Value-Added Tax on Cleaner Cooking Solutions in Kenya

Costs outweigh benefits and impede national climate and sustainable development goals

A key policy objective of the Government of Kenya (GoK) is to meet the Sustainable Development Goal (SDG) 7 target of universal access to clean cooking solutions by 2028. This objective—publicly announced at the Nairobi Clean Cooking Forum in November 2019—is motivated by the many benefits of cleaner cooking solutions, including improved livelihoods, health, environmental quality, and climate change mitigation. However, since only 18% of households currently use clean fuels and only 23% of households use improved cookstoves (ICS),[1] Kenya needs to rapidly expand access to cleaner cooking solutions in order to achieve this goal.

Against this backdrop, in June 2020 the GoK passed the Finance Act, 2020, which levies the full 16% Value-Added Tax (VAT) on previously exempt or partially exempt ICS[2] and liquefied petroleum gas (LPG). LPG was granted a one-year extension during which it maintained a zero-rating, but it is expected to face the standard rate starting in July 2021.

This brief explores the impacts of the VAT on the clean cooking sector, analyzing the likely impacts on stove and fuel use, the likely consequences for stove and fuel companies operating in Kenya, and the trade-off between revenue gains to the GoK and the corresponding negative impact of these taxes on households and society.

Key messages

- The 16% VAT on ICS and LPG is expected to raise KES 48.6 billion (USD 457 million)[3] for the GoK Treasury through 2030, but will generate nearly double the cost—KES 94.6 billion (USD 889 million)—in negative socio-economic impacts, as well as negative effects on employment (which this study did not quantify).

- The increase in tax revenues would add at most 0.05% of GDP equivalent revenue in any given year. This would not substantially reduce the GoK's debt.
- Kenya is already off track for achieving the SDG 7 target related to universal access to clean cooking energy. The VAT will further harm this trajectory, as the number of households using clean fuels and ICS will decline at the expense of traditional biomass technologies. This also complicates Kenya's path to meeting its Nationally Determined Contribution commitments, threatening billions of KES in potential carbon finance investments.
- The Kenya Off-Grid Solar Access Project (KOSAP) and other results-based financing (RBF) programs are expected to underperform their targets, as increasing costs

mean that funds are able to subsidize fewer stoves, with shortfalls especially likely in rural areas.

- The GoK can better achieve its social and environmental policy goals by reinstating the VAT exemptions for ICS and by maintaining exemptions for clean cooking fuels like LPG. Imposing the full 16% VAT on kerosene,[4] which is a highly polluting fuel and currently faces a reduced VAT rate of 8%, would speed the transition away from this fuel, generate revenue in the short term, and more than compensate for the reduced revenue from not taxing ICS.
- More generally, the GoK should work to reduce taxation of socially beneficial technologies like ICS and clean fuels and maintain consistency in these policies over time. Over the past decade, numerous changes in the VAT and other duties have discouraged private sector investment.

Introduction

Reliance on polluting open fires and inefficient stoves and fuels for cooking leads to health and economic burdens that disproportionately fall on women and girls. Transitioning to cleaner stoves and fuels has the potential to reduce deaths from smoke-related illnesses, save households time, mitigate climate change, and improve local environmental quality. In Kenya, over 80% of households still rely on polluting fuels (i.e., firewood, charcoal, and kerosene) for cooking, of which about 85% use an inefficient or "traditional" cookstove. About 17% of households use LPG as their primary fuel, and very small numbers (less than 1%) use other clean fuels such as ethanol, biogas, and/or electricity.[5] Moreover, most households using cleaner fuels simultaneously use polluting ones; only 2% of households exclusively use LPG and other clean fuels.[6]

Kenya's National Energy Policy of 2018 calls for an aggressive transition to cleaner cooking solutions, and the GoK has supported a number of recent projects and policies to increase access to ICS and clean fuels. These include the US$150 million KOSAP project, which aims to increase access to clean energy in underserved counties of Kenya; EnDev activities to support results-based financing, skills training, and sector coordination efforts; and the Promotion of Climate-Friendly Cooking Project, supported by the

Analyzing the impacts of the VAT on the cleaner cooking sector in Kenya: Overview of study methods

To understand the impacts of the reintroduction of VAT on the sector, this study combined interviews of key sector stakeholders with quantitative, model-based counterfactual analysis comparing a no-VAT baseline to two different scenarios including the VAT: one with the VAT imposed on both ICS and LPG fuel, and the other with the VAT only on ICS (defined to also include LPG stoves). The interviews were used to document short-term responses and long-term expectations from a broad range of stakeholders.[1] To enhance understanding of trends in sales of ICS, sales data were also collected from a small set of companies willing to share such information.

