Inclusive Green Economy

Policy instruments to achieve cleaner cooking practices

Experiences and cross-country learning from the East African region

EfD

Table of contents

Cover photo: Pixabay

Inclusive Green Economy in Practice

The Inclusive Green Economy (IGE)[1] in Practice Program (2023-2027) is a capacity development program designed for civil servants in Eastern Africa, specifically Ethiopia, Kenya, Rwanda, Tanzania, and Uganda. The IGE program focuses on promoting increased knowledge of, and use of, economic policy instruments to achieve just green transitions. It bridges gaps between research and policy to strengthen evidence-based policymaking and practices.

The program is funded by the Swedish International Development Cooperation Agency (Sida) and implemented by the Environment for Development Initiative (EfD)[2] at the University of Gothenburg in close collaboration with EfD centers and partners in Ethiopia, Kenya, Rwanda, South Africa, Tanzania, and Uganda.

This year, the IGE Program also benefitted from the input from researchers associated with the Sustainable Energy Transitions Initiative (SETI)[3] collaborative program, an interdisciplinary and global social science collaborative that aims to foster research on energy access and energy transitions in low and middle-income countries. SETI strives, among other things, to understand the drivers and dynamics of energy transitions across settings, as well as their impacts on health, gender equality, economic growth, poverty alleviation, climate change, and natural resources.

1 Read more about the program here: Inclusive Green Economy in Practice | EfD - Initiative (efdinitiative.org).

2 Read more about EfD: www.efdinitiative.org

3 Read more about SETI here: Sustainable Energy Transitions Initiative (SETI) | EfD - Initiative (efdinitiative.org)

Introduction

Transformation towards an inclusive green economy is one of the prerequisites for achieving the sustainable development goals in Agenda 2030.

If not managed well, economic growth may come at a high price, including pollution, loss of environmental resources, and large negative impacts on human health. By implementing different policy instruments, such as rules, regulations, taxes, fees, subsidies, and information, governments have tried to tackle challenges to sustainable development. But to reverse negative trends much more must be done to make the economic development greener and more socially inclusive.

This report presents a summary of lessons learned from the IGE cross-country workshop held in Arusha, Tanzania April 15-18, 2024. It reflects on practical experiences of working towards achieving an inclusive green economy in Eastern Africa, by specifically addressing sustainable and just energy transitions.

As the scope of this topic is broad, this year's theme within the IGE program was selected through a consultative process between the enrolled participating IGE organizations during 2023-2024 and the academic institutions of EfD. This process concluded to focus on opportunities to reduce biomass dependency for clean cooking, and energy-related issues of high relevance in all participating countries.

"To reverse negative trends, much more must be done to make the economic development greener and more socially inclusive"

For over a year, civil servants (IGE Fellows) from the five IGE program countries have together with researchers at EfD centers engaged and worked in a process of developing so-called **Transformation Initiatives** to find solutions to reduce biomass dependency for clean cooking, with a focus on policy instruments, in their respective countries.

To gain further knowledge in these processes on what works and what does not, IGE Fellows and EfD researchers met in the above-mentioned cross-country peer-learning workshop. The objectives of the workshop were to:

- Share experiences and achievements of the Transformation Initiatives (TIs) so far
- Build a stronger IGE capacity and knowledge through peer learning based on the TI process
- Facilitate a regional IGE network between civil servants and academics.

The civil servants and researchers spent four intense days discussing and learning from each other. Photos: Anders Ekbom and Petra Hansson.

During the workshop, the civil servants and the researchers presented, discussed, and learned from each other's ongoing Transformation Initiatives.

This report synthesizes the key lessons. Chapter 1 introduces the theme of biomass dependency. Chapter 2 presents the concept of IGE Transformation Initiatives. Chapters 3 to 7 focus on each country respectively including key lessons learned and chapter 8 presents concluding remarks.

Note that this report is written by some of the EfD partners involved in the IGE program. A special thanks to Marc Jeuland and Philip Adom. The report does not necessarily represent the views of the researchers or the participants from ministries and agencies or their organizations.

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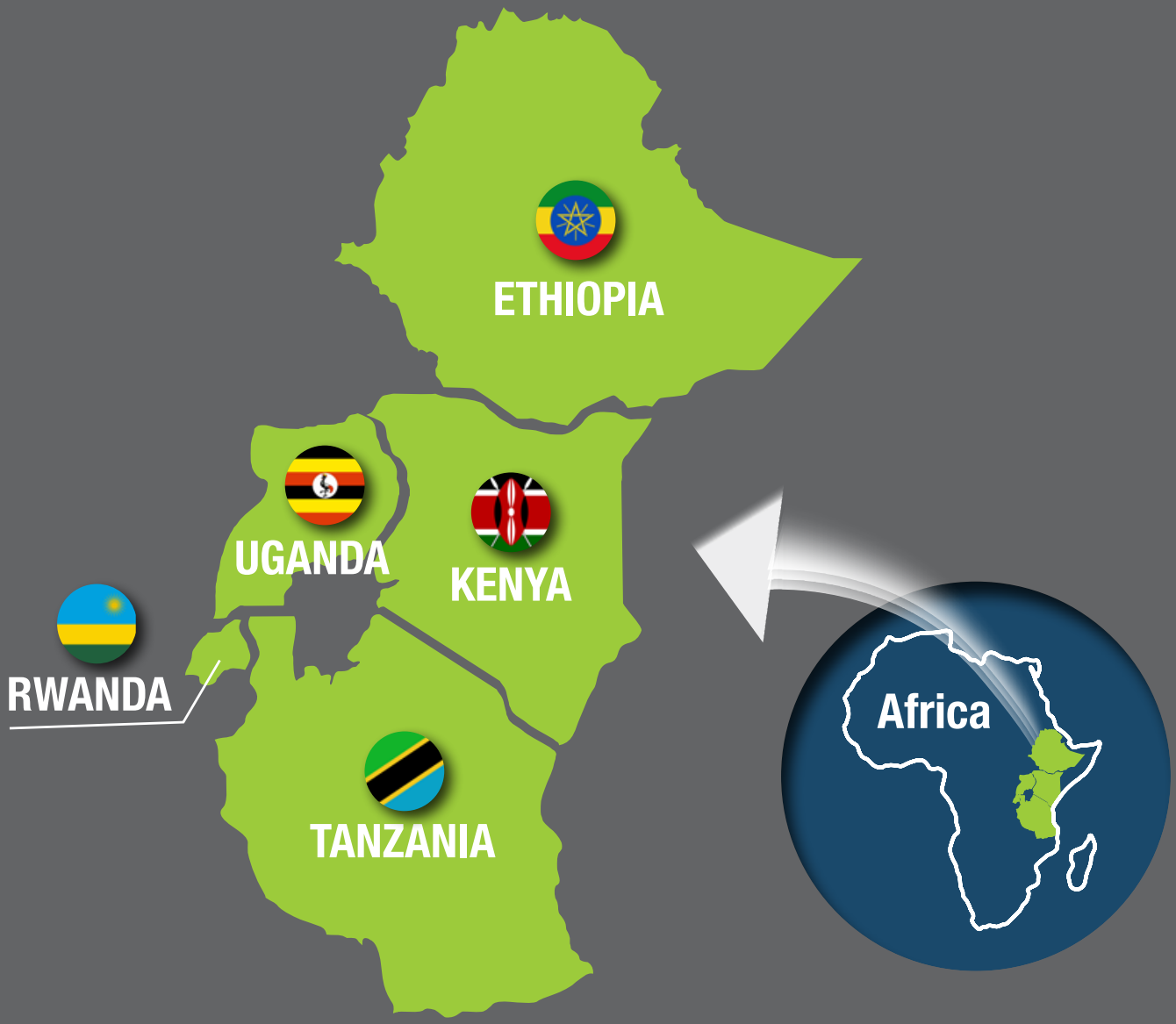


