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UNDP

# Advancing clean cooking for climate action:

## Pathways to higher-tier solutions and scaled investment

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In collaboration with:

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# Acronyms and abbreviations

| | |
|---|---|
| **AFREC** | Africa Energy Commission |
| **BAU** | business-as-usual |
| **$CO_2$** | carbon dioxide |
| **$CO_2e$** | carbon dioxide equivalent |
| **COP** | conference of the Parties |
| **(d)MRV** | (digital) measurement, reporting and verification |
| **FAO** | Food and Agriculture Organization of the United Nations |
| **fNRB** | fraction of non-renewable biomass |
| **GBEP** | Global Bioenergy Partnership |
| **GeCCo** | Global Electric Cooking Coalition |
| **GHG** | greenhouse gas |
| **HAP** | household air pollution |
| **ICS** | improved cookstove |
| **INDC** | Intended Nationally Determined Contribution |
| **IEA** | International Energy Agency |
| **IRENA** | International Renewable Energy Agency |
| **ITMO** | Internationally Transferred Mitigation Outcome |
| **LPG** | liquefied petroleum gas |
| **LT-LEDS** | Long-Term Low-Emission Development Strategy |
| **MECS** | Modern Energy Cooking Services |
| **MTF** | Multi-Tier Framework |
| **Mt** | million tonnes |
| **NDC** | Nationally Determined Contribution |
| **SDG** | Sustainable Development Goal |
| **SEforALL** | Sustainable Energy for All |
| **SOLCO** | Solar-Electric Cooking Partnership |
| **RBF** | results-based financing |
| **UNCDF** | United Nations Capital Development Fund |
| **UNDP** | United Nations Development Programme |
| **UNEP-CCC** | United Nations Environment Programme – Copenhagen Climate Centre |
| **VAT** | value added tax |

# Preface

**This publication—jointly developed by the United Nations Development Programme (UNDP) and the Food and Agriculture Organization (FAO), and in collaboration with the United Nations Environment Programme (UNEP)—arrives at a pivotal moment as countries are submitting, or have recently submitted, more ambitious national climate plans, or Nationally Determined Contributions (NDCs).**

Recognizing the centrality of clean cooking as both a climate and development priority, this report offers practical guidance on how clean cooking can be systematically included as a priority sector in NDC preparation and implementation, helping to unlock investment and accelerate the shift towards more sustainable and resilient societies. Above all, it is intended as a resource to support governments and partners in closing the clean cooking access gap while advancing global goals on climate, health, food security and sustainable development.

Globally, nearly 2.1 billion people still lack access to clean cooking technologies. This perpetuates household air pollution, which is responsible for an estimated 2.9 million premature deaths annually, while also contributing to deforestation, gender inequality and lost economic opportunities. At the same time, the 2025 ***Emissions Gap Report***

reminds us that the world remains off target in meeting the goals of the Paris Agreement, which calls for limiting global warming to 1.5°C. By integrating clean cooking into NDC revision and planning processes, the world can accelerate progress towards a clean energy future and realize scalable and cost-effective opportunities to cut emissions while delivering broader sustainable development gains.

While clean cooking has risen sharply on global and regional political agendas in recent years, implementation requires stronger attention, investment and coordinated action to ensure that billions of people gain access to something as fundamental as a safe way to cook. Meanwhile, achieving higher climate ambition requires integrated solutions. As such, the design and rollout of climate action must intersect with broader systems vital to sustainable development, including health, gender equality and agriculture. NDCs, as policy instruments, provide an opportunity to realize these integrated solutions, yet the level of ambition in NDCs related to agrifood systems remains limited. For example, only 40 percent of agrifood system emissions, including those from food preparation, are covered by concrete mitigation actions across NDCs. This results in a mitigation action gap of 60 percent for agrifood system emissions or 20 percent of global emissions. When solutions such as clean cooking are embedded into NDCs, this underscores a country's commitment to them and allows a country to tap into its full potential for strengthening food security, reducing pressure on forests and agricultural land, and delivering transformative benefits across rural and urban communities alike.

Within this context, strengthening clean cooking targets and actions as part of NDCs and national policy processes will be essential to achieving the Sustainable Development Goals (SDGs) and Paris Agreement targets. Under the umbrella of the United Nations Climate Promise 2025 effort, UNDP, FAO and UNEP remain committed to supporting countries as they look to align their NDCs with a 1.5°C goal, enhancing their quality, implementation and "investability" to drive sustainable development. In addition to collaboration across a wide range of stakeholders on the ground, there is an even greater need to actively mobilize resources at scale. This must come not only from public finance, but also by unlocking greater contributions from the private sector, at both domestic and international levels, including through carbon finance and high-integrity carbon markets. Higher ambition in NDCs, combined with effective implementation, is therefore critical to changing course.

Finally, as highlighted in the United Nations Energy Transition 2025 Report, ***Seizing the Moment of Opportunity***, the clean energy sector is on the rise, driving growth, jobs, affordability and economy-wide electrification. However, the report also warns that stark access gaps remain, especially in sub-Saharan Africa. Countries and development partners have taken note and are making strides to promote clean energy for all. Countries need policy and capacity support to shift from less-efficient, transitional technologies towards higher-tier solutions that are safer, more efficient and resilient, and less polluting. These solutions will be key to long-term sustainability, emissions reductions and a just transition. Renewable-based options, such as renewable-powered electric cooking, bioethanol and biogas, can further strengthen the foundation for sustainable clean cooking access.

The path forward is clear. Scaling up clean cooking is not only a moral imperative—it is a strategic priority that connects local well-being with our shared global climate future.

# 1. Introduction

**"Our planet is issuing more distress signals – but [...] limiting long-term global temperature rise to 1.5 degrees Celsius is still possible. Leaders must step up to make it happen—seizing the benefits of cheap, clean renewables for their people and economies—with new national climate plans due this year."[1]**

**United Nations Secretary-General, António Guterres**

1 United Nations (2025). "Climate change: Paris Agreement goals still within reach, says UN chief." UN News, 25 March 2025.

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The world remains far from meeting the goals of the Paris Agreement and the window for meaningful climate action is rapidly closing.[2] As countries submit enhanced Nationally Determined Contributions (NDCs) in 2025 and beyond, an urgent need exists for integrated solutions that can accelerate both climate protections and development progress. A transition to clean cooking systems is pivotal in this effort. Not only do clean cooking systems reduce emissions and improve health, but they also expand clean energy access and play a central role towards a just energy transition.

Approximately 2.1 billion people, or around a quarter of the global population, still lack access to low-carbon, efficient, convenient, safe, reliable and affordable cooking energy.[3] Nearly half (49 percent) of the deficit is in sub-Saharan Africa where progress on clean cooking lags the region's rapid population growth.[4] As a result, the rate of clean cooking poverty in Africa is growing rapidly, making it the only region in the world in which the absolute number of people without access continues to rise. In 2023, the population lacking access reached 960 million people – an increase of 14 million from 2022.[5]

2 The United Nations Environment Programme (UNEP) *Emissions Gap Report 2025* found that the full implementation of NDCs put the world on track for a global temperature rise of 2.3-2.5°C, while those based on current policies are 2.8°C. This compares to 2.6-2.8°C and 3.1°C in the 2024 report. Reductions to annual emissions of 35 per cent and 55 per cent, compared with 2019 levels, are needed in 2035 to align with the Paris Agreement 2°C and 1.5°C pathways, respectively.

3 IEA, IRENA, UNSD, World Bank, WHO (2025). *Tracking SDG 7, The Energy Progress Report 2025.*

4 Ibid.

5 Ibid.


Beyond sub-Saharan Africa, other vulnerable populations also face significant challenges. Globally, long-term displaced populations—often overlooked in national policy and planning—represent a growing demographic with limited access to clean cooking solutions. Meanwhile, other regions have made significant progress. In Asia, access deficits are shrinking, demonstrating how government-led programmes, infrastructure investment and economic growth can reduce deficits substantially.

Yet, despite their clear potential, the transition to low-carbon clean cooking is a complex technological and socio-economic process. Such a transition requires active government leadership to set a clear vision, align policies and mobilize investment.[6] Until recently (as will be noted in Section 3), clean cooking was often ignored in climate policy and NDC processes. However, UNDP and FAO analysis of NDCs, including more recent third generation NDCs (NDC 3.0), shows that clean cooking is increasingly becoming a priority area of climate action (Figure 1). Across 81 countries sampled in Asia, Africa, Latin America and the Caribbean, and Oceania (expanding on previous FAO analysis[7]), Figure 1 shows that clean cooking actions are mentioned in all countries' NDCs, with 62 percent articulating quantitative targets. This data illustrates a changing momentum. Recognition is growing that clean cooking is a strategic and simultaneous opportunity for climate and development, particularly in low-income countries, where cooking with biomass accounts for around 10 percent of national net emissions.[8]

6 The role and importance of the State in not only setting the 'mission' and policies around climate action, but building the requisite structures, processes and partnership for implementation is discussed in a Policy Brief published by UNEP (2025). *Advancing NDC implementation: Insights from UNEP's NDC Action Project*.

7 FAO (2025). *Bioethanol for clean cooking – An analysis of its role in energy transition in Africa*. Rome, FAO.

8 This estimate is derived from figures used in UNEP's *Emissions Gap Report 2019* which estimated 760 $MtCO_2e$ annual emissions from biomass-based cooking in Africa alone, based on 2011 data (since then Africa's continent-wide population and GDP have grown by more than 40 percent). When applying a conservative 30 percent fNRB value, this implies a total of 228 $MtCO_2e$ per year. When this figure is divided by the total African Union-wide territorial net GHG emissions of approximately 3,190 $MtCO_2e$ (EGR, 2024) this accounts for more than 7 percent of emissions. In reality this figure is likely much higher.

**Fundamentally, the term "clean cooking" refers to the use of modern, sustainable fuels and technologies for cooking (see Box 1), and aligns with the energy access priorities of Sustainable Development Goal (SDG) 7. Modern energy forms of clean cooking, such as electric cooking, can also strengthen the business case for expanding electricity access. Shifting household spending away from polluting fuels and increasing demand for electricity can help reinforce broader energy access and energy system sustainability.**

The positive contribution of clean cooking to the achievement of other SDGs beyond SDG 7 is also evident. Expanding access to efficient, clean cooking solutions reduces pressure on forest resources, therefore contributing to restoration of forest landscapes and ecosystems. It also reduces time spent in collecting biomass and cooking, freeing up time for education and income-generating activities, especially for women and girls. Specific bio-based clean cooking solutions can also provide diversified income sources through the sale of by-products from energy production. New technologies, such as biogas, illustrate these multiple benefits. Derived from animal manure or crop residues, biogas reduces health risks from indoor air pollution, eases pressure on forests and frees up time and space for income opportunities for farmers and rural communities, especially women.

Clean cooking is also proving to play a vital role in food security, impacting the quantity, quality and nutritional content of food consumed. However, despite the clear interlinkages between clean cooking, climate and food systems, only 40 percent of agrifood system emissions—including those arising from food preparation—are currently addressed through concrete mitigation actions in NDCs.[9] This leaves a mitigation gap covering 60 percent of agrifood system emissions, equivalent to 20 percent of total global emissions. Therefore, global food security cannot be achieved without reimagining a food system where clean cooking plays a central role in safeguarding climate and nature, improving nutrition and supporting livelihoods.

Considering this context, it is clear that the benefits of clean cooking extend beyond the energy sector and intersect with broader systems critical to sustainable development. As such, clean cooking needs to be integrated and prioritized within national policies and NDCs to align energy, food and climate objectives with the SDGs and the Paris Agreement, and to mobilize resources to scale up action.

9 Crumpler, K., Wybieralska, A., et al. (2024). *Agrifood systems in nationally determined contributions: Global analysis – Key findings*. Rome, FAO.

# Strengthening clean cooking targets and actions through NDCs

As countries advance more ambitious NDC commitments to limit global warming to 1.5°C, a critical and urgent opportunity exists to ensure that clean cooking is systematically integrated in these efforts. Doing so can deliver multiple co-benefits. For example, clean cooking value chains (from fuel production to the manufacturing, sale and distribution of stoves) can boost local economic growth through job creation, improving productivity and reducing healthcare costs.

As a policy instrument, NDCs can serve as an effective, nationally owned process for integrating clean cooking into climate and development agendas. NDCs are sovereign, politically endorsed commitments, and therefore are among the most powerful tools available to align climate action with national development priorities, plans and investments.[10] Their strength lies in national ownership, which enables them to catalyze whole-of-economy transformations, including greater momentum for clean cooking.

