness raising activities to promote clean cooking 	 Increase in sale regions 	es of electric cookstoves for identified
	Improved const using electric c	umer awareness on the benefits of ooking

One-Year Roadmap

A one-year roadmap has been developed to outline certain high-priority interventions (Quick Wins and Transformational) that need to be implemented earlier than others or require some groundwork in the first year (Figure 5). It is important to note that the set of activities for each high-priority intervention may not be fully completed during the first twelve months. But these set of activities will be essential to help execute the interventions. For example, E1 (Ensure the quality of electric cookstoves and utensils by enforcing standards and implementing awareness-raising activities and training programs) will start in the first year and continue in the next 3–4 years, as it involves multiple activities such as developing and enforcing standards and conducting associated

awareness-raising activities. However, priority interventions such as F7 (Provide zero-interest capital to banks, MFIs, cooperatives, and SHGs to enable them to lend to MSMEs at a concessional interest rate) can be initiated independently and, therefore, can be implemented later. Hence F7 is not included in the one-year roadmap but it is placed in the tenyear roadmap.

- For each activity, two stakeholder entities have been highlighted: Stakeholders responsible for the activity (denoted by R); and stakeholders to support the activity (denoted by S).
- Each intervention in the roadmap has been tagged to a fuel type and segregated based on its priority order (i.e., Quick Wins or Transformational).



Figure 5: CAP high-priority interventions: one-year roadmap





	1 year		
回费同	Define a framework for clean cooking awareness raising activities as well as key messages focused on user benefits, safety standards, and behavioral changes R · Development partner, Civil society S · AEPC		
回食	Identify regions exhibiting strong potential to adopt clean cooking solutions R - NEA S - AEPC Liaise with local government to understand adoption barriers R - Local Gov, Dev. Partner S - AEPC Identify stakeholders who will conduct campaigns for these regions R - AEPC, Dev. Partner S - AEPC		
國費同	Pilot try-before-you-buy schemes for these regions R - Development partner, identified stakeholders S - AEPC		
03 套	Research on small business opportunities that can be unlocked from using electric Initiate research activities cooking appliances R - CCA S - Development partner S - Development partner		
- Responsible			
Support team Quick-Win intervention	Biomass ● g ◆ Fuel Agnostic ★ Electricity		

Ten-Year Roadmap

The ten-year roadmap lays out the sequencing of all high-priority interventions over a ten-year period for each of the four output areas. There are three phases in the CAP ten-year roadmap:

- **Reinforce:** includes the first three years of the roadmap, when the Quick Wins interventions are executed, and the Transformational interventions commence.
- Growth: includes the medium term years four to six, when adoption of clean cooking solutions will witness robust growth and sufficient penetration amongst households.
- Scale: includes the long term years seven to ten, when clean cooking will see accelerated adoption and a significant number of households will use clean cooking solutions. The clean cooking sector is expected to mature at this point of time.

The CAP ten-year roadmap also includes milestones that will serve as markers to indicate progress throughout the implementation of the CAP high-priority interventions. The series of graphics that comprise Figure 6 describes the tenyear roadmap in more detail.



Figure 6: CAP high-priority interventions: ten-year roadmap



	Reinforce: Year 1-3 Grow: Year 4-6 Scale: Year 7-10
E6	Encourage academia and private sector involvement to carry out adaptive research on carbon emission reductions, electricity demand-side management, and cost and efficiency improvements of clean cooking technologies
<u>(51</u>)	Conduct research studies on the value drivers and supply chain environment for pellets and bio-briquettes Decision on investment feasibility on pellets and bio-briquettes
D13	Commission a study to understand consumer preferences, perceived value and cost of clean cooking technologies, and analyze perspectives on technology reliability
E10	Lobby for support from local governments by including the clean cooking agenda in municipal action plans Step may be delayed
E7	Redirect budgets of provincial and local governments for households' electricity infrastructure upgrades Step may be delayed
S3	Scaling down of business models for electric cookstoves Established private levels for the electric cooking sector
(F11)	Expand carbon financing and results-based financing for clean cooking initiatives
F10	Use challenge funds to scale up private sector participation
	Finance Supply Transformational intervention Milestone Enabling environment Demand Quick-Win intervention CLEAN