Population density[3] & country size[2] – People/km² (2021) & km²

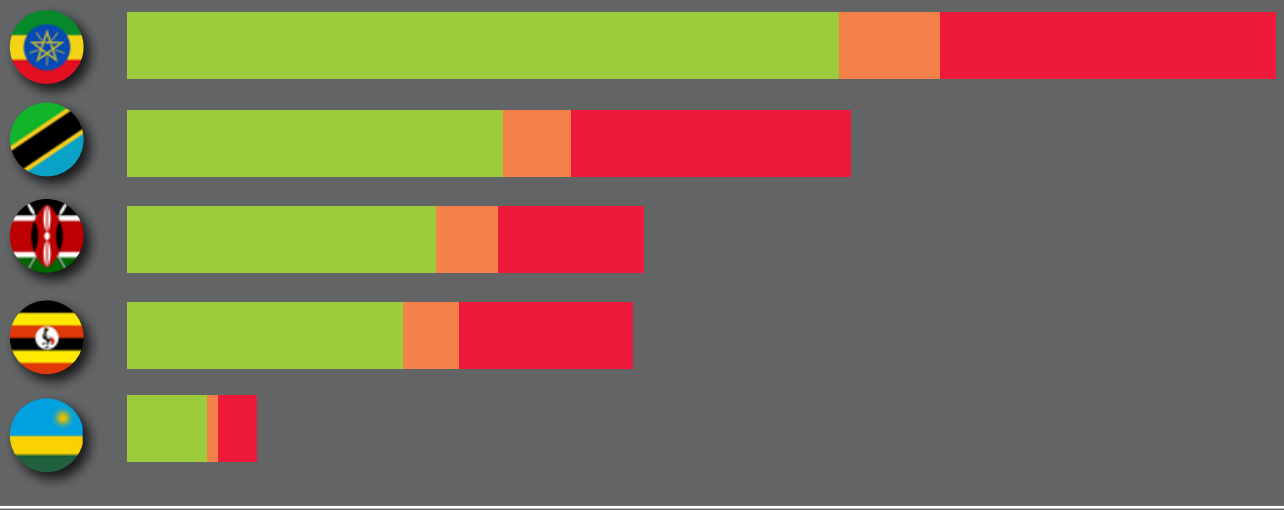
RWANDA	UGANDA	ETHIOPIA	KENYA	TANZANIA
546/km²	**229**/km²	**107**/km²	**93**/km²	**72**/km²
26 338km²	**241 038**km²	**1 104 300**km²	**580 367**km²	**947 300**km²

GDP/Capita[5] - USD/Capita (2023)

KENYA	ETHIOPIA	TANZANIA	UGANDA	RWANDA
1950$	**1294$**	**1211$**	**1014$**	**1000$**

Population size (million people) in 2023[1] / 2030[4] / 2050[4]

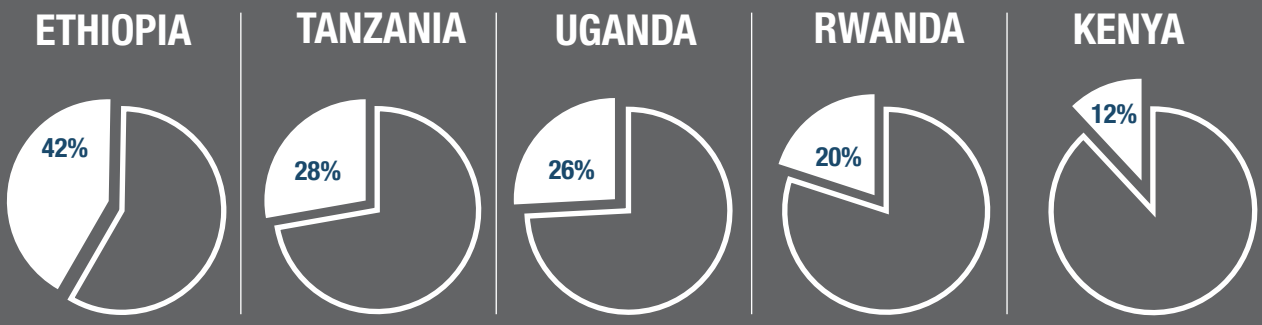
	ETHIOPIA	TANZANIA	KENYA	UGANDA	RWANDA
2023	127M	67M	55M	49M	14M
2030	145M	79M	66M	59M	16M
2050	205M	129M	92M	90M	23M



Access to clean cooking[6] (% of population)

KENYA	TANZANIA	ETHIOPIA	RWANDA	UGANDA
30%	9%	9%	8%	1%

Population in severe multidimensional poverty[7] – according to the Global Multidimensional Poverty Index