By setting specific clean cooking targets in NDCs (or their implementation plans), and aligning them with existing national policies, countries can better position themselves to attract climate finance, leverage carbon market opportunities and build robust implementation coalitions at national, regional and global levels. Embedding clean cooking into NDCs creates a structured pathway for achieving just and inclusive energy transitions, ensuring that energy and climate commitments go hand in hand with improved public health outcomes and social empowerment.[11]

**As such, this report encourages countries to strengthen how clean cooking actions are prioritized throughout the preparation and implementation of their NDCs. When relevant, clean cooking can be reflected as a priority across both adaptation and mitigation actions that are articulated in the NDC. The implementation and scale-up of clean cooking can be supported through dedicated investment planning, including by exploring opportunities to leverage national budget resources and carbon finance opportunities (see Section 4).**

10 UNDP (2025). "Climate Promise 2025." [accessed August 2025].

11 For a more extensive synthesis of the development and climate gains of a clean energy transition, see: Sahadevan, D., Irfan, M. T., Luo, C., Moyer, J. D., Mason, C., and Beynon, E. (2025). *Charged for change: The case for renewable energy in climate action.* UNDP; Pardee Institute for International Futures; Octopus Energy.

**The primary audience for this report includes policymakers and partners working at the intersection of energy, climate and development—across global, national and local levels and spanning both public and private sectors. While global in scope, a particular emphasis is placed on Africa, where the urgency and scale of the clean cooking challenge are most pronounced.**

To provide the theory and data behind this call, the report explores the climate implications of different cooking systems, both low and high tier (refer to Box 1). It examines the critical role of NDCs as vehicles for transformative change and showcases how NDCs can serve as a platform for countries to define clear targets and indicators for higher-tier clean cooking solutions. An emphasis is placed on the importance of elevating clean cooking as a core pillar of national climate and development strategies—and how to move beyond ambition and target-setting to integrated, actionable implementation.[12] As one example, aligning these efforts with **Long-Term Low-Emission Development Strategies** (LT-LEDS) offers a valuable longer-term framing for NDC implementation. While NDCs typically cover a five-year period, LT-LEDS extend to mid-century (2050 to 2070), which positions NDCs as useful intermediary steps toward achieving these long-term visions. **India's LT-LEDS**, for instance, prioritizes the development of low-carbon electricity systems. While the LT-LEDS does not explicitly address clean cooking, it provides an enabling context for a shift to electric cooking, underscoring the broader point: integrating clean cooking into long-term energy planning can strengthen coherence across climate and development strategies, helping to grow demand for low-carbon electricity, especially in rural areas.

12 Also see: UNDP (2025). *No time to waste: Pathways to deliver clean cooking for all: A UNDP approach and policy guide.*

# Box 1: Classification of cooking technologies by "tier" of access

**The Multi-Tier Framework (MTF) evaluates cooking systems, both the combination of stove and fuel, across six attributes:**

| | Tier 0-1 No access | Tier 2-3 Transitional | Tier 4-5 Modern |
|---|---|---|---|
| | **Cooking poverty**<br>**Stove technology and fuel:** Open fire, three-stone stove with traditional solid fuels (e.g., firewood, charcoal, dung, agricultural residue) | **Improved access**<br>**Stove technology and fuel:** Energy-efficient biomass, rocket stove, kerosene stove | **Modern cooking, including renewable-based solutions**<br>**Stove technology and fuel:** Electricity, LPG, biogas, ethanol |
| **Exposure to pollutants** | ●●● **High** | ●●○ **Medium** | ●○○ **Low** |
| **Stove efficiency** | ●○○ **Low** less than 10% | ●●○ **Medium** greater than 20% | ●●● **High** greater than 40% |
| **Time needed for acquiring and preparing fuel** | ●●● **High** over 7 hours per week | ●●○ **Medium** less than 7 hours per week | ●○○ **Low** less than 1.5 hours per week |
| **Severity of incidents caused by stove** | ●●● **High** Serious incidents | ●●○ **Medium** Minor incidents | ○○○ **None** No incidents |
| **Fuel cost as a share of household expenditure** | ●●● **High** Greater than 10% when purchased (or collected for free) | ●●○ **Medium** less than 10% | ●○○ **Low** less than 5% (however, stove and downstream infrastructure costs need to be accounted for e.g., cost of electricity connection) |
| **Availability of fuel** | ●●○ up to 80% availability | ●●○ more than 80% availability | ●●● 100% availabilty |

**As countries update and implement their NDCs, integrating explicit targets for clean cooking provides an important opportunity to accelerate progress specifically toward higher-tier solutions (Tier 4 or 5, for efficiency and emissions). By embedding commitments to renewable-based options such as ethanol, biogas or electricity, NDCs can serve as a policy lever to close energy access gaps and deliver climate and development gains.**

Infographic was adapted from: World Bank (2020). *The State of Access to Modern Energy Cooking Service (Volume 1)*. and UNDP (2025). *No time to waste: Pathways to deliver clean cooking for all: A UNDP approach and policy guide.*

# 2. Clean cooking as a global climate imperative

## 2.1 What is the challenge at the global level?

**Most of the 2.1 billion people without access to clean cooking rely on biomass fuels, mainly firewood and charcoal that are unsustainably collected and burned in open fires, as their primary energy source for cooking.[13] This leads to harmful household air pollution (HAP), which is a major cause of premature deaths globally, contributing to an estimated 2.9 million deaths per year in 2021, including about 309,000 deaths of children under the age of 5.[14]**

13 IEA (2023). *A Vision for Clean Cooking Access for All.* IEA, Paris.
14 World Health Organization (2024). Household air pollution (fact sheet).


The use of unsustainable biomass for cooking is also a major emitter of short-lived climate pollutants, especially black carbon, which has a global warming potential several hundred times greater than $CO_2$ over a 20-year period.[16] In addition to black carbon, the International Energy Agency's (IEA) Global Methane Tracker for 2025 highlights that bioenergy production and consumption contributes 20 million tonnes (Mt) of methane, primarily from the incomplete combustion of traditional biomass used in cooking and heating in developing countries.[17]

**The open and unsustainable burning of solid biomass fuels for cooking also generates around 1.2 gigatonnes of carbon-dioxide equivalents ($CO_2e$) globally. This is roughly equivalent to the total $CO_2$ emissions from international aviation and shipping, making cooking activities a major global pollutant.[15]**

15 IEA (2025). *Universal Access to Clean Cooking in Africa. Progress update and roadmap for implementation.* IEA, Paris.
16 Carbon Containment Lab (2025). "Black Carbon: An introduction to a high-impact super pollutant." Also see: MECS (2025). "Why Black Carbon Isn't Just Another "$CO_2$ Equivalent." Blog, 24 September 2025.
17 IEA (2025). The Global Methane Tracker 2025, Key findings.


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The collection and distribution of fuelwood and charcoal for cooking also contributes to severe forest degradation and biodiversity loss.[18] While some biomass for cooking may be harvested sustainably, a substantial share is not. Although carbon released from burning renewable biomass can, in theory, be reabsorbed through regrowth, this process is slow – and the urgency of the climate crisis leaves little time to wait. To capture this distinction, emissions from cooking activities are measured using the fraction of non-renewable biomass (fNRB) metric, which estimates the portion of biomass harvested unsustainably, i.e., extraction that exceeds natural regrowth rates. For example, while a traditional cooking fire may emit two to four tonnes of $CO_2$ annually, only the share linked to non-renewable biomass is counted toward emissions totals.

While fNRB varies by context, in areas facing high rates of deforestation, which can often correlate to humanitarian settings and regions hosting displaced populations (Box 2), fNRB can be particularly high, leading to greater cooking-related emissions. As a result, fNRB plays a foundational role in carbon credit methodologies and is essential to understanding the climate impact of biomass use for cooking. Articulating clear targets to advance clean cooking solutions as part of NDC priorities and implementation plans can therefore deliver substantial mitigation gains while contributing to broader development objectives, helping to close the emissions gap.[19]

Institutional clean cooking, in particular, represents a critical entry point for accelerating the clean energy transition,

18 Clean Cooking Alliance (2022). *A call to action: Accelerating Clean Cooking as a nature-based solution.*
19 UNEP (2024). *Emissions Gap Report 2024*.


## Box 2: Rethinking the fractions of non-renewable biomass in displacement and refugee-hosting settings

Approximately 85 percent of displaced and refugee populations in camps use unsustainably harvested biomass, such as firewood, for cooking.[a] Thus, displaced- and refugee-hosting areas face unique and acute pressures on natural resources that may justify the use of localized, site-specific fNRB values in clean cooking and carbon methodologies.

Standard national averages fail to capture the "marginal consumption shock" that occurs when large numbers of displaced people or refugees arrive in already fragile ecosystems with limited forest regeneration capacity. Evidence from across East Africa, such as 96 percent fNRB in Tanzania's Nyarugusu camp,[b] demonstrates that displaced and refugee camps can push wood fuel demand far beyond sustainable supply levels. Localized fNRB values reflect this reality, ensuring that the true scale of unsustainable biomass use is recognized, which is critical for both accurate emissions accounting and appropriate intervention design. Using national fNRB averages in locations with displaced and refugee populations risks underestimating the environmental burden and dilutes the measurable climate benefits, as well as other co-benefits to health, workload and gender equality, of clean cooking interventions in displacement- and refugee-hosting settings.

Localized fNRB can also enable higher-integrity carbon crediting, helping attract results-based finance for solutions like electric cooking. Recognizing the distinct environmental dynamics of these settings through context-specific fNRB values could prove essential for advancing both climate action and humanitarian outcomes, while ensuring that displaced and refugee populations are appropriately included in sustainable development efforts and that environmental pressures are addressed in a just and evidence-based manner.

a UNHCR (2022). *Annual Report 2022 on Sustainable Energy.*
b Rivoal, M., & Haselip, J. A. (2017). *The true cost of using traditional fuels in a humanitarian setting. Case study of the Nyarugusu refugee camp, Kigoma region, Tanzania.* UNEP DTU Partnership Working Paper Series 2017, Vol. 3.

© UNDP Somalia

where schools, reception centres and health facilities consume vast amounts of firewood daily. In many parts of Africa institutional cooking is a major driver of deforestation, household financial strain, and gendered protection risks for women and girls who bear the burden of fuel collection. The World Food Programme (WFP) has been at the forefront of addressing these challenges by linking food assistance programmes with innovative energy solutions, recognizing that nutrition, protection and environmental sustainability are deeply interconnected. The **Solar Electric Cooking Partnership** (SOLCO), launched as part of the **Global Electric Cooking Coalition (GeCCo)** at COP28, builds on this momentum, bringing together WFP, Mercy Corps, FAO (in Uganda), Last Mile Climate and private-sector innovators to enable a market-driven transition to institutional electric cooking. By introducing solar-powered and grid-connected electric cooking systems in schools and refugee-hosting facilities, SOLCO aims to reduce dependence on unsustainable biomass, unlock carbon finance and demonstrate financially sustainable pathways for higher-tier clean cooking. This integrated approach not only alleviates environmental and health burdens but also strengthens resilience in vulnerable communities, offering a replicable model for scaling investment in clean cooking across Africa and beyond.

# 2.2 The first global stocktake and growing global momentum for clean cooking

The first global stocktake under the Paris Agreement, along with a series of recent high-level events, is building critical momentum for a just and inclusive energy transition. At COP28, countries committed to significant energy system transformation to accelerate the shift to renewable energy and transition away from fossil fuels. Key elements include tripling the world's installed renewable energy capacity to at least 11,000 gigawatts and doubling the global average annual rate of energy efficiency improvements from two percent to over four percent by 2030.[20] COP28 also witnessed the launch of the **Global Electric Cooking Coalition (GeCCo)**, aimed at expanding markets globally for clean and low-carbon electric cooking. The ***Climate Technology Progress Report 2024,*** produced by the United Nations Environment Programme Copenhagen Climate Centre (UNEP-CCC), highlights significant advancements in renewable energy adoption for electricity generation, emphasizing the critical roles of innovation, digitalization and blended finance in driving the global shift to clean electricity. While initiatives such as the **Global Bioenergy Partnership** (GBEP), with 92 members from national governments and international organizations, have made the transition to clean cooking one of its priorities.

In May of 2024, the **Summit on Clean Cooking in Africa** hosted by IEA in Paris concluded with a commitment of US$2.2 billion in financing and investments from government and private sector sources to expand clean cooking solutions across the continent. In the same year, the G7 Italian Presidency committed to promote clean cooking technologies (including electrification, sustainable and low-greenhouse gas (GHG) biomass, biogas, ethanol and, where alternatives are unavailable, liquefied petroleum gas - LPG) in developing countries.[21] Meanwhile, the G20 Brazilian Presidency launched the **Roadmap for the Brazil G20 Presidency's Clean Cooking Strategy**. At COP 29, in Azerbaijan, clean cooking was included as a priority in the **African Energy Efficiency Strategy and the African Energy Efficiency Alliance**, both launched to advance energy productivity on the continent. At the Africa Energy Summit in Tanzania in January 2025, 12 African countries presented **National Energy Compacts** that include clean cooking targets and priorities for 2030, integrated as part of broader energy access and electrification initiatives at the national level (these were presented as part of regional efforts under the Mission 300 initiative; see Box 3). And throughout 2025, the South Africa G20 Presidency continued to support clean cooking as an essential component to achieve energy security and affordable and reliable access to energy and discussed the topic in the context of the Energy Transition Working Group (ETWG).

