



EASTERN AND
SOUTHERN AFRICA

UNITED REPUBLIC OF TANZANIA

Clean Cooking Background Note

World Bank Group

COUNTRY CLIMATE AND DEVELOPMENT REPORT

November 2024

© 2024 The World Bank Group
1818 H Street NW, Washington, DC 20433
Telephone: 202-473-1000; Internet: www.worldbank.org

This work is a product of the staff of the International Bank for Reconstruction and Development (IBRD), the International Development Association (IDA), the International Finance Corporation (IFC), and the Multilateral Investment Guarantee Agency (MIGA), collectively known as The World Bank Group, with external contributors.

The World Bank Group does not guarantee the accuracy, reliability or completeness of the content included in this work, or the conclusions or judgments described herein, and accepts no responsibility or liability for any omissions or errors (including, without limitation, typographical errors and technical errors) in the content whatsoever or for reliance thereon. The boundaries, colors, denominations, and other information shown on any map in this work do not imply any judgment on the part of any of the organizations of The World Bank Group concerning the legal status of any territory or the endorsement or acceptance of such boundaries. The findings, interpretations, and conclusions expressed in this volume do not necessarily reflect the views of IBRD/IDA, IFC and MIGA, their respective Boards of Executive Directors, and the governments they represent.

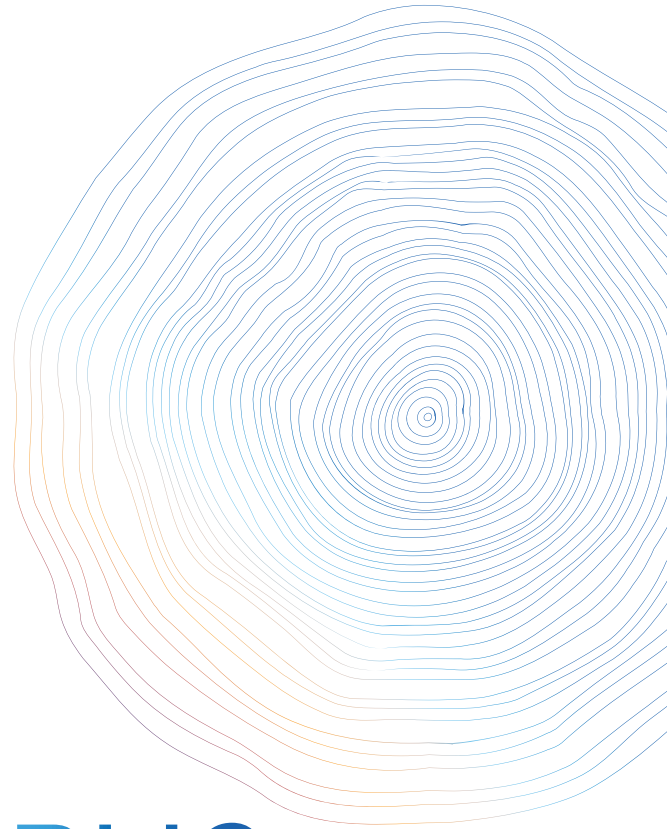
The contents of this work are intended for general informational purposes only and are not intended to constitute legal, securities, or investment advice, an opinion regarding the appropriateness of any investment, or a solicitation of any type. Some of the organizations of The World Bank Group or their affiliates may have an investment in, provide other advice or services to, or otherwise have a financial interest in, certain of the companies and parties named herein.

Nothing herein shall constitute, or be construed, or considered to be a limitation upon or waiver of the privileges, and immunities of any of IBRD/IDA, IFC and MIGA, all of which are specifically reserved.

Rights and Permissions

The material in this work is subject to copyright. Because the World Bank Group encourages dissemination of its knowledge, this work may be reproduced, in whole or in part, for noncommercial purposes as long as full attribution to this work is given, and all further permissions that may be required for such use (as noted herein) are acquired. The World Bank does not warrant that the content contained in this work will not infringe on the rights of third parties, and accepts no responsibility or liability in this regard.

All queries on rights and licenses should be addressed to World Bank Publications, The World Bank, 1818 H Street NW, Washington, DC 20433, USA; e-mail: pubrights@worldbank.org.



UNITED REPUBLIC OF TANZANIA

Clean Cooking Background Note

COUNTRY CLIMATE AND DEVELOPMENT REPORT

TABLE OF Contents

Acknowledgments	iv
Acronyms and Abbreviations	v
Executive Summary	1
Overview of Demand for Cooking Fuels and Solutions in the United Republic of Tanzania	3
Lack of Clean Cooking Access and Climate	6
Enabling Environment	7
Summary of Ongoing and Recent Programs	10
Challenges and Opportunities	15
Lessons Learned from the World Bank’s Operational Experience in the Efficient and Clean Cooking and Heating Sector	18
Clean Cooking Scenarios	19
Scenario for achieving universal access by 2030	19
Scenario for achieving universal access by 2034	20
Lack of progress on the clean cooking agenda	21
Recommendations	21
Enhance the enabling environment and strengthen financial and technical capacity for clean cooking projects	21
Enhance institutional cooperation	22
Promote sustainable charcoal production and efficient fuel use	22
Implement behavior change and awareness strategies	23

Appendix A: Methodological Note: Calculating the Cost of Inaction	24
Health: the costs of morbidity and mortality	24
Gender: the costs of fuel collection, cooking, and stove cleaning	24
Climate: the social costs of carbon	24
Appendix B: Methodological Note: Calculating the Transition Costs	25
Data sources	25
MECS transition scenario	25
Disaggregated costs	26
Public sector	26
Private sector	27
Households	27
ICS transition scenario	27
Appendix C: Methodological Note: Calculating the Benefits of Transition	29
Health	29
Gender	29
Climate	29

Acknowledgments

The Tanzania Country Climate and Development Report (CCDR) was prepared by a multisectoral World Bank Group team led by Diji Chandrasekharan Behr (Lead Environmental Economist, East Africa Environment Department), and William Battaile (Lead Economist, Macroeconomics, Trade & Investment, Eastern and Southern Africa), under the supervision of Paul Jonathan Martin (Manager, East Africa Environment Department) and Abha Prasad (Manager, Eastern and Southern Africa Macroeconomics, Trade and Investment Department), and the direction of Iain Shuker (Regional Director, Planet Vertical, Eastern and Southern Africa).

The Tanzania CCDDR Clean Cooking Background Note was developed by the World Bank's Energy Sector Management Assistance Program (ESMAP). The note was authored by Clémence Dryvers (Consultant) with input from Michelle Carvalho Metanias Hallack (Senior Energy Specialist) and Jingyi Wu (Consultant). The ESMAP team received valuable guidance from Diji Chandrasekharan Behr (Lead Environmental Economist), Rhonda Lenai Jordan (Senior Energy Specialist), and Carla de Nobrega (Senior Energy Specialist).

Abbreviations and Acronyms

ABPP	Africa Biogas Partnership Program
ADALYs	averted disability adjusted life years
ASCENT	Accelerating Sustainable and Clean Energy Access Transformation Program using the Multiphase Programmatic Approach project
BAU	business-as-usual
BC	black carbon
CAMARTEC	Centre for Agricultural Mechanization and Rural Technology
CDDR	Country Climate and Development Report
CEAP	Cooking Energy Action Plan
CO₂eq	carbon dioxide equivalent
DALYs	disability-adjusted life years
ESMAP	Energy Sector Management Assistance Program
EU	European Union
fNRB	fraction of non-renewable biomass
FYDP III	Third Five Year Development Plan
GDP	gross domestic product
HAP	household air pollution
HAPIT	Household Air Pollution Intervention Tool
IBRD	International Bank for Reconstruction and Development
ICS	improved cookstoves
IDA	International Development Association
IFC	International Finance Corporation
LPG	liquefied petroleum gas
MCFA	Modern Cooking Facility for Africa
MECS	modern energy cooking solutions
MEM	Ministry of Energy and Minerals
MIGA	Multilateral Investment Guarantee Agency
MEM	Ministry of Energy and Minerals

MoHCDGEC	Ministry of Health, Community Development, Gender, Elderly and Children
MtCO₂	million tons of carbon dioxide equivalent
NDC	nationally determined contribution
NEP	National Environmental Policy
NGO	nongovernmental organization
PPP	purchasing power parity
QUALITAN	Quality standards and compliance program for the United Republic of Tanzania
RBF	results-based financing
REMP	Rural Energy Master Plan
SDG	Sustainable Development Goal
SEforALL	Sustainable Energy for All
SME	small and medium-sized enterprise
SNV	Netherlands Development Organization
TAREA	Tanzania Renewable Energy Association
TaTEDO	Tanzania Traditional Energy Development Organization
TBS	Tanzania Bureau of Standards
TCCP	Tanzania Clean Cooking Project
TEMK	traditional earth mount kilns
TZS	Tanzanian Shillings
UNCDF	United Nations Capital Development Fund
UNIDO	United Nations Industrial Development Organisation

Executive Summary

The Clean Cooking Background Note developed under the United Republic of Tanzania's Country Climate and Development Report (CCDR), accentuates the importance of scaling access to clean cooking regarding climate mitigation and adaptation and developing climate resilience. In mainland Tanzania, over 89 percent of households still rely on traditional polluting fuels and technologies for cooking, while in Zanzibar, the figure is over 84 percent. This widespread reliance, coupled with unsustainable harvesting of cooking wood fuel, significantly impedes progress toward achieving the Sustainable Development Goals in Tanzania. Firewood and charcoal are the main fuels used for cooking, with a higher proportion (84.8 percent in the mainland and 80.5 percent in Zanzibar) of households in rural areas using firewood as the primary fuel for cooking, compared to 17.4 percent of households in urban areas of mainland Tanzania and 18.3 in urban Zanzibar. Despite repeated policies aimed at making butane gas affordable to encourage its adoption, its 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.

In Tanzania, deforestation and forest degradation are primarily driven by demographic growth and increasing demand for agricultural land and domestic cooking fuel such as wood and charcoal. This pressure on forest resources is exacerbated by inefficient cooking methods. This has led to one of the highest deforestation rates globally, approximately 469,000 hectares of forest in Tanzania are cut per year. The rapid depletion of forests has profound implications for climate change, posing significant risks to an economy reliant on climate-sensitive sectors such as agriculture, tourism, fishing, and livestock keeping. Tanzania is already experiencing heightened frequency and severity of climate-related events, including floods and droughts. This vulnerability amplifies environmental challenges, exacerbating deforestation. Moreover, deforested land is more susceptible to flooding, drought, and soil erosion, heightening the risk of converting productive landscapes into degraded wastelands.

Furthermore, the use of solid fuels also causes household air pollution that in turn impacts health and causes time poverty and loss of productivity among its primary users – women. This lack of access to clean cooking solutions has an impact on Tanzania's economy – the cost of inaction is estimated at US\$39 billion each year, of which adverse impacts on health are US\$25 billion, women US\$12 billion due to lost productivity, and climate US\$2 billion. Accelerating access to clean cooking is an urgent development issue for Tanzania with important potential benefits for the global climate, public health, and advancement for gender equality. Acknowledging the importance of clean cooking, the government of Tanzania has initiated significant advancements in clean cooking policymaking. In May 2024, it launched the National Clean Cooking Strategy 2024–34 aiming to reach 80 percent of modern cooking energy access by 2034. The strategy aims to increase access to clean cooking through the promotion of gas along with the promotion of alternative fuels such as electricity, bioethanol, biogas and briquettes, by creating a conducive environment for the clean cooking sector to attract private investment for clean cooking projects and infrastructure. Tanzania's commitment is not new as in 2015, mainland Tanzania set the target of reaching 75 percent of modern cooking energy¹ by 2030 through its Sustainable Energy for All (SEforALL) 2015 Action Agenda. The Action Agenda's priority actions for the clean cooking sector include developing regulations for sustainable charcoal production, creating policies and targets for biomass energy regulation, implementing a monitoring and evaluation system for the energy sector, and establishing national or regional performance standards for energy products.

Tanzania's clean cooking market remains nascent and fragmented. A major obstacle that former policies and gas subsidies have failed to address is the historical preference for solid biomass, including charcoal in urban areas, despite the availability of other options. Rapid population growth and historical promotion

1 Includes biogas, liquefied petroleum gas, ethanol, natural gas, or charcoal with ICS.

of improved cookstoves (ICS) in clean cooking projects exacerbate this challenge. Addressing the lack of access to and adoption of clean cooking solutions requires an integrated and collaborative approach to overcome supply and demand constraints and create a supportive environment for market growth. With substantial health burdens from household air pollution and increasing deforestation, timely intervention in the cooking sector is critical. Tanzania has demonstrated its commitment to addressing this long-standing issue through its National Clean Cooking Strategy 2024–34, which aims for 80 percent access to modern cooking solutions by 2034, and through strong political will, including hosting and co-chairing significant clean cooking events.

