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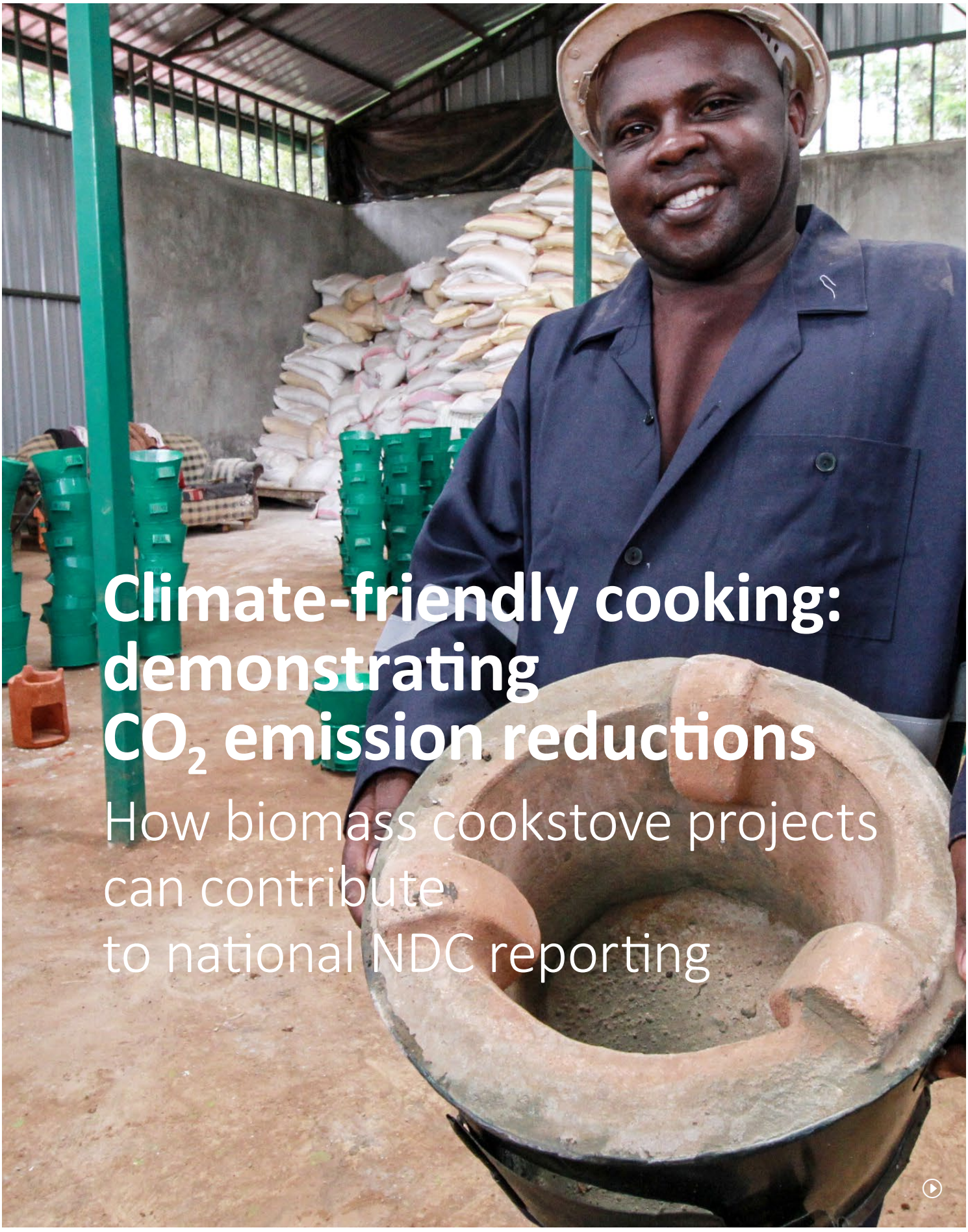


Climate-friendly cooking: demonstrating CO_2 emission reductions

How biomass cookstove projects can contribute to national NDC reporting

Content

Explanation cover picture:
Bruce Mukuru an ICS producer at Steloxy Production Centre in Tharaka Nithi County, Kenya is showcasing a portable ICS that he produced during a stove fabrication training.

Abbreviations

AQL	Access Quality Level
BAU	Business as Usual
BMZ	German Federal Ministry for Economic Cooperation and Development
BTR	Biennial Transparency Report
BUR	Biennial Update Report
CCT	Controlled Cooking Test
CDM	Clean Development Mechanism
EnDev	Energising Development Partnership
ETF	Enhanced Transparency Framework for UNFCCC reporting
GCF	Green Climate Fund
GHG	Greenhouse gas
ICS	Improved cookstoves
ISO	International Standard Organisation
KPIs	Key Performance Indicators
KPT	Kitchen Performance Test
MRV	Monitoring, Reporting and Verification
MTF	Multi-Tier Framework
NC	National Communication
NCCAP	National Climate Change Action Plan of Kenya
NDC	Nationally Determined Contributions
ODA	Official development assistance
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
VER	Verified Emission Reductions
VCM	Voluntary Carbon Market
WBT	Water Boiling Test

1 Introduction

Ameth Thiam, a professional producer of improved stoves in Thiaroye Dakar, in front of Jambar stoves.

Burning solid fuels for cooking in open fires and traditional stoves has negative environmental and climate impacts. Total emissions from the cooking sector, representing about 3 percent of global greenhouse gas (GHG) emissions, are estimated at 1.69 gigatonnes of carbon dioxide equivalent, of which 1.30 Gt (77 %) are from non-renewable biomass, 0.33 Gt from liquefied petroleum gas (LPG) and liquefied natural gas (LNG), and 0.06 Gt from electricity (UN-Energy, 2023, based on FAO statistics for 2020). In its Net Zero Emission Scenario, the IEA estimates that a total GHG emission reduction potential of 870 Mt CO_2-eq in 2030 could be achieved with an energy mix of 40 % LPG, 35 % improved cookstoves, and 15 % electricity (IEA, 2022). Reducing the use of non-renewable biomass for cooking therefore has a significant **climate change mitigation potential** (Pearson *et al.*, 2017; CCA, 2022a). At the same time, it offers a wide range of development benefits, such as reduced pressure on forests and biodiversity, reduced exposure to smoke-related health hazards, reduced burden on women and children to collect fuelwood, and reduced expenditure on cooking fuel.

Because of this high relevance in terms of emission reductions and co-benefits, as well as the high cost-effectiveness of interventions, **transforming the cooking sector has become a priority in many sub-Saharan governments' Nationally Determined Contributions** (NDCs). As of March 2023, 98 countries have included clean cooking and other household energy-related targets in their NDCs, and many governments have joined energy compacts or developed national clean cooking strategies to accelerate action on clean cooking and other energy targets.

However, clean cooking is a notoriously difficult subsector to monitor, particularly in the case of unmetered improved biomass cookstoves (ICS). In addition, many developing countries are in the early stages of establishing robust greenhouse gas inventories and national monitoring systems. The project **Promotion of Climate-friendly Cooking: Kenya and Senegal** (see box below) aims not only to demonstrate an innovative ICS market transformation strategy, but also to show how robust monitoring of ICS sales, use and associated CO_2 emission reductions can be implemented and ultimately integrated into national NDC monitoring and reporting, therefore supporting countries in reaching their NDC targets.

This report has the following outline:

1. Chapter 1 summarises the monitoring and verification processes for ICS sales (and use) at the project level
2. Chapter 2 discusses the project's contribution to the national MRV system for NDC reporting

The target audiences are partner governments looking for means of how to achieve their NDC clean cooking objectives and on how to improve their MRV systems, actors developing new project approaches in the cooking sector with a focus on climate impacts, and ICS practitioners tasked with developing MRV systems for climate impacts.

Promotion of Climate-friendly Cooking: Kenya and Senegal

The **Promotion of Climate-friendly Cooking: Kenya and Senegal** project is commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ) and co-financed by the Green Climate Fund (GCF), Kenya's Ministry of Energy and Petroleum, and Senegal's Ministry of Petroleum and Energy, and Ministry of the Environment and Sustainable Development. The project is implemented by GIZ as an associated project under the umbrella of the EnDev Partnership. It is in line with the EnDev Strategy 2019–2025 and EnDev's overarching approach to energy access for all. The vision is to transform the national ICS sector by professionalising local ICS producers and their distribution networks (Professionalisation Approach). The performance-based support offered in a 5-year roll-out uses demand as well as supply side measures. Supply side measures include support via tools and machinery as well as investments in production facilities and retail structures, and technical and business training to improve both the quality and quantity of the ICS sold. The objective of the intervention is to massively scale up the production and sale of ICS to achieve accelerated and sustainable long-term market growth. The aim is to triple the annual sales of ICS by the end of the project (after 5 years) and to achieve a 6-fold increase by 2030. This would lead to a significant reduction in the use of non-renewable biomass in the cooking sector compared to the baseline, leading to GHG emission reductions of 6.47 Mt CO_2eq over the project period and an additional 24.77 Mt CO_2eq by 2030. This scaled ICS deployment contributes to reaching the NDC targets in Kenya and Senegal in the energy sector. Furthermore, the number of ICS users among the rural and most vulnerable populations in both countries will increase, directly benefiting 11.23 million people, representing 1.91 million mainly rural households, including 0.61 million female-headed households and 5.57 million children (GIZ, 2024).