1) World Development Indicators | DataBank (worldbank.org), Population (total) Last Updated: 06/28/2024
2) Countries by Area - WorldAtlas, Accessed: 2022-02-04
3) World Development Indicators | DataBank (worldbank.org), Population density (people per sq. km of land area) Last Updated: 06/28/2024
4 World Population Prospects 2019, Volume I: Comprehensive Tables (un.org) Accessed: 2022-02-04
5) World Development Indicators | DataBank (worldbank.org), GDP per capita (current US$) Last Updated: 06/28/2024
6) World Development Indicators | DataBank (worldbank.org), Access to clean fuels and technologies for cooking (% of population) Last Updated: 06/28/2024
7) 2023 Global Multidimensional Poverty Index (MPI) | Human Development Reports (undp.org)
It is a weighted index of the following poverty/development indicators: nutrition, child mortality, years of schooling, school attendance, use of cooking fuel, sanitation, drinking water, access to electricity, housing, assets.

1. Biomass dependency and clean cooking

– an introduction to the theme

Almost three billion people globally depend on biomass for cooking and heating. There is some progress towards clean cooking, but still many depend on biomass in the form of fuelwood, charcoal, and residues. Sub-Saharan Africa (SSA) is the region with the highest level of biomass dependency in the world (IEA, 2022).

While other regions have rapidly improved access to clean cooking, progress towards clean alternatives has been much slower in SSA and is not even keeping pace with population growth. (IEA et al., 2023).

The societal costs of this household biomass dependency are extremely high. More than 900 000 people die prematurely each year in SSA from diseases caused by household air pollution (WHO, 2021). The collection of wood and other biomass causes deforestation, leading to land degradation, soil erosion, and biodiversity loss. Especially in places with net losses in biomass, as in most of SSA, burning firewood and charcoal also adds to climate change.

> *"More than 900 000 people die prematurely each year in Sub-Saharan Africa from diseases caused by household air pollution"*

In addition, household members, usually children and women, spend many hours collecting firewood, hours that could have been spent in school, doing household chores, or paid work. The harmful consequences of using firewood and charcoal have been on the agenda of policymakers and researchers for many decades.

However, the barriers to switching from biomass to cleaner and sustainable fuels are many and significant.

Barriers to transition to clean cooking

Poverty is the number one barrier. Clean cooking technologies often cost more than collecting firewood, at least if one disregards the costs of negative impacts on human health, biodiversity, land, water and forest resources, and climate change. When subsidies and other cost-reducing policies have been implemented, such policies are often unstable or contradictory (such as inconsistent approaches to Value Added Tax exemptions in Kenya). Affordability can remain a hurdle for low-income households.

Lack of infrastructure and spare parts. Many other barriers have also caused

interventions to fail. Markets for spare parts and equipment for maintenance are often weak, and so-called improved technologies may not be durable. Other barriers include insufficient infrastructure, such as distribution channels for gas cylinders for LPG stoves or electricity grids and -connections for e-cooking, lack of knowledge about more efficient and clean alternatives, lack of decision-making power among the women who are most harmed by traditional cooking, and a lack of consumer-oriented designs.

Lack of reliable alternatives. In SSA, over 70% of the population still has no access to electricity (Sida, 2024), and even where access exists, tariffs or local connection costs are often unaffordable, especially for poor households. Electricity supply is also often unstable and unpredictable due to poor utility cost recovery, high generation and distribution costs, and other problems. This makes investing in an electric stove risky. Indeed, electric cooking remains very rare throughout the SSA.

Culture and habits play key roles as barriers to cleaner cooking, but the role of such preferences and traditions is complex. For example, many people in Eastern Africa argue that they prefer certain dishes to be prepared only over an open fire, for taste reasons. Yet research has found that the stove features that are most valued are not really about taste, but robust functionality for multiple types of preparations, multiple cooking surfaces, and reduced smoke emissions. There is a fear and hesitation to adopt new technologies such as gas or electricity, due to safety concerns though such technologies tend to be much safer than traditional stoves.

Fieldtrip to Dorcas a company that sells, improved cookstoves using wood pellets. Photo: Petra Hansson.

However, although many barriers exist, there are promising and encouraging examples where different policy instruments have worked together to accelerate the provisioning of cleaner sources of energy. Such examples include broad-based information campaigns and awareness raising targeting the poorest, rules and regulations promoting cleaner technologies, and strengthening of energy markets and technology supply chains.

Other examples include the use of economic policy instruments such as subsidized clean cooking technologies, tax exemptions on imported clean cooking equipment, and results-based financing that successfully and effectively reduces consumer costs.

Good examples exist linked with pilot projects and the promotion of role models that can inspire others, who hesitate to switch to cleaner energy sources for household cooking. Some of these experiences are discussed in the sections below. Strengthening relations and collaboration between research and policy is also a promising route.

2. What are IGE Transformation Initiatives?

The IGE Transformation Initiative (TI) is a key component of the IGE program. The IGE Fellows work together with their colleagues in their government organizations (ministries and agencies) and with their Support Team of EfD researchers on a TI, to put knowledge about inclusive green economy into practice.

This means identifying a locally relevant challenge or issue linked with inclusive green economy, investigating this challenge or issue, and taking concrete actions toward addressing the issue.

The purpose of working on a TI is to build individual capacity via the enrolled civil servants along with organizational capacity to design and apply environmental economic policy instruments in practice, or other measures that pursue IGE processes.

The TI gradually evolves during the program's phases through a so-called action learning process. It is a step-wise approach where researchers and IGE Fellows work jointly to identify a particular problem or challenge that the IGE Fellows and their organization want to improve/address, define actions, and start to execute those actions. The sum of the actions taken over time comprises a TI. The TI is conducted within the IGE program's thematic area, on a relatively small scale; and in this case, the focus is on sustainable energy transition and specifically on reducing biomass dependency for cleaner cooking practices.

> *"The TI model promotes local ownership, networking, and strengthening of interfaces between academia and policy"*

The work to develop the TIs builds on a back-casting procedure, where a desirable future is jointly identified, and ways are explored to get there. In the TI process, the back-casting consists of four steps:

The preparatory stage (*step zero*) involves planning the process as far as possible, finding the thematic question to be explored, and inviting relevant participants. The *first step* is about describing the desired future; the *second step* is about describing today's situation in relation to the desired future; the *third step* is about finding possible areas of intervention that can bring the fellows and their organization closer to the desired future; and the *fourth step* is about taking the first action(s) towards the desired future.