20 UNFCCC (2023). Outcome of the first global stocktake.
21 G7 Italia (2024). G7-Climate, Energy and Environment Ministers' Meeting Communiqué. Turin, 29-30 April 2024.


## Box 3: Aligning SDG 7 and climate priorities through NDC processes

For many African countries, NDC revision cycles offer a strategic opportunity to align energy access goals under SDG 7 with national climate commitments. The **Mission 300** (M300) initiative, which aims to provide electricity access to 300 million people across Africa, offers a strong platform for this alignment. As of October 2025, 30 countries in the region have developed Energy Compacts with quantitative targets for expanding renewable energy generation, electricity access and clean cooking solutions, as well as the public and private financing needed to meet these ambitions by 2030.

UNDP analysis of Energy Compacts reveals strong areas of alignment with emerging NDC priorities across key SDG 7 action areas (particularly SDG 7.1.1 on electricity access and 7.1.2 on clean cooking). In these specific areas, countries are setting Energy Compact targets that are two to three times the current baseline. These ambitious targets can be easily translated into the NDCs, highlighting the alignment between new NDCs and equivalent Energy Compacts or strategies that articulate targets for 2030 and beyond.

# 3. Clean cooking in NDC submissions and emerging trends

**Climate Promise 2025 is a United Nations system-wide initiative to support countries to align their NDCs with the 1.5°C goal, which can enhance NDC quality and "investability" to drive sustainable development.**

**An analysis of NDC submissions as of November 2025, including the most recent NDC submissions from the 2025 cycle, shows that 81 countries sampled across Africa, Asia, Latin America and the Caribbean, and Oceania have identified clean cooking as a priority sector reflecting its growing recognition within national climate agendas (see Figure 1).[22]**

22 Compiled by FAO and UNDP from NDCs, including NDC 3.0 submissions available as of November 7, 2025. This figure builds on FAO's earlier assessments for African countries, as presented in FAO (2025) *Bioethanol for clean cooking – An analysis of its role in energy transition in Africa*. Rome, FAO.


Despite this growing recognition, some countries may not always align fuel and technology targets in their NDCs with existing SDG 7 targets, roadmaps or energy policies. This misalignment or policy incoherence could negatively impact the effective implementation of targets. For example, some countries may include quantified targets, such as the number of clean cookstoves to be installed or the share of households expected to be using them by a specified timeline (e.g., by 2030 or 2035), while others may use more qualitative language to state their ambition to transition away from unsustainable cooking practices.[23] In many cases, these targets are not anchored in a clear national strategy for the rollout of appropriate solutions, nor do they adequately differentiate between fuel and technology types.

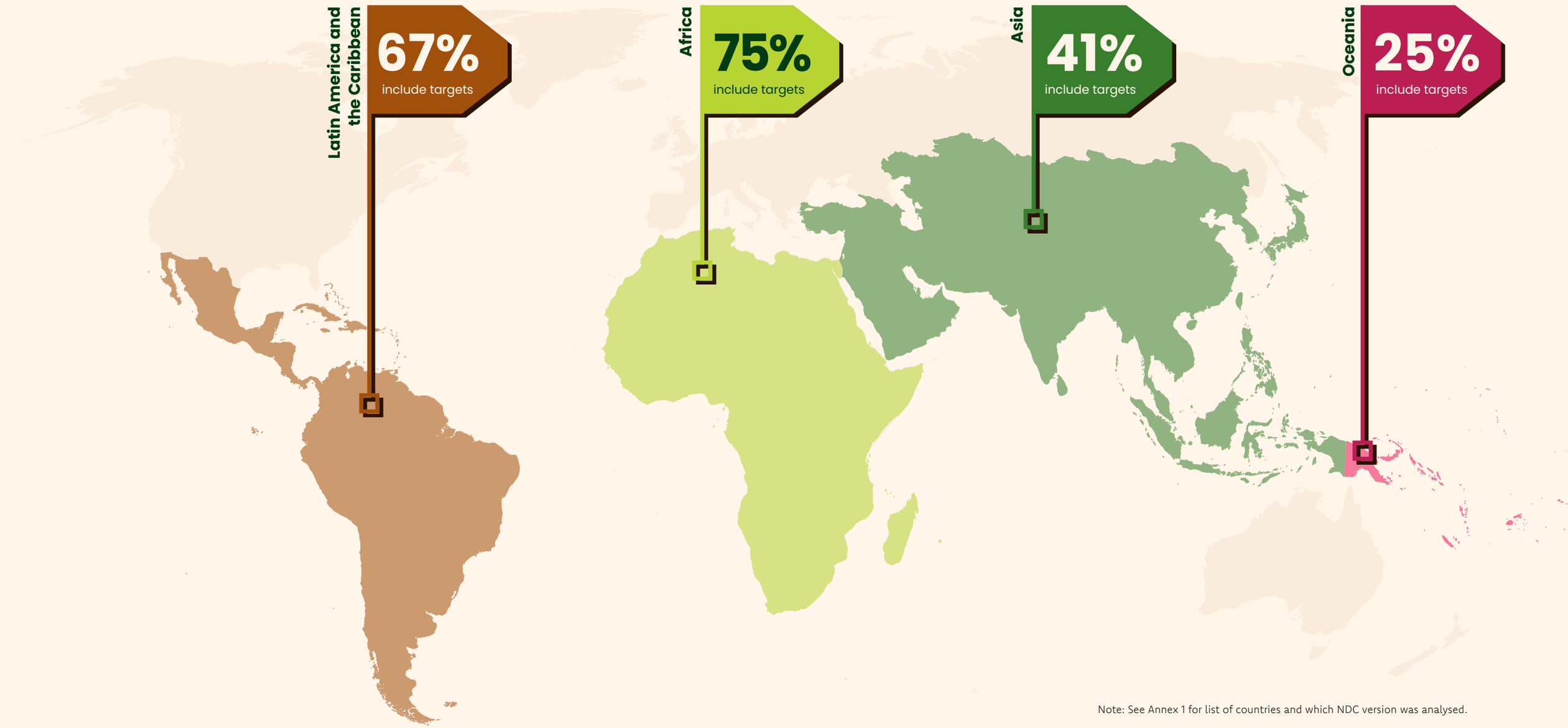
This disconnect is particularly evident when electricity is treated simply as a fuel type, without considering broader infrastructure and electricity access constraints. For example, in contexts with low electricity access, scaling up electric cooking remains

23 International Renewable Energy Agency (IRENA) (2023). *Renewables based electric cooking: Climate commitments and finance*. Abu Dhabi.

## Figure 1: Clean cooking representation in NDCs for selected countries and regions

**100%** of 81 sampled countries mention clean cooking as a priority

**62%** include specific quantitative targets




Note: See Annex 1 for list of countries and which NDC version was analysed.


limited unless it is embedded within integrated energy planning. This would not only make the shift to electric cooking more achievable, but it would also reduce the cost of future infrastructure upgrades needed to account for the additional electricity generation load for cooking. **Sierra Leone** offers an emerging example of this suggested approach in that clean cooking is embedded within national energy planning, including through the **Presidential Initiative on Climate Change, Renewable Energy and Food Security** (PI-CREF). This initiative promotes integrated and inclusive energy transitions that link energy access with development priorities, such as food security, climate resilience and renewable energy development and is supported by the establishment of a Clean Cooking Delivery Unit to drive implementation and coordination.

Encouragingly, several countries are developing dedicated national clean cooking strategies. In **Lao People's Democratic Republic**, the development of a National Electric Cooking Strategy is underway. Similarly, **Kenya's National Clean Cooking Strategy** (2024-2028) includes specific targets for clean cooking, which are being considered within broader NDC implementation. These targets incorporate factors such as appliance efficiency and defined uptake goals.

An urgent need still exists for countries to set concrete, context-specific targets that emphasize the adoption of higher-tier cooking solutions—ones that are cleaner, more reliable and safer for households and communities. In this context, it is equally important to establish investment plans to support the expansion of clean

cooking. These investment plans, like the targets themselves, should be embedded within broader, integrated energy transition planning frameworks to ensure coherence, sustainability and effective implementation.

While clean cooking transitions will vary at the country level, NDCs offer an opportunity for countries to articulate more specific targets that promote the use of higher-tier solutions for cooking (e.g. electricity and bioethanol, among others) as a critical step toward achieving both SDG 7 and the Paris Agreement objectives. Prioritizing such solutions not only maximizes co-benefits for health, gender and climate, but also supports the development of more resilient, inclusive and sustainable energy systems.

## 3.1 Approaches for strengthening clean cooking in the NDC process

Clean cooking transitions, like all energy transitions, do not necessarily follow a linear or deterministic path. Rather, they are shaped by a mix of socio-political, economic and cultural dynamics.[24] While often driven by necessity or market opportunity, clean cooking transitions can be deliberately guided through strong policy signals, targeted public finance and international cooperation.

This complexity underscores the value of the NDC process as a multisectoral platform for defining nationally appropriate clean cooking pathways. It enables countries to assess how clean cooking can be integrated within broader mitigation and adaptation strategies, rather than treated as a standalone issue. Embedding clean cooking across the entire NDC development/revision and implementation cycle ensures that it is considered alongside other energy, climate and development priorities, helping align ambition with practical, context-specific actions.

NDCs also offer a strategic lever to reframe clean cooking as a legitimate GHG reduction strategy[25] and financing opportunity. For example, by embedding clean cooking as part of mitigation, adaptation and just transition priorities, countries can unlock Article 6 carbon markets and catalyse private and blended finance. This is illustrated by **Burundi**, a country that has used global platforms, such as COP29, to promote electric cooking as a climate-aligned solution, despite only six percent of the country's population having grid access. The Burundi strategy, targeting $0.15/kWh electricity tariffs through renewable-based cooking initiatives, illustrates how energy planning, tariff reform and climate ambition can converge.

Below are recommendations and examples of how countries can articulate more specific and time-bound targets for clean cooking in line with existing national processes and strategies, including SDG 7 roadmaps and Energy Compacts.

24 Haselip, J. and Trærup, S. (2021). *Scaling up investment in climate technologies: Pathways to realizing technology development and transfer in support of the Paris Agreement.* UNEP Copenhagen.

25 United Nations (2023). *Achieving universal access and net-zero emissions by 2050: A global roadmap for just and inclusive clean cooking transition.*; Clean Cooking Coalition (2022). *Clean Cooking for Climate Action: Roadmap for National Clean Cooking Programmes to Achieve Emission Reduction Targets.*

# Actionable recommendations for clean cooking integration in NDCs

**One**

## Situation analysis and NDC stocktake

- Assess current situation and local cooking practices and uses at the national and local levels, including across different community typologies (e.g. rural, peri-urban and urban).

- Integrate clean cooking data, disaggregated by technology and fuel types, as part of national energy statistics.

**Two**

## Policy alignment

- Assess existing national policies to identify clean cooking strategies and targets. Identify synergies across policy documents to facilitate coherence.

- If available, incorporate existing targets as part of NDC development processes and finalize through consultative processes and data collection. For example, targets may already be articulated in existing national clean cooking strategies, in SDG 7 frameworks and Energy Compacts that could be incorporated as part of the NDC drafting process and subsequent implementation.

**Example**

**Kenya** offers a good example on policy alignment. The country's 2025 NDC includes a general reference to clean cooking, aiming to contribute to its NDC mitigation targets. However, ambitious clean cooking rollout is further supported through **Kenya's National Clean Cooking Transition Strategy** (prepared in 2024). Following a consultative process and data modelling, the strategy details a target fuel mix for 2028 that speaks to Kenya's context and places emphasis on promoting renewable fuels, such as electricity, biogas and bioethanol for cooking.

## Three

# Target setting

- Through consultative processes, data modelling and policy alignment (from recommendation two above), incorporate specific, time-bound and measurable clean cooking targets as part of NDC development (e.g. to 2035 for the 2025 NDC update), across different technology and fuel baskets, being sure to match them with national realities and priorities.

- When possible, prioritize higher-tier solutions (e.g. electric cooking, biogas and ethanol), define targets, and align with WHO emissions thresholds and ISO standards.

### Example

**Nepal's 2025 NDC** includes clean cooking as a priority sector, with unconditional and conditional targets for higher-tier solutions, such as electric and biogas cooking. Nepal aims to expand these solutions to over 2.5 million households (2.1 million households using electricity for cooking by 2030 and 500,000 households using biogas for cooking), supported through the scale-up of carbon financing.

**Additional resources:** ***Clean Cooking for Climate Action: Roadmap for National Clean Cooking Programmes to Achieve Emission Reduction Targets*** by the Clean Cooking Alliance and Berkeley Air Monitoring Group, with inputs from the UNFCCC, CCAC, SEI, and US EPA.