2 Monitoring results of improved biomass cookstove promotion

Newly produced rocket insert portable stoves stocked at the Steloxy Production Centre, Mitheru, Tharaka Nithi County in Kenya.

The project **Promotion of Climate-Friendly Cooking: Kenya and Senegal** is implemented as an associated project to the Energising Development (EnDev) Programme under the umbrella of the EnDev Partnership. It is building upon EnDev's prior ICS market development efforts in these countries and also follows its rigorous results monitoring approach. The project's monitoring system collects and reports on results achieved in terms of ICS sales, people provided with access and market building such as access to finance as well as changes in the level of production. In addition, it collects and aggregates the data required for CO_2 eq emission reduction reporting.

Due to this purpose, the project's MRV system is designed to capture additional ICS sales beyond the growth trajectory of the business as usual (BAU) scenario. Thus, the MRV system captures two workstreams[1]:

1. **ICS production and sales.** These are monitored monthly, verified and validated by an independent entity every six months, and numbers are aggregated on a yearly basis for reporting purposes to donors (see chapter 2.1).
2. **Adoption, use, and performance of ICS** as well as **market development** and socio-economic aspects are assessed based on representative studies conducted as baseline and endline surveys (see chapter 2.2).

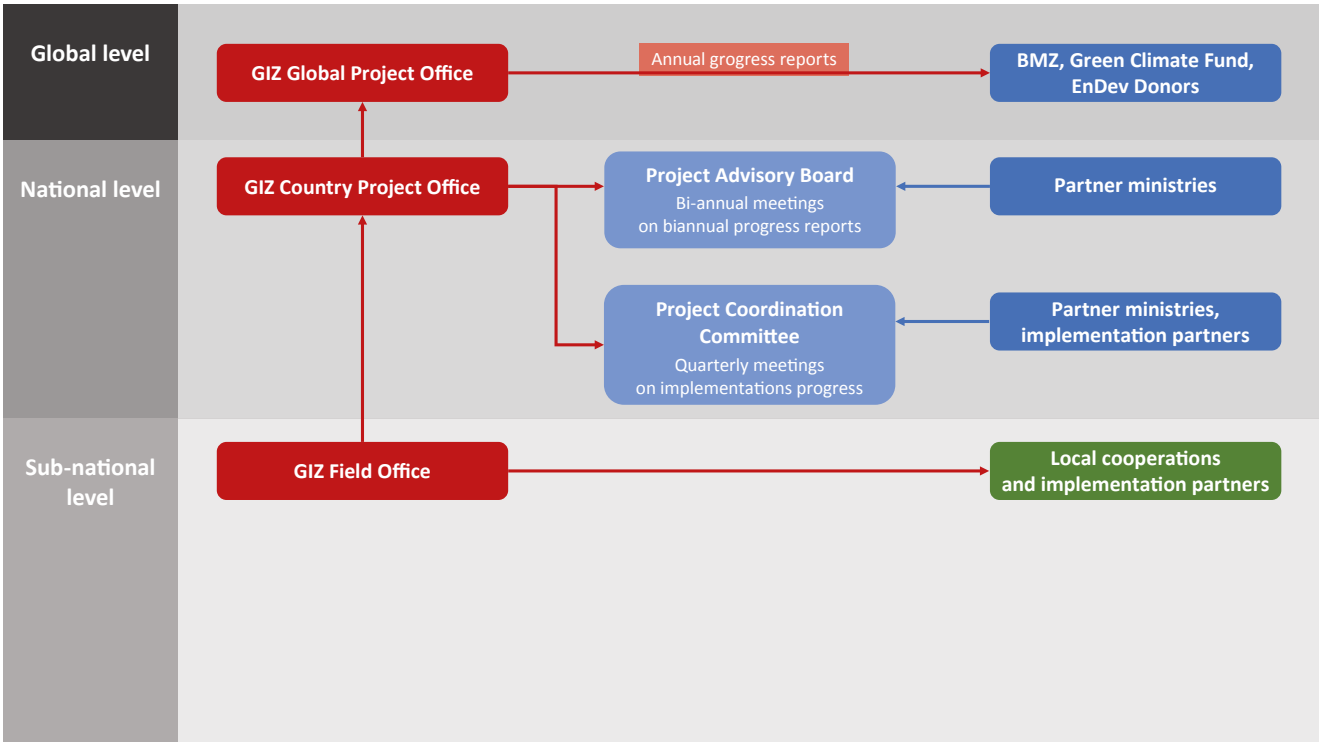
1 A number of additional project specific KPIs are monitored as well, e.g., the number of artisanal, intermediate and business class producers, as well as number of distributors supported and the number of jobs created. As these are not relevant for the monitoring of emission reductions, they are not further discussed in this guide.

2.1 MRV of stove sales

Generally, MRV activities in the project are coordinated by the MRV teams at the **global, national and sub-national** levels (see Figure 1 below). **At the global level**, a GIZ team coordinates the project and is responsible for aggregated reporting on key performance indicators (KPIs) to the project's donors BMZ and GCF. In addition, results are also reported to EnDev's Consultative group, which consists of the programme's main donors. **At the national level**, MRV activities are coordinated through two key structures: (1) the Project Coordination Committees (PCC) where GIZ and partner institutions, e.g., the Kenyan Ministry of Energy and organisations such as the National Designated Authorities coordinate implementation, gender aspects as well as environmental and social safeguard topics every three months. And the (2) Project Advisory Board (PAB), consisting of the project executing entities and implementing partners, which meets twice a year to steer the project. In addition, there are various thematic working groups i.e. for gender. At the **sub-national level** – within the two countries, project activities are implemented in different regions which are further subdivided into counties in Kenya and districts as well as urban and rural areas within these in Senegal. In Kenya, the target groups and local cooperation and implementation partners operate in four different regions (Western, Lake Victoria, Lower Eastern and Central regions); in Senegal the project operates in all districts of the country. GIZ field offices coordinate implementation and monitoring activities with the target groups and cooperation partners.

At the **national and sub-national level**, monitoring of activities and results is guided by the MRV framework as well as the individual plans of the executing entities and implementing partners.

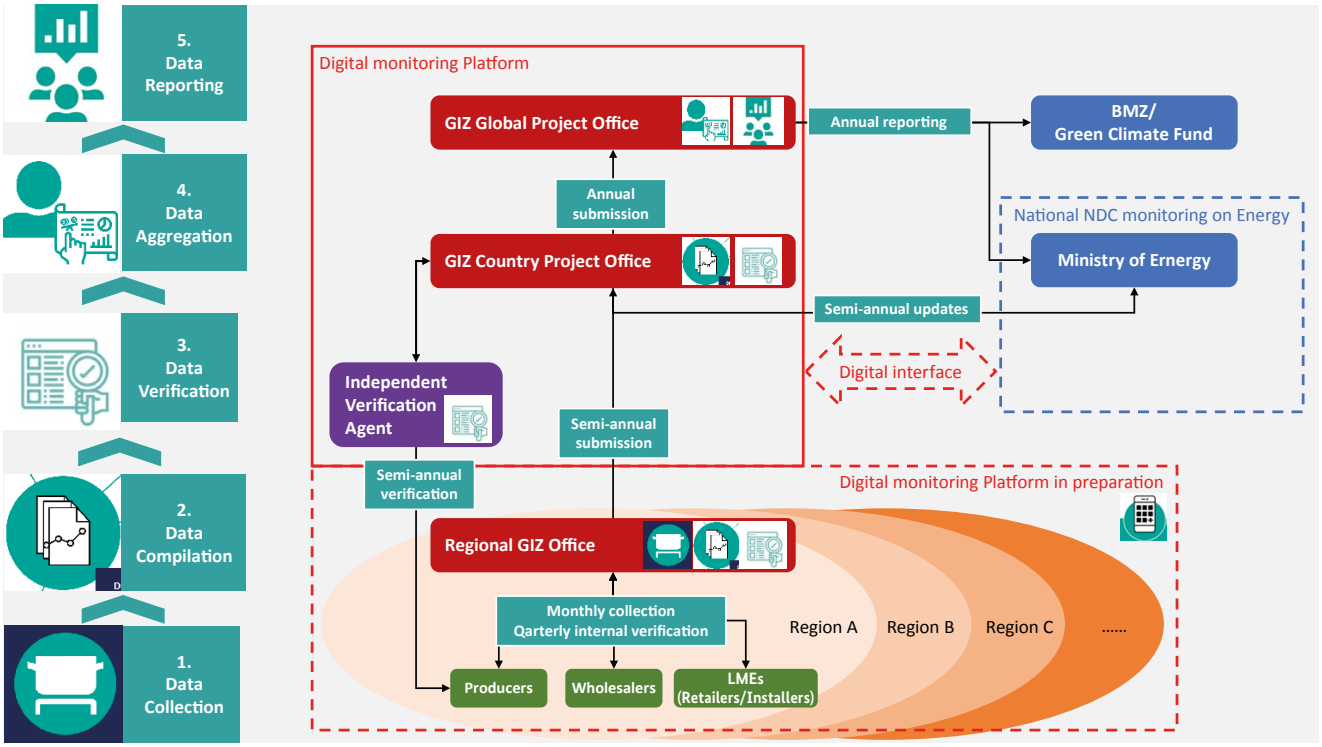
Figure 1: Project steering and implementation structure