The TI model promotes local o wnership, networking, and strengthening of interfaces between academia and policy by bringing local researchers, and civil servants together in a coherent, struc-

Remidius Ruhinduka, EfD Tanzania's Center Director summarized the findings of the Tanzanian group. Photo: Petra Hansson

tured process. The scope and scale are rather small since funding is limited (essentially the involved actors' working time).

Hence, the work is meant to be inspirational, catalytic, based on peer learning, and aims to inform future scaling, rather than immediately lead to full-scale operations or (national) implementation. However, the TIs lay the ground for scaled-up interventions and strengthens research-policy interaction.

Chapter 4-8 shortly describe the TI processes in the IGE program 2023/2024 and key lessons learned during the cross-country peer learning review workshop.

Improved biomass stove from Malawi. Photo: James E. Rogers Energy Access Project at Duke

3. Ethiopia: Incentives for private sector engagement in clean cooking transition

Today, Ethiopia's private sector engagement in, and contribution to, a sustainable energy transition is very limited.

Strong partnerships across domestic and international spheres, and active private sector involvement, are needed as the private sector can significantly contribute to renewable energy initiatives, develop infrastructure and innovations, as well as provide affordable services, and generate new green jobs.

Increased private sector engagement would mark a pivotal step and change in Ethiopia's energy transition, allowing scaling of solutions much more quickly than is currently possible. The low engagement today, among other factors, has been attributed to high tax rates[1], a burdensome administrative system for licensing, and long-standing foreign exchange challenges in the country.

These factors hamper private sector engagement in the import, production, and distribution of clean energy technologies in Ethiopia, including cooking technologies. To incentivize and improve this, Ethiopia has initiated two TIs.

The first focuses on **developing tax incentive instruments** to stimulate private sector engagement to reduce biomass dependency. The second reviews international experiences on innovative financing mechanisms for improved private sector access to finance and gives recommendations to policymakers on the **best available innovative financing mechanism** suitable to its national circumstances.

Key lessons from cross-country learning:

Incentives for the domestic private sector: The domestic private sector needs incentives to drive the adoption of clean cooking technology. To increase private sector involvement, a robust regulatory framework is essential, and strong government institutions are key. It ensures accountability, effective monitoring, and evaluation of clean cooking initiatives. In addition, the government should provide a range of incentive schemes, minimize bureaucratic inefficiencies in the government and financial institu-

1 Source: https://ethiopianlaw.com/2023/09/16/list-of-taxes-imposed-on-business-companies-operating-in-ethiopia/

The principal taxes currently in place are profit tax, turnover tax (TOT) (2% and 10%), value-added tax (VAT) (15%), excise tax (10% - 100%), customs duty (0% - 35%) and income tax from employment (0% - 35%). VAT has replaced sales tax. TOT and withholding taxes (2%) have been introduced recently. Other taxes include corporate tax (30%), dividend income tax, royalties, and stamp duties.

tions, and improve access to skilled human resources through capacity-building training, among others. Furthermore, governments should establish a strong regulatory framework to ensure transparency and accountability.

Researchers in the SETI collaborative program argue that the high cost of doing business is the main barrier to development of the off-grid energy in the country.

Leveraging carbon finance: Governments can collaborate with private sector actors operating at the intersection of carbon markets and clean cooking. Responsible carbon finance can support clean cooking projects without disrupting local markets.

However, the necessary enabling conditions should be in place like institutions, policies, guidelines, policy instruments, etc. for both the private sector and government to benefit from the carbon finance. Based on previous experience, Ethiopia can also leverage carbon finance for its mitigation priorities including emission reduction by reducing biomass dependency while achieving its development goals.

Enhance public-private sector partnerships: Encouraging partnerships between the public and private sectors is crucial for achieving universal access to clean cooking. Collaboration with local organizations, including NGOs, community leaders, women's groups, and household members responsible for cooking, enhances the success of clean cooking initiatives. Ethiopia has developed different policies to facilitate the implementation of privately financed infrastructure projects. However, these policies mainly consider large projects and not the small and medium enterprises, which are the main players in reducing biomass dependency. So, there is a need to reconsider how small and medium enterprises can be considered in this policy.

Inclusive tax exemptions: Tax exemption can be on cookstoves that have high emission standards and efficiency, as well as locally manufactured stoves. However, when designing tax exemptions, inclusivity and distributional effects must be considered. Assessing who benefits and who might lose from introducing policy instruments of different types is essential, e.g. to not leave out poor and marginalized groups. Poorly structured tax exemptions may unintentionally harm low-income households and importers and disproportionately benefit high-income earners.

Access to finance for small and medium enterprises: The importance of facilitating access to finance (loan availability) to the private sector through different financing mechanisms such as green funding and Results-Based Financing (RBF) could ease financial constraints. Ethiopia can learn from the experiences of Rwanda and Kenya on green funding and RBF, as well as the cook fund program in Tanzania.

In addition, the government needs to create an enabling environment to facilitate investment development insurance and encourage the microfinance institutes or local development investment banks to provide loans for the private sector so they can engage in the production of clean cooking technologies. This is important, particularly in rural Ethiopia where a scattered households-settlement pattern is difficult for grid connection and unlikely to adopt e-cooking in the short term.

Transformation Initiative team

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4. Kenya: Barriers to clean cooking implementation

Kenya's TI aims to understand barriers to transition from biomass dependency to clean cooking energy in Kenya.

The TI process focuses on advancing the use of clean fuels in Kenya, such as LPG, biogas, electricity, and solar energy. Its goals include pinpointing factors affecting the adoption of these sources of energy, identifying key players to expedite the shift to cleaner cooking methods, and scaling up successful models across populations and regions.

Additionally, the TI seeks to inform potential investors about bioenergy prospects and engage with crucial stakeholders in the clean cooking sector.

The transition to clean cooking in Kenya faces several barriers, for instance, high prices on clean cooking technologies, lack of infrastructure for distributing clean fuels, technology issues, and socio-cultural factors. Overarching barriers include too little government investment and unpredictable fiscal policies. Supply-side challenges involve high production costs, lack of financing options, and market volatility, while demand-side barriers include the initial cost of buying and limited financing.