## Four

# Financing and investments

- Integrate clean cooking into national investment plans, national budgets and Integrated National Financing Frameworks (INFFs).

- Explore carbon finance opportunities, including carbon markets.

- Clarify how including clean cooking emissions reductions (in unconditional and conditional NDC targets) interact with national processes to issue Internationally Transferred Mitigation Outcomes (ITMOs) to avoid double counting.

- Prioritize investments for higher-tier solutions, such as electric cooking from renewable sources, ethanol and biogas, aligned with WHO emissions thresholds and ISO standards.

- Ensure that clean cooking is included as part of broader energy planning efforts, leveraging ongoing and planned investments in energy infrastructure to also deliver clean cooking outcomes, particularly when synergies exist with electrification and grid expansion.

## Five

# Implementation

- Link targets to ongoing implementation efforts, including as part of broader energy planning efforts, ensuring that clean cooking actions are not implemented as a stand-alone priority, but as part of broader energy sector planning.[26]

- Identify opportunities to scale up national efforts and align financing and investments with these opportunities (including carbon markets and Article 6).

## Six

# Measurement, reporting and verification (MRV)

- Establish robust indicators for clean cooking in NDC and MRV frameworks.

- Ensure accurate and granular fNRB estimates that will improve the credibility of MRV systems, ensure additionality in carbon trading projects registered under Article 6 and increase investor confidence in clean cooking as a climate intervention.

**Additional resources:** ***Introductory Framework for Measurement, Reporting, and Verification: Clean Cooking MRV in the Paris Context*** by the Clean Cooking Alliance and Berkeley Air Monitoring Group, with inputs from the United Nations Framework Convention on Climate Change (UNFCCC), Climate and Clean Air Coalition (CCAC), Stockholm Environment Institute (SEI) and U.S. Environment Protection Agency (EPA).

26 SEforALL (2024). *Integrating Clean Cooking into National Energy Access Planning: Tools and Considerations for Planning and Implementing eCooking.*

**The overconsumption of biomass fuels for cooking, especially firewood, often results in total deforestation and biodiversity loss.**

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# 4. The case for financing tier 4+ low-carbon technologies

**The NDC revision process presents a timely opportunity to catalyse investment in low-carbon clean cooking technologies, enabling a transition toward higher-tier (Tier 4+ for efficiency and emissions on the MTF; see Box 1) cooking solutions, such as biogas, micro-gasification of pellet fuels, advanced biofuels, including sustainable ethanol, and renewably powered electric cooking. Evidence increasingly supports the viability of these advanced technologies, including for last mile communities.[27] A recent (2024) report from the African Energy Commission (AFREC) demonstrates that electric cooking offers not only the highest potential for emissions reductions but also significant health and economic co-benefits.**

27 Haselip, J., Bisaga, I., Bellanca, R., Hussain, F., Butterfield, A., Øster, J. and Rosenberg-Jansen, S. (2025). *Business and financing models for PV-supported clean cooking as a critical climate technology for Last Mile Communities.* UNEP-CCC, Copenhagen.

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# 4.1 Financing barriers: High capital expenditures, operational expenditures and market failures

Despite these promising developments, markets for Tier 4+ cooking systems remain under-capitalized. Financing the transition requires overcoming key market failures—specifically high capital expenditures (CapEx) for hardware and infrastructure that fail to reflect the negative externalities linked to unsustainable fuel use and operational expenditures (OpEx) for fuels and maintenance (when relevant). Clean cooking systems are typically consumer-facing and distributed across millions of households, which makes them less attractive to investors accustomed to centralized energy infrastructure.

While public and philanthropic grants have traditionally supported early-stage deployment, especially in low-

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income contexts, these resources alone are insufficient for scaling solutions or ensuring long-term sustainability. Financial sustainability must be embedded within market-driven delivery models. This includes transitioning toward blended finance structures that combine public, private and concessional capital to de-risk investments, reduce the cost of capital and incentivize commercial participation to grow both the supply and demand for Tier 4+ technologies.

## 4.2 Unlocking carbon finance and Article 6 opportunities

Carbon markets, both voluntary and compliance-based, represent one of the most promising pathways to closing the commercial financing gap. It is important to acknowledge that voluntary carbon markets have historically provided most carbon credit revenues for the sector. With ongoing concerns over credit quality, securing new purchase commitments will be critical to avoid market disruption and ensure continued financing for clean and modern cooking transitions.

Projects that displace traditional biomass with Tier 4+ low-carbon technologies (especially electric and sustainable bio-based systems) can generate high-integrity carbon credits, provided that usage is metered and verified using digital Measurement, Reporting and Verification (dMRV) systems.[28] These credits are becoming increasingly attractive to companies in the Global North seeking cost-effective mitigation options and SDG-aligned investments.

28 For a more detailed analysis, see: Clean Cooking Alliance and Berkeley Air Monitoring Group (2022). *Introductory Framework for Measurement, Reporting and Verification Clean Cooking MRV in the Paris Context.*

For instance, a household electric cooking project powered by solar photovoltaics (PV) and displacing wood or charcoal could yield two to four tonnes of net $CO_2e$ emission reductions annually. At carbon prices exceeding $40 per tonne, a single household could generate $80–160 per year in carbon finance.[29] This revenue could subsidize upfront appliance costs or support pay-as-you-go models to improve affordability.[30]

As of late 2023, nearly one billion tonnes of emission reductions from Clean Development Mechanism (CDM) projects, including many clean cooking initiatives, have applied to transition into the Paris Agreement Crediting Mechanism (PACM). This could significantly scale finance availability, particularly when supported by credible dMRV systems.

Article 6 of the Paris Agreement offers an additional opportunity to channel international carbon finance into clean cooking transitions, particularly where projects can demonstrate verifiable emission reductions alongside strong sustainable development co-benefits. By integrating clean cooking into national Article 6 strategies, governments can prioritize the sector as a means of delivering conditional NDC commitments while accessing ITMOs. This requires robust governance to ensure corresponding adjustments and avoided double counting, thereby safeguarding environmental integrity and delivering genuine global emission reductions.[31]

At the project level, the use of accurate, context-specific non-renewable biomass (fNRB) values is critical for setting baselines


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that reflect real-world impacts. Combined with dMRV-enabled monitoring, this ensures that carbon credits are both credible and financeable. Innovative approaches such as carbon aggregators that pool smaller projects, or a "Contracts for Difference" mechanism proposed by the Clean Cooking Alliance,[32] could further stabilize revenues and reduce investment risk in more capital intenseive technologies that depend upon carbon financing. When structured carefully, Article 6 transactions can help unlock scaled and predictable finance for clean cooking, positioning the sector as a cost-effective, SDG-aligned solution with far-reaching climate, health, gender and ecosystem benefits.

29 Haselip, J., and Bisaga, I. (2024). *Powering progress: Market creation strategies for solar e-cooking in off-grid and displaced communities*. UNEP-CCC, Copenhagen.
30 Through the SPAR6C project, UNEP-CCC helped develop robust dMRV systems to ensure credit credibility in Zambia, where clean cooking has been integrated into the national Article 6 legal and regulatory framework.
31 Heras, B., Isakova, I., Spalding-Fecher, R., Hopkins, M. and Haselip, J. (2023). Developing an Article 6 host party strategy. S PAR6C Guide 2. Global Green Growth Institute.
32 For more information refer to: Haselip, J., Bisaga, I., Bellanca, R., Hussain, F., Butterfield, A., Øster, J. and Rosenberg-Jansen, S. (2025). *Business and financing models for PV-supported clean cooking as a critical climate technology for Last Mile Communities.* UNEP-CCC, Copenhagen.

Modern forms of clean cooking, such as electric cooking, can enhance the business case for expanding electricity access. By shifting household spending away from polluting fuels and increasing demand for electricity, electric cooking technologies can promote broader energy access and contribute to energy system sustainability.


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# 5. Digital measurement, reporting and verification systems and the role of the Internet of Things

**The availability of robust dMRV is central to unlocking carbon finance, particularly considering previous over-crediting associated with traditional improved cookstoves and their legacy MRV processes. Legacy MRV, often reliant on manual surveys and site visits, have proven costly, time-consuming and inaccurate, undermining trust in clean cooking-related carbon credits.**


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The evolution of dMRV offers a transformational shift. Many Tier 4+ cooking systems, especially electric cooking devices, are Internet of Things (IoT) enabled, providing real-time data on energy consumption. Although this adds to initial costs, it significantly lowers transaction costs and improves transparency, resulting in higher-integrity credits.

In early 2025, the Integrity Council for the Voluntary Carbon Market (ICVCM) approved three cookstove methodologies adopted by leading crediting bodies, including Gold Standard and the CLEAR Methodology by 4C, forming the basis for scalable, verifiable and trustworthy carbon finance (see Box 4).[33] These systems are essential to building investor confidence and ensuring long-term financial sustainability. In parallel, initiatives such as the **Principles for Responsible Carbon Finance in Clean Cooking** and the **Buyer's Guide to High-Quality Carbon Credits** can increase market transparency and integrity, strengthening buyer confidence.

33 The Integrity Council (2025). "Integrity Council approves three cookstove methodologies among latest decisions." Press release, 7 March 2025.

## Box 4: Towards more robust accounting of carbon reductions

In 2021, Gold Standard approved a new **"Methodology for Metered and Measured Energy Cooking Devices"** (MMECD), developed by Climate Impact Partners and Modern Energy Cooking Services Programme (University of Loughborough). This approach calculates emissions reductions based on real energy use, using embedded metering or direct fuel measurements. The **CLEAR methodology**, developed by 4C and currently under review by UNFCCC and Gold Standard, is the first public-good, fuel-neutral methodology designed for Article 6 and the voluntary markets. It builds on MMECD, mandates direct in-home fuel consumption measurements, and incorporates the latest science, requiring higher transparency and accuracy in estimating emissions reductions.

Clean cooking companies such as **ATEC Global**, **EcoSafi** and **BURN Manufacturing**, are already using some of these methodologies. While providers like **Geocene** and **Climate Solutions** Consulting offer a variety of metering tools, helping streamline crediting processes and reduce long-term costs. Others, such as **Odyssey** and **Isometric**, have also launched new dMRV tools to expedite carbon credit verification with platforms that connect to MRV systems, centralizing carbon accounting and integrating with verification bodies to reduce delays and inconsistencies. These developments reflect a growing trend toward digitalization in the voluntary carbon market. Though the transition can be complex, dMRV promises long-term savings, greater transparency and stronger data integrity—all crucial elements to build trust and unlock finance for clean cooking transitions.

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# 6. Case studies: Evidence from the ground

**This section showcases a variety of case studies that illustrate how implementing complementary measures, such as a supportive policy and financing environment, can drive and accelerate the clean cooking transition. Experiences from Rwanda, Tanzania and Uganda demonstrate how to successfully enhance national access to clean cooking through cross-cutting policies and implementation strategies. Meanwhile, Zambia's case study illustrates how progress also requires supportive tariffs, regulations and established standards.**

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# Rwanda

Currently, Rwanda ranks among the 20 countries with lowest access rates to clean cooking systems. Traditional biomass fuels (firewood and charcoal) account for 93.4 percent of total household energy use in the country.[34] This has dire consequences, contributing, in 2019, to over 7,000 premature deaths from HAP, and an annual biomass deficit of over four million cubic meters.[35,36] It also leads to forest degradation, threatens biodiversity and exacerbates erosion in forests.

National awareness of this issue has been growing since 2015, when the government published its Intended Nationally Determined Contribution (INDC). Among its commitments, the government set an ambitious target to reach 100 percent of the population with access to improved cookstoves by 2030 and to scale up both biogas production and adoption of LPG as clean cooking fuel.[37]

Over the course of the following near-decade, access to clean cooking fuels and technologies increased steadily from 0.9 percent of the total population to 8.3 percent in 2022.[38] In urban areas, this progress was even more pronounced, with 34 percent of

34 Ministry of Infrastructure (MININFRA) of Rwanda (2025). *Energy Policy*. Republic of Rwanda.
35 Taghian, G., Fisher, S., Chiles, T.C., Binagwaho, A., and Landrigan, P.J. (2024). The Burden of Cardiovascular Disease from Air Pollution in Rwanda. *Annals of Global Health*, 90(1): 2.
36 Tsanga, R.; Ducenne, Q.; Habimana, C.; Brasseur, R.; Cerutti, P.O. (2021). *Wood Supply Chain in Rwanda. A market analysis*. Eco-EmploiGIZ and GIZ.
37 Republic of Rwanda (2015). *Intended Nationally Determined Contribution (INDC) of Rwanda.*
38 World Bank Group. "Access to clean fuels and technologies for cooking (% of population)." World Development Indicators. [accessed 12 Sept. 2025].