To quantify and monetize the impacts of the VAT reform, the study built on previous cost-benefit and policy analyses conducted globally and in Nairobi, to develop a cost-benefit analysis for Kenya.[2] The model relied on a range of data sources but used recent publicly available, nationally representative secondary data sources whenever possible, relying most heavily on the Kenya Household Cooking Sector Study (2019) and the Multi-Tier Framework survey (2016).

The cost-benefit model allows for comparison of the revenues gained from the VAT reform with the monetized impacts of reduced transitioning to cleaner solutions over time, as well as households back-sliding toward traditional stoves and fuels when they do not replace their ICS at the end of their useful lives, owing to these solutions' increased costs. Costs and benefits are aggregated to the national level, in the two scenarios described above.

1. These stakeholders included ICS and clean fuel suppliers, government officials, NGOs and donors helping to support progress towards SDG 7, and households in peri-urban Nairobi, who represent the diversity of different cooking technologies used nationally.
2. Jeuland and Pattanayak 2012, Jeuland et al. 2018, Das and Jeuland 2020

Table 1. Changes in VAT and import duty for the cooking sector (Note: Ethanol imported before 2016 was not used as a cooking fuel).

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
LPG VAT	0%	16%	16%	16%	0%	0%	0%	0%	0%	16%
Kerosene VAT	0%	16%	16%	16%	16%	16%	8%	8%	8%	8%
ICS import duty	25%	25%	25%	25%	10%	10%	10%	10%	25%	25%
ICS VAT	0%	0%	0%	0%	0%	0%	0%	0%	16%	16%
Ethanol VAT	16%	16%	16%	16%	16%	16%	16%	16%	16%	16%
Ethanol import duty	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%

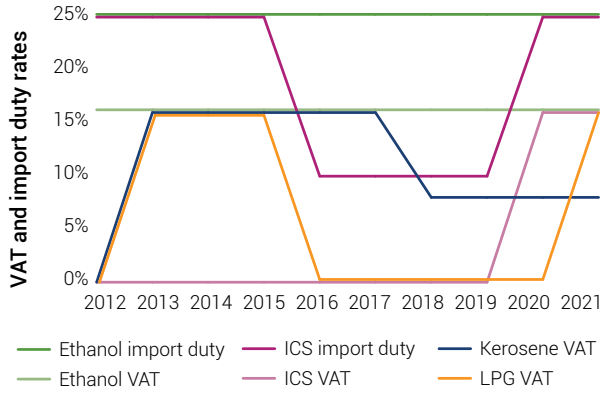

Figure 1. Changes in VAT and import duty for the cooking sector.

Green Climate Fund. The latter aims to disseminate ICS to 1.9 million households by leveraging USD 20 million in grant financing and an additional USD 8.8 million in co-financing from the GoK and others.

In recent years, the GoK has also instituted various fiscal incentives that have helped make ICS and clean fuels more affordable for low-income households. These incentives include a VAT zero-rating on clean cooking solutions like LPG and biogas stoves, a VAT exemption on ICS, and an excise duty reduction on ethanol fuel used for cooking purposes. These policies have contributed to a six-fold increase, from 0.6 million to 3.7 million, in the number of Kenyan households using LPG for cooking over the last two decades.[7]

Amidst these efforts, in June 2020 the GoK reintroduced a 16% VAT on ICS and LPG fuel in the Finance Act, 2020 (LPG was granted a one-year extension during which it maintained a zero-rating, therefore the effective date of the change in its VAT status is July 2021).[8] These changes coincided with the COVID-19 pandemic, which placed substantial new strain on public resources from both a revenue and expenditure perspective.[9]

The GoK's revenue needs notwithstanding, the recent reinstatement of VAT fits into a pattern of multiple changes to the taxes and duties levied on cooking solutions over the past decade. This policy instability has created confusion and uncertainty in the Kenyan market (*table 1 and figure 1*). For example, the standard VAT on LPG was introduced in 2013 and then removed in 2016 in an effort to induce higher adoption of that clean fuel. The import duty on ICS (which were also VAT-exempt at the time) was also reduced substantially in 2016, but in 2020 the standard VAT was reintroduced. Further highlighting the lack of policy coordination, use of kerosene, which is highly polluting, has rightfully been discouraged through levies since 2018, but is still favored with a relatively reduced VAT rate of 8%. This unpredictability in the tax regime discourages the capital investment needed to scale up commercial production of cleaner cooking solutions, hindering the success of Kenya's SDG 7 efforts.