The MRV system consists of five integrated workstreams (see figure 2):

1. data collection
2. data compilation
3. data verification
4. data aggregation and calculation of related GHG emission reductions as well as other KPIs
5. data reporting

Figure 2: MRV system for stove sales



SUB-NATIONAL MRV

As part of the project's Professionalisation Approach, ICS producers and distributors can apply on a competitive basis for support to set up new enterprises or professionalise existing ones. This performance-based support includes technical and business trainings as well as materials and equipment ranging from hand tools and machines to workshop construction and transport related items. ICS producers and distributors applying for support have to provide verifiable data on monthly production and sales of ICS for at least their last 6 months of production.

From the start of the support activities, the ICS producers are required to participate in the project's sales monitoring system (**data collection**). They need to maintain sales records on sales sheets which are collected on a monthly basis, analysed and verified by the sub-national MRV teams before being sent to the national MRV teams for independent verification and reporting (see Annex). Where applicable, producers and/or distributors must also report the share of local sales which have benefited from additional grant support (e.g., bulk procurement of stoves by NGOs that are distributed for free or at a large discount) or Voluntary Carbon Market (VCM) mechanisms to avoid double counting.

Monitoring officers compile the collected sales data into a digital database (**data compilation**). They verify the consistency and plausibility of the data submitted on a quarterly basis, for example by comparing the sales figures of specific ICS producers with collected data from previous months and with data from their respective distributors along the supply chain. Inconsistencies are clarified and spot checks are carried out (**data verification**). Bi-annually, the revised data is submitted to the national project office.

National MRV

On the national level a digital monitoring and reporting platform is used for in-time data processing, verification, aggregation and analysis for reporting on results and impacts as well as to enable an adaptive management process.

The project offices in Kenya and Senegal upload the data into the digital monitoring platform (**data compilation**) and cross-check the sub-national data sets for consistency and plausibility. Irregularities are clarified with the field offices and an internal verification process is implemented. This also includes visits to ICS producers (**data verification**). In Senegal to better monitor ICS sales a QR system was developed. Once the national data set is complete and coherent, the annual **external verification** by an independent body is initiated. The external verification is based on a random sample of ICS producers at a sufficient size to follow a minimum requirement of 95 % confidence interval and a 5 % margin of error for household verification. An independent verifier checks household level results mostly by phone. If the verification factor is low, field visits are also conducted for households.[2] A census by field visits is always conducted for verification and validation at all ICS production centres.

The minimum data points required for verification and validation are:

1. Name of entrepreneur
2. Telephone contact of the buyer. This is voluntary and buyers are notified of this provision at which they provide consent for the entrepreneurs to keep their records.
3. Type of stove
4. Number of stove
5. Date of purchase
6. Location (county, sub-county or ward)

As outlined above double counting will be avoided by verifying also the share of local sales which have benefited from additional grant support.

The project is currently preparing the transition to a fully digital system, where ICS producers and distributors will be able to report their sales via a web-based business tool for business class producers and a mobile app-based application for professional and artisanal producers. This will enable direct data transmission, directly to the national and indirectly to the global digital monitoring platform.

Global MRV

On a global project level the data submitted undergoes a final check on consistency as well as integrity. The consolidated final data set is aggregated by country and by stove type and thereby provides the basis to calculate GHG emission reductions applying the *CDM Small-scale Methodology Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass* (AMS-II.G). GHG emission reductions are the project's main impact indicator (see section 2.2. for other project KPIs and additional impact studies conducted).

2 Further details on EnDev's approach on rigorous verification is provided in the report "Rigorous Verification of Results: Value for Money or Waste of Time?" (EnDev, 2020).

To calculate ICS sales and thus GHG emission reductions for **reporting purposes**, the average usage time of the ICS is considered. Therefore, stoves that are no longer in use are deducted from the ICS stock while new stoves sold are added. Then the development of sales over time is compared to a pre-intervention BAU growth scenario. These were identified in baseline market studies as 2 % BAU growth in Senegal and 5 % BAU growth in Kenya. Sales up to these thresholds are attributed to previous EnDev interventions as long-term impacts. Sales above the BAU growth scenarios are attributed to the project intervention.

Where stove sales were reported with additional grant or VCM mechanisms support, this is noted in the data and considered for ICS sales reporting, but excluded from the reported GHG emission reductions to avoid double counting.

Finally, the project's annual progress reports are shared with project donors and partners involved in project coordination and steering. Being part of the Project Advisory Boards, national partners are able to comment on the progress reports before they are sent to the donors.

2.2 Monitoring and reporting of stove adoption, use, and performance

The project is implementing a comprehensive set of baselines, midline and endline surveys as well as studies to assess the impact of ICS interventions in terms of quantity of fuel savings, quality of access, ICS market development, and socio-economic and gender impacts.

In general, the project **eligibility criterion for ICS** is based on efficiency (either fuel efficiency or thermal efficiency)[3]:

- Regarding fuel efficiency, the intervention stove has to be tested against the baseline stove in terms of fuel saving, using the Controlled Cooking Test (CCT) or the Kitchen Performance Test (KPT). EnDev requirement is at least 30 % fuel saving for charcoal stoves and 40 % fuel saving for firewood stoves.
- Regarding thermal efficiency, intervention stoves are tested using the ISO Test 19867-1 or the Water Boiling Test (WBT). The thermal efficiency has to be at least 20 %.

3 This is in line with EnDev's criteria for ICS stove eligibility.

In addition to the technical performance criterion efficiency, the **quality of the access to cooking** provided to household customers by the project is assessed, using a Multi-Tier-Framework (MTF) based tool. This is done via desk and field research using the EnDev project level MTF methodology (MTF-p), which is based on the MTF developed by ESMAP (2015). The MTF-p methodology is EnDev's proxy-indicator approach for determining the **Access Quality Level (AQL)** of **modern cooking energy services** provided by Endev's interventions. The methodology accounts for the transitional character as well as the complexity of improving access to cooking energy services. It considers five dimensions of AQL:

1. **Fuel Availability** assesses the availability of fuel needed for cooking purposes.
2. **Affordability** assesses a household's ability to pay for both the cookstove and fuel.
3. **Cooking Exposure** assesses users' exposure to pollutants from cooking activities, which depends on stove emissions, ventilation structure (which includes cooking location and kitchen volume) and contact time (time spent in the cooking environment).
4. **Safety** assesses the safety in using the cookstove within the household.
5. **Convenience** measures the time spent acquiring (through collection or purchase) fuel and preparing fuel and purchasing the stove itself.

While other internationally discussed quality measurement approaches are focussing on the technology (cookstoves) and respective laboratory performance test results, the MTF-p evaluates the **access quality** that a household is experiencing as a result of the project intervention. The results are informing about the households stacking practice[4], the contribution of the intervention, and the way how people cook. It can be used not only to inform about aggregated AQL, but also to adjust project implementation. For example, the 2022 MTF-p surveys confirmed that the project's baseline assumptions on stove stacking are still valid, i.e. that most intervention stoves in Senegal are used in combination with one traditional (baseline) stove, whereas in Kenya only one in five households still use a traditional (baseline) stove in parallel.