The successful implementation of the National Clean Cooking Strategy for 2024–34 relies on several critical factors. Central to this effort is the need to enhance the enabling environment for the clean cooking market, ensuring a stable and predictable landscape that attracts private investment and facilitates market functionality overall. Moreover, achieving the ambitious clean cooking targets requires substantial financing from both public and private sectors, with climate finance mechanisms playing a pivotal role. As Tanzania plans to expand subsidies and awareness for clean cooking projects while seeking greater private sector involvement, it is imperative to bolster technical and human resources within its institutions to support this scaling. Building capacity for clean cooking initiatives is especially critical within the Ministry of Environment’s carbon trading management department and other entities involved in clean cooking projects and policy. Efforts must also prioritize enhancing interinstitutional cooperation, which has historically hindered efficient resource allocation and project execution within the sector. Moreover, ICS will remain an important part of Tanzania’s clean cooking transition toward 2034. Therefore, it is imperative that the National Strategy prioritizes enhancing the sustainability of charcoal production through more efficient methods. While the Strategy rightly identifies the exploration of alternatives such as electric cooking, briquettes, biogas, and bioethanol, it could strengthen its focus on ensuring the sustainability of charcoal production itself through the replacement of traditional earth mount kilns (TEMK) with improved kilns. Additionally, establishing robust mechanisms for developing and implementing stove and fuel labels and standards is essential. This will ensure that the improvements in fuel efficiency and reductions in emissions promised by ICS translate into tangible benefits for users and the environment.

Furthermore, promoting behavior change through robust awareness campaigns is crucial to fostering behavior change and shifting away from longstanding dependence on solid biomass toward cleaner alternatives. These campaigns should emphasize the health benefits, time-saving advantages of clean cooking solutions, as well as educating users on identifying high-quality ICS.

Based on the World Bank’s Clean Cooking Planning Tool,² reaching Tanzania’s 2015 SEforALL Action Agenda would require an overall investment of US\$850 million per year.³ This corresponds to an investment of US\$381 million per year from the public sector to support the development of the clean cooking market, bridge the affordability gap for poor households and unlock private investments. US\$43 million per year is needed from the private sector to install downstream infrastructure for the functioning of modern energy cooking markets and the remaining US\$426 million per year from households’ direct contribution. Achieving these targets yields an overall benefit of transition of approximately US\$10 billion each year, with health accounting for US\$6.6 billion each year, US\$2.5 billion each year to gender benefits and climate benefits at US\$887 million each year.

Government estimates show that implementing its clean cooking strategy will cost less than implementing the SEforALL agenda. The government of Tanzania estimated that the implementation of the latest National Clean Cooking Strategy for 2024–34 (reaching 80 percent of clean cooking by 2034) will

² <https://energydata.info/cleancooking/planningtool/>.

³ The investment estimates for this background note were conducted prior to the release of the 2024–34 National Clean Cooking Strategy.

require US\$180 million per year,⁴ which is four times lower than the US\$850 million estimate for the 2015 SEforALL Action Agenda.

Drawing on the World Bank’s operational experience in the sector and baseline assessment, addressing this development issue requires a comprehensive and systemic approach. This involves working across sectors to address both supply and demand constraints, while creating a strong enabling environment for the sector. To advance further, it is important to allocate dedicated resources and bring in key partners in coordinated efforts to scale up investments, encourage market innovation, and drive the delivery of clean cooking solutions for all.

Overview of Demand for Cooking Fuels and Solutions in the United Republic of Tanzania

Access to clean cooking is a development issue, contributing to energy poverty while impacting multiple sectors such as health, climate change, gender, and environment. The 2024 Sustainable Development Goal (SDG) 7 tracking report shows that, the United Republic of Tanzania’s access to clean fuels and technologies for cooking was at 9.2 percent in 2022, with 22.3 percent of the population in urban areas and only 2.4 percent in rural areas having access.⁵

Tanzania’s progress in meeting the United Nations SDGs is constrained by its high dependence on firewood for cooking. According to Tanzania’s 2017/2018 Household Budget Survey⁶ published in June 2019, the main source of energy for cooking in mainland Tanzania is firewood (60.9 percent) followed by charcoal (28.8 percent), industrial gas (3.2 percent), electricity (2.1 percent), paraffin (1.3 percent), and solar (1.1 percent). The use of firewood as the main cooking fuel is more common in rural areas, representing 84.8 percent of use, against 17.4 percent in urban areas. Charcoal is mainly used in urban areas, accounting for 60.5 percent of use against 11.5 percent in rural areas. At regional level, the Kagera Region has the largest percentage of households using firewood (87.5 percent) as a source of cooking energy while Dar es Salaam—Tanzania’s economic center and largest city—has the smallest, representing 5.9 percent of household use. For further details, figure 1 illustrates the repartition of primary fuels across households in mainland Tanzania between 2017 and 2018.

The 2019/2020 Zanzibar Household Budget Survey⁷ reveals that despite a decrease by 18 percentage points of the overall use of firewood in Zanzibar between 2009/2010 and 2019/2020, firewood remains households’ main cooking fuel, representing 50.8 percent of use. Charcoal is the second main cooking fuel with 34.1 percent of household use, followed by industrial gas (7.7 percent). The use of firewood as a main cooking fuel is prominent in rural areas (80.5 percent), against 18.3 in urban areas. On the contrary, the use of charcoal for cooking is more common in urban areas, representing 60.3 percent of use against 13.1 percent in rural areas. The use of industrial gas as a main fuel for cooking is more common in urban areas (14.5 percent), while it represents only 2.4 percent of use in rural areas. For more details, figure 2 illustrates the repartition of primary fuels across households in Zanzibar between 2019 and 2020.

4 This difference is primarily due to variations in baseline data, which reflect differing market conditions and access rates. Additionally, discrepancies arise from the different methodologies used by the government of Tanzania and the World Bank’s Clean Cooking Planning Tool. While the government’s estimates focus on public and private sector needs, the tool also includes households’ direct contributions, which make up the largest portion of the total estimate.

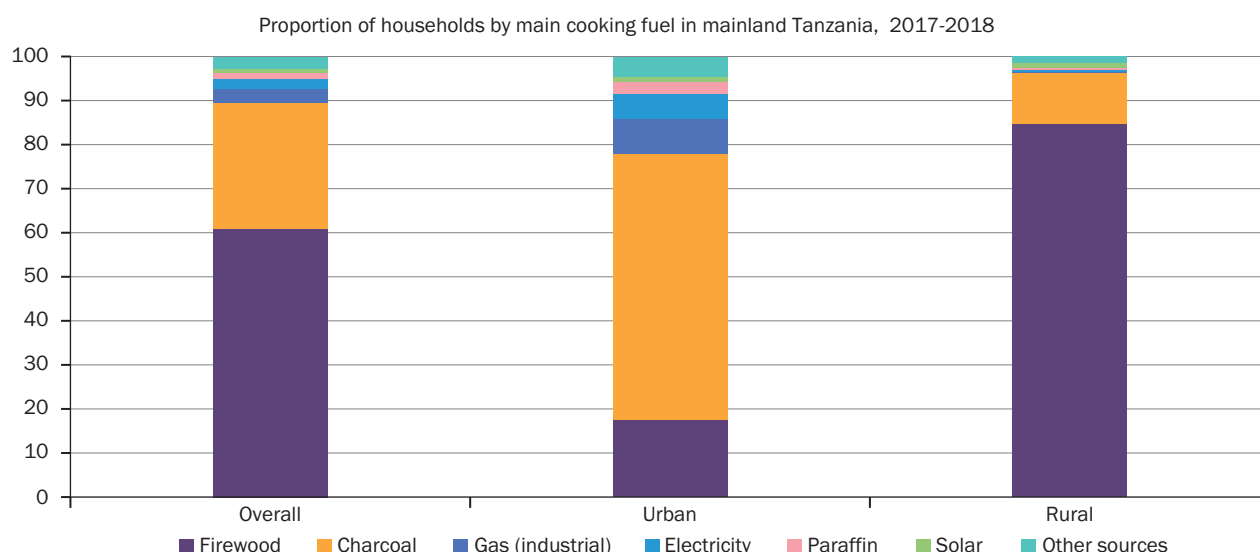
5 IEA, IRENA, UNSD, World Bank, WHO. 2024. Tracking SDG 7: The Energy Progress Report. World Bank, Washington DC.

6 United Republic of Tanzania’s National Bureau of Statistics, 2019. Household Budget Survey 2017/2018: https://www.nbs.go.tz/nbs/takwimu/hbs/2017_18_HBS_Key_Indicators_Report_Engl.pdf.

7 Office of the Chief Government Statistician Ministry of Finance and Planning Zanzibar, 2020. Household Budget Survey of Zanzibar 2019/2020: [https://www.ocgs.go.tz/ReportOCGS/HBS%20Main%20Report_final%2031.12.2020%20printing%20\(2\).pdf](https://www.ocgs.go.tz/ReportOCGS/HBS%20Main%20Report_final%2031.12.2020%20printing%20(2).pdf).

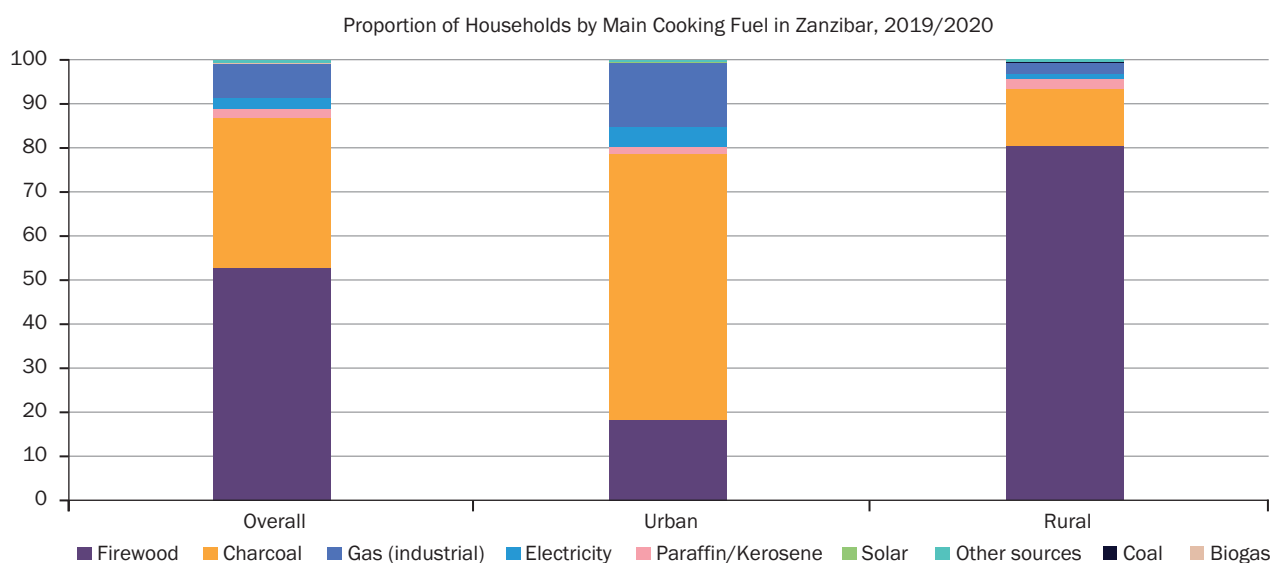
Furthermore, according to the Zanzibar Household Budget Survey, 47.7 percent of households allocate an average of 20,490 Tanzanian Shillings (TZS), equivalent to US\$8.21 per month, for charcoal. Additionally, 50.9 percent of households reported spending an average of 16,538 TZS per month (US\$6.63) on firewood, while 63.8 percent of households indicated an average monthly expenditure of 5,321 TZS (US\$2.13) for kerosene.

Figure 1: Main cooking fuel used in mainland Tanzania, by household type (2017/18)



Source: National Bureau of Statistics, 2019.

Figure 2: Main cooking fuel used in Zanzibar, by household type (2019/20)



Source: Office of the Chief Government Statistician Ministry of Finance and Planning of Zanzibar, 2020.

The absolute and relative prices of alternative fuels and stoves to biomass are key determinants in the uptake of modern alternatives to solid fuels in Tanzania. About 90 percent of charcoal users identify the affordability of charcoal as the primary factor driving their preference. Charcoal stoves, including traditional and improved stoves, offer the most cost-effective unit price per megajoule of energy generated, whereas

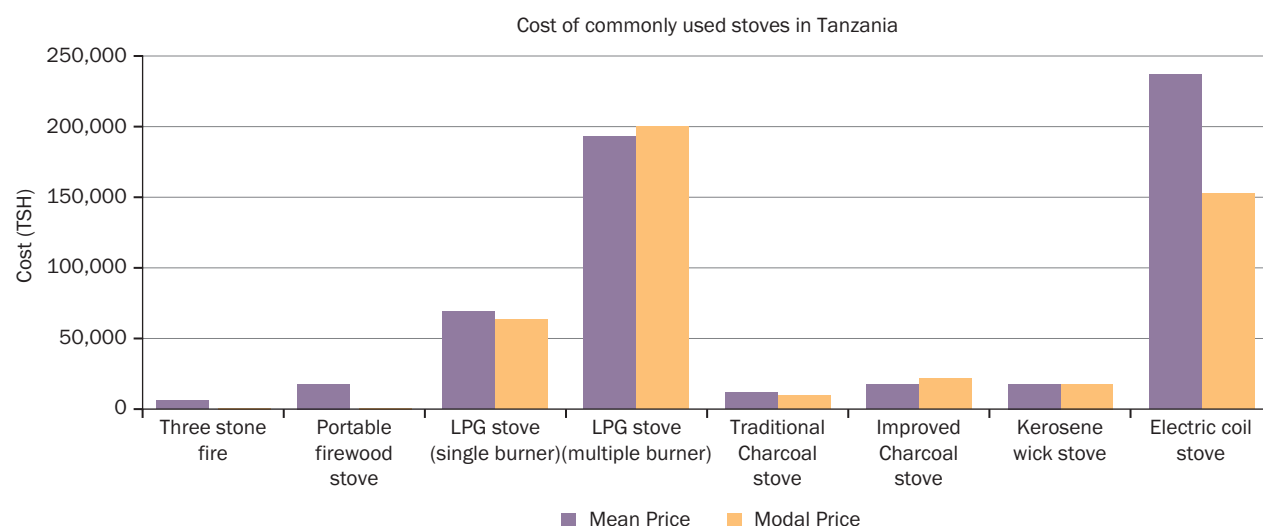
liquefied petroleum gas (LPG), electricity, and bioethanol options are comparatively more expensive. Charcoal costs approximately TZS 89 per megajoule (US\$0.034), compared with TZS 123 (US\$0.046) for LPG and TZS 141 for electricity (US\$0.053) (table 1). Moreover, traditional charcoal stoves cost about TZS 5,000 (US\$2), while single and multiple LPG burner stoves cost respectively TZS 60,000 (US\$23) and TZS 200,000 (US\$77) representing a high upfront cost (figure 3). Furthermore, charcoal can be purchased in small quantities by end users, such as small daily refills, adapting to irregular income, which is not the case for LPG. Despite increasing affordability of alternative fuels to biomass and the availability of financing options, charcoal is the preferred option in urban areas due to its affordability and availability in small quantities.⁸ In addition to affordability, preference for charcoal can be linked to cultural and user preferences, and the fact that investment in the clean cooking sector has historically been directed toward solid biomass improved cookstoves (ICS). This has contributed to the perception that biomass is a fundamental cooking fuel, deeply embedded in social and cultural norms. Furthermore, charcoal can be easily transported, distributed and stored. Firewood is not considered in comparing the affordability of fuels as it is mostly collected for free by households rather than purchased.