Key lessons from cross-country learning:

A subsidy may not always be the best policy: While poverty is a root cause that must be considered in most interventions, simply providing subsidies is often seen as a good solution. However, if a subsidy recipient receives, for instance, a free LPG stove but can't afford to buy gas, they may go back to using firewood. Subsidies may also be a bad solution if many beneficiaries are not poor or in need of subsidized energy solutions. Subsidies can even hinder adoption if not implemented wisely, by discouraging private entry into the market. Development institutions commonly offer subsidies for clean cooking, only to withdraw them later, leading people to go back to using biomass. In addition, subsidies are costly in the burden imposed on the public purse. Alternative uses of the same money are not always considered.

Secure land tenure is key: If biomass (firewood) is cheap or accessible at no cost and easily available, switching to clean cooking will be difficult. But for those who own land, consuming all the firewood on it is also undesirable. Thus, secure land tenure provides incentives to move up the "energy ladder" to fuel-saving devices such as improved cookstoves.

There is a disconnect between supply and demand – and more studies on behavioral change are needed: Policy interventions have mostly been directed to the supply side, but providing elec-

tric cooking devices or LPG stoves to households will fail if the consumers do not use them. Often people are informed of the benefits of clean cooking technologies such as the electric pressure cooker (EPC), such as the fact that EPCs are relatively cheaper to use compared to other cooking modes, but deliberately choose not to use these devices for cooking. This potentially calls for research on behavioral change to understand why individuals behave as such and to identify potential ways to incentivize the adoption of clean technologies.

There is no one-size-fits-all: Treating all people as the same and providing the same solutions for everyone is not a sustainable way forward. The Multi-Tier Framework for Measuring Access to Cooking Solutions, used in for instance Kenya and Rwanda, measures access to modern energy cooking solutions based on six attributes: i) Cooking Exposure, ii) Cookstove Efficiency, iii) Convenience, iv) Safety of Primary Cookstove, v) Affordability, and vi) Fuel Availability.

This captures specific data that allows governments to identify and understand energy access gaps and develop potential solutions to improve energy services.[1]

Political will is crucial: A widely cited tree-planting campaign in Kenya, that aimed at planting 15 billion trees, has been largely successful. A similar government initiative, to adopt clean cooking in the next five years could similarly transform the landscape on this issue. With the support from the political leadership, it would be much easier to obtain favorable results. For example, in Tanzania, President Samia Suluhu has made clean cooking a prioritized area for policy interventions, which has played a pivotal role in Tanzania's transition towards clean cooking.

1 Cooking | Multi Tier Framework (esmap.org)

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5. Rwanda: Results-based finance for clean cooking

Rwanda's government is supporting the transition to modern energy-efficient cooking by lowering import tariffs and taxes on electric cooking appliances. This makes appliances more affordable and competitive in local markets.

Additionally, the introduction of clear standards and quality control ensures that these appliances are cost-effective, high-quality, high-performing, and durable. These and other measures have used Results-Based Financing (RBF) for greener and cleaner cooking solutions. RBF is an approach that links funding to pre-agreed and verified results. It ensures that funding is provided when these results are achieved, driving development impact and improving accountability.[1]

In Rwanda, suppliers need to provide clean cookstoves that fulfill a certain standard and deliver them to households. Households pay a share of the cost but receive a subsidy afterwards. The subsidy ranges from 45% to 90% depending on the household income levels. The installations are evaluated by an independent evaluator.

The Rwanda TI considers RBF as a core mechanism to enhance sustainable access to clean cooking solutions in Rwanda. It evaluates the effectiveness of RBF initiatives undertaken in 2020-2026, analyzes the Rwandan government's strategies to facilitate the adoption of clean cooking technologies, and assesses the impacts of RBF. Additionally, it identifies obstacles to RBF in the program's execution and informs decisions to optimize future efforts.

Key lessons from cross-country learning:

The results of RBF programs in poor areas have been less favorable: In regions affected by poverty, the adoption of RBF for clean cooking technologies has met significant obstacles. For these communities, the immediate concern is securing daily needs, which often takes priority over the adoption of new cooking methods. This is understandable, as the benefits of advanced cooking technology are secondary to having sufficient food to prepare.

Therefore, any strategy to implement RBF in such areas must be sensitive to the primary needs of the population. If not, other policy instruments need to be considered.

There are challenges in all countries with RBF schemes: Different types of RBF schemes are found in other program countries, such as Kenya's Off-grid Solar Access Project (KOSAP)[2],

1 Banking on Impact: What You Need to Know about Results-Based Financing (worldbank.org)

2 Kenya Off-Grid Solar Access Project - (kosap-fm.or.ke)

Ethiopia's strategy for biogas digesters, Tanzania's initiative for promoting LPG in rural and peri-urban areas[3] and Uganda's RBF facility for energy companies to enter the solar and clean cooking businesses[4]. In Kenya, an issue arises on the unfair competition between vendors who were already established and those who were granted support by the program. In Tanzania, the target number of LPG technologies has not been met, because the requirements to sell the stoves beyond a certain distance from urban centers raised distribution costs and challenged the business model. In Uganda, the main challenge is that beneficiaries of clean energy products lack operational and maintenance skills, whereas these products often require such skills and services.

Designing for local market conditions is crucial: For a successful RBF program, it is important to consider local market conditions and adapt the scheme design accordingly. This includes selecting markets with sufficient maturity in terms of private sector presence, consumer awareness, and fuel supply for the targeted technologies.[5]

Flexibility in program design should be considered: RBF programs need to be flexible, allowing for adjustments as warranted by learning on the ground. This adaptability ensures effective implementation and responsiveness to changing circumstances.[6]

Monitoring and verification are key for successful implementation: Tracking stove usage and impact metrics is crucial for successful RBF financing instruments. Ensuring accurate monitoring and verification processes helps measure success. Engaging independent third-party validators for periodic audits is needed to create confidence in verified impact data and the cost of this should be built into the programs directly.[7]

The risk of corruption should be addressed, perhaps through cooperative systems: The use of formalized cooperative systems is one way of addressing corruption in subsidy programs. Such systems include reports and control, whereas, in a community-based system, a leader gets to distribute and decide who should benefit from subsidies. Different models should be rigorously tested and assessed for their susceptibility to corruption.