The **ICS market development** is assessed by the project to identify changes in the market environment during the project period. This is done based on the Energy Access Marked Development (EAMD) Scorecard methodology developed by EnDev. The EAMD systematically tracks the market environment of energy access interventions over six market phases: pre-commercial, pioneering, expansion, maturity, saturation, and degeneration (EnDev, 2019). For the Promotion of Climate-Friendly Cooking: Kenya and Senegal project, a baseline and midline study were implemented in mid-2020 and end-2022; an endline study is planned for mid-2025. The 2022 midline study confirmed the devastating impact of the Covid-19 pandemic on the emerging ICS markets in Kenya and Senegal, captured by declining sales figures. However, it also indicated that the markets are recovering from the shock and are slowly moving towards pre-Covid levels. This is consistent with monitored ICS sales, which exceeded pre-covid levels by end of 2022 and gained further momentum in 2023.

4 Households' stove and fuel stacking practices tracing the numbers and respective share of cooking places, stove models, and fuel types used by an average household for their various cooking tasks.

Additional impact studies were conducted to assess **(1) gender and socio-economic impacts**, **(2) knowledge increase**, and another study is planned on **(3) the actual reductions in wood fuel use**.

Gender aspects assessed by the impact studies include time spent on household work, labour division in the household, decision-making in the household, and conflict potentials in the households. The **gender and socio-economic** baseline surveys confirmed that women and girls do most of the household work, but in some regions in Kenya men are involved in the collecting/purchasing of firewood/charcoal. About two thirds of women stated to have decision-making power over spendings related to cooking with even higher shares in urban areas. These results are used in the awareness raising as well as targeting approaches of the project.

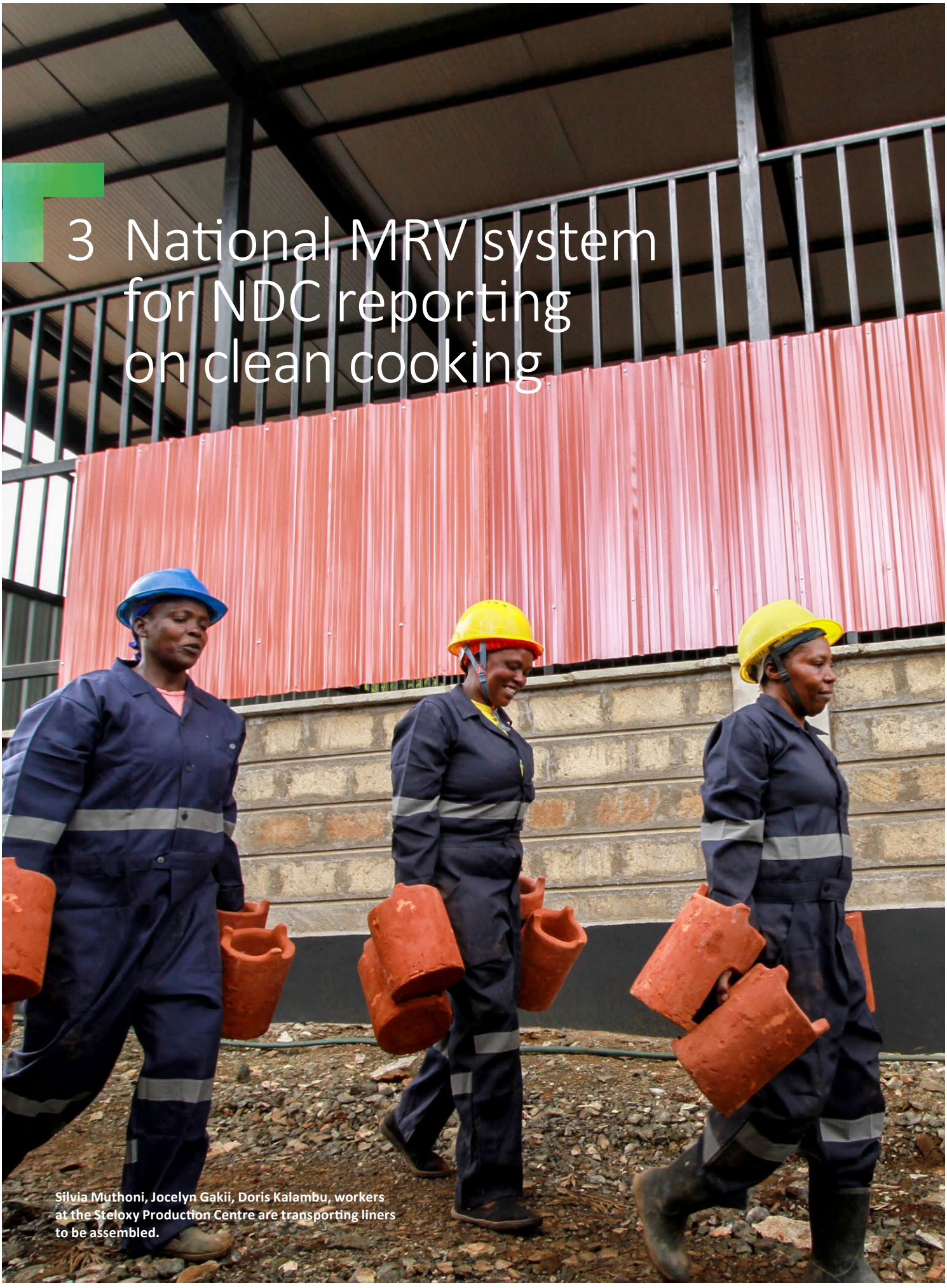
The **knowledge increase** baseline concluded that there is considerable knowledge on ICS benefits among the target population in Kenya and Senegal. In Kenya, 75 % of both ICS users and non-users could coherently name at least one benefit of ICS use, while in Senegal, 58.5 % of non-users in the new intervention areas could name a benefit of ICS use.

The **reductions in wood fuel use** study is planned to assess the actual impacts on household fuel use of the project and thus utilizing of the ICS promoted by the project by tracking fuel consumption as households cook their normal daily meals. This is generally measured using the Kitchen Performance Test (KPT), which is a field test to evaluate the performance of ICS in real-world settings.

For the calculation of **GHG emission reductions**, the project follows the *CDM Small-scale Methodology Energy Efficiency Measures in Thermal Applications of Non-renewable Biomass, AMS-II.G* (UNFCCC, 2022)[5] – a project procedure which has been approved by the GCF. Field parameters for calculating emission reductions are provided by the sales monitoring and impact surveys. Additional parameters such as the fraction of woody biomass (fNRB), net calorific value and emission factors are selected as default values according to the CDM methodology. The project as well as the EnDev programme are also providing comments in the ongoing review of clean cooking carbon methodologies facilitated by the Clean Cooking and Climate Consortium (4C) and are endorsing the methodology.

5 For details see: https://cdm.unfccc.int

3 National MRV system for NDC reporting on clean cooking



Silvia Muthoni, Jocelyn Gakii, Doris Kalambu, workers at the Steloxy Production Centre are transporting liners to be assembled.