Table 1: Relative fuel prices of household cooking fuels in Tanzania 2020

Fuel type	Unit	Price (TZS) per unit	Conversion factor to megajoule	End use of cooking efficiency	Price (TZS) per megajoule
Charcoal	kg	776	29	0.30	89.20
LPG	kg	3,333	45	0.60	123.43
Electricity	kWh	356	3.6	0.70	141.27
Kerosene	liter	2247	36.3	0.40	154.75

Source: Based on Doggart, N., T. Morgan-Brown, E. Lyimo, B. Mbilinyi, C. K. Meshack, S. M. Sallu, and D. V. Spracklen. 2020. "Agriculture Is the Main Driver of Deforestation in Tanzania." *Environmental Research Letters* 15 (3): 034028. doi:10.1088/1748-9326/ab6b35

Figure 3: Cost of commonly used stoves in Tanzania



Source: Dar es Salaam Energy Survey, Environment for Development Initiative (EfD), 2020

Note: The mean price refers to the average price that households reported paying for the stove. The modal price is the reported prices that recurred most often and is likely a better indication of actual prices households face.

⁸ National Clean Cooking Strategy 2024–34.

Lack of Clean Cooking Access and Climate

Use of traditional biomass leads to negative environmental impacts such as deforestation due to unsustainable harvesting of firewood. Tanzania has one of the fastest deforestation rates in the world. Approximately 469,000 hectares of forest in Tanzania are cut per year. This is mainly driven by demographic growth and increasing demand for agricultural land and domestic cooking fuel such as wood and charcoal.⁹ In addition to population growth, the widespread use of inefficient cooking methods exacerbates the consumption of fuelwood and pressure on forests. As of 2015, available ICS were: the SEECO Improved Charcoal stove, Jiko Bora, the Centre for Agricultural Mechanization and Rural Technology (CAMARTEC) Improved Charcoal stove, the Envirofit Imported stove, the Portable Rocket Wood stove, the Charcoal Baking Oven, and the Tanzania Traditional Energy Development Organization (TaTEDO) fixed and portable Okoa wood stoves.¹⁰ Several programs have been implemented to improve cooking technologies and services, with a focus on solid biomass stoves.¹¹ Nevertheless, only a minority of these initiatives reached large-scale commercialization. Moreover, some largely disseminated ICS such as the Jiko Bora have been heavily subsidized by donor and nongovernmental organization (NGO) projects, which further highlights the fragile nature of the ICS and clean cookstove market in Tanzania.

Clean cooking is a key climate mitigation measure in Tanzania's 2020 nationally determined contribution (NDC), aligned with achieving SDG 7 along with SDGs 1, 3 and 13. Usage of traditional stoves and fuels in Tanzania has adverse impacts on health, gender, climate and the environment, employment and society in general. These negative impacts can be given a dollar value to quantify and estimate the costs associated with no action in addressing access to clean cooking; the total cost of inaction of the clean cooking agenda in Tanzania is estimated to be US\$38.9 billion per year stemming from the negative externalities on health, gender, and climate. The health impact is estimated at US\$24.9 billion per year. This figure results from quantifying the deaths and disability-adjusted life years (DALYs) linked to household air pollution (HAP) produced by stoves and fuels. It is estimated that in 2019, around 39,200 premature deaths and 2,031,000 DALYs were attributable to HAP in Tanzania.¹² The gender cost is estimated at US\$12 billion annually, due to lost productivity from the extended time spent on cooking-related tasks, including fuel collection, cooking and stove cleaning. While inequalities in social standing, economic capability, and gender-defined roles mean women often suffer disproportionately from a lack of clean cooking; the burden borne by women in poorer households is even more pronounced. Finally, the climate impact cost is estimated at US\$2 billion per year.¹³

Transition to clean cooking solutions is also a key climate adaptation action for Tanzania. Tanzania's economy is highly reliant on climate-sensitive activities, including agriculture, tourism, fishing, and livestock keeping, ranking it as the 45th most vulnerable country out of the 182 assessed in terms of climate change impact. Notably, Tanzania is already experiencing a rise in the frequency and severity of climate-related events such as floods and droughts. Over the past four decades, floods have accounted for approximately two-thirds of all natural disasters, with droughts being the second most prevalent cause. These events not only result in significant economic costs, but also disrupt the lives of the population.¹⁴ Furthermore, climate change affects nearly all sectors in Tanzania including agriculture, energy supply and demand, infrastructure

9 Building Resilience to Climate Change, IMF Staff Country Reports 2023, 154 (2023), A002, accessed Nov 7, 2023, <https://www.elibrary.imf.org/view/journals/002/2023/154/article-A002-en.xml>.

10 Government of Tanzania, SEforALL, 2015. Tanzania's SEforALL Action Agenda: https://www.se4all-africa.org/fileadmin/uploads/se4all/Documents/Country_AAs/Tanzania_AA_EN_Released.pdf.

11 SNV, MEM, TAREA, CCFAT, 2014. Country Action Plan for Clean Cookstoves and Fuels: <https://tarea-tz.org/storage/app/media/Blog/ICS%20Country%20Action%20Plan.pdf>.

12 Health Effects Institute. 2020. State of Global Air 2020. www.stateofglobalair.org [accessed: 07/11/2023]. Data source: Global Burden of Disease Study 2019.

13 World Bank Clean Cooking Planning Tool (CCPT), 2022: <https://energydata.info/cleancooking/planningtool/mecs/TZA>.

14 Government of Tanzania, 2021. Nationally Determined Contributions (NDC): https://unfccc.int/sites/default/files/NDC/2022-06/TANZANIA_NDC_SUBMISSION_30%20JULY%202021.pdf.

and water resources, putting in jeopardy the country's ability to achieve economic growth, sustainable development, and poverty reduction targets.¹⁵

Tanzania's climate vulnerability further exacerbates the environmental challenges it faces, including deforestation. Deforested land is at higher risk of experiencing flooding, droughts, and more prone to soil erosion with the risk of land degrading into wasteland.¹⁶ Additionally, the growing demand for wood fuels has led to rising prices, limiting access and affordability of charcoal and firewood, particularly for low-income households.¹⁷ These challenges not only threaten the forests but also the livelihoods of impoverished and vulnerable communities dependent on forests for cooking fuel. It is essential to adopt a climate-adaptive approach, emphasizing the promotion of affordable and diversified fuels and technologies less vulnerable to climate change, while also easing the pressure on natural resources. Moreover, capacity building among the population to withstand disruptions and shocks in fuel supply is the key.

Enabling Environment

Overall, in the past decade, Tanzania has been promoting LPG for cooking for charcoal and firewood substitution. More recently, the government has demonstrated political commitment to address lack of clean cooking access through clean cooking strategies at the national and rural level and in the participation and organization of clean cooking events. These efforts to improve access to clean cooking can be seen through the policy commitments outlined here.

National Clean Cooking Strategy for 2024–34: Launched on May 7, 2024, in Dar es Salaam by Her Excellency Dr. Samia Suluhu Hassan, President of Tanzania, this is Tanzania's first integrated national strategy to reduce the use of traditional fuels and solutions since independence in 1961. The strategy aims to fulfil the objectives of the 2015 National Energy Policy, which focused on improving quality of life by promoting access to modern energy. It will also contribute to the objectives of the 2021 National Environmental Policy aiming at reducing deforestation and land degradation through forest management and promoting access to modern fuels. The National Clean Cooking Strategy is available in both English and Swahili to promote inclusivity, will be supervised by the Ministry of Energy and Minerals (MEM) and coordinated by the Prime Minister's Office. Implementation will require strong collaboration with stakeholders including ministries, public institutions, government departments, regional and local government authorities, civil society organizations, private sector and development partners. The strategy aims to increase the use of clean cooking to 80 percent by 2034, with an implementation cost of approximately US\$1.8 billion. To achieve this, the government will explore various strategies, including subsidizing gas cylinders, encouraging private sector involvement in gas distribution, and promoting the development and adoption of electric cooking solutions through prepaid meters, while ensuring the inclusion of rural households. The government plans to leverage existing business opportunities in the clean cooking value chain, promote the use of existing funds and programs, and enhance project implementation capacity.

The MEM will oversee the development of clean cooking policies and raise public awareness. This includes implementing favorable fiscal policies, adopting progressive affordability approaches, establishing quality standards to regulate the clean cooking value chain, and integrating these standards into land use plans and building construction. The ministry will collaborate with stakeholders to establish a clean cooking fund and develop a strategy and implementation plan for 2050. Additionally, a monitoring and evaluation framework has been developed to promote effective implementation and provide guidance on the involvement of

15 Government of Tanzania, 2021. Nationally Determined Contributions (NDC): https://unfccc.int/sites/default/files/NDC/2022-06/TANZANIA_NDC_SUBMISSION_30%20JULY%202021.pdf.

16 Building Resilience to Climate Change, IMF Staff Country Reports 2023, 154 (2023), A002, accessed Nov 7, 2023, <https://www.elibrary.imf.org/view/journals/002/2023/154/article-A002-en.xml>.

17 SNV, MEM, TAREA, CCFAT, 2014. Country Action Plan for Clean Cookstoves and Fuels: <https://tarea-tz.org/storage/app/media/Blog/ICS%20Country%20Action%20Plan.pdf>.

different stakeholders. A report on the status of the strategy's implementation and the use of clean cooking at the institutional level is expected from the Vice President's Office by August 2024.

The Cooking Energy Action Plan (CEAP) of the Rural Energy Master Plan (REMP) of 2022. The CEAP was adopted in 2022 by the government of Tanzania, acknowledging the importance of addressing reliance on biomass for cooking and accelerating access to clean cooking, while focusing on the demand side. It is expected that the successful implementation of the CEAP will contribute to achieving the clean cooking targets of the 2015 Sustainable Energy for All (SEforALL) Action Agenda of achieving this target' by 2030 requires the following transitions:

- 65 percent of reliance on biomass in rural areas and 20 percent in urban areas, corresponding to less than 50 percent of reliance at the national level
- 3.7 million households to adopt ICS by 2030 (for which 2.5 million are in rural areas)
- 21 percent use of LPG for cooking in rural areas (2 million rural households will obtain LPG stoves and cylinders) and 30 percent LPG use at national level
- 370,000 metric tons per year of capacity for LPG import and storage.

Tanzania's 2021 NDC:¹⁸ An update of the intended NDC submitted to the United Nations Framework Convention on Climate Change in 2015, the 2021 NDC has a total budget of US\$19.2 billion (19,232,170,000) and aligns with the Tanzania Development Vision (2025) and Zanzibar Development Vision (2050), as well as the Third Five Year Development Plan (FYDP III). Furthermore, the NDC is in line with the National Climate Change Response Strategy of 2021 and the Zanzibar Climate Change Strategy of 2014. In the low-ambition scenario of the mitigation component of its NDC, the Government of Tanzania aims to reduce greenhouse gas emissions by 30 percent across all sectors of the economy, relative to the business-as-usual (BAU) scenario by 2030, resulting in a reduction of approximately 138 million tons of carbon dioxide equivalent (MtCO₂e). In the high-ambition scenario, the aim is to achieve a 35 percent reduction relative to the BAU scenario by 2030, resulting a reduction of about 153 MtCO₂e. The emissions reduction targets are subject to review after the first biennial update report and updated greenhouse gas inventory.

The priority sectors within the mitigation component are characterized by their significant potential to reduce greenhouse gas emissions, both in terms of their current high emissions and their anticipated increase in emissions. These sectors encompass energy, transportation, forestry, and waste management. Within the energy sector, the objective is to increase the use of natural gas for power production, cooking, transportation, and thermal services through the improvement of the supply chain of natural gas nationwide. Moreover, the aim is to reduce charcoal consumption within urban and rural areas through the promotion of affordable and alternative fuels that would be supported by regulation and policies for charcoal production and use. Under the forestry sector, the 2021 NDC aims to promote nationwide forest landscape restoration programs and initiatives.