Supply should be coordinated to reduce transaction costs: In Rwanda, there are some 15 producers of improved cookstoves; however, there is no coordination of producers and programs. The transaction costs could be lower if these were to collaborate, and the government could help to build up the support systems for such cooperation. Capacity building is needed among both suppliers and beneficiaries.

3 Invitation for Application of RBF for selling Liquified Petroleum Gas (LPG) in Rural and Peri Urban Areas of Mainland Tanzania

4 Result Based Financing Facility – Uganda Energy Credit Capitalisation Company (ueccc.or.ug)

5 Results-based_financing_report.pdf (energy4impact.org)

6 Results-based_financing_report.pdf (energy4impact.org)

7 Results-based_financing_report.pdf (energy4impact.org)

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6. Tanzania: Policy instruments to increase electricity use for clean cooking

Tanzania is stepping up support for the transition to clean cooking. In May 2024, the new National Clean Cooking Strategy (2024-2034) was launched, with the aim that 80 % of the population would use clean cooking technology by 2034.

The government has taken several initiatives towards clean cooking to promote the transition. Initiatives include, for example, the establishment of a clean cooking fund and tax reform to make clean cooking technologies more affordable, with government institutions leading by example. For instance, public institutions with more than 100 people such as prisons or universities no longer use charcoal or firewood for cooking, starting in 2025.

The Transformation Initiative of the Tanzanian team aims to accelerate the transition to modern and affordable clean cooking technologies in line with the government's aim, as articulated in the national clean cooking strategy. This includes contributing to increased LPG storage infrastructure in all regions, increased public awareness, and access to subsidized clean cooking technologies, including access to electricity. Long-term objectives are to contribute to ensuring reduced taxes and fees on clean cooking energy, and more efficient stoves, increased subsidies to clean cooking projects, and to have financial institutions provide low-interest loans to clean cooking stakeholders.

As part of the TI process, the Tanzania team members are participating in the process of preparing the Tanzanian government's energy sector plan including consideration of budget needs, while also supporting the implementation of the new Clean Cooking Strategy and its action plan.

Key lessons from cross-country learning:

Incentives are needed for increased electricity production: Subsidizing production rather than consumption would help to lower the cost of electricity.

Awareness is critical to changing attitudes toward e-cooking: Using electricity for cooking is rare in Tanzania, where it is rather used for lights and charging electronic devices. Cost to consumers is not the only issue: although electricity is significantly cheaper in Ethiopia compared to other program countries, very few households use electricity for cooking even there.

Thus, it is not enough to address only the demand side with subsidies on appliances and fuel. Behavior-change campaigns coupled with incentives are needed. This may be complemented by

further studying and understanding the (lack of) behavioral change in households.

There is a higher potential for e-cooking in urban areas: The promotion of electricity for cooking should focus on urban areas where most people are connected to the grid but still rely largely on biomass. Promoting the use of electric pressure cookers (EPC) is promising in these areas, as these technologies are designed to cook different varieties of foods at the same time, making them a versatile cooking option. In for instance Rwanda, a standard threshold for the quality of appliances to allow for government subsidies has been introduced since the energy efficiency of different EPC brands varies. That should be considered if electric appliances are to be included in waiver schemes.

Differentiated tariffs for electricity should be considered: Implementing different types of electric tariffs, such as time of use tariff, peak time tariff, etc., needs to be considered and analyzed carefully. The poor often benefit from so-called *lifeline tariffs*, (a basic level of free energy to vulnerable customers) but electric cooking will push electricity consumers beyond this lifeline tariff. Moving to the next tariff level could almost double the tariff, leading to resistance to this use of electricity. Adjusting tariff bands to encourage the use of electricity for cooking should be looked into, still keeping in mind how this affects the utility companies financially, which has implications for energy security.

The reliability of the electricity supply must be improved: People will not use electricity for cooking if they fear a blackout may occur during while cooking. This infrastructure and generation issue must be addressed and include backup solutions for electricity. Back-up solutions like improved (biomass) cookstoves are needed. This connects to the phasing of interventions – the energy ladder. Achieving 100% reliability in electricity supply may not be realistic, at least in the short term.

Rural hubs for enhanced access are needed: In most rural areas, people live in scattered settlements. It is difficult and costly for the government to introduce infrastructure like grid electricity connections, piped water and sewage, health facilities, schools, etc, and even off-grid technologies.

This lack of infrastructure and electricity are key factors that increase community dependence on biomass. One suggestion is for governments to establish hubs (or town centers) with all the necessary facilities near the scattered communities and encourage households to settle near the newly established hubs. This can contribute to reducing biomass dependency and promote more sustainable livelihoods in rural areas.

Transformation Initiative team

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7. Uganda: Increasing uptake of clean cooking in rural areas

The objective of Uganda's TI is to raise awareness of the need to transition from biomass dependence to clean energy sources.

The specific objectives include an understanding of the factors that can increase the uptake of cleaner energy sources and creating awareness of the benefits of reduced dependence on biomass as well the need transition to cleaner energy sources, especially in rural areas.

To achieve these targets, the TI process has included: Dialogues and a national stakeholders' workshop, the development of policy briefs, focus group discussions, and awareness-raising campaigns on social media, printed media, and TV. The TI process also contributes to the development of the National Climate Finance Strategy 2023/24 - 2029/30, guidelines to mainstream climate change in the financial sector of Uganda, the fiscal framework for carbon markets, national green taxonomy, and just transition framework.

One goal in the Uganda Vision 2040 (National Planning Authority, 2015) is to achieve universal clean energy use by 2040. COP28 spells out annual targets, and Uganda follows this plan for energy transition. Biogas uptake is increasing in schools and other institutions. Farmers are also being encouraged to adopt biogas, and the government is working on modalities of biogas energy storage.

The workshop discussion focused on policy instruments for behavioral changes that can be employed to increase the uptake of clean energy sources and reduce energy poverty, mainly in rural settings. The rural perspective presents specific challenges, such as the easier availability of wood fuel and weaker infrastructures for alternative energy sources compared to the urban setting.