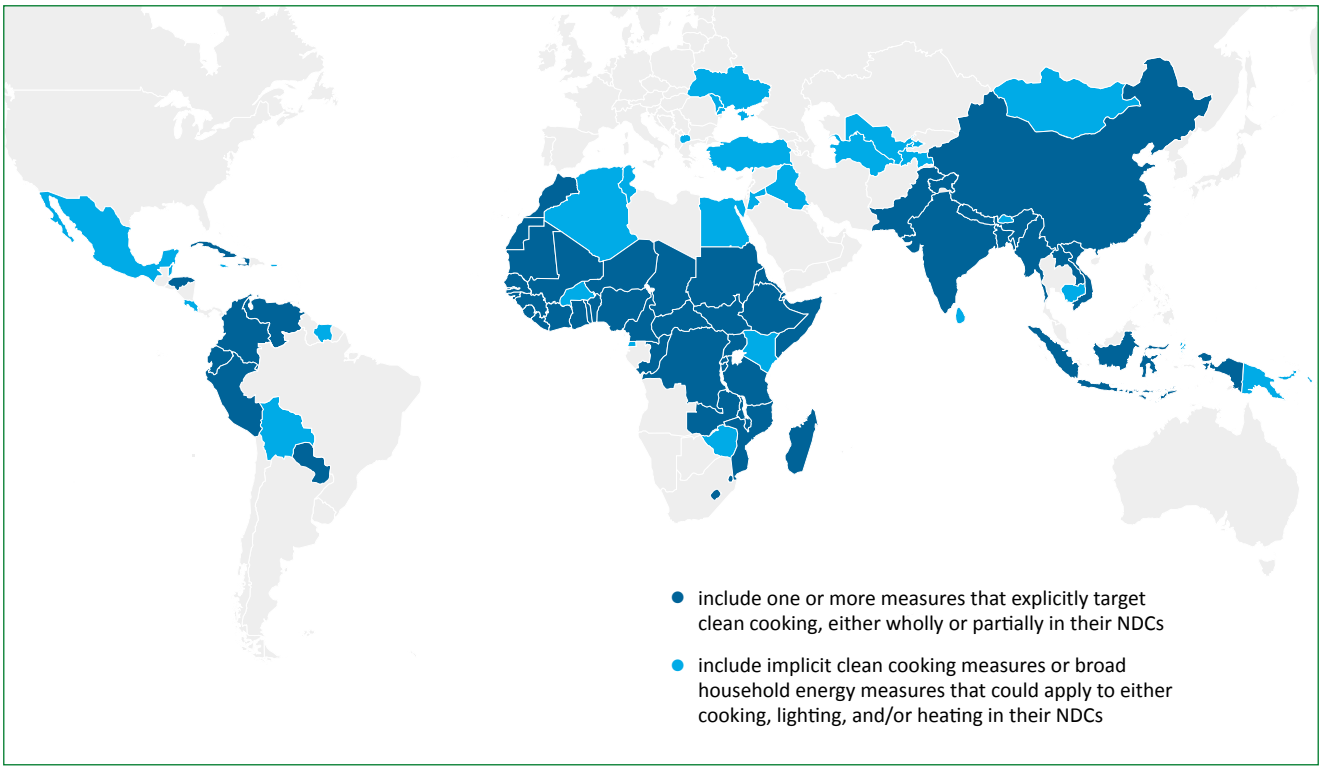
In the context of the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement of 2015, nearly all UN member states pledged to develop and – over time – raise the ambition of national climate targets within their Nationally Determined Contributions (NDCs) as well as to report on their national GHG inventories and mitigation measures. Countries have submitted National Communications (NC) since 1997 and Biennial Update Reports (BUR) since 2014, focusing on national GHG inventory reports and mitigation actions. These established MRV arrangements are currently in transition to the Enhanced Transparency Framework (ETF) and a new format of Biennial Transparency Reports (BTR), the first of which is due by end of 2024 (UNFCCC, 2023). Key elements of the national MRV system include institutional arrangements to collect and process the data required for reporting on adaptation and mitigation measures and to establish and update the national GHG inventory (UNCCS, 2014, 2020).

Table 1: Reporting requirements under UNFCCC and the Paris agreement

	NC	**NDC**	**BUR**	**BTR**
	National communication	Nationally determined contribution	Biennial update report	Biennial transparency report
Regulation	UNFCCC Article 4.1 and 12.1; decision 17/CP.8	Paris Agreement Article 4.2; Decision 4/CMA.1	Cancun Agreements (1/CP.16) and Durban Outcomes (2/CP.17)	Paris Agreement Article 13; decision 18/CMA.1
Content	National greenhouse gas inventory Mitigation measures Adaptation measures Finance, technology and capacity-building needs	Post-2020 climate actions Conditional and unconditional mitigation targets Accounting on NDC achievement of prior NDC for 2nd NDCs onwards	National greenhouse gas inventory Mitigation actions and their effects Finance, technology and capacity-building needs	National greenhouse gas inventory Progress made in achieving national determined contributions (NDC) Climate change impact and adaptation Financial, technology transfer and capacity-building support needed and received
Frequency	Since 1997, every 4 years	Since 2020 Update every 5 years	Since 2014 every 2 years	Every 2 years starting from 12/2024

Transforming the cooking sector has become a priority in many Sub-Saharan governments' NDCs. As of March 2023, 98 countries have included clean cooking and other household energy-related targets in their NDCs (CCA, 2023b; see also figure 3 below).

Figure 3: Countries with clean cooking targets in their NDCs



Source Clean Cooking Alliance (2023)

While some countries explicitly address clean cooking, others set climate targets for adjacent sectors, such as energy efficiency, forest conservation, and air quality, that could be partially met through clean cooking activities. As cost-effective mitigation measures, clean cooking activities are often fully listed under unconditional NDC targets or potentially upgraded under the condition of additional support.[6] Thus, how to measure and report progress on clean cooking in the context of NDC reporting has become a question of high concern. The project **Promotion of Climate-friendly Cooking: Kenya and Senegal** strives to demonstrate how robust MRV systems for clean cooking can be established at project level and integrated at national level to contribute to the achievement and reporting of the two host countries' NDCs.

6 An "unconditional target" is what countries could implement based on their own resources and capabilities. A "conditional target" is a more ambitious goal which countries would undertake if international support through means of implementation (technology, capacity building, finance incl. carbon markets) are provided.

3.1 Kenya's NDC related to clean cooking

Kenya published its National Communications in 2002 and 2015 and its first NDC in 2016, which was updated in 2020. Kenya's climate policy and legal framework is based on the Climate Change Act (No. 11 of 2016). The NDC's adaptation and mitigation priorities are aligned with the National Adaptation Plan (NAP) and the National Climate Change Action Plan (NCCAP). A National Inventory Report (NIR), which assesses Kenya's GHG emissions by sources and removals by sinks for the period 1990–2022, is under development. The NIR is part of the preparation of the 3rd National Communication (NC), the 1st Biennial Update Report (BUR), the 1st Biennial Transparency Report (BTR), as well as the 3rd NDC.

Clean cooking related NDC targets

Kenya's total GHG emissions were 69.5 Mt CO_2eq in 2010 according to its latest (2nd) national communication (NC) to the UNFCCC on the GHG inventory (Government of Kenya, 2015). After agriculture and forestry, the energy sector is the largest contributor to national GHG emissions. Emissions from non-renewable biomass accounted for almost 70 % of the non-electricity and non-transport household energy demand and were projected to increase from 7 Mt CO_2eq in 2015 up to 10 Mt CO_2eq in 2030 in the baseline scenario.

Kenya's 2nd NDC of 2020 addresses clean cooking under the topic of *"clean, efficient, and sustainable energy technologies to reduce over-reliance on fossil and non-sustainable biomass fuel"*, contributing to the overall target emission reduction target of 32 % compared to BAU emissions of 143 Mt CO_2e by 2030 (Government of Kenya, 2020). The 2nd NDC sets an ambitious target of 6.1 Mt CO_2eq in GHG emission reductions by 2030 for the energy demand sector (60 % below BAU). This target represents 50 % of the estimated technical potential for GHG emission reductions in the energy demand sector. Of the eight low-carbon options analysed in the energy demand sector, the use of ICS showed the largest reduction potential, i.e. 5.6 Mt CO_2eq per year in 2030. At least 50 % of this potential, or 2.8 Mt CO_2eq of GHG emission reduction per year, should be realised in the cooking sector to enable Kenya to meet its NDC targets.

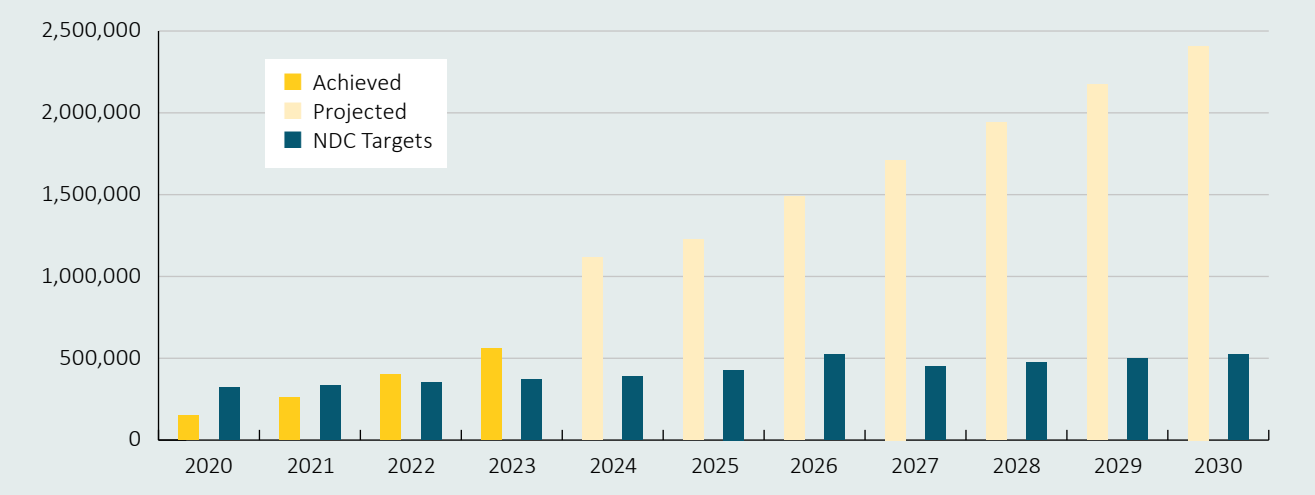
The NCCAP 2023–2027 aims for GHG emission reductions of 3.3 Mt CO_2eq in the energy demand sector by transitioning 75 % of households to modern energy cooking services (MECS) such as LPG, e-cooking, biogas and bioethanol, while the remaining 25 % of households are expected to continue using biomass ICS.