The adaptation component of Tanzania's 2021 NDC will be implemented within the following sectors: agriculture, livestock, forestry, energy, coastal, marine environment and fisheries, water, sanitation and hygiene, tourism, land use and human settlements developments, health, infrastructure, disaster risk reduction, gender mainstreaming, capacity building, research and systematic observation, and technology development and transfer. Within the forestry sector, an adaptation measure is the safeguard of ecosystem services through the promotion of alternative livelihood options to forest dependent communities. Moreover, for the energy sector, the aim is to explore options for energy diversification.

¹⁸ The United Republic of Tanzania, 2021. Nationally Determined Contributions (NDC): https://unfccc.int/sites/default/files/NDC/2022-06/TANZANIA_NDC_SUBMISSION_30%20JULY%202021.pdf.

FYDP III, 2021–22/2025–26: Outlining the nation’s strategic priorities and policies for socioeconomic advancement, with a focus on fostering inclusive growth, sustainable development, and poverty reduction, the FYDP III objectives for the energy sector include developing renewable energy sources for cooking and implementing renewable energy technologies and projects (biogas, geothermal, LPG, solar, and wind energies), particularly targeting rural households.

National Environmental Policy (NEP), 2021:¹⁹ An overarching national framework for environmental management in Tanzania, this NEP updates the 1997 NEP, addressing its gaps and shortcomings. Throughout the implementation of the 1997 NEP along with various environmental policies, Tanzania achieved the recognition of pressing environmental issues such as land degradation and deforestation and setting an enabling framework for environment management in the country. However, these issues remain pressing challenges in Tanzania. Despite small increase in the adoption of ICS and alternative fuels, and reforms on land use, efforts are constrained by rapid population growth (about 3.1 percent), exacerbating pressure on forest resources in particular for energy needs, such as firewood and charcoal, as well as the lack of financial resources. The 2021 NEP aims to curb deforestation by improving access to affordable and available modern domestic fuels and attract private sector participation in forest management. It will be implemented through sectoral ministries, by mainstreaming policy statements and subsequent strategies in their respective sectoral policies and strategies. Moreover, there will be a review of relevant legislation to address policy gaps and incoherences with NEP 2021.

Health and Pollution Action Plan, 2019:²⁰ To address priority pollutants, one of the key actions of this plan is to increase the adoption of clean cooking solutions and the availability of alternative fuels by creating an enabling environment, awareness raising activities and supply-oriented programs with an estimated cost of US\$749,035 from July 2019 until June 2023.

National Energy Policy, 2015: Aiming to promote sustainable and diversified energy sources, enhance energy accessibility, and foster economic development while addressing environmental concerns and ensuring energy security, this government policy recognizes the necessity for alternatives to wood fuel for cooking, aiming to enhance access to modern fuels for improved household quality of life and deforestation control. It outlines that the government should facilitate the adoption of adequate cooking appliances and explore various fuel switch options, including compressed natural gas, LPG, and electricity.

Tanzania’s SEforALL Action Agenda of 2015:²¹ Setting the objective of reaching at least 75 percent of access to modern cooking solutions by 2030—including biogas, LPG, ethanol, natural gas, and charcoal with ICS—the Tanzanian’s SEforALL Action Agenda does not include the semi-autonomous region of Zanzibar as energy is not a sector governed by Tanzania. Energy in Zanzibar is within the competencies of the Ministry of Land, Housing, Water and Energy of the autonomous region, while on the mainland it is the responsibility of the Ministry of Energy and Minerals (MEM). The SEforALL priority actions related to the clean cooking sector are to develop:

- Specific regulations for sustainable efficient charcoal production and use methods linked with appropriate forestry management plans and afforestation efforts
- A concrete policy, strategy and targets to regulate biomass energy, particularly the clean cooking sector
- Implement a monitoring, evaluation and reporting system for the energy sector to monitor the performance of the implementation of different strategies, policies and programs in place in Tanzania

19 <https://www.vpo.go.tz/uploads/publications/sw-1644923087-NATIONAL%20%20ENVIRONMENTAL%20POLICY%202021%20new.pdf>.

20 https://www.unido.org/sites/default/files/files/2019-10/Tanzania%20HPAP.English_2.pdf.

21 <https://faolex.fao.org/docs/pdf/tan205790.pdf>.

- Minimum national or regional performance standards for energy products, based on government testing, labeling, and certification.

Moreover, the MEM will lead the creation of a cross-sectoral initiative to promote coordinated action across agencies, private sector, civil society organizations and NGOs. Furthermore, MEM is expected to develop a master plan for wood fuel supply and demand, targeting main production and demand centers. Finally, MEM is responsible for implementing cookstoves dissemination projects and for scale-up certification processes for residential and commercial cookstoves.

The National LPG Policy (2013): A framework promoting LPG as a clean and efficient energy source for cooking and heating while reducing deforestation and improving public health by reducing household air pollution.

Biomass Energy Strategy (2013): The strategy objectives are to: identify means of increasing the sustainability of the supply of biomass energy; increase the efficiency of the production and use of biomass; promote access to alternative fuels while ensuring affordability; and create an enabling institutional environment for strategy implementation.

Removal of import duties and added value added tax on LPG in 2008: This tax relief applies only to the LPG fuel, not to the stoves or related equipment needed to use LPG. The removal of these taxes does not equate to a direct government subsidy for LPG. Instead, it is a tax relief measure intended to lower the cost of LPG by reducing the taxes levied on it and therefore encourage the substitution of charcoal and firewood use. Over the past 10 years, there has been a significant increase of LPG supply for household cooking. The total volume of LPG imported in 2010/2011 was 24,470 metric tons compared to 69,148 metric tons in 2014/2015.²² However, this measure increased LPG use for cooking among wealthy households and established enterprises. This is because LPG adoption involves a high upfront cost for equipment and inflexible recurring expenses for refilling, making it unaffordable for poor and vulnerable users despite tax relief on fuel.

Organization and participation in clean cooking forums and events: The MEM of Tanzania hosted the Clean Cooking Conference Tanzania in November 2022. The aim of the conference was to address key barriers and increase access to clean cooking energy, as well as inform the formulation of new clean cooking strategies, building on existing strategies such as the 2015 SEforALL Action Agenda for Tanzania. Among key participants were the president of the Tanzania, H E Samia Suluhu Hassan. The president also co-chaired the Summit on Clean Cooking in Africa, organized by the International Energy Agency in May 2024.

Summary of Ongoing and Recent Programs

Accelerating Sustainable and Clean Energy Access Transformation Program using the Multiphase Programmatic Approach project (ASCENT): a regional program with a US\$5 billion envelope aiming to increase access to sustainable and clean energy in Eastern and Southern Africa from 2023 to 2030, ASCENT has three pillars including electrification and grid expansion, and scaling distributable renewables and clean cooking solutions. The program for Tanzania is a US\$300 million Program-for-Results Financing, which includes the promotion of clean cooking access by facilitating results-based financing (RBF), and adequate grants for enterprises as well as supporting an enabling environment to attract at private financing.

²² Ministry of Energy and Minerals. 2015. National Energy Policy: [https://www.nishati.go.tz/uploads/documents/en-1622283004-National%20Energy%20Policy%20\(NEP\),%202015.pdf](https://www.nishati.go.tz/uploads/documents/en-1622283004-National%20Energy%20Policy%20(NEP),%202015.pdf).

Tanzania Rural Electrification Expansion Program: Effective in 2023, this World Bank Group project has a clean cooking component that aims to provide 0.97 million people—representing 200,000 households—with access to improved and clean cooking solutions under RBF. The RBF will support the provision of quality-verified solar home systems and clean cooking solutions for rural households through supply-side and demand-side subsidies. For instance, some grants will be provided to vendors to lower the end user prices and to expand services to remote areas that are not expected to have grid electricity in the short-to-medium term. The program includes technical assistance to support market intelligence studies; consumer awareness campaigns; and advisory services and capacity building for the private sector, financial institutions, and the government. The pilot phase will focus on Tier 3 cooking solutions, with the potential to increase in TIERS depending on funding availability.

Tanzania Clean Cooking Project (TCCP), 2022:²³ A US\$3.75 million three-year project funded by the government of Sweden and implemented by the Africa Enterprise Challenge Fund, the TCCP seeks to catalyze the clean cooking sector through enhanced private sector participation. The project will provide matching grant financing and technical assistance to small and growing businesses operating within the clean cooking sector. The aim of the financing is to de-risk companies to venture into underserved markets and enhance the affordability and accessibility of clean cooking solutions for at least 60,000 beneficiary households. The clean cooking technologies supported by the project are ICS meeting or exceeding Tier 2 fuel use efficiency (thermal efficiency > 25 percent), clean cookstoves and fuel solutions meeting Tier 4 threshold for indoor emissions (including pellets, briquettes bioethanol, biogas and LPG), affordable electric cooking solutions, and other technologies that conform to national industry standards for clean cooking. It is estimated that by its closing date in 2025, the project would have had contributed to the distribution of 60,000 clean cooking solutions, supported between 10 and 15 small and growing businesses in catalyzing clean cooking access in rural and marginalized regions of Tanzania, with at least 20 percent being led or owned by women. Moreover, it is expected that the project will contribute to the creation of 150 new jobs within investee companies and their direct supply chains, of which at least 50 percent are targeted at women. Finally, TCCP will contribute to the avoidance or reduction of at least 240,000 tons of carbon dioxide equivalent.

Modern Cooking Facility for Africa (MCFA), 2022:²⁴ An RBF initiative funded by Sweden and overseen by Nefco, the Nordic green bank, MCFA is dedicated to supporting clean cooking companies in advancing access to and the scaling of high-technology clean cooking solutions across various Sub-Saharan countries, including Tanzania. The program's overarching goal is to provide three million people in Africa access to clean, modern, and affordable cooking solutions by the end of 2027.

Beyond financial support, MCFA extends technical assistance to successful cooking service providers, encompassing guidance on product and business model development, monitoring, fundamental business principles, strategy formulation, and human resource management. Furthermore, the program facilitates technical assistance for Cooking Service Providers seeking access to carbon finance.

In its first round (MCFA1), the initiative focused on supporting cooking suppliers offering electric, solar thermal, biogas, and bioethanol stoves meeting Tier 4–5 performance standards. Additionally, briquette and/or pellet stoves meeting Tier 3 and above performance standards were eligible, while LPG stoves were excluded. The first funding round attracted substantial interest, resulting in a total financing of US\$33.5 million. Notably, BURN—a clean cooking company and carbon project developer based in Kenya—secured MCFA support through a competitive selection process. With the support of MCFA, BURN plans to establish up to 456,000 clean cooking services and bolster its operational presence across five countries, including Tanzania. MCFA committed up to US\$11 million in RBF until 2027 to expand clean cooking access, with an additional US\$11 million in co-financing mobilized through MCFA financing.

²³ <https://www.aecfafrica.org/approach/our-programmes/renewable-energy/tanzania-clean-cooking-project-tccp/#contact-us>.

²⁴ <https://www.moderncooking.africa/modern-cooking-facility-for-africa-signs-its-first-agreement-with-a-clean-cooking-service-provider/>.

The second round, MCFA 2, which started in November 2023 with a funding allocation of up to US\$17.4 million, is designed to enhance opportunities for clean cooking businesses, including startups. In this phase, two distinct forms of funding are offered: RBF and catalytic grant funding. Notably, MCFA 2 exclusively supports higher tier cooking solutions, encompassing electric stoves, stoves utilizing sustainably produced solid and liquid biofuels or biogas solutions, and conventional solutions like LPG stoves.

Integrated Approach for Sustainable Cooking Solutions, 2021–25:²⁵ Implemented by the United Nations Capital Development Fund (UNCDF), the MEM of Tanzania, the Ministry of Natural Resources and Tourism and funded by the European Union (EU), this US\$33.5 million project (€30 million) aims to contribute to the reduction of climate change impacts in Tanzania and reduce deforestation by addressing policy and market challenges of the clean cooking sector. It has three components:

- **CookFund Programme “Accelerated Market rollout of Clean Cooking Solutions in Tanzania”:**²⁶ This is a three-year program occurring from 2021 until 2024, implemented by the UNCDF in collaboration with the United Nations Industrial Development Organisation (UNIDO) and funded by the EU up to US\$18.5 million (€17 million). The official launch took place on the 13th of December 2021 in Dodoma, Tanzania. The Cook Fund targets five regions—Dar es Salaam, Pwani, Morogoro, Dodoma, and Mwanza—and aims at providing financial and technical assistance to eligible enterprises and companies to accelerate market roll-out of clean cooking solutions (including stoves and fuels). The fund will finance capital expenditures and/or working capital for building the internal capacity of businesses involved in the production, importation, distribution, wholesale or retail of stoves, fuels, or related products and services. It is expected that the program will enable over 295 small and medium-sized enterprises (SMEs) suppliers to receive financial and technical support, grant access to clean cooking to about 580,000 households and 3,340 end-user SMEs, as well as contribute to the creation and support of about 11,500 jobs. At the environmental level, it is expected that the program will reduce about 5 million metric tons of carbon emissions, save over 23,000 hectares of forest/trees and prevent the production or consumption of over 185,000 metric tons of charcoal. The CookFund launched its second call for proposals on April 6, 2023.
- **Allocating US\$3.3 million for promoting bioethanol:**²⁷ It is expected that US\$3.3 million (€3 million) will be allocated to UNIDO for the promotion of bioethanol for cooking.
- **Raising awareness and creating an enabling environment:** The last component focuses on developing and implementing awareness campaigns and strategies for clean cooking solutions. It also involves reinforcing the legal and institutional framework to support the sustainable management of forest resources.