Key lessons from cross-country learning:

Local solutions are essential to address local problems: For sustainable energy transformations, one needs to understand the community being targeted and create bottom-up strategies for providing clean cooking technologies. These can be based on locally available materials to make the technology accessible, affordable, and understandable. Another aspect to consider is the need to make alternative fuels more accessible, since some households in rural areas are not poor, but have long distances to buy fuel. For some households availability rather than affordability is the key issue. Thus, distribution networks must be developed, and private sector initiatives can play a crucial role in spreading solutions and technologies to rural communities to supply clean cooking such as LPG, electricity, or biogas. The introduction of smaller quantity cylinders that are relatively cheap can also provide incentives to establish LPG points. (see more under Chapter 4 for incentives to engage the private sector).

For poor households, affordability might be the key barrier to adoption.

A common problem with subsidized LPG stoves is that the gas cylinders are too big of an investment for low-income, credit-constrained households. Solutions that some countries have tried include providing smaller cylinders or metered LPG where you pay for usage incrementally.

Information must be packaged carefully: Just telling people that using biofuels is not good is likely to be insufficient. By comparing and informing people about what they pay for medical fees due to air pollution and comparing it with electricity costs, it may be possible to convince people to switch to electricity or other clean cooking options. Likewise, comparing alternative time uses to collecting firewood can serve the same objective. However, more research is needed to provide evidence that it pays off economically to switch to clean cooking.

Spreading the word and leading by example: Conducting extensive awareness and informational campaigns in local languages, blended with demonstrations of clean cooking techniques, are ways to increase rural uptake. Uganda's government has invested in raising rural awareness through local language-translated adverts. In addition, the census to be conducted in 2025 will establish whether progress has been made on clean energy transition following these increased efforts.

Facilitating factors for energy transition are to target different groups based on stakeholder mapping and identification of the key issues requiring solutions, and what those solutions look like. For example, fathers/husbands in households should be brought on board given that they are often the main household decision-makers. These individuals have frequently been singled out as hindering the energy transition. The message to men needs to be tailored to ensure their constructive involvement in energy decision-making.

When promoting clean cooking technology, it is important to identify key people and role models who can convey the message to others and lead by example. The chairperson of the community should be an example for the community in adopting the technology or using other public figures to endorse the awareness campaign. A study by EfD Vietnam indicates that endorsement by public persons (in the study specifically a celebrity) can increase pro-environmental behavioral change.

Capacity building is needed: It's important to provide targeted training programs to empower rural residents with knowledge and skills related to clean energy adoption. Community leaders, village groups, or cooperative leaders should be targeted first as those can transfer the knowledge and skills to their communities.

Transformation Initiative team

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Concluding remarks

The Transformation Initiative (TI) is a process aimed at fostering trust and building long-term relationships between individuals and their organizations, including those from academia and government.

It also involves the development of a robust and lasting community of practice between researchers and policymakers, focused on promoting an inclusive green economy (IGE) in sectors and countries.

Arguably, there exists **a knowledge gap** in planning as well as in the implementation of inclusive green economy policies, plans, and programs. This gap can be bridged by building dedicated platforms for learning, knowledge exchange, and collaboration.

In addition to the knowledge gap, there is **an institutional gap**, where government agencies and ministries are on one side, and universities on the other, as societal institutions typically do not make full use of each other – their respective capacities, knowledge, and experiences in both sets of institutions. From a societal and sustainable development point of view, this is sub-optimal.

"The domestic private sector actors need better incentives to drive supply and adoption of clean cooking technologies"

By **bringing policymakers and researchers together** in a structured format, such as the TI process, and more generally in the IGE program, we contribute to reducing this gap in the program countries. Planners and policymakers, in their need for science-based knowledge and evidence, have a lot to learn from research and what researchers can offer.

Likewise, researchers have a lot to learn from governments' strategic planning, decision-making and implementation, in their ambitions to conduct policy-relevant research that answers critical implementation questions and addresses gaps in understanding of effective program design.

Moreover, bringing neighboring countries and different sector representatives together for joint learning and experience sharing further contributes to break-up silos, reducing institutional gaps and promoting new collaborations.

In addition to the knowledge and institutional gaps, there is a lot that can be done to **improve the supply and demand for transitioning to sustainable cooking solutions and in government policies**. The workshop and the TI processes show that **better incentives are needed to spread sustainable cooking solutions.**

For instance, the domestic private sector actors need better incentives to drive supply and adoption of clean cooking technologies. To enhance private sector involvement, robust regulatory frameworks and strong government institutions are essential. Subsidizing produc-

Participants in the workshop.
Photo: Petra Hansson

tion rather than consumption would help to lower the cost of adoption of e-cooking, but subsidies may not always be the most viable option, given its costs to government finances and risks of low policy implementation efficiency.

Moreover, **awareness creation for behavioral change** related to sustainable cooking solutions and **increased knowledge on adoption** is critical to accelerating the transition to modern and affordable clean cooking technologies in line with the governments' aims in this region.

Given general policies, designing local interventions requires **adaptation to local market conditions and local preferences, barriers, and opportunities**; one size does not fit all in this field.

Flexibility in program design should thus be considered. Translating general policies into local action needs to be flexible, allowing for adjustments as warranted by learning on the ground. This adaptability ensures more effective implementation and responsiveness to changing circumstances.

"There is a knowledge gap on how to implement green economy policies. This gap can be filled through a learning platform such as the IGE program. When we go back, we share our knowledge with our colleagues, other managers, decision-makers, and organizations. After we have finalized our Transformation Initiatives we will present them to higher civil servants and hopefully, we can mitigate the challenges we face with green policies. We have learned a lot from the other countries in the program. Not everything is applicable because the context differs between countries, and you have to customize your policies. But a lot of what we have learned has been very valuable and really related to our daily work."

– Hana Mekonnen, IGE Fellow 2023, Climate Change Expert at the Ministry of Water and Energy, Ethiopia.

References

Abdulai, M. A., Afari-Asiedu, S., Carrion, D., Ae-Ngibise, K. A., Gyaase, S., Mohammed, M., ... & Jack, D. (2018). Experiences with the mass distribution of LPG stoves in rural communities of Ghana. *EcoHealth*, *15*, 757-767.

Batchelor, S., Khan, R., Scott, N., & Leary, J. (2018). Ecook—The Near Future Landscape of Cooking in Urban Areas in Africa. *no. October*, *2017*.