Accelerating the growth of Kenya's ICS Market to reach NDC Targets

By 2016, 3.7 million households were estimated to have had adapted ICS, representing about 37 % of the total population. By the same time, previous interventions of EnDev Kenya had supported ICS producers to reach total annual sales in the range of 240,000–300,000 ICS. Considering an average lifetime of 3.5 years, these annual sales can replace obsolete stoves to maintain a stock of about 1 million ICS in use, while higher sales are required to actually increase ICS usage in the population.

The project **Promotion of Climate-friendly Cooking in Kenya** makes a substantial contribution to Kenya's NDC and NCCAP targets. By accelerating the growth of the market for climate friendly ICS, it aims to achieve annual sales of 1.3 million ICS by 2025 and at cumulative sales of almost 17 million ICS by 2030 exceeding the targeted 50 % contribution of clean cooking to the total GHG emission reductions in the energy demand sector. Based on the monitoring and planning of the Kenya project component, Figure 4 presents achieved and projected ICS sales in relation to the ICS sales required to reach NDC targets for the household energy subsector.

Figure 4: Planned and achieved annual ICS sales in Kenya



While ICS sales collapsed during the COVID crisis, the project helped the ICS market to recover quickly and to surpass NDC targets since 2022, reaching almost 560,000 ICS sold in 2023.

Strengthening the Institutional Framework for NDC Reporting on the Cooking-Subsector in Kenya

The GCF Project **Promotion of climate friendly cooking in Kenya** supports the development of a harmonized reporting environment for the cooking sub-sector in Kenya. The project is collaborating with the Ministry of Energy and Petroleum (MoEP), which is in the lead on energy related reporting on SDG and NDC targets. The project is supporting the Ministry to develop robust tools to monitor and report on energy consumption from the household cooking sector. This will enable the Ministry to collect and analyse energy consumption data for reporting to the Climate Change Directorate of Kenya's Ministry of Environment and Natural Resources. The tool is being designed based on the existing UNFCCC reporting requirements.

In addition, an over-arching Cooking Sub-sector Knowledge Management Strategy (2022) was developed via stakeholder engagement efforts led by the Ministry. The project is also supporting the development of sector wide key performance indicators (KPIs) upon which periodic sub-sector updates will be based. A web-based knowledge hub for the cooking sub-sector is under development to facilitate the efficient and transparent knowledge management and sharing.

3.2 Senegal's NDC related to clean cooking

Senegal published its National Communications in 1997, 2010 and 2016 and its 1st NDC in 2020. Senegal's latest GHG inventory is presented in the 3rd National Communication of 2015. Senegal has not yet enacted a specific law on climate change and the National Adaptation Action Plan has not been updated since 2006. An updated National Inventory Report (NIR) assessing Senegal's GHG emissions by sources and removals by sinks has recently been completed as part of the preparation of the 4th NC, the 1st BUR, the 1st BTR, as well as to inform the 2nd NDC to be submitted by 2025.

Clean cooking related NDC targets

Senegal has explicitly included clean cooking targets in both the unconditional and conditional sections of its NDC. These set specific distribution targets for ICS, in addition to defining reductions in household energy emissions as a contribution to overall emission reduction targets of 7 % (unconditional) and 29.5 % (conditional) compared to BAU emissions of 37.7 Mt CO_2e by 2030.

By 2005, GHG emissions from the energy sector amounted to 12 Mt CO_2eq or about 57 % of national GHG emissions. With 7.8 Mt CO_2eq, woodfuels (firewood and charcoal, including charcoal production) were the largest single contributor to the GHG emissions in the energy sector, of which residential biomass energy use accounted for 4.6 Mt CO_2eq. Since 1994, these GHG emissions from the domestic cooking subsector have grown steadily by about 11 % per year and represented 22 % of total energy sector emissions in 2005. They are projected to increase further to 20 Mt CO_2eq in 2030 under the BAU scenario, largely as a result of projected population growth and continued reliance on woodfuel (Government of Senegal, 2015).

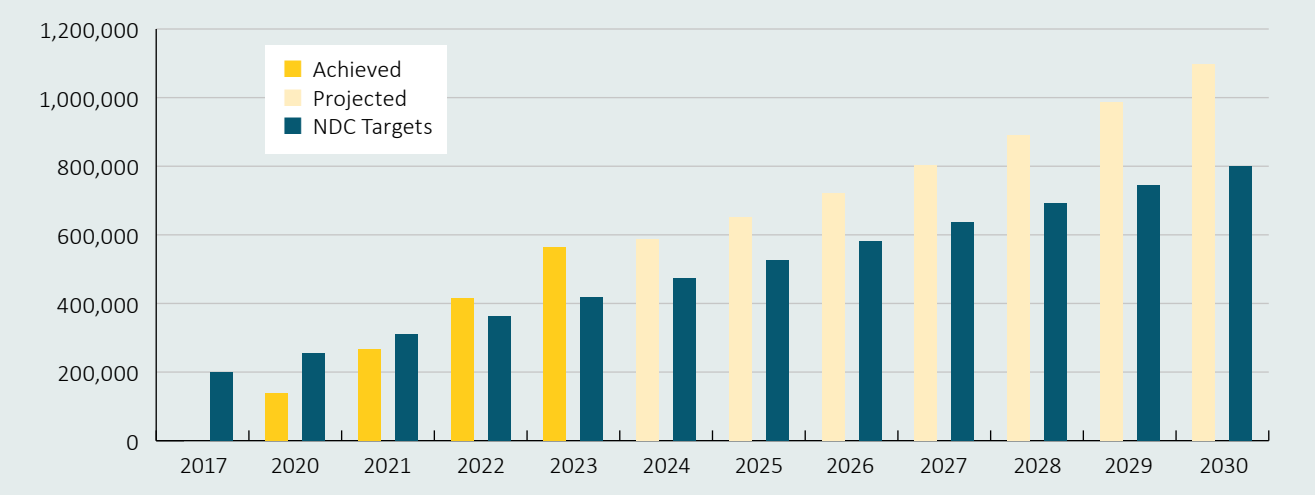
The national unconditional NDC mitigation target is a 7 % reduction in total emissions and a 10 % reduction in energy sector emissions by 2030, including the unconditional annual distribution of 800,000 ICS and a total of 27,000 biodigesters. Conditionally, these targets are increased to 1.5 million ICS and 48,000 biodigesters (Government of Senegal, 2020).

Accelerating the growth of Senegal's ICS market to reach NDC targets

In 2017, ICS producers sold about 200,000 ICS annually, sufficient to maintain a stock of about 400,000 ICS with an average ICS lifetime of 2 years. Assuming an average use of two stoves per household, about 200,000 households or 12 % of the population were fully cooking with ICS. The same number of households, or 32 % of the projected population, could be reached by 2030 with a targeted annual sales volume of 800,000 (unconditional target). Achieving the conditional target of 1.5 million annual sales of ICS could cover the full cooking demand of about 60 % of the population by 2030.

The project **Promotion of Climate-Friendly Cooking in Senegal** is making a substantial contribution to Senegal's NDC targets. By accelerating the growth of the market for climate friendly ICS, it aims to achieve annual sales of 650,000 ICS by 2025, which, with a sustained market growth, would lead to annual sale of over 1 million ICS by 2030. This would suffice to meet Senegal's unconditional NDC target of 800,000 ICS and even two-thirds of its conditional target of 1.5 million ICS sold annually. This would result in cumulative sales of 8.1 million ICS by 2030. Based on the monitoring and planning of the Senegal project component, figure 3 presents achieved and projected ICS sales in relation to ICS sales required to reach Senegal's unconditional NDC targets for the household energy subsector.