Promotion of bioethanol as alternative fuel for cooking:²⁸ This project, with a total budget of US\$2,557,078, was executed from January 2018 to 2022. Its overall goal was to promote the adoption of bioethanol as a sustainable cooking fuel in Tanzania, with the aim of reducing greenhouse gas emissions resulting from the extensive reliance on biomass for cooking. The project’s activities aimed to establish a thriving bioethanol market for cooking in Tanzania. These efforts encompassed the entire process, from producing bioethanol derived from molasses (a byproduct of sugar cane, one of Tanzania’s key crops) to developing suitable clean cooking stoves. Furthermore, the project aimed to support the government in creating a favorable environment for the establishment and growth of the bioethanol market. The objectives of the project were to transition 500,000 households in Dar es Salaam from traditional, polluting fuels to clean ethanol and to create a market demand for 90 million liters of ethanol fuel annually. Moreover, it was

²⁵ https://www.eeas.europa.eu/sites/default/files/sustainable_cooking_solutions-project-fact-sheet_jm.pdf.

²⁶ <https://www.uncdf.org/cookfund>.

²⁷ MECS, 2022. Tanzania e-cooking assessment: <https://mecs.org.uk/wp-content/uploads/2022/08/Tanzania-eCooking-Market-Assessment-2022-Final.pdf>.

²⁸ https://rise.esmap.org/data/files/library/tanzania/Clean%20Cooking/Tanzania_UNIDO-Promotion%20of%20Bioethanol%20for%20clean%20cooking_2018.pdf.

expected that the program would directly benefit a minimum of 500,000 women. But the adoption of bioethanol technology in Tanzania remains limited due to challenges in obtaining raw materials, limited awareness among users, and an absence of guidelines to promote the use of bioethanol and associated technologies.²⁹

Reduction of Indoor Air Pollution and its impact on Health of Women and Children in Vulnerable Rural and Urban Communities, 2019:³⁰ This US\$4,977,872 project will be developed over five years in seven geographical zones: Shinyanga, Dar Es Salaam, Kigoma, Iringa, Lindi, Dodoma and Arusha, and implemented by the Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC), MEM, Muhimbili University of Health and Allied Sciences, TaTEDO, Tanzania Atomic Energy Commission, National Institute of Medical Research, and the President's Office - Regional Administration and Local Governments. The primary objective of the project is to reduce the prevalence of respiratory and associated health problems, as well as fatalities among women, and their young children. This will be achieved by minimizing their exposure to indoor air pollution, primarily stemming from biomass combustion during domestic cooking. This implies assessing cooking fuels, technologies, and practices, along with the health effects of indoor air pollution in target communities. Moreover, it entails raising awareness, building capacity and enhancing access to cleaner cooking technologies and fuels, upgrading housing standards for improved ventilation, and supporting the development of a policy framework for indoor pollution control. The project is expected to enable 5,250 women and children to benefit from clean indoor air environments and reduce their risk of associated diseases. On the supply side, the project will benefit 105 stove suppliers and producers through capacity building and training in ICS repair and maintenance. Moreover, the project will directly benefit over 3,000,000 community members in urban and rural areas who are impacted by air pollution problems and indirectly by raising awareness.

Biomass Cookstove Standard, 2019:³¹ The Tanzania Bureau of Standards (TBS) developed this new standard while the Netherlands Development Organization (SNV) worked in partnership with the Tanzania Renewable Energy Association (TAREA) through its Energising Development Program to improve the enabling environment of the cooking subsector in Tanzania, focusing on policy, standardization and the elaboration of a cooking energy working group. The new standard sets the minimum performance requirements of biomass stoves and fuels for which levels of performance were inconsistent due to lack of standards and testing. By increasing users' access to high-quality products and supporting manufacturers to produce high quality stoves, the new standard aims to improve the recognition of biomass cooking solutions as a quality cooking alternative. The Matawi stove, which is a firewood and charcoal ICS developed by EnDev through SNV Tanzania, will be tested against the new Biomass Cookstove Standard. The Biomass Cookstove Standard requirements are:

- The stove or any of its parts may be manufactured using different materials and/or methods, but castings shall have a good finish and without cracks, stomata (holes) and sand holes
- Weldments shall be flat and uniform without perforations and slag stomata
- Stamped parts shall have a good finish without cracks, wrinkles, flashes and burrs
- Sheet metal surfaces and edges shall have a good finish without cracks, wrinkles, bumps and any type of imperfection
- Riveted pieces shall be firmly attached, and the rivets shall not be loose and/or skewed
- Rivet heads shall be smooth and shall not protrude

29 National Clean Cooking Strategy 2024–34.

30 UNIDO. 2019. Health and Pollution Action Plan: United Republic of Tanzania. https://www.unido.org/sites/default/files/files/2019-10/Tanzania%20HPAP.English_2.pdf.

31 <https://rea.go.tz/DesktopModules/EasyDNNNews/DocumentDownload.ashx?portalid=1&moduleid=1362&articleid=2281&documentid=2251>

- Ceramic parts shall have a good finish without cracks and voids
- For stoves made of different parts, such as ceramic core and a metal cladding, the parts shall be firmly assembled
- The stove shall be made from a metal sheet not less than 0.65 millimeters thick and weighing no less than 22 grams.

However, to date, there has been a lack of enforcement mechanisms of the Biomass Cookstove Standard and its use.

Country Action Plan for Clean Cookstoves and Fuels of 2014:³² Developed by the ICS Taskforce in collaboration with the Clean Cookstoves and Fuels Association of Tanzania, the plan's main objective is to boost nondonor-subsidized ICS production and distribution, thus reducing charcoal consumption within households and institutions consuming fuelwood for cooking by 50 percent by 2020. The ICS Taskforce was created in 2011, coordinated by the Tanzania Renewable Energy Agency and supported by SNV and other ICS players such as COSTECH and TaTEDO, with the aim of coordinating the sector, raising awareness, and improving the ICS market.

Africa Biogas Partnership Program (ABPP), 2009–13 and 2014–19:³³ ABPP is a two-phased program implemented in Burkina Faso, Ethiopia, Kenya, Tanzania and Uganda, to develop and support a sustainable market for biodigesters. During Phase I in Tanzania, ABPP fell short of its ambitious biodigester construction target of 12,000, achieving only approximately 35 percent with the construction of 4,181 biodigesters. Phase II, which ran from 2014 until 2019, had a US\$95.9 million budget, including US\$65.4 million from household contributions and US\$3.3 million from carbon revenues. In this second phase, the program aimed to build 21,000 biodigesters but by January 31, 2018, it had only met 10 percent of this goal, with 2,260 biodigesters built. Program evaluation revealed that a considerable share of biodigesters constructed during Phase I were not operational. In 2016, the attrition rate was of 33 percent of installations in Tanzania, 31 percent in Uganda and 23 percent in Kenya. A high share of attrition was due to malfunction as a result of broken fixtures and technical problems paired with the lack of aftersales services. Therefore, starting from 2016, campaigns were launched to repair biogas plants. Between 2015 and 2016, 232 biodigesters were repaired in Tanzania, 294 in Uganda and 55 in Kenya.

Tanzania Improved Cookstove Programme, 2012:³⁴ Implemented by SNV as part of the EnDev Tanzania program, this program aims to improve access to adequate clean cooking technologies for peri urban and rural households in Tanzania through the market development of the ICS segment, building on the existing ICS supply chain. The program enabled the development of the Matawi stove, an improved cookstove that can be used with charcoal and firewood and for which production is standardized to ensure quality. Moreover, the program supports entrepreneurs in building capacity through the delivery of market intelligence of local renewable markets, training with local artisans in the production of Matawi stoves, support in business development and marketing, and the identification of “cookstoves champions” for further personalized support. As of 2015, the program reached more than 226,000 Tanzanians in rural areas and engaged 51 cookstove producers, providing employment for 145 people. Furthermore, 47 percent of the cookstove enterprises were female headed, and accounted for 65 percent of production and sales of the Matawi stove.

32 <https://tareaz-tz.org/storage/app/media/Blog/ICS%20Country%20Action%20Plan.pdf>.

33 Clemens et al., 2018. Africa Biogas Partnership Program: A review of clean cooking implementation through market development in East Africa: <https://www.sciencedirect.com/science/article/pii/S0973082618302497>.

34 <https://www.snv.org/project/tanzania-improved-cookstoves-tics-programme>.

Challenges and Opportunities

Table 2 summarizes the status and assessment of challenges and opportunities of key elements of Tanzania's cooking sector.

Table 2: Status and assessment of challenges and opportunities of key elements of Tanzania's cooking sector

Key elements	Status	Challenges	Opportunities
Policy priority	Launch of the National Clean Cooking Strategy for 2024–34 in May 2024 with the aim of reaching 80% of clean cooking adoption by 2034. A CEAP was developed under the REMP with the objective of facilitating reaching the clean cooking targets of the SEforALL 2015 Action Agenda. Clean cooking is mentioned in the 2021 NDC and other policy documents without precise clean cooking objectives. Health and Pollution Action Plan aims to reduce indoor air pollution through clean cooking access. Tanzania's SEforALL 2015 Action Agenda sets the target of 75% of modern cooking (including charcoal ICS). LPG promotion in 2013 and 2008 to reduce deforestation and indoor air pollution. Political commitment and leadership at presidential and MEM level.	To date, there is no clean cooking policy or strategy for Zanzibar. Lack of interministerial coordination. Lack of monitoring and evaluation of the impact of policies, such as the promotion of LPG for household use. Lack of knowledge and data on the impact of LPG promotion. Lack of publicly available information such as market assessments and takeaways from past/recent initiatives and programs.	Harness and formalize current political will to combat deforestation and improve access to clean cooking. Integrate clean cooking within broader energy goals and strategies. Leverage on the existing policies across sectors to promote coordination and national guidelines. Build capacity for data and knowledge sharing, to inform future policies and stakeholders (donors, private sector) with recent data, including lessons learned. Training programs for carbon trading business management department (within the Ministry of Environment). Evaluate past policies and programs to determine their impact and identify necessary adjustments.
Institutions	The MEM of mainland Tanzania designs energy policies and regulations and oversees and coordinating interventions related to energy including energy efficient cook stoves. The Rural Energy Agency of Tanzania is an autonomous body under the MEM. Its key role is to promote and facilitate improved access to modern energy services in rural areas of mainland Tanzania. The Ministry of Natural Resources and Tourism is responsible for management of natural, cultural and tourism resources. MoHCDGEC formulates policies related to health, community development, gender, elderly, and children. This includes health impacts caused by indoor air pollution. Ministry of Health, Social Welfare, Gender and Children Zanzibar	The government has limited resources. Lack of coordination and documentation mechanisms for knowledge sharing. Need for further cooperation between the respective MEMs of mainland Tanzania and Zanzibar. Numerous initiatives exist across different sectors, but they are often carried out in isolation. There is a substantial risk of duplicating efforts and initiatives due to in-house project implementation. The progression of clean cooking adoption is slow (3.7% on average between 2010 and 2021).	Strengthen the coordination mechanism between actors of the cooking sector. Build on existing cooperation with government agencies such as CAMARTEC to promote alternative fuels that are adapted to rural and periurban areas. Development partners can play a role in building capacity and raising awareness. Having distinct MEMs for mainland Tanzania and Zanzibar is an opportunity to formulate policies and initiatives that are tailored to the specific needs and priorities of both within the union.

Key elements	Status	Challenges	Opportunities
	Ministry of Industry and Trade of Tanzania is mandated to formulate and monitor implementation of policies on industrial, internal trade, external trade, marketing and research. Ministry of Trade and Industrial Development of Zanzibar. CAMARTEC is responsible for interpreting government policies of applied research and development in agricultural mechanization and rural technologies into programs aimed at improving the agricultural production and quality of rural livelihoods.	Limited financial, technical and human resource capacities in some institutions, implementing clean cooking projects.	
Resources	The National Clean Cooking Strategy has an estimated implementation cost of approximately US\$1.8 billion. Establishment of a Clean Cooking Fund by June 2025.	The government has limited resources. Investment in the clean cooking sector has historically been directed toward solid biomass ICS.	Increase cooperation opportunities with donors by building capacity on data collection, monitoring, and knowledge sharing. Improve resource allocation by building on lessons learned from past initiatives and policies. Increase opportunities to leverage climate finance/carbon trading for clean cooking projects to attract private investment.
Standards and testing	TBS and Zanzibar Bureau of Standards Muhimbili University of Health and Allied Sciences contributes to research and development and academic teaching on indoor air pollution. The TBS is the recipient of a US\$7.6 million EU-funded project called Quality standards and compliance program for the United Republic of Tanzania (QUALITAN), implemented by UNIDO from 2022 until 2024, aiming to strengthen the capacity of the TBS, including the functioning and reach of laboratories, standardization activities, ICT and information systems management. New biomass cookstove standard 2019	Lack of standards and testing among ICS which poses an issue in terms of stove quality. Lack of enforcement mechanisms for the Biomass Cookstove Standard and its use.	Build on existing cooperation with development partners to develop an enforcement mechanism of the Biomass Cookstove Standard and extend quality control and standards to fuels, stoves and appliances. Development partners can also play a role in developing testing procedures within local conditions, that align with International Organization for Standardization.
Technology	Fuels used in Tanzania include animal dung, plant residues, firewood, charcoal and kerosene. Cleaner options are briquettes, bioethanol, LPG, natural gas, biogas and electricity.	Clean cooking-related investment has been historically directed toward the promotion of solid biomass ICS.	Leverage the existence of stakeholders operating for clean cooking research and development (government agencies, academia, donors, NGOs) to promote technology development, transfer and localization based on the local cooking culture.