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the urban population having access in 2022, up from 3.6 percent in 2015.[39] This progress was achieved through a combination of strong policy support from the government across different sectors, the adoption and harmonization of standards, import duty and tax exemptions, and key partnerships with financial institutions and donors.

## Policy context

Rwanda is known for its strong vision and policy framework, guided by Vision 2050 and the National Strategy for Transformation (NST) with the aim to become a middle-income country by 2035 and a high-income country by 2050.[40] Over the last 10 years, targets and strategies to scale up clean cooking fuels and technologies have been integrated and prioritized in many of Rwanda's policies spanning different sectors (e.g., energy, environment, forestry and education).

39 World Bank Group. "Access to clean fuels and technologies for cooking, urban (% of urban population)." World Development Indicators. [accessed 12 Sept. 2025].
40 Republic of Rwanda (2024). *National Strategy for Transformation (NST2) 2024-2029.* Kigali.

Setting these explicit targets in policy has helped scale up access and adoption but also shape which technologies and fuels are prioritized. For instance, in Rwanda's first National Strategy for Transformation (NST1), published in 2017, the government committed to halving the number of households dependent on firewood for cooking from 79.9 percent to 42 percent by 2024, with a focus on promoting LPG in urban areas and biogas in rural areas.[41] Its second National Strategy for Transformation 2024-2029 (NST2), published in 2024, focuses on increasing adoption of efficient biomass technologies for large-scale users like schools, health facilities and prisons, as well as for households.[42] Rwanda's updated NDC, published in 2020, shifted the focus to rural households, setting an unconditional measure to disseminate modern efficient cookstoves to 80 percent of the rural population and 50 percent of the urban population by 2030.[43] And more recently, in October 2024, the Government of Rwanda outlined their commitment to transition to electric cooking via a Letter of Intent to join GeCCo. In addition to being integral to the national strategy aimed at enhancing the quality of life of Rwandans, increasing electric cooking aligns with SDG goals and the country's NDC targets.

## Adoption and harmonization of standards

In addition to establishing a strong and enabling policy framework, the government has taken steps to reduce barriers limiting the uptake of new clean cooking fuels and technologies through the development and adoption of standards. In 2022, the Ministry of Infrastructure (MININFRA) published Ministerial Guidelines on Clean Cooking Technologies to help streamline the enforcement of existing standards and those under development.[44]

The guidelines set minimum quality and performance requirements for different fuels and technologies, including biomass, LPG, electric and biogas cookstoves, and define the accepted test procedures to evaluate them. This is crucial for ensuring safety, quality and consistency of products and services entering the market. The guidelines also ensure that minimum standards and procedures are up-to-date and in line with internationally recognized standards, thereby facilitating trade and encouraging investment in the sector.

## Import duty and tax exemptions

In Rwanda, the standard VAT, applied to most goods and services, is 18 percent and is directly passed on from businesses to consumers through higher prices. This can pose barriers to adoption of clean cooking technologies, particularly when they are in competition with the alternative free or low-cost use of traditional biomass and stoves.

In 2015, the Ministry of Finance and Economic Planning of Rwanda took measures to reduce these barriers by approving VAT exemptions

41 Republic of Rwanda (2017). *7 Years Government Programme: National Strategy for Transformation (NST1).*
42 Republic of Rwanda (2024). *National Strategy for Transformation (NST2) 2024-2029.*
43 Republic of Rwanda (2020). *Updated Nationally Determined Contributions.* UNFCCC.
44 Ministry of Infrastructure (MININFRA) (2022). *Ministerial Guidelines for Clean Cooking Technologies.* Republic of Rwanda.

on cooking-related products, including, among others:[45]

- solid biomass fuels produced in Rwanda in the form of densified pellets;
- cookstoves that meet ISO/IWA11:2012 Tier 2-4 emission standards and fuel efficiency;
- vermiculite (insulation material for installation of institutional stoves and assembling household stoves);
- equipment, tools, machinery and replacement parts and appliances for biomass densification pellet production and use;
- equipment, tools, machinery, replacement parts and appliances designed for use in the supply of bio-gasification energy; and
- LPG fuel, cylinders and accessories.

These exemptions, which have been confirmed and updated in May 2025,[46] have been supportive in making clean cooking alternatives more affordable and have accelerated adoption, encouraging more businesses to enter the market and appeal to cost-sensitive consumers.[47]

Following an agreement signed in 2022 with KOKO Networks, a climate technology company specializing in bioethanol cooking fuel and stoves, the government removed VAT and import duties on bioethanol fuel, cookstoves and all related distribution hardware. These fiscal measures have facilitated trade and lowered costs for businesses in the sector. In parallel, KOKO Networks committed to developing a nationwide renewable cooking fuel utility for bioethanol, mobilizing up to $25 million in private climate finance to support the initiative.[48]

## Key partnerships

Finally, the government has been strategic in its partnerships with financial institutions and international donors to support funding the country's clean cooking transition. In 2020, MININFRA launched the Rwanda Universal Energy Access Programme (RUEAP), a multi-donor energy sector investment financing programme to support the government in attaining its energy access objectives during the period of the NST1.

Under this programme, and specifically as part of the Rwanda Energy Access and Quality Improvement Project (EAQIP) launched in 2020,[49] the Clean Cooking Results-Based Financing (CC-RBF) project was launched as a partnership between the Development Bank of Rwanda (BRD) and the Energy Development Corporation Limited (EDCL), co-financed by the World Bank's Clean Cooking Fund. The project includes a results-based financing

45 Energypedia. Examples of Legal Texts and Regulations to Lift Import Duties for PV Products - energypedia. [accessed 12 Sept. 2025]. Elaborated from Ministry of Finance and Economic Planning (MINECOFIN) (2015). "List of Energy Supply Equipment Exempted From Value Added Tax." Republic of Rwanda.

46 Ministry of Finance and Economic Planning (MINECOFIN) (2025). List of energy supply equipment exempted from VAT. Republic of Rwanda.

47 Nshimiyimana, J.P., Mukeshimana, M.C., and Nshimyimana, E. (2024). Tracking the progress towards adopting LPG as a clean cooking fuel in Rwanda: User's perspective. *Energy for Sustainable Development*, 80: 101441.

48 Rwanda Development Board (RDB) (2022). "Rwanda signs agreement with KOKO to establish $25 million renewable cooking fuel utility." Press release, 22 March 2022.

49 Development Bank of Rwanda (BRD) (2022). *Rwanda Energy Access and Quality Improvement Project: Component 3b Increasing Access to Clean Cooking Solutions Operations Manual.*


(RBF) subsidy scheme that effectively reduces costs for clean cooking companies and subsidizes the sale of cookstoves and fuel for end-users, alongside grid- and off-grid electrification support. This creates an investable pathway for electric cooking and other modern cooking solutions and contributes to NDC mitigation. Total financing is $17 million for the RBF programme and $3 million for technical assistance—sums that would be infeasible without external support and collaboration.[50]

Carbon finance is another important accelerator for Rwanda's clean cooking transitions and the achievement of its NDC. The government concluded an Article 6 Implementation Agreement with Singapore in May 2025[51] and, building on a 2024 collaboration between the Rwanda Green Fund, REMA, Gold Standard and GenZero, is positioning high-integrity credits (including early Article 6 credits) to crowd in private capital for clean cooking and related projects while avoiding double counting against its NDC.

50 Ibid.
51 Ministry of Trade and Industry, Singapore (2025). "Singapore signs implementation agreement on carbon credits collaboration with Rwanda." Press release, May 2025.


# Tanzania

The United Republic of Tanzania is a lower-middle-income country and ranks amoung the top countries in the world with the highest population growth rate, currently standing at 2.9 percent annually.[52] This rapid growth, while a sign of potential, also poses significant challenges for the country's economic and social development.

Based on Tanzania's **National Energy Compact**, submitted during the **'Mission 300', African Energy Summit** in January 2025, the country's domestic low-cost energy resources provide conditions and opportunities for affordable electricity to facilitate economic growth. However, existing power infrastructure has been unable to adequately cater for the rising demand, given the high rates of economic and population growth. Therefore, Tanzania aims to diversify its electricity generation mix; as of December 2024, the total installed capacity is comprised of 59.1 percent hydropower, 35.2 percent natural gas, 3 percent heavy fuel oil (HFO) and diesel, 0.1 percent solar photovoltaics (PV) and 2.6 percent biomass and co-generation.

The Tanzania Energy Compact informs that overall electricity access in mainland Tanzania has increased from 14 percent in 2011 to 78.4 percent in 2025, as the country has expanded the power grid to reach nearly 100 percent of villages. However, approximately a quarter of the population in mainland Tanzania remains without access to electricity services. A significant disparity exists between electricity access rates in urban areas (99.6 percent) and rural areas (69.6 percent). Electricity connectivity rates have also increased in recent years, estimated to be 46 percent overall in 2022, with connection rates in urban areas (79 percent) being much higher than rural areas (36 percent). The same is true for Zanzibar, where electricity access

52 World Bank (2024). "Population growth (annual %) - Tanzania." World Development Indicators.

has increased from 38.3 percent in 2011 to 88 percent in 2020, with a connectivity rate of 57 percent in 2024.

Nonetheless, in mainland Tanzania, traditional polluting fuels (firewood and charcoal are the primary cooking fuels) and technologies for cooking are still in high demand with more than 89 percent of households still relying on traditional cooking methods. In Zanzibar, this figure exceeds around 84 percent. Despite repeated policies aimed at making natural gas and LPG affordable to encourage their adoption, their usage remains low, accounting for only 3.2 percent in mainland Tanzania and 7.7 percent in Zanzibar, primarily in urban areas with significant stacking practices (using more than one fuel option for cooking, such as combining charcoal and electricity). As per the national clean cooking strategy, for cooking purposes, it is estimated that around 90 percent of households in the country rely on wood and charcoal as their primary cooking energy, accounting for 63.5 percent and 26.2 percent of usage, respectively. The remaining 10 percent includes LPG at 5.1 percent, electricity at 3 percent and other energy sources at 2.2 percent.

## NDC implementation and policy coherence

In 2021, Tanzania submitted its NDC in which it set a conditional pledge to reduce GHG emissions by 30 percent (138 Mt CO2-eq) by 2030 against a base year of 2000 under the business-as-usual (BAU) scenario, with limited international support or by 35 percent (153 Mt CO2-eq) with substantial international support and depending on the efficiency improvements, consistent with its sustainable development agenda. The government prioritized four mitigation sectors in this NDC: energy, transport, forestry and waste.

Under the energy sector, the government specifically committed to ensuring that 100 percent of electricity generation would be from renewables by 2050. The NDC outlines priorities to expand the use of natural gas for power production, cooking, transportation and thermal services through improvement of natural gas supply systems throughout the country and to promote climate-smart rural electrification, including development of micro- and mini-grid renewable generation for improved rural electrification. The NDC does not include specific subsector targets for clean cooking.

Since the 2021 NDC, Tanzania developed and adopted a **National Clean Cooking Strategy (2024-2034)** in 2024 with a main objective "to ensure that 80 percent of Tanzanians use clean cooking solutions by the year 2034." Five out of the ten specific objectives of this strategy are to:

1. increase public and institutional awareness on the importance of using clean cooking solutions;
2. strengthen the accessibility of raw materials and reliable infrastructure of clean cooking solutions;
3. reduce the cost of clean cooking energy sources, appliances and efficient cookstoves;
4. develop, update and harmonize enabling policies, laws, regulations and guidelines to facilitate the adoption of clean cooking solutions; and
5. promote investments in clean cooking.

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Due to the disproportionate burden that women and girls bear from traditional cooking practices, including related health issues from smoke inhalation and time spent collecting firewood, the government developed a Tanzania-led initiative called the Women Clean Cooking Support Programme (AWCCSP). This initiative was **launched** by the President of Tanzania, Ms. Samia Suluhu Hassan, at the COP28 in 2023 to raise awareness of the problem, investigate and create partnerships, and mobilize financial resources to scale clean cooking solutions. In addition, at COP29, the African Union and Tanzania joined forces in a **high-level side event**, titled "Addressing Clean Cooking Challenges in Africa: A call for African Leadership" to make clean cooking a central part of the global climate agenda. This side event convened African leaders, policymakers and international stakeholders to tackle the critical issue of clean cooking and to underscore the urgency of political leadership, innovative partnerships and significant financial investment to achieve sustainable clean cooking solutions.

In January 2025, in Dar es Salaam, the Government of Tanzania, the African Union, the African Development Bank Group and the World Bank Group hosted the **Mission 300 - Africa Energy Summit**. At the summit, African heads of states, private sector leaders, development partners and civil society discussed the urgent need for reliable, affordable and sustainable energy to drive economic growth and unlock development across the continent. The objective of the summit was to strategize ways to connect 300 million Africans to electricity by 2030 in a new ambitious and collaborative initiative.