Bailis, R., Wang, Y., Drigo, R., Ghilardi, A., & Masera, O. (2017). Getting the numbers right: revisiting woodfuel sustainability in the developing world. *Environmental Research Letters*, *12*(11), 115002.

Bailis, R., Drigo, R., Ghilardi, A., & Masera, O. (2015). The carbon footprint of traditional woodfuels. *Nature Climate Change*, *5*(3), 266-272.

Bensch, G., Grimm, M., & Peters, J. (2015). Why do households forego high returns from technology adoption? Evidence from improved cooking stoves in Burkina Faso. *Journal of Economic Behavior & Organization*, *116*, 187-205.

Bensch, G., & Ankel-Peters, J. (2012). A recipe for success? Randomized free distribution of improved cooking stoves in Senegal. *Randomized Free Distribution of Improved Cooking Stoves in Senegal (March 1, 2012)*.

Berkouwer, S. B., & Dean, J. T. (2022). Credit, attention, and externalities in the adoption of energy efficient technologies by low-income households. *American Economic Review*, *112*(10), 3291-3330.

Beltramo, T., Blalock, G., Levine, D. I., & Simons, A. M. (2015). The effect of marketing messages and payment over time on willingness to pay for fuel-efficient cookstoves. *Journal of Economic Behavior & Organization*, *118*, 333-345.

Blimpo, M., McRae, S., & Steinbuks, J. (2018). Why are connection charges so high? an analysis of the electricity sector in Sub-Saharan Africa. *An Analysis of the Electricity Sector in Sub-Saharan Africa (April 16, 2018). World Bank Policy Research Working Paper*, (8407).

Bos, K., Chaplin, D., & Mamun, A. (2018). Benefits and challenges of expanding grid electricity in Africa: A review of rigorous evidence on household impacts in developing countries. *Energy for sustainable development*, *44*, 64-77.

Chandrasekaran, M., Krishnapriya, P. P., Jeuland, M., & Pattanayak, S. K. (2023). Gender empowerment and energy access: evidence from seven countries. *Environmental Research Letters*, *18*(4), 045003.

Das, I., Jeuland, M., & Plutshack, V. (2022). The Role of Taxes and Subsidies in the Clean Cooking Transition: A Review of Relevant Theoretical and Empirical Insights. *Review of Economic Studies*, *86*(3), 976-1009.

Dissanayake, S., Beyene, A. D., Bluffstone, R., Gebreegziabher, Z., Kiggundu, G., Kooser, S. H., ... & Toman, M. A. (2018). *Improved cook stoves for climate change mitigation? evidence of values, preferences and carbon savings from a choice experiment in Ethiopia* (No. 8499). The World Bank

Ho, Q.T., Nie, Z., Alpizar, F., Carlsson, F. & Nam, K.P. 2022. Celebrity endorsement in promoting pro-environmental behavior. *Journal of Economic Behavior & Organization*, 198, pp. 68-86.

IEA, IRENA, UNSD, World Bank, WHO. 2023. Tracking SDG 7: The Energy Progress Report. World Bank, Washington DC. World Bank. License: Creative Commons Attribution—Non-Commercial 3.0 IGO (CC BY-NC 3.0)

IEA. 2022. Solid biofuels consumption estimation model. https://www.iea.org/data-and-statistics/data-product/solid-biofuels-consumption-estimation-model

Jeuland, M., Babyenda, P., Beyene, A., Hinju, G., Mulwa, R., Phillips, J., & Zewdie, S. A. (2023). Barriers to off-grid energy development: Evidence from a comparative survey of private sector energy service providers in Eastern Africa. *Renewable Energy*, *216*, 119098

Jeuland, M., Desai, M. A., Bair, E. F., Cader, N. M. A., Natesan, D., Isaac, W. J., & Thirumurthy, H. (2023). A randomized trial of price subsidies for liquefied petroleum cooking gas among low-income households in rural India. *World Development Perspectives*, *30*, 100490.

Jeuland, M., Soo, J. S. T., & Shindell, D. (2018). The need for policies to reduce the costs of cleaner cooking in low income settings: Implications from systematic analysis of costs and benefits. *Energy policy*, *121*, 275-285.

Gill-Wiehl, A., Price, T., & Kammen, D. M. (2021). What's in a stove? A review of the user preferences in improved stove designs. *Energy Research & Social Science*, *81*, 102281.

Khavari, B., Ramirez, C., Jeuland, M., & Fuso Nerini, F. (2023). A geospatial approach to understanding clean cooking challenges in sub-Saharan Africa. *Nature Sustainability*, *6*(4), 447-457.

Krishnapriya, P. P., Chandrasekaran, M., Jeuland, M., & Pattanayak, S. K. (2021). Do improved cookstoves save time and improve gender outcomes? Evidence from six developing countries. *Energy Economics*, *102*, 105456.

Klug, T. W., Beyene, A. D., Meles, T. H., Toman, M. A., Hassen, S., Hou, M., ... & Jeuland, M. (2022). A review of impacts of electricity tariff reform in Africa. *Energy Policy*, *170*, 113226.

Pailman, W., De Groot, J., Clifford, M., Jewitt, S., & Ray, C. (2018). Experiences with improved cookstoves in Southern Africa. *Journal of Energy in Southern Africa*, *29*(4), 13-26.

Pattanayak, S. K., Jeuland, M. A., Lewis, J. J., Bhojvaid, V., Brooks, N., Kar, A., ... & Ramanathan, V. (2016). Cooking up change in the Himalayas: experimental evidence on cookstove promotion. *Proceedings of the National Academies of Sciences*, *116*(27), 13282-87.

Rehfuess, E. A., Puzzolo, E., Stanistreet, D., Pope, D., & Bruce, N. G. (2014). Enablers and barriers to large-scale uptake of improved solid fuel stoves: a systematic review. *Environmental health perspectives*, *122*(2), 120-130.

Sida, 2024. Power Africa Power Africa | Sida

Trimble, C. P., Kojima, M., Perez Arroyo, I., & Mohammadzadeh, F. (2016). Financial viability of electricity sectors in Sub-Saharan Africa: quasi-fiscal deficits and hidden costs. *World Bank Policy Research Working Paper*, (7788).

WHO. 2021. Tracking SDG7: The Energy Progress Report Global Launch: Tracking SDG7: The Energy Progress Report (who.int)


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