Key elements	Status	Challenges	Opportunities
	In urban areas LPG can be accessed through smart metering technology. Key technologies available for households include SEECO ICS, Jiko Bora, CAMARTEC Improved Charcoal Stove, Envirofit Imported Stove, the Portable Rocket Wood Stove, the Charcoal Baking Oven and the TATEDO fixed and the portable Okoa wood stoves.³⁵ Solar energy cookstoves are also used but paired with traditional methods because of lack of energy storage capacity.³⁶ A lot of efforts in terms of research development and programs have been directed toward ICS, leaving little experiences on modern energy cooking services promotion in Tanzania.	Most charcoal is produced using TEMK.³⁷	Support and development of supply chains for alternative fuels adapted to local contexts (including aftersales services and communication). Further develop metered LPG and prepaid meters for electric cooking. Tanzania has one of the highest potentials of Africa for biogas, representing 1.8 million households.³⁸ Improve the sustainability of charcoal production through improved kilns.
Supply: private sector development	The ICS market is very fragmented, and most successful suppliers are artisans within the informal sector. Stoves such as the Jiko Bora were largely disseminated but heavily subsidized through donor programs. Underdeveloped clean cooking market outside of urban centers. ICS suppliers do not have adequate training to meet carbon finance requirements. The US\$7.6 million project funded by the EU and implemented by UNIDO, named QUALITAN seeks to support micro, small, and medium-sized enterprises in accessing compliance testing, reducing compliance costs whether in monetary terms or time delays, and facilitate market accessibility and cross border trade.	Clean cooking market (including ICS) is very fragile and donor dependent. Most ICS on the market are not tested or standardized which poses an issue in terms of stove quality. Most ICS initiatives did not reach large-scale commercialization. Many ICS programs lack coordination and stove certification. Most clean cooking projects (mostly ICS) took place in mainland Tanzania. LPG is imported, as Tanzania's natural gas has insufficient propane (0.3%) and butane (0.06%) for LPG production. LPG receiving terminals have limited capacity.	Multiple ICS suppliers would benefit from financial support and capacity building to reach scale. Need for private and public investments to support cooking technologies suppliers. Promote carbon trading in clean cooking projects for supplier capacity building and financial resources. Formalize the cookstove production segment and intensify production (through technical and financial support), while integrating women in the value chain. Leverage on existing programs such as the QUALITAN project to support clean cooking companies in streamlining compliance processes. Tanzania has strong mini-grid and off-grid infrastructure, with nearly 1 million mini-grid customers and 94 mini-grid developers as of 2022.
Demand: awareness and affordability	Majority of rural households use three-stone stoves In urban areas, most households use traditional charcoal stoves. Charcoal is the preferred cooking fuel in urban areas because of its affordability, availability and convenience. Underdeveloped clean cooking market outside of urban centers.	Lack of awareness of end users on how to identify and select quality ICS. The type of fuel used depends on income but also on the type of cooking activity involved, which leads to stacking. Charcoal will continue to be part of households' consumption habits (especially in urban areas and as part of stacking).	Need to offer high performance cooking technologies, including aftersales services and other low-cost mitigation measures (such as raising awareness and behavior change). Understand user preferences and behavior, for efficient behavior change and raising awareness strategies. Promote carbon trading in clean cooking projects to improve affordability of clean cooking services.

35. Government of Tanzania, SforALL, 2015. Tanzania's SforALL Action Agenda: https://www.se4all-africa.org/fileadmin/uploads/se4all/Documents/Country_AAs/Tanzania_AA_EN_Released.pdf.

36. National Clean Cooking Strategy 2024–34.

37. https://www.tfs.go.tz/uploads/MNRT_2019_National_Charcoal_Study.pdf.

38. Clemens et al., 2018. Africa Biogas Partnership Program: A review of clean cooking implementation through market development in East Africa: <https://www.sciencedirect.com/science/article/pii/S0973082618302497>.

Key elements	Status	Challenges	Opportunities
	Removal of VAT and import duties on LPG in 2008 increased LPG use for cooking amongst wealthy households and established enterprises. Overall, there is a low uptake of LPG despite government promotion. Tanzania has the fastest electricity access expansion rate of Africa, going from 15% of access in 2010 to 40% in 2020.	Low uptake of LPG for cooking despite government promotion of LPG. Many urban households cooking with charcoal are connected to electricity but do not cook with it. Lack of publicly available information including market assessments of the demand side, and takeaways from recent/past initiatives. Longstanding dependence on biomass and promotion of biomass ICS have entrenched the perception that biomass is a fundamental cooking fuel deeply embedded in social and cultural norms.	Explore alternative cooking fuels such as electric cooking, biogas, ethanol in addition to existing LPG promotion. This includes scaling up smart metering for LPG, and prepaid meters for electric cooking. Tanzania has strong mini-grid and off-grid infrastructure, with nearly 1 million mini-grid customers, and 94 mini-grid developers as of 2022. Include institutions, the industry, and the service sectors in the clean cooking transition. Implement transition toward modern energy cooking solutions (MECS) in large institutions which prepare an important number of meals.

Lessons Learned from the World Bank's Operational Experience in the Efficient and Clean Cooking and Heating Sector

Building on the World Bank's lending experience in the cooking sector, the Energy Sector Management Assistance Program (ESMAP) conducted a portfolio review of World Bank efficient, clean cooking and heating operations over the last 10 years to review the operations models used, and synthesize the lessons learned. The operations models involved streams of support for technical assistance and investment. Specifically, the interventions included: (i) technical assistance provided to governments and key stakeholders to improve the enabling environment and implementation capacity; (ii) RBF and its variance under country conditions to incentivize private sector enterprises to deliver defined results on improved cooking and heating technologies; (iii) community-driven development approaches involving public sector procurement to support end users to obtain improved cooking technologies; (iv) training of NGOs and local partners to increase their capacity to deliver cooking technologies; (v) access to finance support to stove/fuel enterprises and/or end users mainly through credit-line operations; and, (vi) business incubation support to SMEs, including those focused on stoves and fuels. Key lessons learned from the sector portfolio review are summarized here.

Access to clean cooking services is a development issue. Access to MECS is closely related to the level of economic development and urbanization rate. The most effective way to reduce HAP is by switching to modern clean fuels (for example, electricity, natural gas, LPG, ethanol, and biogas). Fuel switching should be encouraged, and more efforts are needed to invest in the delivery infrastructure. At the same time, it should be recognized that large-scale fuel switching is unlikely to occur in rural areas until rural economies become substantially more developed, or ongoing public funding is provided for fuel switching. To lower HAP in rural households, where the use of biomass is likely to persist over the near term, it is important to modernize the biomass fuel sector and promote integrated and cost-effective approaches (for example, improved/advanced biomass stoves, together with improved ventilation and behavior change).

A systems approach is needed to promote access to clean cooking. To make the cooking process clean, the whole system of interactions of cooking technologies (the combination of stove and fuel) with human

behavior (for example, what to cook, how to cook, and how often and long to cook) and housing conditions (for example, kitchen location, indoor vs. outdoor cooking, movable vs. fixed ICS, arrangement of rooms and size, construction materials, and quality of ventilation) needs to be considered. It is important to encourage innovation in each element of the system.

Local innovation and localized solutions are critical for long-term sustainability. Cooking is a contextualized system with no one-size-fits-all solution. Although projects share common barriers, the best solutions will vary by location owing to differences in cooking behavior, culture, resources, institutions, and market conditions. Therefore, empowering the development of localized solutions, based on lessons from international experience, including the latest technology innovations, will be key because localized solutions are more likely sustainable. And only when solutions are sustainable can they be truly transformative.

A national program with high-level support is essential to scale up access to clean cooking. While such programs need to involve stakeholders from a wide variety of positions and roles (public sector, civil society, and private sector) at all levels (that is, local, provincial, national, and international), there is no substitute for high-level political, technical, and financial support from national leaders and agencies.

Incentives or subsidies will be needed to achieve universal access to clean cooking. Like universal access to electricity—which no country has achieved without some form of subsidy—subsidies will be needed to achieve universal access to MECS. Market forces and mechanisms are powerful tools for ensuring a sustainable supply of modern cooking technologies and should be harnessed in a way that helps the private sector to develop, market, and deliver modern cooking solutions. However, if left to market forces alone, access will be limited by affordability and other constraints that affect mainly poor households, particularly in less developed and more remote areas. Thus, government policies are needed to: (i) establish and maintain adequate levels of subsidies; and (ii) design and implement effective subsidy allocation mechanisms to mobilize and sustain private-sector participation, and target households with an affordability gap.

RBF has been demonstrated to be an effective approach to using public resources to incentivize the market and can be designed to fit the country context and market conditions. The World Bank has implemented the RBF framework to support efficient, clean cooking and heating solutions in 10 client countries with variations based on country conditions (for example, in Bangladesh, China, Indonesia, Kenya, the Lao People's Democratic Republic, Mongolia, and Uganda). The results demonstrate that RBF is an effective instrument to incentivize private sector investment, and deliver clean and efficient cooking and heating solutions with predefined result levels and triggers for payment. The RBF framework can be used to unify key elements and interventions, needed to achieve results. In addition, its flexibility allows for designing and adjusting the predefined results and associated incentives based on the country context, market conditions, and feedback from program implementation.

Clean Cooking Scenarios

Scenario for achieving universal access by 2030

Solutions to tackle this pressing development challenge must prioritize user preferences and local cooking contexts to address longstanding barriers to the adoption of modern cooking solutions that are clean, efficient, convenient, safe, reliable and affordable. Mainland Tanzania's SEforALL clean cooking targets—reaching 75 percent of access to modern cooking solutions by 2030—correspond to reaching 53 and 33 percent of ICS access, and 10 and 60 percent of MECS access in rural and urban areas, respectively.

Based on the methodology of the Clean Cooking Planning Tool,³⁹ reaching mainland Tanzania’s clean cooking targets as outlined in the 2015 SEforALL Action Plan, requires an overall investment of US\$850 million per year. This corresponds to an investment of US\$381 million per year from the public sector to support the development of the clean cooking market, bridge the affordability gap for poor households and unlock private investments. US\$43 million per year is needed from the private sector to install downstream infrastructure for the functioning of modern energy cooking markets. The remaining US\$426 million per year will be from households’ direct contribution.

By reaching these clean cooking targets, the overall benefits of transition total US\$10 billion, which is more than 11 times the estimated total investment (US\$850 million per year) and 26 times the public financing needed (US\$381 million per year). The health benefit is estimated at US\$6.6 billion per year linked to averted deaths and averted disability-adjusted life years from reductions in exposure to HAP. The gender co-benefit is estimated at US\$2.5 billion per year, associated with time savings in performing cooking-related tasks such as collecting fuel and cooking. Finally, the climate co-benefit is estimated at US\$887 million per year due to reductions in greenhouse gas and black carbon emissions by switching the targeted population to cleaner cooking solutions (see appendixes B and C for detailed methodologies).

Scenario for Achieving Universal Access by 2034

Tanzania launched its National Clean Cooking Strategy 2024–34 in May 2024, with the goal of achieving 80 percent access to modern cooking solutions by 2034. The analysis for this background note on clean cooking was conducted prior to the release of the new strategy. Consequently, the investment estimations provided by the World Bank’s Clean Cooking Planning Tool⁴⁰ currently reflect earlier targets set of the SEforALL 2015 Action Agenda, aiming to achieve 75 percent clean cooking access by 2030.

The Tanzanian government estimated that reaching 80 percent of modern cooking energy by 2034 as outlined in the National Clean Cooking Strategy 2024–34, will require an investment of approximately US\$1.8 billion, corresponding to US\$180 million per year. This investment estimate includes contributions from both the public and private sectors. Primarily driven by the public sector, investment will ensure the availability of affordable, high-quality clean cooking solutions for all households, with a particular focus on impoverished and rural communities. Moreover, the goal is to stimulate private sector involvement in financing, thereby fostering innovation and bolstering essential infrastructure such as distribution networks, storage facilities, and marketing channels.

The investment needs from the World Bank’s Clean Cooking Planning Tool for mainland Tanzania’s 2015 SEforALL Action Agenda target—75 percent of modern cooking energy by 2030—estimated that reaching this target required an overall investment of US\$850 million per year. This investment is primarily driven by households’ direct contributions (US\$426 million per year), followed by the public sector (US\$381 million per year) and the private sector (US\$43 million per year). Given that the new clean cooking targets of the National Clean Cooking Strategy are 5 percent more ambitious (80 percent instead of 75), and extended by an additional 4 years (2034 instead of 2030), it is expected that the Clean Cooking Planning Tool’s estimations for the 75 percent target for 2030 should not significantly differ from estimates that would have been made for 80 percent of modern cooking energy by 2034.