Together with 11 other African countries at the Africa Energy Summit, Tanzania unveiled its **National Energy Compact** that sets forth actionable commitments to increase the electricity connectivity rate to 75 percent by 2030 and increase clean cooking access to 75 percent by 2030 and 80 percent by 2034. The compact also aims to: 1) increase the share of renewable energy in the generation-mix to 75 percent from the current 61.8 percent, which will require adding 1,973 MW of generation capacity from solar (463 MW), wind (500 MW), geothermal (130 MW) and hydro (880 MW); and 2) mobilize significant public- and private-sector financing (over

$4 billion) to create a favourable investment climate, strengthen local capacities through training and establish robust data collection systems for informed energy-planning and decision-making.

Achieving these targets will require critical reform actions to be taken across the energy-sector value chain. Fortunately, Tanzania has already laid the groundwork and developed and adopted several strategies (the National Electrification Strategy, National Clean Cooking Strategy and National Energy Efficiency Strategy) and implemented several measures to incentivize private sector participation. The measures include: 1) outlining a process for regulatory approval of private-sector-led mini-grids, including tariff regulations; 2) financial support to private sector distributed renewable energy (DRE) and clean cooking operators to ensure affordability and viability; and 3) ensuring transparency, including through auditing and publishing of annual financial statements of utilities.

## Key partnerships

The government received, and is still receiving support from several United Nations organizations, and others, to achieve its clean cooking targets, as listed below.

- UNIDO Global Impact Programme for Clean Cooking, **Tanzania**.
- **UNIDO/GEF project** – Technical support to facilitate the transition to clean cooking energy solutions (bioethanol-based and efficient electric cooking) and enhance reduction of GHG emissions (implementation is until the end of 2026).
- The United Nations Capital Development Fund (UNCDF) CookFund Programme, **Accelerated Market Rollout of Clean Cooking Solutions in Tanzania** (2021-2024).
- UNCDF (under the CookFund programme) project delivered by UNIDO and FAO, supporting the government to accelerate implementation of a clean cooking strategy to ensure over 80 percent of the population transitions to clean cooking solutions by 2034.
- UNDP is promoting clean and energy-efficient cooking solutions in Tanzania through a range of initiatives. Under the country's first Energy Efficiency Action Plan, funded by the European Union, UNDP is working with partners to develop and introduce Minimum Energy Performance Standards (MEPS) for electric cooking appliances and solid biomass cookstoves. Through the United Nations Kigoma Joint Programme, UNDP is supporting the Small Industries Development Organization (SIDO) to strengthen the Nyansha Training and Production Centre's capacity to manufacture fuel-efficient stoves and biomass briquettes, thereby expanding access to clean cooking energy. Additionally, the Integrated Net-Zero Nature-Positive project, supported by a $4.7 million grant from the Global Environment Facility (GEF), is addressing key barriers to electric cooking by fostering market development, promoting digital metering and pay-as-you-go systems and linking users to carbon finance and special electricity tariffs. The project aims to reach 5,000 new household and enterprise users.

- Sustainable Energy for All (SEforALL) and WFP **launched** an innovative partnership in 2024, focused on bringing clean and efficient cooking solutions to schools in Africa. In Tanzania, together with the Government of Tanzania and the UKAid-funded Modern Energy Cooking Services (MECS) programme, the partners have created an eCooking programme targeting up to 50 primary schools across Tanzania, interconnecting energy with food systems, while improving health, environment and livelihoods.
- UNCDF, in collaboration with the Government of Tanzania and the European Union, inaugurated in May 2025 the **Eastern Africa Regional Clean Cooking Energy Symposium** in Arusha to accelerate momentum of the clean cooking revolution. The event brought together industry leaders and policymakers to discuss strategies for advancing clean cooking, under the theme "Linking finance, innovation, technology adoption, access and policy."

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# Uganda

The Government of Uganda is widely recognized for its efforts creating an enabling environment to scale up clean cooking. Over the past 24 years, access to clean cooking has increased from below 1 percent in 2000 to 15 percent in 2024.[53] Similarly, access to electricity increased from 7.4 percent in 2000, to 51.5 percent in 2023, at the national level.[54]

Despite notable progress, substantial disparities persist between urban and rural populations, with electricity access in 2023 at 76 percent in urban areas and only 42 percent in rural areas.[55] According to the National Population and Housing Census 2024, a total of 53 percent of Ugandan households now have access to electricity—25 percent through the national grid and 28 percent off-grid (solar).[56] Meanwhile, only 3.8 percent of households in Uganda use electricity (1.7 percent) and alternative non-biomass fuels such as LPG (1.1 percent) as their primary cooking fuel.[57] Affordability remains a major barrier, with rural areas disproportionately affected. For instance, out of the small sector of population that has access to clean cooking, less than 30 percent can afford cooking with LPG.[58]

Solid biomass, namely firewood, charcoal and bagasse, is the predominant cooking fuel in Uganda, accounting for over 90 percent of the

53 Kayodi, M.M. (2025). "Uganda Fostering Affordable and Clean Cooking Technology." Blog, UNDP Uganda, 8 January 2025.
54 The World Bank. World Development Indicators. (accessed July 2025).
55 The World Bank. World Development Indicators. (accessed July 2025).
56 Republic of Uganda (2024). *National Population and Housing Census 2024.*
57 Ibid.
58 International Energy Agency (IEA) (2023). *Uganda Energy Transition Plan.* IEA, Paris.

population's primary energy consumption.[59] Charcoal is the primary cooking fuel for 58 percent of the urban population, while 80 percent of rural residents rely on firewood.[60] This overreliance on solid biomass fuels is directly responsible for unsustainable wood harvesting, which contributes to an annual deforestation rate of 1.61 percent in Uganda, one of the highest in sub-Saharan Africa.[61] Targeted subsidies and financing mechanisms are needed to overcome this gap.

To address this, the Ministry of Energy and Mineral Development (MEMD), the main government institution in Uganda's energy sector, in collaboration with other national institutions, has taken key measures in policy, regulation and international cooperation to facilitate a country-wide transition from biomass to modern clean cooking technologies by 2030. Achieving universal access to clean cooking by 2030 in Uganda could reduce net GHG emissions by 17 Mt CO2-e, equivalent to removing over 3.5 million cars from the road annually. It could also prevent 50,000 premature deaths caused by indoor air pollution per year and save households two hours per day on firewood collection.[62]

## Policy measures and targets

Since it first committed to scaling up clean cooking in 2015 in its INDC through promotion and wider uptake of energy-efficient cooking stoves and induction cookers,[63] Uganda has published and implemented increasingly targeted and specific policies and strategies that demonstrate increasing coherence across Uganda's climate, energy and development agendas.

While the **National Climate Change Policy** (2015) and **Biomass Energy Strategy** (2015) first outlined intentions to scale up access and affordability of improved biomass cookstoves, LPG, sustainable biofuels and biogas, the first tangible targets were set in 2020, with the publication of the **Third National Development Plan III (NDP III) 2020/21-2024/2025**. The targets for 2025 included reducing the share of biomass energy for cooking from 88 percent to 50 percent, increasing clean energy access from 15 percent to 50 percent, increasing LPG uptake from 1 percent to 8 percent and grid reliability to 90 percent.[64] The country's **updated NDC**, published in 2022, took these targets a step further by setting sector-specific indicators and targets for industry, commercial and residential energy use for cooking. Most recently, in 2023, Uganda published its **Energy Transition Plan** with the objective of providing universal access to electricity and cleaner cooking by 2030, with the strategy to first prioritize improved cookstoves, LPG and biogas and subsequently focusing more on electricity and, to a lesser extent, LPG. This reflects the current limitations in infrastructure readiness and affordability, with electricity receiving priority as grid reliability continues to improve. Electric cooking was prioritised in the NDC Action project implemented by UNEP, which developed market expansion proposals currently under consideration by the African Development Bank (AfDB).[65]

59 National Planning Authority (NPA) (2020). *Third National Development Plan (NDPIII) 2020/21 - 2024/25.* Republic of Uganda.
60 Government of Uganda (2023). *Uganda Demographic and Health Survey 2022.* Uganda Bureau of Statistics.
61 FAO (2020). *Global Forest Resources Assessment 2020: Main report.* Rome.
62 International Energy Agency (IEA) (2023). *Uganda Energy Transition Plan.* IEA, Paris.
63 Republic of Uganda (2015). *Intended Nationally Determined Contribution (INDC) of Uganda.* UNFCCC.
64 National Planning Authority (NPA) (2020). *Third National Development Plan (NDPIII) 2020/21 - 2024/25.* Republic of Uganda.
65 UNEP (2024). "NDC Action validation workshop in Uganda concludes with a commitment to advance Uganda's climate goals into actionable projects." 27 August 2024.

# Policies under development

To achieve the ambitious target of universal clean cooking access by 2030, Uganda is taking additional steps outside of conventional energy and climate policies that specifically target clean cooking. Currently, MEMD and the Ministry of Water and Environment (MWE) are working in collaboration with the Stockholm Environment Institute (SEI), the Berkeley Air Monitoring Group, the Centre for Integrated Research and Community Development of Uganda (CIRCODU) and the Clean Cooking Alliance to develop the country's first Nationally Integrated Clean Cooking Strategy (NICCS). This Strategy will focus on synthesizing existing policies and convening stakeholders in the clean cooking sector to develop a roadmap for achieving universal clean cooking as well as a MRV framework to monitor progress to achieve this objective.[66] The MRV framework will include dMRV systems to enable real-time tracking of emissions reductions and support carbon credit generation.


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At the same time, MEMD and MECS have commissioned CIRCODU to develop a national electric cooking strategy, with specific interventions to scale up adoption of electric cooking from 1 percent to 18 percent by 2030.[67] This has followed and complemented considerable efforts to expand access to electricity country-wide, starting in 2013 with the **Rural Electrification Strategy and Plan**, which set a target to expand access in rural areas to 51 percent by 2030 and the more recent **National Electrification Strategy**, published in 2021, which set a national target of 80 percent access by 2040. Despite ongoing grid expansion, high initial connection costs, low household income and poor grid reliability constitute key barriers to grid electricity access for consumers, especially in peri-urban and rural areas. Reliability issues such as voltage fluctuations, unplanned outages and limited last-mile connectivity, undermine the confidence in electric cooking appliances, which require stable and predictable power to function efficiently.[68]

66 Stockholm Environmental Institute (SEI) (2023). *A National Integrated Clean Cooking Strategy for Uganda (NICCS).* [accessed August 2025].
67 Clements, W. (2024). "Uganda's Modern Energy Cooking journey: a timeline." Blog, Modern Energy Cooking Services (MECS), 30 May 2024.
68 Murungi H., Kiiza N., Nkurunziza G., Ssennono V.F., Manjeri Aarakit S. (2025). Why is there low grid electricity access in rural Uganda? Evidence from the Uganda National Household Survey. *Energy Policy*, Vol. 203,114652, ISSN 0301-4215.


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## Tariffs and regulations

In addition to policy targets and strategies, the government has also taken measures through regulation and market interventions to establish incentives for private sector engagement by reducing the costs that often discourage entry to the sector and decreasing prices for end-users. For instance, as of 2023, a zero-import tax applies to all imported parts destined for local assembly of cookstoves and a reduced import tax (from 25 percent to 10 percent) applies to all imported clean cookstoves. In addition, no tax is assigned to biogas tubular digesters and VAT has been waived for LPG and ethanol for cooking.[69]

In 2022, Uganda's Electricity Regulatory Authority (ERA) introduced a reduced lifeline cooking tariff, known as *Fumba*, for all households connected to the national grid through the country's main distributor, UMEME. This tariff applies between the 81st and 150th units in a month of consumption and is designed to incentivize wealthier urban households to increase their electricity use for cooking purposes.[70,71] To reinforce these incentives from the supply side, the government has also limited its fossil fuel subsidies[72] and announced an executive order banning tree-cutting for charcoal in northern and north-western Uganda after the National Environment Management Authority (NEMA) revealed that none of the charcoal dealers in the country were properly certified as required.[73]

69 ICLEI Africa (2023). "Advancing the clean cooking transition in Uganda." iENACT Project, 21 June 2023.
70 International Energy Agency (IEA) (2023). *Uganda Energy Transition Plan.* IEA, Paris.
71 International Energy Agency (IEA) (2023). *Uganda 2023: Energy Policy Review.* IEA, Paris.
72 International Energy Agency (IEA) (2023). *Uganda Energy Transition Plan.* IEA, Paris.
73 International Energy Agency (IEA) (2023). *Uganda 2023: Energy Policy Review.* IEA, Paris.

## Interventions in humanitarian contexts

Uganda represents a unique case in the clean energy transition given that it hosts more refugees than any other country in Africa. The country has over 1.9 million refugees and asylum seekers,[74] the majority (between 89 and 93 percent) have minimal access to basic energy services and rely on biomass in the form of firewood or charcoal for cooking.[75] Women and children in refugee settlements bear the brunt of biomass reliance, facing health and gender-based violence risks and impacts on time poverty. Clean cooking interventions must be gender responsive.