Figure 5: Planned and achieved annual ICS sales in Senegal



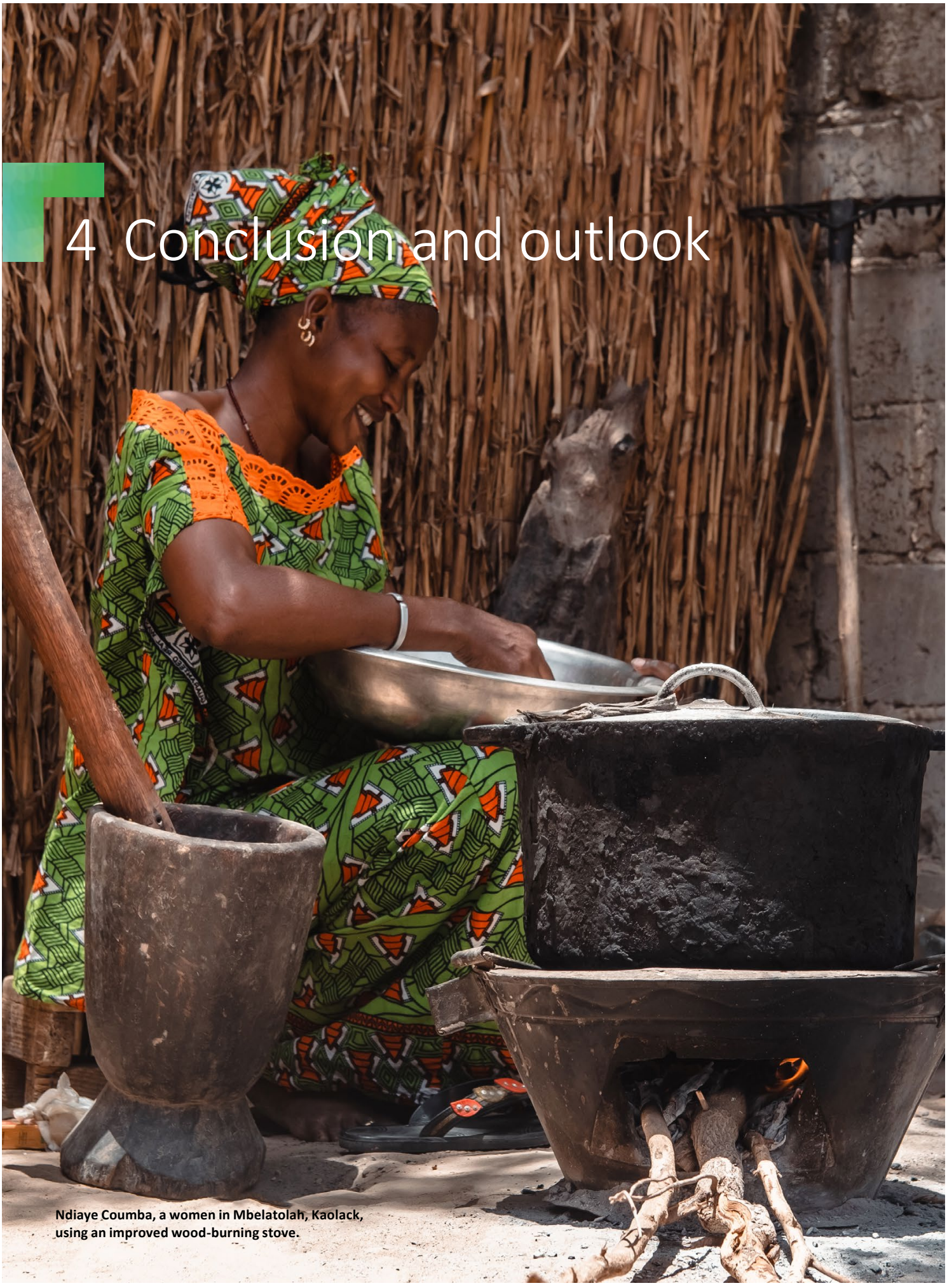
ICS sales, previously at 200,000 per year, collapsed during the COVID crisis. The project has helped the ICS market to recover quickly and to exceed sales targets since 2022, reaching 563,000 ICS sold in 2023.

Strengthening the Insitutional framework for NDC reporting on the cooking subsector in Senegal

The government is in the process of developing a transparency framework and a national MRV system for NDC reporting to be implemented by sectoral technical services under the supervision of the Ministry of Environment and Sustainable Development (MEDD), with support from the National Climate Change Committee (COMNACC). For the energy sector, technical services are provided by the Energy Information System (SIE) of the Ministry of Energy and Petroleum (MEP).

The project **Promotion of Climate-friendly Cooking in Senegal** is supporting the development and application of a national monitoring system for the domestic cooking sub-sector and its integration into the national MRV system. To this end, the project has set up a digital monitoring and evaluation platform. Beyond verified data on ICS sales, the platform will also integrate data from surveys and studies on stove stacking and firewood and charcoal consumption. The data will facilitate the calculation of emission reductions in terms of CO_2 equivalent avoided. The platform is planned to be extended to cover the entire domestic cooking sub-sector, including electric cooking and LPG. The monitoring data will be enriched by field studies on cooking access quality provided (MTF-p) as well as socio-economic and gender impacts. The domestic cooking monitoring platform will be integrated into the energy sector monitoring system via the Energy Information System (SIE), which will feed into Senegal's current and future reports to the UNFCCC and under the Paris Agreement.

4 Conclusion and outlook



Ndiaye Coumba, a women in Mbelatolah, Kaolack, using an improved wood-burning stove.

The project **Promotion of Climate-friendly Cooking: Kenya and Senegal** is one example of how to establish robust MRV systems for clean cooking at project level and how to contribute to the achievement and reporting of the two host countries' NDCs. The guide at hand detailed how the project monitors and verifies ICS sales and use at the project level and how its results are integrated into national MRV systems. Kenya and Senegal not only progressed decisively towards reaching their NDC targets in the cooking sector but also ramped up their capacities to collect and analyse cooking sector-related data for UNFCCC reporting purposes.

One next step may be to use ICS MRV experience made and the data at hand at country level to mobilise more carbon funding for the clean cooking sector. A prerequisite in this endeavour is the review of existing GHG emissions calculations methodologies for clean cooking projects. To estimate and calculate mitigation impacts, UNFCCC offers a set of methodologies for different technologies and projects. So far, the methodology most commonly applied for cooking energy projects is the *AMS-II.G: Energy efficiency measures in thermal applications of non-renewable biomass*[7]. However, the UNFCCC standard methodologies for clean cooking projects are currently under review due to international ambitions to increase the integrity and robustness of mitigation impact calculations, but also in light of the global uptake of carbon trading and ongoing negotiations on modalities, procedures and guidelines for Article 6 of the Paris Agreement[8] (CCA, 2022b, 2023). This review includes developing improved procedures for the accurate representation of emission factors, fractions of renewable biomass, and stove use and efficiency. The review process is supported and guided, among others, by the UNFCCC and the Clean Cooking Alliance[9]. EnDev is contributing to these review activities on the basis of its experience made with its project **Promotion of Climate-friendly Cooking: Kenya and Senegal** and its other clean cooking interventions. A robust and shared MRV framework is essential, not only as a means of unlocking funding sources, but also for joint impact accounting towards the SDGs and our climate commitments.

7 See footnote 5.

8 Article 6 of the Paris Agreement allows countries to voluntarily cooperate with each other to achieve emission reduction targets set out in their NDCs. This may include either a bilateral trading between countries of carbon credits earned from the reduction of GHG emissions; a trading carbon credits on international carbon markets; and the promotion of non-market-based emission reductions.

9 The draft Comprehensive Lowered Emissions Assessment and Reporting (CLEAR) Methodology for Cooking Energy Transitions is available at https://cleancooking.org.