Concluding Remarks

The CAP aims to secure a market-based sustainable clean cookstoves and fuels market in Nepal. It aligns with the GoN's goal and vision for clean cooking in Nepal; as well as the GoN's commitment to SDG7, especially SDG7.1.2 and its NDC goals. The successful implementation of the CAP requires a holistic and evidence-based approach as well as:

- Buy-in and support from the GoN.
- Extensive coordination among relevant stakeholders in the clean cooking sector.
- Large-scale funding from the GoN and external donors.

CCA has worked extensively with the AEPC and subsequently with the National Planning Commission (NPC) to ensure that the CAP is (1) aligned with the GoN's goal and activities, (2) integrated into the national energy agenda, and (3) tailored to Nepal's context. The CAP draft was further presented to key stakeholders, including provincial and local governments, to gain feedback and buy-in.

AEPC will provide additional input and adapt this report according to their formal reporting procedures. Next, the the CAP will be presented to the AEPC board for approval. Once approved, the CAP is expected to be utilized by the GoN to help achieve its clean cooking goals. The AEPC board consists of eleven members who represent various organizations.

In parallel, CCA will continue to collaborate with NPC and AEPC to develop a coordination guideline, as requested by local leaders during the provincial consultations conducted as part of the CAP development. The coordination guideline will define for example, the mechanism for effective coordination and cooperation among key stakeholders (especially the three levels of the government—federal, provincial, and local) in the clean cooking sector and contribute to developing a framework for CAP implementation.

It is also important to emphasize that the CAP priority interventions and their related activities may not be fully completed in the timelines portrayed in this report due to competing priorities and unexpected exogenous shocks (e.g., natural disasters, political unrest, Covid-19, and other possible global health pandemics). However, the roadmaps provide a pathway forward and prioritize actions essential to scale up the adoption of clean cooking in Nepal.

The CAP also faces several challenges. However, measures can be taken to address them. For example:

- Maintaining continued buy-in among stakeholders for effective implementation: The CAP relies on continued buy-in from stakeholders for extended, multi-year timeframes. This type of buy-in can face difficulties. For example, a change of leadership at a Ministry can alter the Ministry's organizational priorities. The MoEWRI and NPC need to work efficiently towards ensuring coordination among the stakeholders and guide AEPC as well as provincial and local governments to implement the CAP.
- Buffering against upstream value chain dependencies: In the case of electric cooking, the consumer market depends entirely on the availability of reliable and high-quality electricity supply. Therefore, if the GoN's electricity distribution network expansion and upgrade plans suffer delays, then uptake in electric cooking will be affected. Close coordination with the NEA will be needed to prepare for the investment, construction, and upgrade challenges associated with the expansion of electricity transmission and distribution infrastructure.
- Managing fluctuations in consumer sentiment: A single event can turn mass market sentiment against a particular technology. For example, electric cookstoves can pose a fire hazard and an electrocution risk in the absence of a rigorous quality and safety assurance mechanism. Expediting the process for introducing quality standards and implementing mandatory compliance requirement for improved cookstoves at an early stage will be important.
- Managing interdependencies of multiple CAP interventions: Inherent interdependencies among the CAP interventions can threaten the effectiveness of all successive interventions if an upstream intervention is delayed or ineffective. For example, the upgrade of testing facilities for clean cookstoves cannot be undertaken if the quality standard for these cookstoves is not previously developed. Mapping interdependencies between various CAP interventions, strong coordination, and regular reporting between involved stakeholders is needed.

The successful implementation of the CAP will aid the GoN in accelerating Nepal's large-scale transition to cleaner cooking solutions and achieve long-term environmental, climate, livelihood, and health impacts.

Notes

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