In 2020, MEMD developed the **Sustainable Energy Response Plan for Refugees and Host Communities (SERP)** which provides a roadmap for increasing access to affordable, reliable and clean energy in this sector.[76,77] The plan recognizes the need for a dramatic shift to alternative fuels in refugee and host community settings and aims to enhance coordination between humanitarian and development stakeholders as well as the public and private sectors in realizing this shift.

## Key partnerships and multi-stakeholder coalition projects

Facilitated by the enabling policy and regulatory environment it has built, Uganda has secured funding and formed partnerships to launch several multimillion-dollar projects to scale up clean cooking. This approach has been spearheaded since 2013 by the **Uganda National Alliance on Clean Cooking (UNACC)**, a non-profit organization aimed at achieving universal clean cooking in Uganda through a multi-stakeholder partnership including MEMD, FAO, Modern Energy Cooking Solutions (MECS), Clean Cooking Alliance (CCA), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Netherlands Development Organization (SNV), World Wildlife Fund (WWF) and Energising Development (EnDev). UNACC mandates include raising awareness of clean cooking through exhibitions and behaviour change campaigns, supporting development and enforcement of standards on clean fuel and technology, collaborating with policymakers and stakeholders to encourage clean cooking adoption, and securing financial resources.[78]

A previous collaboration between MEMD and the World Bank resulted in the Clean Cooking Supply Chain Expansion project in Uganda, a $2.2 million project that took place between 2015 to 2020 and aimed to reduce inefficient use of biomass fuels for cooking. The project forged partnerships between quality-verified manufacturers and local retailers to sell improved cookstoves and

74 UNHCR (2025). Uganda Comprehensive Refugee Response Portal (accessed 1 September 2025).
75 Save the Children (2024). *Energy for Household Uses in Refugee Settlements in Uganda: Desk Review for the Uganda refugee response.* United States Agency for International Development (USAID).
76 International Energy Agency (IEA) (2023b). *Uganda 2023: Energy Policy Review.* IEA, Paris.
77 Grafham, O., Lahn, G. and Haselip, J. (2022). *Scaling sustainable energy services for displaced people and their hosts: How policy and governance make a difference.* Chatham House Research Paper, London.
78 Clements, W. (2024). "Uganda's Modern Energy Cooking journey: a timeline." Blog, Modern Energy Cooking Services (MECS), 30 May 2024.


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resulted in the distribution of over 58,000 cookstoves by March 2020, exceeding the initial target of 45,000.[79]

More recently, the World Bank Energy Access Scale Up Project (EASP), led by MEMD and the Uganda Energy Credit Capitalisation Company (UECCC) is set to invest $505 million in extending grid coverage and increasing electricity access in the country over five years and $92 million in scaling up access to improved cookstoves, biogas, briquettes, ethanol and LPG.[80] Another collaborative project, **Strengthening the Entrepreneurial Ecosystem for the Clean Cooking Sector (SEE-CC)**, financed by the European Commission, Netherlands Ministry of Foreign Affairs and Ministry of Foreign Affairs Denmark and coordinated by the Netherlands Enterprise Agency (RVO), GIZ and EnDev, aims to reach 12,000 households (60,000 beneficiaries) with higher-tier cooking technologies through interventions across entire value chains and results-based financial subsidies on high quality, low-emission energy efficient (Tier 3+) cookstoves.[81] Launched in early 2024, **the SOLCO Partnership** in Uganda aims to create access to Tier 4+ PV-supported clean cooking technologies for 150,000 households in last-mile communities, including refugee-hosting districts.

Local entrepreneurship and private sector investment has also flourished in the wake of the introduction of supportive policies, public-private partnerships and financing programmes. One such programme is the **Higher-Tier Cooking Component (HTCC)** Results-based Financing, administered by CLASP and supported by GIZ and SNV, which aims to support the sale of 12,000 clean cooking stoves annually.

79 International Energy Agency (IEA) (2023). *Uganda 2023: Energy Policy Review.* IEA, Paris.
80 Clements, W. (2024). "Uganda's Modern Energy Cooking journey: a timeline." Blog, Modern Energy Cooking Services (MECS), 30 May 2024.
81 Netherlands Enterprise Agency (2024). "Strengthening the Entrepreneurial Ecosystem for Clean Cooking (SEE-Clean Cooking)." Programmes, 9 September 2025.

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# Zambia

Zambia is one of the most urbanized countries in sub-Saharan Africa, with approximately 45 percent of its population living in cities.[82] According to the 2023 **National Energy Access Survey**, charcoal is a dominant source of energy in Zambia, with 57.6 percent of households at the national level using charcoal at home, of which 98.8 percent is for cooking purposes. Meanwhile, electricity use for cooking is at 15.8 percent, though differences vary between rural and urban areas, whereby 4.2 percent of rural populations use electricity for cooking compared to 31.6 percent in urban areas. These differences are a direct consequence of low levels of grid access and limited access to, and unaffordability of, modern cooking solutions among the rural population. Additionally, the affordability and easy access to illegal charcoal in urban areas contributes to high usage of fuelwood. Such charcoal use contributes to GHG emissions from land-use change and forestry.

In 2016, the Government of Zambia submitted its **first Nationally Determined Contribution** in which it set a conditional pledge to reduce GHG emissions by 25 percent (20,000 gigagrams (Gg) $CO_2e$) by 2030 against a base year of 2010 under the BAU scenario, with limited international support or by 47 percent (38,000 $GgCO_2e$) with substantial international support. The programmes of focus identified to attain these reductions were sustainable forest management, sustainable agriculture, and renewable energy and energy efficiency. Under the sustainable forest management programme, the government specifically committed to implement improved cooking devices, including improved biomass, ethanol, LPG and electric stoves.

82 Berman, L.W., Hosier, R.H., and Ungari, B. (2022). *Zambia Clean Cooking Market Assessment.* The World Bank.

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Despite this commitment, between 2015 and 2022, the percentage of the Zambian population with access to clean fuels and technology dropped from 13.9 percent to 9 percent.[83] This regression was experienced almost entirely in urban areas, while in rural areas access rates remained comparatively stable. Within the same time frame, physical access to electricity increased from 31 percent to 47.8 percent.[84] However, the main source of electricity in the country is generated through hydropower which, through increasingly frequent periods of low rainfall, led to heavy load shedding and interruptions in supply.[85] This has been a major driver behind the reduction in clean cooking in Zambia as many households using electricity for cooking have been forced to revert to charcoal use when electricity is unavailable or unreliable. In 2013 alone, 12 percent of households using electricity for cooking reverted to charcoal as their primary fuel source.[86]

The government has recognized the importance of the widespread access gap to clean cooking solutions and to the risks of relying exclusively on electric grid expansion to solve it. Over the past decade, the government has taken actionable steps to address this access gap by ensuring an enabling environment for private sector actors to scale up alternative clean cooking options through a supportive policy framework. More recently, the government recognized the importance of reducing barriers to trade, including import duties and a lack of harmonized standards, and has set commitments to addressing these barriers in its **National Energy Compact**.

83 World Bank Group (2025). "Clean Cooking and Electricity Access for Zambia." World Development Indicators Data Bank.
84 Ibid.
85 Samboko, P.C., Dlamini, C., Moombe, K., and Syampungani, S. (2016). *Load shedding and charcoal use in Zambia: What are the implications on forest resources.* White Paper. 109. Lusaka, Zambia, Indaba Agricultural Policy Research Institute (IAPRI).
86 Ministry of Energy (2022). *Renewable Energy Strategy and Action Plan.* Republic of Zambia.

# Supportive policy framework

In 2021, the government updated its NDC and, in 2023, published a **NDC Implementation Framework for Zambia (2023-2030)** to operationalize and guide its implementation, identifying 135 climate mitigation measures and 158 key performance indicators across various sectors. Related to clean cooking, the framework includes a targeted production of 100,000 improved cookstoves by 2026. Zambia's National Development Plan, updated every five years, sets the strategic direction for development priorities towards achieving Zambia's Vision 2030 goal of becoming a middle-income country by 2030. The last three plans have included explicit actions to scale up clean cooking in line with the country's NDCs.[87,88,89]

In 2016, the government also prepared a Sustainable Energy for All (SEforALL) Action Agenda and Investment Prospectus for reducing deforestation attributable to the prevalent use of charcoal and fuelwood for cooking by promoting alternative cooking solutions. The agenda sets targets for the uptake of clean and modern cooking solutions by 2022 (since updated to 2030), which include:

- reduce deforestation attributable to prevalent use of charcoal and fuelwood for cooking by promoting alternative cooking solutions; and
- by 2030, for urban households, the breakdown of cooking solutions will be 20 percent electricity, 40 percent LPG, 20 percent charcoal and 20 percent firewood.[90]

Most recently, in 2025, the Mission 300 Summit saw the launch of **Zambia's National Energy Compact**, in which the government set a target to achieve universal access to electricity and reach 40 percent of the population with clean cooking solutions by 2030. It also announced the development of a comprehensive clean cooking strategy currently underway, focused on alternative fuels and technologies for women and marginalized groups.

# Secured external funding for clean cooking projects

In addition to building a supportive policy environment, Zambia has been highly successful in securing investments from external donors for multi-year clean cooking programmes.

In 2021, the United States Agency for International Development (USAID) launched a $24.9 million project aimed at decreasing charcoal production for use as cooking fuel to reduce deforestation and GHG emissions. The project took a market-driven approach that focused on shifting demand from charcoal for cooking to low-emission alternative technologies and fuels (ATFs). This was

87 Ministry of Finance and National Planning (2011). *Sixth National Development Plan 2011-2015.* Republic of Zambia.
88 Ministry of Finance and National Planning (2017). *Seventh National Development Plan 2017-2021.* Republic of Zambia.
89 Ministry of Finance and National Planning (2022). *Eighth National Development Plan 2022-2026.* Republic of Zambia.
90 EED Advisory Limited/World Bank (2022). *Zambia Clean Cooking Market Assessment.*

done through strategic partnerships with private sector actors working in the clean cooking supply chain with a strong focus on biomass and LPG, as well as with financial institutions in partnership with key government ministries to strengthen the business-enabling environment.[91] While investment from this project has recently been frozen, other projects funded by external donors have had great success and are still ongoing.

The World Bank has also invested $32.8 million in the Zambia Integrated Forest Landscape Project 2017-2022 for improving resilience and sustainable management of forest systems, including through distribution of fuel-efficient cookstoves to reduce deforestation.[92] The project resulted in the distribution of 156 cookstoves to public institutions and over 4,800 cookstoves to community households.[93]

## Tariffs and regulations

Regarding the tax and tariff landscape for clean cooking, Zambia still lags other countries in Africa. At the moment, only LPG stoves and kerosene are exempt from the 16 percent VAT, although LPG cylinders still face a 15 percent import duty and 16 percent VAT. Biogas, ethanol, pellets and briquettes are all still affected by VAT, as well as their associated cookstoves and burners.[94] Ethanol for cooking attracts an excise duty tax of 60 percent, as it is considered the same as ethanol for beverages, making it too expensive to scale up as a viable cooking fuel. This seems to be changing, however, as the government recently set a target in its National Energy Compact to establish mechanisms for duty exemptions and tax relief on renewable energy technologies and clean cooking solutions, with a clear policy on zero import duties and simplified tax exemption procedures by 2026.[95]

## Standards

Zambia is making progress on standards. For example, standards for ethanol for cooking exist, however standards for improved cookstoves (ICS) are yet to be developed.[96] The Energy Regulations Board (ERB) or Zambia developed standards for liquid and gel bioethanol for cooking and updated the standards for LPG, with support from USAID's Alternative to Charcoal Project. In collaboration with the Zambia Bureau for Standards (ZABS) the Ministry of Energy, ERB has also developed standards for biogas.

In addition, the National Energy Compact has set a goal to adopt minimum quality standards for off-grid and clean cooking solutions by 2026.[97]

91 Ibid.
92 Ibid.
93 The World Bank (2024). Zambia Integrated Forest Landscape Project (P161490).
94 EED Advisory Limited/World Bank (2022). *Zambia Clean Cooking Market Assessment.*
95 Republic of Zambia (2025). *National Energy Compact for Zambia.* Mission 300: Africa Energy Summit.
96 As of September 2025.
97 Republic of Zambia (2025). *National Energy Compact for Zambia.* Mission 300: Africa Energy Summit.

# 7. Policy recommendations for integrating clean cooking into NDCs

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Based on country experiences and best practices, seven key policy recommendations for increasing clean cooking access and use that should be considered and included in NDCs are listed below.