However, the Clean Cooking Planning Tool’s estimate for 2030 (US\$850 million per year) is over four times larger than the government’s estimate for 2034 (US\$180 million per year). This discrepancy can be attributed to several factors. First, the World Bank estimate is based on clean cooking access rates publicly available since 2017, which does not fully reflect recent improvements made in terms of access rates, available infrastructure and market developments. Second, the Clean Cooking Planning Tool incorporates

39 <https://energydata.info/cleancooking/planningtool/>.

40 <https://energydata.info/cleancooking/planningtool/>.

households' direct contributions to the estimate, whereas the government's estimate focuses solely on investment needs from the public and private sectors (see appendix B for a detailed explanation of the Clean Cooking Planning Tool's methodology).

Lack of Progress on the Clean Cooking Agenda

The cost of inaction of the clean cooking agenda in Tanzania is estimated to be US\$39 billion per year stemming from the negative externalities on health, gender, and climate. The health impact is estimated at US\$25 billion per year. This figure results from quantifying the deaths and DALYs linked to HAP produced by stoves and fuels. The gender cost is estimated at US\$12 billion annually, due to lost productivity from extended time spent on cooking-related tasks, including fuel collection, cooking, and stove cleaning. While inequalities in social standing, economic capability, and gender-defined roles mean women often suffer from a lack of clean cooking in a disproportionate way, the burden borne by women in poorer households is even more pronounced. Finally, the climate impact cost is estimated at US\$2 billion per year based on the climate impact of fuel use (see appendix A for detailed methodology).

Recommendations

Moving forward, as the clean cooking market is still nascent and fragmented in Tanzania, it is important to take an integrated and collaborative approach by working across sectors and tackle supply and demand constraints while developing an enabling environment to support clean cooking market development. With a substantial disease burden associated with HAP and increasing deforestation, Tanzania needs a timely cooking sector intervention. Tanzania has emphasized the importance of increasing access to clean cooking to mitigate climate change in its Third Five Year Development Plan, and with the launch of its National Clean Cooking Strategy for 2024–34, setting the ambitious target of reaching 80 percent of access to modern cooking solutions by 2034. Furthermore, it has demonstrated strong political commitment to addressing this critical issue by hosting and co-chairing significant clean cooking events. However, Tanzania's commitment to clean cooking is not new. In its 2015 SEforALL Action Agenda, mainland Tanzania set ambitious targets to achieve at least 75 percent access to modern cooking solutions—including LPG, natural gas, biogas, ethanol, and improved charcoal cookstoves—by 2030. Additionally, the adoption of the CEAP under the REMP to support the 2015 SEforALL Action Agenda cooking targets underscores the country's dedication to tackling this development challenge.

The successful implementation of the National Clean Cooking Strategy for 2024–34 hinges on several key factors. Achieving clean cooking targets requires substantial financing from both the public and private sectors, with climate finance mechanisms serving as a critical resource. This requires strengthening the enabling environment for the clean cooking market and building capacity for the expected growing number of clean cooking projects. Moreover, this implies fostering interinstitutional cooperation to avoid siloed actions and duplication. Furthermore, behavior change strategies and raising awareness are vital to shift the deeply rooted reliance on solid biomass toward the adoption of cleaner alternatives. However, it is important to note that charcoal ICS remains a part of the clean cooking transition for now, highlighting the need for the promotion of sustainable charcoal production and efficient fuel use through quality stoves.

Enhance the enabling environment and strengthen financial and technical capacity for clean cooking projects

Achieving Tanzania's clean cooking targets will require substantial financing, with active private sector participation being essential. The government has identified climate finance, particularly carbon trading, as a catalyst for private sector engagement. The National Clean Cooking Strategy outlines various measures to boost private sector involvement in clean cooking projects. By July 2024, the government plans

to enhance subsidies for these projects, including offering low-interest loans to project implementers, and aims to expand public-private partnerships in the clean cooking sector by 2026. Additionally, Tanzania is working to bolster investor confidence by establishing international agreements on carbon trading within clean cooking projects, and educating investors on the benefits and opportunities available through national and international funds and programs.

As Tanzania aims to increase the number of clean cooking projects, the strategy includes strengthening the operational capacity of the department responsible for carbon trading management under the Ministry of Environment by June 2025. Enhancing human resources and providing training for monitoring and evaluation are essential, given the anticipated growth in clean cooking projects. However, capacity building should extend to entities involved in clean cooking policy overall. Despite various efforts to improve access by promoting of gas and alternatives to biomass—for example, with the National LPG Policy and Biomass Energy Strategy, both of 2013—there is limited publicly available information on the content of these strategies, and few policies and initiatives have been tracked for impact. This lack of data and transparency hinders effective collaboration with development partners and the private sector and prevents leveraging lessons learned to improve future initiatives. Building capacity across all entities involved in the sector is crucial for ensuring efficient implementation, highlighting project successes to potential investors, and planning future policies based on past experiences.

Moreover, the National Clean Cooking Strategy strives toward strengthening its enabling environment by reducing taxes and fees on clean cooking energy, appliances, and efficient stoves by June 2026. Along with other measures, this should stimulate private sector engagement, as it will improve access to clean technologies and fuels for end users, stimulate market expansion, and support the development of the supply chain by lowering costs for imported stoves and locally produced components. While these tax reductions signal a conducive business environment, it is important that the government sustains these fiscal incentives in the long-term and officially commits to do so. It is key to provide private actors with enough security and predictability for medium- to long-term private sector investment planning.

Enhance institutional cooperation

Cooperation between institutions and ministries is vital to avoid isolated efforts and duplication, a longstanding issue in Tanzania’s clean cooking sector. By July 2024, ministries, departments, public institutions, regional administrations, and local government authorities will integrate clean cooking initiatives into their strategic plans and appoint desk officers to oversee implementation. This approach will enhance capacity within relevant entities, improve data collection and tracking, facilitate more efficient resource allocation, and inform the design and implementation of future interventions. Additionally, it is recommended to extend cooperation between mainland Tanzania and Zanzibar, especially given Zanzibar’s lack of experience in clean cooking projects and planning. This collaboration is essential for informing future initiatives and should consider Zanzibar’s local context and specific needs.

Promote sustainable charcoal production and efficient fuel use

Solid biomass will continue to be part of households’ clean cooking transition toward the 2034 target. Fuels such as charcoal are deeply rooted in consumers’ preferences, particularly in urban areas due to their affordability, availability, and ease of use and transport. The National Clean Cooking Strategy for 2024–34 recognizes the imperative to promote alternatives to charcoal, such as briquettes, and other sustainable fuels like electricity, biogas and bioethanol. However, the need to improve the sustainability of charcoal production which relies on TEMK must be emphasized. TEMK have low efficiency, leading to considerable wood wastage as they fail to convert a significant portion of the input wood into usable charcoal. It is important to promote the adoption of improved kilns that incorporate features, such as better insulation, controlled airflow, and optimized combustion processes to enhance charcoal yield and quality, while minimizing emissions and

reducing wood wastage. Efficient forest resource management, combined with the adoption of high-quality ICS, can notably decrease greenhouse gas emissions and deforestation, in a context where many households may continue using charcoal-based ICS as a main fuel or alongside modern cooking services, such as gas, biogas, bioethanol and electricity.

Tanzania, for instance, aims to develop and implement updated guidelines on the quality standards for cooking energy, appliances, and cookstoves starting in June 2025. By this date, Tanzania also plans to have established infrastructure for testing of quality standards. To promote efficient resource allocation and intervention, it is important to build on existing standards, such as the Biomass Cookstove Standard created in 2019, which lacked an enforcement mechanism. This effort can be supported by leveraging the recent QUALITAN project, implemented by UNIDO from 2022 to 2024, which aimed to strengthen the capacity of the TBS for testing and standardization activities. Ensuring adherence to these standards will help make the use of solid biomass more sustainable and efficient, thereby contributing to the clean cooking transition.

Furthermore, through its National Clean Cooking Strategy, the government has implemented a ban on the use of firewood and charcoal in 31,395 institutions that prepare food and feed more than 20,100 people. This is a key achievement, as institutions are not driven by consumer preference, which facilitates adoption and has a significant impact due to their large size.

Implement behavior change and awareness strategies

It is recommended to allocate sufficient resources to behavior change strategies and awareness-raising efforts to facilitate the scaling up of clean cooking adoption. Historically, clean cooking projects have promoted solid biomass ICS, further embedding the perception that charcoal and solid biomass are essential for cooking. Furthermore, the choice of cooking fuel is driven by affordability and the type of cooking activity, leading to the widespread practice of fuel stacking in Tanzania. To address these issues, it is crucial to consider end user preferences, consumption habits, and local cultural norms. Understanding these factors will enable the design of targeted awareness and behavior change campaigns. These initiatives could include communication strategies, demonstrations of cooking local dishes using clean cooking methods, and partnerships with local communities, with a focus on gender inclusion. Targeting electricity users for electric cooking is also key, given Tanzania's high current and projected unrealized potential for electric cooking.⁴¹ Moreover, awareness campaigns should include programs to educate households on identifying high-quality ICS. By equipping users with this knowledge, they will be able to enjoy the associated health, timesaving, and climate benefits that come with using high-quality ICS.

As part of the National Clean Cooking Strategy 2024–34, Tanzania is developing a national communications strategy and an awareness and sensitization plan on the use of clean cooking, with both initiatives scheduled for implementation by September 2024. Additionally, a national clean cooking conference will be held annually to improve access to information and raise awareness about the benefits of clean cooking. Starting in July 2024, educational and awareness programs will also be implemented through women's and youth groups, as well as in schools.⁴²

41 Based on the MECS global market assessment for electric cooking methodology, the unrealized potential for electric cooking is the gap between the electricity access rate and the electric cooking adoption rate.

42 National Clean Cooking Strategy, 2024–34.

Appendix A: Methodological Note: Calculating the Cost of Inaction

The cost-of-inaction estimates presented in this note rely on three separate calculations, all seeking to unitize the annual dollar value of sustaining the status quo (that is, continuing to cook with the latest available global fuel mix). These estimates cover health, gender, and climate.

Health: the costs of morbidity and mortality

The health calculation understands the cost of morbidity as the cost of one year of life lost to disability, including work absenteeism and medical treatment, resulting from household air pollution (HAP) and the cost of mortality as the cost of a life lost due to HAP. The calculation for health costs follows a top-down methodology. It takes estimates for deaths and disability-adjusted life years (DALYs) due to HAP. It then multiplies each country-specific value by a country-specific gross domestic product (GDP) per capita expressed in terms of purchasing power parity (PPP). Finally, this value is multiplied by a cost multiple specific to DALYs or deaths: DALYs are estimated at 5 times GDP per capita expressed in terms of PPP, while the cost of mortality or the cost of one death due to HAP is estimated at 70 times GDP per capita, expressed in terms of PPP.

Gender: the costs of fuel collection, cooking, and stove cleaning

The gender and climate calculations follow a bottom-up approach. A factor multiple for annual time spent on fuel collection, cooking, and stove cleaning is applied to each country's primary fuel proportion, using fuel mix data; each factor multiple varies by fuel type. This value is then multiplied by the cost of a woman's time, which is set at a conservative estimate of US\$0.54 per hour.

Climate: the social costs of carbon

The climate calculation relies on the application of a fixed carbon cost to a global estimate of the carbon footprint of the current global cooking fuel mix. The social cost of carbon, also described as the “present value of all future damages to the global society of one additional metric ton of carbon dioxide (CO₂) – equivalent [eq] greenhouse gasses emitted today”, is set at US\$45.92.⁴³ This cost value is then multiplied by a volume value—an estimate of the carbon footprint of the current global cooking fuel mix (tons of CO₂ per year)—which is calculated using a bottom-up analysis: each country's proportion of cooking fuel is multiplied by a factor-specific multiple to understand the tons of CO₂ per year resulting from yearly fuel usage (in kilograms), the total Kyoto emissions rate with fraction of nonrenewable biomass (fNRB) (in grams per kilogram), total CO₂ emissions for production (in grams per kilogram), and total black carbon (BC) emissions (in grams per kilogram). When added together, these values produce a total estimate of emitted CO₂eq. The same quantity of yearly fuel used per average households is assumed across countries using the reference data from a Kenya study. fNRB rates for each country are sourced from Bailis et al. 2015;⁴⁴ if the value for fNRB for a particular country was not available, a default rate of 0.3 was used. For the given fuel source, total BC emissions (in grams per kilogram) are multiplied by the yearly fuel usage per household (in kilograms) and a global warming potential conversion factor of 1140.

43 Howard, P., and D. Sylvan. 2015. Expert Consensus on the Economics of Climate Change. New York: Institute for Policy Integrity, New York University School of Law. <https://www.edf.org/sites/default/files/expertconsensusreport.pdf>.

44 Bailis, R., D. Rudi, A. Ghilardi, and O. Masera. 2015. The Carbon Footprint of Traditional Woodfuels. *Nature Climate Change*. 5. 10.1038/nclimate2491

Appendix B: Methodological Note: Calculating the Transition Costs

The transition cost is a combination of costs associated with transitioning the population/households to modern energy cooking services (MECS) and improved cookstoves (ICS). Under the MECS Scenario, the global population accesses the Tier 4 (or higher) level of the Multi-Tier Framework for cooking, while under the alternative improved cooking scenario, it transitions from below Tier 2 access to at least universal Tier 2 access.