Annex

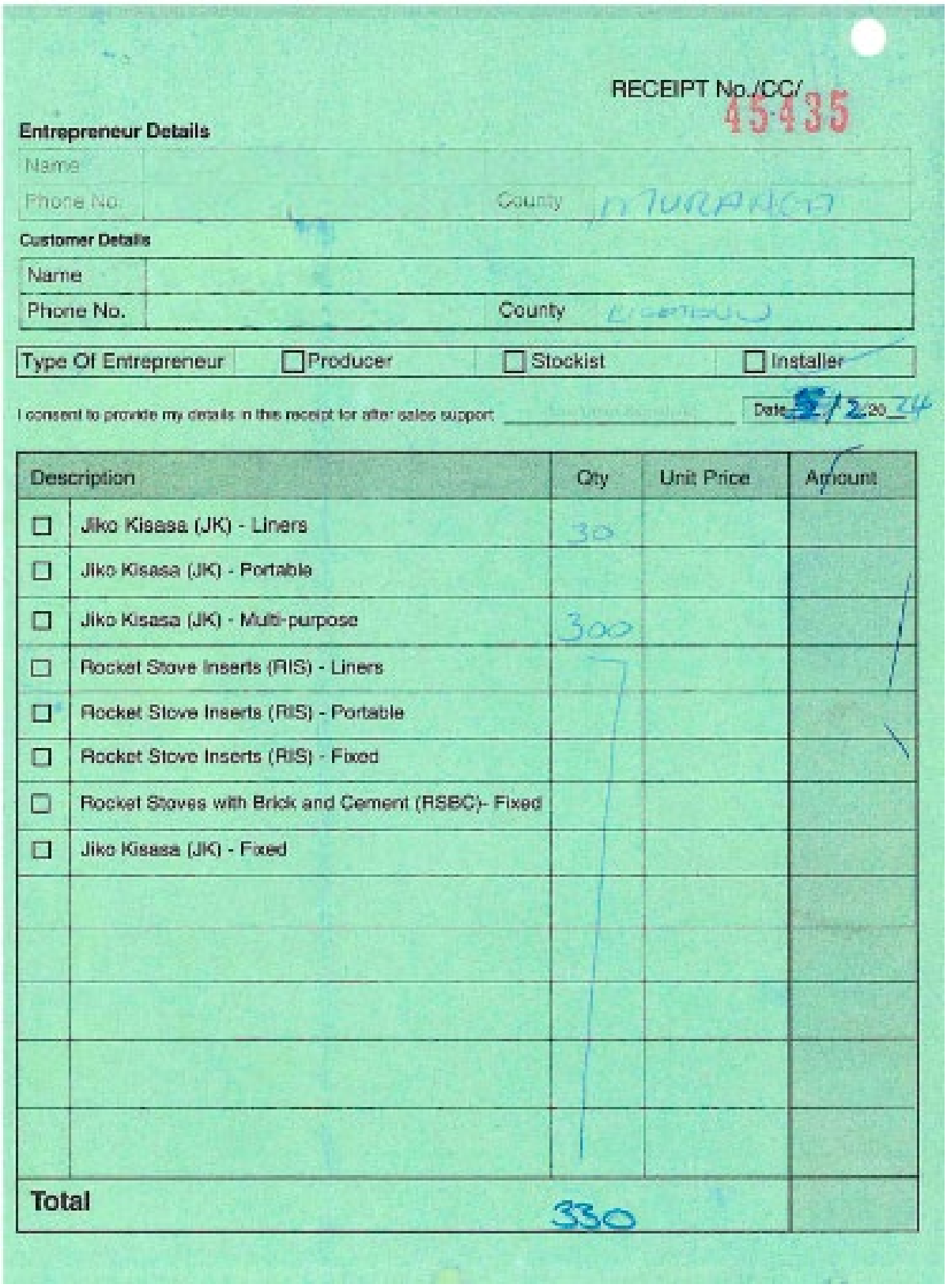
Rocket Insert Portable Stoves get a spray painting at Steloxy Production Centre in Kenya

Templates for monthly reporting on ICS sales

FICHE DE VENTE FOYERS AMELIORES

Date de vente	Prénom et Nom du Client	Région du client	Numéro de téléphone du client	Nom du foyer								
				Jegg charbon et Taksi Rip 4kg	Jaboot charbon et Taksi Rip 7kg	Jongoma charbon et Taksi Rip 15kg	Taaru charbon 7kg	Jegg bois 4kg	Jaboot bois 7kg	Jongoma bois 15kg	Sakkanal Mono 7kg	Sakkanal Multi 7kg

OBSERVATION : .....



RECEIPT No./CC/ 45435

Entrepreneur Details

Name	
Phone No.	County NYERI

Customer Details

Name	
Phone No.	County

Type Of Entrepreneur ☐ Producer ☐ Stockist ☐ Installer

I consent to provide my details in this receipt for after sales support: _____ Date 5/2/2024

	Description	Qty	Unit Price	Amount
☐	Jiko Kisasa (JK) - Liners	30		
☐	Jiko Kisasa (JK) - Portable			
☐	Jiko Kisasa (JK) - Multi-purpose	300		
☐	Rocket Stove Inserts (RIS) - Liners			
☐	Rocket Stove Inserts (RIS) - Portable			
☐	Rocket Stove Inserts (RIS) - Fixed			
☐	Rocket Stoves with Brick and Cement (RSBC)- Fixed			
☐	Jiko Kisasa (JK) - Fixed			
Total		330		

References

El Hadji Kandji, ICS producer from Kaolack, a region south-east of Dakar, Senegal, at this welding work

CCA (2022a) *Accelerating Clean Cooking as a Nature-based Climate Solution.* Clean Cooking Alliance (CCA). Available at: https://cleancooking.org/reports-and-tools/accelerating-clean-cooking-as-a-nature-based-climate-solution/ (Accessed: 26 September 2023).

CCA (2022b) *Clean Cooking for Climate Action Roadmap.* Clean Cooking Alliance (CCA). Available at: https://www.ccacoalition.org/sites/default/files/resources//Clean-Cooking-for-Climate-Action_Roadmap%20%281%29.pdf (Accessed: 15 February 2024).

CCA (2023) *Introductory Framework for Measurement, Reporting, and Verification.* Clean Cooking Alliance (CCA). Available at: https://www.ccacoalition.org/sites/default/files/resources//Introductory-Framework-for-Measurement-Reporting-and-Verification%20%281%29.pdf (Accessed: 15 February 2024).

EnDev (2019) *Market Development Scorecard, Energypedia.* Available at: https://energypedia.info/wiki/Market_Development_Scorecard (Accessed: 24 May 2023).

EnDev (2020) *Rigorous Verification of Results: Value for Money or Waste of Time?* Eschborn, Germany: Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ) GmbH. Available at: https://endev.info/wp-content/uploads/2021/03/EnDev_RBF_Verification_Knowledge_Product.pdf (Accessed: 29 March 2021).

ESMAP (2015) *Beyond Connections: Energy Access Redefined.* Available at: https://www.esmap.org/node/56715 (Accessed: 29 November 2017).

GIZ (2024) *Climate-friendly cooking: scaling markets – A Guide on the Professionalisation Approach.* Eschborn/Bonn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Available at: https://endev.info/wp-content/uploads/2024/03/GCF_Guide_Cooking.pdf (Accessed: 14 May 2024).

Government of Kenya (ed.) (2015) *Kenya: second national communication to the United Nations Framework Convention on Climate Change.* Nairobi, Kenya: National Environment Management Authority (NEMA-Kenya). Available at: https://unfccc.int/resource/docs/natc/kennc2es.pdf (Accessed: 16 February 2024).

Government of Kenya (2020) *Updated National Determined Contributions (NDC) of Kenya.* Government of Kenya. Available at: https://unfccc.int/sites/default/files/NDC/2022-06/Kenya%27s%20First%20%20NDC%20%28updated%20version%29.pdf (Accessed: 15 February 2024).

Government of Senegal (2015) *Senegal. National Communication (NC).* NC 3. Available at: https://unfccc.int/sites/default/files/resource/Sennc3.pdf (Accessed: 16 February 2024).

Government of Senegal (2020) *National Determined Contributions (NDC) of Senegal.* Government of Senegal. Available at: https://unfccc.int/sites/default/files/NDC/2022-06/CDNSenegal%20approuv%C3%A9e-pdf-.pdf (Accessed: 15 February 2024).

Pearson, T.R.H. et al. (2017) 'Greenhouse gas emissions from tropical forest degradation: an underestimated source', *Carbon Balance and Management,* 12(1), p. 3. Available at: https://doi.org/10.1186/s13021-017-0072-2.

UNCCS (2014) *Handbook on Measurement, Reporting and Verification for developing country Parties.* United Nations Climate Change Secretariat. Available at: https://unfccc.int/files/national_reports/annex_i_natcom_/application/pdf/non-annex_i_mrv_handbook.pdf (Accessed: 21 February 2024).

UNCCS (2020) *Handbook on institutional arrangements to support MRV/transparency of climate action and support.* United Nations Climate Change Secretariat. Available at: https://unfccc.int/sites/default/files/resource/Hand%20book_EN.pdf (Accessed: 21 February 2024).

UNFCCC (2022) *Small-scale Methodology Energy efficiency measures in thermal applications of non-renewable biomass.* CDM AMS-II.G. UNFCCC. Available at: https://cdm.unfccc.int/methodologies/DB/GNFWB3Y6GM4WPXFRR2SXKS9XR908IO (Accessed: 19 March 2024).

UNFCCC (2023) *Technical handbook for developing country Parties on Preparing for implementation of the enhanced transparency framework under the Paris Agreement.* United Nations Climate Change Secretariat. Available at: https://unfccc.int/sites/default/files/resource/ETF%20Handbook-second%20edition%2023_final.pdf (Accessed: 21 February 2024).

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Stored Jiko Kisasa liners are stacked in the Steloxy production centre.