1. **Prioritize clean cooking in NDCs as a central economic, agrifood and development driver.** Clean cooking offers major potential for local economic development, which is a priority reflected in many NDCs. Manufacturing, distribution, maintenance and after-sales services for clean cooking appliances can generate new jobs, while time and health gains from cleaner technologies can improve labour availability and educational attainment, particularly for women and children who bear the burden of fuel collection, without mentioning the potential to strengthen food security for transformative benefits across rural and urban communities. To attract private sector investment in higher-tier clean cooking solutions (i.e., at Tier 4 or higher, refer to Box 1), countries can: (a) develop national clean cooking strategies and investment plans aligned with NDCs; (b) support local manufacturing and assembly to maximize job creation; (c) strengthen standards and

certification systems; and (d) encourage public-private partnerships with clear risk-sharing frameworks.

2. **Leverage institutional settings for high-impact, aggregated delivery.** Institutional cooking in schools, health facilities and protracted displacement and refugee-hosting settings presents an underutilized opportunity for scaled impact. Governments and public and private sector partners can aggregate demand and deploy bulk procurement models. The multi-stakeholder **SOLCO partnership** for solar electric cooking in last-mile communities, for example, aligns clean cooking delivery with national NDCs and development strategies.

3. **Make financing a central pillar of clean cooking integration.** Alongside international finance, countries can leverage carbon markets to finance clean cooking solutions (including Article 6 transactions) and mobilize domestic capital. Regarding Article 6, governments would also need to assess that emission reductions from clean cooking interventions are accounted for in unconditional and conditional targets. Care needs to be taken to account for which credits are claimed toward an NDC or sold as ITMOs in order to avoid double counting. This makes it important to clearly designate which emission reductions are retained domestically and which are made available for transfer.[98] Finally, low-carbon clean cooking transitions must also be driven by domestic capital mobilization, underpinned by coherent taxation and fiscal policy.


4. **Remove market barriers by eliminating VAT/import tariffs on clean technologies. Harmonized efforts are needed to address existing market barriers.** These include a) introducing supportive policies and incentives such as removing VAT or import duties on clean energy technologies, their components and related clean fuels and b) establishing and enforcing quality standards. For example, Uganda has introduced targeted tax reforms: a zero-import tax on parts for local assembly of cookstoves, a reduced import tax (from 25 percent to 10 percent) on imported clean cookstoves, and VAT exemptions for LPG and ethanol for cooking. These measures, when paired with awareness-raising campaigns and community engagement, can improve affordability and accelerate adoption. For Africa more specifically, Mission 300 presents a timely opportunity not only to close the access gap, but also to address these broader systemic issues, such as affordability, reliability, and the integration of clean cooking into national energy strategies, through coordinated investment and policy alignment.

98 Heras, B., Isakova, I., Spalding-Fecher, R., Hopkins, M. and Haselip, J. (2023). *Developing an Article 6 host party strategy.* SPAR6C Guide 2. GGGI, Seoul.


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5. **Integrate clean cooking into energy and agrifood sector planning to leverage infrastructure investments (e.g. grid expansion and renewable energy projects).** Integration within NDCs must go beyond setting targets to embedding clean cooking into energy and agrifood sector planning. This includes leveraging wider energy investments, such as electricity grid upgrades and renewable energy expansion, to create clean cooking transitions at scale. In Uganda, despite ongoing grid expansion, affordability and reliability remain key barriers, particularly in rural and peri-urban areas where high upfront connection costs, voltage fluctuations and unplanned outages undermine consumer confidence in electric cooking solutions.

6. **Use localized fNRB data to accurately quantify emissions reductions and strengthen carbon market participation.** Consideration of fNRB values is essential, especially in contexts that differ significantly from national averages, such as displacement and refugee-hosting settings. In such cases, localized fNRB assessments can ensure that carbon finance methodologies accurately reflect the mitigation potential of clean cooking interventions. Linking NDC ambitions with forest and biomass management strategies, and incorporating precise, localized fNRB values, can strengthen eligibility and value in carbon markets. Notably, an increasing number of African countries are striking Article 6 agreements with partner governments (e.g., Singapore, Sweden and Switzerland), providing an important opportunity to accelerate transitions to clean and modern cooking.

7. **Ensure broader systems integration.** Integrating clean cooking into NDCs does not automatically lead to significant progress in clean cooking transitions. To achieve meaningful impact, it is essential to implement complementary measures—particularly the development of a supportive policy and financing environment. This involves not only aligning climate and energy policies but also integrating relevant policies from other sectors such as agriculture, forestry, industry and education, to establish a comprehensive, consistent and enabling framework. Equally important is aligning these efforts with the SDGs, especially as several countries tend to structure their national development strategies around SDG targets.


In conclusion, low-carbon clean cooking represents a transformative opportunity to deliver on both climate and development objectives, while also strengthening contributions to food security, reducing pressure on forests and agricultural land, and delivering transformative benefits across rural and urban communities alike. Its systematic integration into revised NDCs stands to accelerate progress toward tier 4+ solutions at scale. By prioritising clean cooking as a central driver of economic growth, governments can unlock jobs, productivity and health benefits while addressing gender and equity dimensions. Aggregating demand through institutional cooking, embedding financing strategies that harness both carbon markets and domestic capital, and reforming fiscal policy to remove barriers and redirect subsidies are essential steps for scaling these positive impacts.

National investment plans, strengthened standards, local manufacturing and public–private partnerships can further build market confidence, while aligning clean cooking transitions with broader energy sector planning. Leveraging accurate and localised data to demonstrate emissions reductions is critical for unlocking climate finance, including possible use of Article 6 mechanisms. With initiatives such as Mission 300 in Africa and emerging opportunities in Asia, advancing clean cooking through NDCs offers a timely and high-impact pathway to achieve universal access, drive low-carbon development, and deliver measurable climate action.

ANNEX 1

## Clean cooking representation in NDCs for selected countries and regions

| Region | Country | Mention | Target | Version | Year |
|---|---|---|---|---|---|
| Africa | Angola | Yes | No | NDC 3.0 | 2025 |
| Africa | Benin | Yes | Yes | Updated NDC | 2021 |
| Africa | Botswana | Yes | Yes | Second NDC | 2024 |
| Africa | Burkina Faso | Yes | Yes | First NDC | 2021 |
| Africa | Burundi | Yes | Yes | Updated NDC | 2021 |
| Africa | Cabo Verde | Yes | No | Updated NDC | 2021 |
| Africa | Cameroon | Yes | Yes | Updated NDC | 2021 |
| Africa | Central African Republic | Yes | Yes | Updated NDC | 2022 |
| Africa | Chad | Yes | Yes | Updated NDC | 2021 |
| Africa | Comoros | Yes | No | Updated NDC | 2021 |
| Africa | Côte d'Ivoire | Yes | Yes | NDC 3.0 | 2025 |
| Africa | Democratic Republic of Congo | Yes | Yes | Updated NDC | 2021 |
| Africa | Djibouti | Yes | Yes | INDC | 2016 |
| Africa | Equatorial Guinea | Yes | Yes | Updated NDC | 2022 |
| Africa | Eritrea | Yes | Yes | First NDC | 2018 |
| Africa | Eswatini | Yes | Yes | NDC 3.0 | 2025 |
| Africa | Ethiopia | Yes | No | NDC 3.0 | 2025 |
| Africa | Ghana | Yes | Yes | Updated NDC | 2021 |
| Africa | Guinea | Yes | Yes | NDC 3.0 | 2025 |
| Africa | Guinea-Bissau | Yes | No | Updated NDC | 2021 |
| Africa | Kenya | Yes | No | NDC 3.0 | 2025 |
| Africa | Lesotho | Yes | Yes | Second NDC | 2025 |
| Africa | Liberia | Yes | Yes | NDC 3.0 | 2025 |
| Africa | Madagascar | Yes | Yes | Second NDC | 2022 |
| Africa | Mauritius | Yes | No | NDC 3.0 | 2025 |
| Africa | Malawi | Yes | Yes | Updated NDC | 2021 |
| Africa | Mali | Yes | Yes | Updated NDC | 2021 |
| Africa | Mauritania | Yes | Yes | Updated NDC | 2021 |
| Africa | Morocco | Yes | Yes | NDC 3.0 | 2025 |
| Africa | Mozambique | Yes | Yes | Updated NDC | 2021 |
| Africa | Niger | Yes | Yes | Updated NDC | 2021 |
| Africa | Nigeria | Yes | Yes | NDC 3.0 | 2025 |
| Africa | Republic of Congo | Yes | Yes | Updated NDC | 2021 |
| Africa | Rwanda | Yes | Yes | Updated NDC | 2020 |
| Africa | Senegal | Yes | Yes | Updated NDC | 2022 |

| Region | Country | Mention | Target | Version | Year |
|---|---|---|---|---|---|
| Africa | Sierra Lione | Yes | No | Updated NDC | 2021 |
| Africa | Somalia | Yes | No | NDC 3.0 | 2025 |
| Africa | South Sudan | Yes | Yes | Second NDC | 2021 |
| Africa | Sudan | Yes | Yes | Updated NDC | 2021 |
| Africa | Tanzania | Yes | No | Updated NDC | 2021 |
| Africa | The Gambia | Yes | Yes | Second NDC | 2021 |
| Africa | Togo | Yes | Yes | Updated NDC | 2021 |
| Africa | Uganda | Yes | Yes | Updated NDC | 2022 |
| Africa | Zambia | Yes | No | NDC 3.0 | 2025 |
| Asia | Afghanistan | Yes | No | INDC | 2015 |
| Asia | Bangladesh | Yes | Yes | NDC 3.0 | 2025 |
| Asia | Bhutan | Yes | No | Updated NDC | 2022 |
| Asia | Cambodia | Yes | Yes | NDC 3.0 | 2025 |
| Asia | China | Yes | No | Updated NDC | 2022 |
| Asia | Democratic People's Republic of Korea* | Yes | No | INDC | 2016 |
| Asia | India* | Yes | No | INDC | 2015 |
| Asia | Indonesia | Yes | No | NDC 3.0 | 2025 |
| Asia | Kyrgyzstan | Yes | No | NDC 3.0 | 2025 |
| Asia | Lao People's Democratic Republic | Yes | Yes | Updated NDC | 2021 |
| Asia | Mongolia | Yes | No | First NDC | 2015 |
| Asia | Myanmar | Yes | Yes | Updated NDC | 2021 |
| Asia | Nepal | Yes | Yes | NDC 3.0 | 2025 |
| Asia | Pakistan | Yes | Yes | Updated NDC | 2021 |
| Asia | Timor-Leste* | Yes | No | INDC | 2016 |
| Asia | Viet Nam | Yes | No | Updated NDC | 2022 |
| Asia | Yemen | Yes | Yes | INDC | 2015 |
| Latin America and the Caribbean | Brazil | Yes | Yes | NDC 3.0 | 2024 |
| Latin America and the Caribbean | Chile | Yes | Yes | Updated NDC | 2020 |
| Latin America and the Caribbean | Colombia | Yes | Yes | Updated NDC | 2020 |
| Latin America and the Caribbean | Cuba | Yes | Yes | NDC 3.0 | 2025 |
| Latin America and the Caribbean | Guyana | Yes | No | Updated NDC | 2022 |
| Latin America and the Caribbean | Bahamas | Yes | No | Updated NDC | 2022 |
| Latin America and the Caribbean | Haiti | Yes | Yes | Updated NDC | 2022 |
| Latin America and the Caribbean | Honduras | Yes | Yes | Updated NDC | 2021 |
| Latin America and the Caribbean | Panama | Yes | Yes | NDC 3.0 | 2025 |

| Region | Country | Mention | Target | Version | Year |
|---|---|---|---|---|---|
| Latin America and the Caribbean | Paraguay | Yes | Yes | NDC 3.0 | 2025 |
| Latin America and the Caribbean | Uruguay | Yes | No | NDC 3.0 | 2024 |
| Latin America and the Caribbean | Venezuela | Yes | No | NDC 3.0 | 2025 |
| Oceania | Fiji | Yes | Yes | NDC 3.0 | 2025 |
| Oceania | Kiribati* | Yes | No | First NDC | 2016 |
| Oceania | Papua New Guinea | Yes | No | Updated NDC | 2020 |
| Oceania | Republic of the Marshall Islands | Yes | No | NDC 3.0 | 2025 |
| Oceania | Solomon Island | Yes | No | NDC 3.0 | 2025 |
| Oceania | Tonga | Yes | No | Updated NDC | 2022 |
| Oceania | Tuvalu | Yes | No | Updated NDC | 2022 |
| Oceania | Vanuatu | Yes | Yes | Updated NDC | 2024 |

**Table notes:**
Compiled by FAO and UNDP from NDCs, including NDC 3.0 submissions available as of November 7th, 2025. This table represents an expansion of FAO's prior assessments conducted for African countries, as presented in *Bioethanol for clean cooking: An analysis of its role in energy transition in Africa* (Rome: FAO, 2025).

* The revised NDC confirms that the targets outlined in the previous INDC remain applicable.

~ Mention: Any mention of clean cooking.

+ Target: A timebound and/or quantified target for clean cooking.