Data sources

A wide range of data sources were used for this modeling exercise. They included in-depth data on modern energy use from the World Bank's Multi-Tier Framework household surveys in six "archetype" countries (Cambodia, Myanmar, Nepal, Nigeria, Rwanda, and Zambia). Global fuel mix data was compiled from demographic and health surveys, multi-indicator cluster surveys, and national energy censuses. The report used the World Bank's country-level historical data for gross national income per capita (1960–2018) and electricity access (1960–2017). Additional World Bank data sources included its List of Economies, covering country-level information on income group and country lending category (International Development Association/International Bank for Reconstruction and Development/Blend); energy consumption, covering per-country household-level information on annual energy use expenditure; and population, covering historical and projected country-level information (1960–2030) by total, urban, and rural populations. For household size and composition data, the report used United Nations historical and current country-level data.

MECS transition scenario

Modeling the cost of the MECS transition for each of the 71 countries involves three broad steps:

Step 1. Sizing the number of households to transition to MECS by 2030. The population is first converted into households using the average household size for the selected country. Sizing considers the user input (in percentage), which cannot be smaller than the 2030 business-as-usual (BAU) case. Depending on the user input in the MECS (percentage) slider, current ICS, and traditional households transition to MECS. This step applies to both urban and rural households.

Step 2. Assigning a fuel mix transition pathway through which the selected country aims to achieve MECS access by 2030. In our model, we use a default fuel mix transition pathway based on a review of the government's policy commitments and national energy strategies for meeting the Sustainable Development Goal 7.1 targets; modern energy forecasts by the International Energy Agency and the International Renewable Energy Agency; and considerations of the existing installed energy infrastructure. This default fuel mix proportion sums to 100 percent. For 18 countries on this list, we found no clearly dominant fuel type; thus, the default values assume an even distribution.

Step 3. Applying a set of costs to transition. Following the selected fuel mix pathway (Step 2), the transition cost figure is determined by multiplying the number of households (Step 1) by the weighted cost to transition. A bottom-up cost of transition per household is determined for each fuel (liquefied or natural gas, electricity, ethanol, pellet gas, and biogas). In 2020, the cost estimates vary by household tier, locality (urban or rural), and income group (low, lower middle, and upper middle). The transition costs consist of those for a double-burner cooking setup (either two single-burner stoves or one double-burner stove), fuel, downstream infrastructure, and behavior change. The values for fuel consumed vary by urban and rural contexts and

reflect unitized caloric values per person, validated through expert interviews. Fuel prices reflect market values as of January 2020, and stove prices reflect retail (unsubsidized) prices. Both fuel and stove prices for each transition include benchmarks, from which an average is taken.

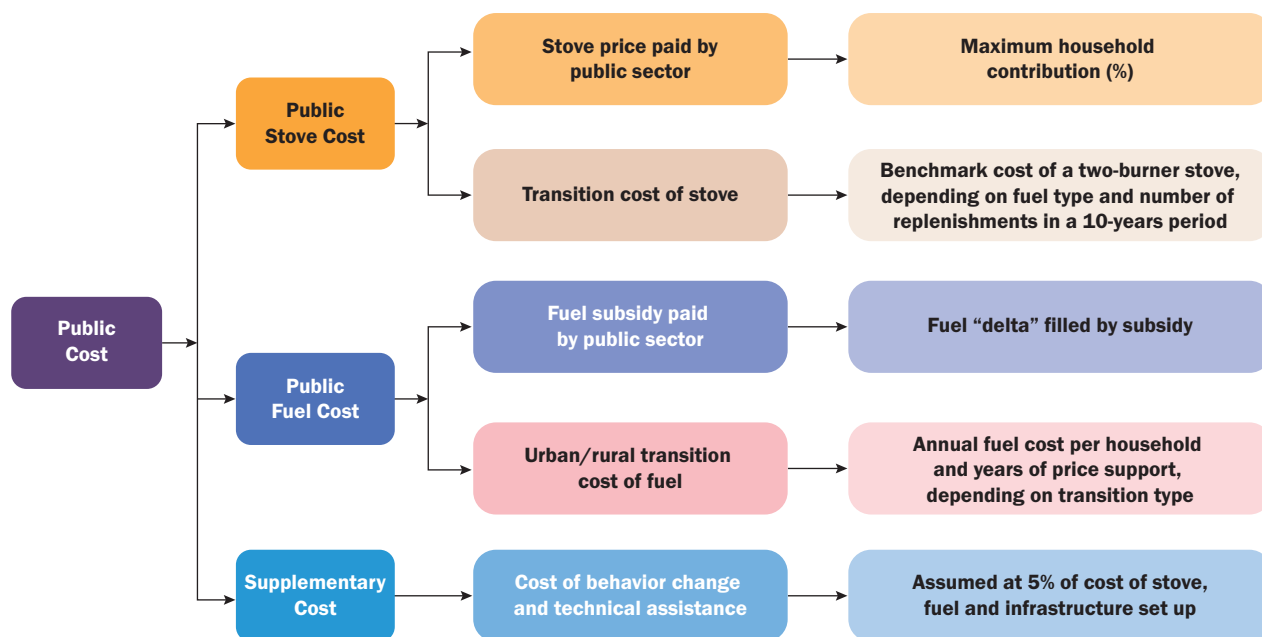
Disaggregated costs

The MECS transition costs are disaggregated into public sector, private sector, and household costs for the urban and rural split. *Public sector cost* means that government and development partner contributions cover the affordability gap to help ensure households' adoption and continued use of MECS. *Private sector cost* refers to private sector contributions from investment in downstream infrastructure. It is expected that private sector investment in stoves and fuels is fully reflected in the unit prices paid by consumers and thus is not included in the private sector cost. *Household cost* refers to households' contribution to paying for the cost of stoves and fuels. The ICS transition costs are disaggregated into public sector and household costs for the corresponding urban and rural split. Since the ICS transition assumes no fuel switch and no downstream infrastructure costs, the ICS transition has no private sector cost.

Public sector

Following the logic of the MECS transition cost calculation, a three-step process is used to calculate the public sector cost. Step 1 estimates the number of urban and rural households to transition. Step 2 assigns a transition pathway, and Step 3 calculates the public cost, combining three broad cost categories: (i) stove; (ii) fuel; and (iii) supplementary cost (figure B.1). These costs vary, depending on the urban and rural split.

Figure B.1: Public sector cost categories



A two-burner stove is considered as the benchmark in this analysis. The cost borne by the public sector on a per household basis is estimated using the product of: (i) the price of the stove paid by the public sector to fill the affordability gap and incentivize adoption; and (ii) the number of stove replacements (determined by the transition tier). The fuel "delta" is the difference between the annual fuel cost per household and the maximum household fuel contribution (capped at 5 percent of the household's monthly income). The product of the fuel "delta" filled by the public subsidy and the transition cost of the fuel yields the fuel cost.

Finally, the supplementary cost is the share of overall program costs allocated to behavior change and technical assistance, which is assumed at 5 percent (figure B.1).

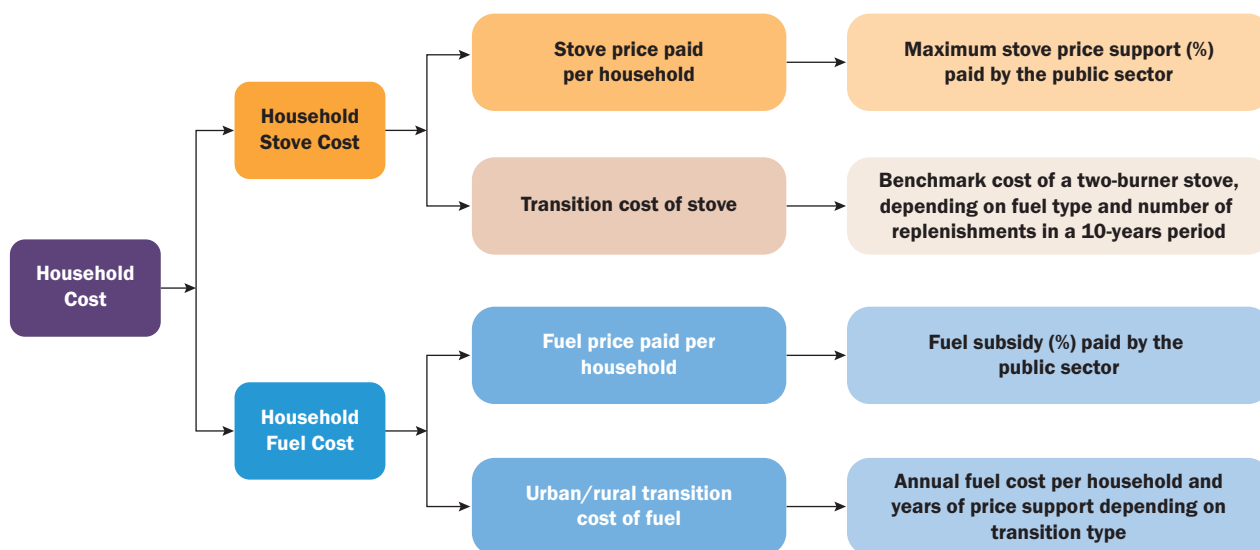
Private sector

The private sector cost is estimated using the cost of marginal distribution of infrastructure per household, which includes the cost of setting up the downstream distribution infrastructure, storage, and transport. In the case of such fuels as liquefied petroleum gas, ethanol, biomass pellets, and biogas, this value is calculated from the benchmark capital expenditure for plant setup on a per household basis. In the case of electricity, it is the cost of a one-time circuit and meter installation.

Households

A similar three-step process is used to calculate the household cost of transition. Step 1 sizes the number of urban and rural households to transition, and Step 2 assigns a transition pathway. Step 3 calculates the household cost, which requires adding the stove and fuel costs borne by the household (figure B.2). The share of the household contribution is determined by the transition stove technology and fuel combination, the income group for the country, and the tier level of the household in 2020. These costs vary, depending on the urban and rural split.

Figure B.2: Household cost categories



The public sector, private sector, and household costs are added together to obtain the total transition cost.

ICS transition scenario

Modeling the ICS transition cost follows the logic of the MECS scenario but is applied to fewer population segments since the eligible proportion for transitioning to ICS is affected by the 2030 BAU case and the percentage MECS input. Only populations with existing access to traditional cooking services can transition to ICS. Once the households transitioning to ICS are sized, that number is multiplied by the corresponding transition cost set to obtain the total cost of the ICS transition. Adding the ICS transition cost to the MECS transition cost yields the total transition cost.

The ICS transition assumes displacement of traditional cooking by providing households a double-burner cooking setup. It assumes no fuel switching (that is, households would continue to cook with wood and other biomass fuels), and no downstream infrastructure costs. The ICS transition costs are disaggregated into public sector and household costs for the corresponding urban and rural split. Since the ICS transition assumes no fuel switching and no downstream infrastructure costs, the ICS transition has no private sector cost.

Appendix C: Methodological Note: Calculating the Benefits of Transition

The co-benefits estimates rely on three separate calculations. These estimates cover health, gender and climate benefits depending on the number of households that transition to modern energy cooking solutions (MECS) and improved cookstoves (ICS).

Health

Calculating the health benefits of transitioning relies on a top-down methodology. Using the Household Air Pollution Intervention Tool, HAPIT,⁴⁵ it takes the estimated averted deaths and averted disability-adjusted life years (ADALYs) due to household air pollution (HAP), based on the best available health effects information linked to HAP. This value is then multiplied by each country's gross domestic product (GDP) per capita, expressed in terms of purchasing power parity. Finally, this value is multiplied by a cost multiple specific to averted deaths and ADALYs, which are estimated at 70 times and 5 times GDP per capita, respectively.

Gender

Calculating the gender benefits of transition uses a bottom-up process. Depending on the type of transition (for example, traditional cooking services to MECS, ICS to MECS, or traditional cooking services to ICS), the amount of time saved in fuel collection, cooking time, and stove cleaning is calculated on an annual basis. This value is then multiplied by each country's corresponding households transitioning to MECS and ICS, which is further multiplied by the cost of a woman's time, conservatively estimated at US\$0.54 per hour.

Climate

Like the gender co-benefits, the climate co-benefits from transitioning are calculated using a bottom-up approach. The social cost of carbon is multiplied by a volume value—an estimate of the carbon emissions reduction obtained in transitioning from traditional cooking services to ICS and MECS technologies, which is further multiplied by the corresponding number of households that transition. This volume value of carbon emissions reduction in tons of carbon dioxide equivalent (CO₂eq) is obtained using each fuel type's yearly fuel usage (in kilograms), the total Kyoto emissions rate with the fraction of nonrenewable biomass (in grams per kilogram), total carbon dioxide emissions for production (in grams per kilogram), and total black carbon (BC) emissions (in grams per kilogram). To convert the BC emissions into the CO₂eq for the given fuel source, total BC emissions (in grams per kilogram) are multiplied by the yearly fuel usage per household (in kilograms) and a global warming potential conversion factor of 1140.

45 Pillarisetti, A., S. Mehta, and K. R. Smith. 2016. "HAPIT, the Household Air Pollution Intervention Tool, to Evaluate the Health Benefits and Cost-effectiveness of Clean Cooking Interventions." In *Broken Pumps and Promises: Incentivizing Impact in Environmental Health*, edited by E. Thomas, 147–69. Springer International Press.



World Bank Tanzania
50 Mirambo Street
P. O. Box 2054
Dar es Salaam, Tanzania
Tel : +255-22-216-3200
tanzaniaalert@worldbank.org



**Read more on linkages
between climate and
development in Tanzania**