The VAT sharply reduces the number of households adopting cleaner cooking solutions

Relative to a no-VAT counterfactual, the number of households using wood and charcoal ICS and LPG declines, as these solutions become less affordable (*figure 2*). Focus group discussions with consumers in Kenya confirmed that they are very price sensitive regarding choice of cooking stoves and fuels. As such, higher taxes on ICS in Scenarios 1 and 2 push households away from taxed charcoal and

firewood ICS, and LPG stoves, and toward untaxed traditional firewood and charcoal stoves and fuels. The substitution toward traditional solutions is greater in Scenario 1 as the VAT on LPG fuel makes LPG particularly expensive. The effects on kerosene use (not shown) are relatively modest, because kerosene is predicted to phase out by 2029 even without the VAT, based on that fuel's current use trajectory. With the VAT, the transition away from kerosene moves up to 2027.

Stakeholder interviews support these model results. Some ICS companies have already started to pass the full cost of the VAT to customers. Those who have not are subsidizing their stoves in the short term through climate finance or by tightening their profit margins. However, this subsidization is not sustainable in the long run. Assuming the VAT reform remains unchanged, these companies expect to pass on an average of 52% of the VAT to customers, and anticipate an average decline in sales of about 25%. This will have knock-on effects for GoK programs like KOSAP, which acknowledged that the price increase will decrease the number of stoves that can be disseminated through its RBF fund.

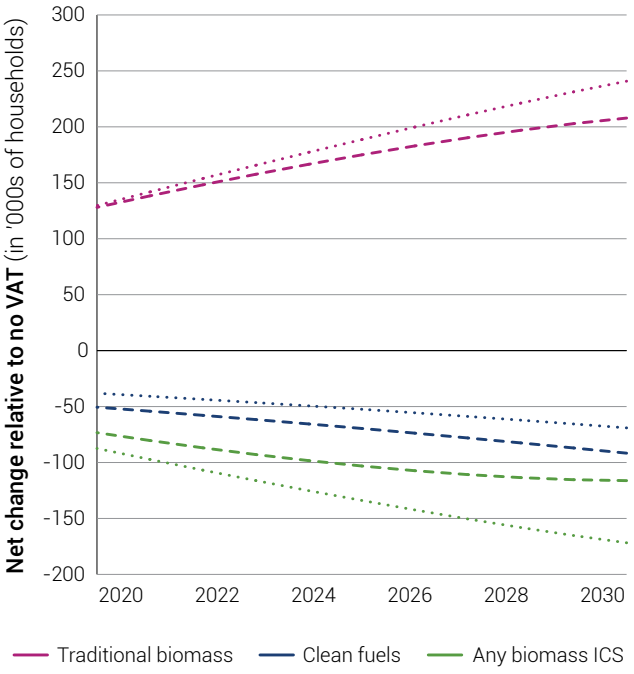

Figure 2. Effects of the VAT policy scenarios on the numbers of households using different technologies, relative to a no-VAT counterfactual. The wider dash represents Scenario 1 (tax on ICS and LPG), and the dotted dash represents Scenario 2 (tax on ICS only).

The VAT has negative overall impacts on Kenya

The impacts of the tax on net money savings from stove and fuel purchases by households, the value of time losses resulting from longer cooking and fuel collection time, and the environmental and health damages are summarized in Figure 4, aggregated over the years 2020–2030 ("S1" and "S2" refer to Scenario 1 and Scenario 2). **While GoK revenue increases, the costs in both scenarios far outweigh the revenue benefits, especially in Scenario 2.** Even disregarding the climate emissions costs, which are a global benefit that may not entirely benefit Kenya, the costs of the VAT outweigh the revenue benefits by a large amount. Moreover, it is possible that the GoK could be compensated by donors and investors for the climate benefits of transitioning to cleaner cooking through carbon and adaptation financing. By slowing down the transition to cleaner cooking solutions, the VAT may cut off a significant amount of climate finance.

The VAT will add thousands of deaths and many new cases of illness

Large costs are associated with negative health impacts due to reduced transitioning to cleaner cooking solutions, reaching an undiscounted total cost of KES 37.8 billion in Scenario 1 and KES 30.7 billion in Scenario 2. About 93% of these costs are due to increased mortality (1,633 additional deaths in Scenario 1 and 1,329 in Scenario 2) especially among young children and the women most directly involved

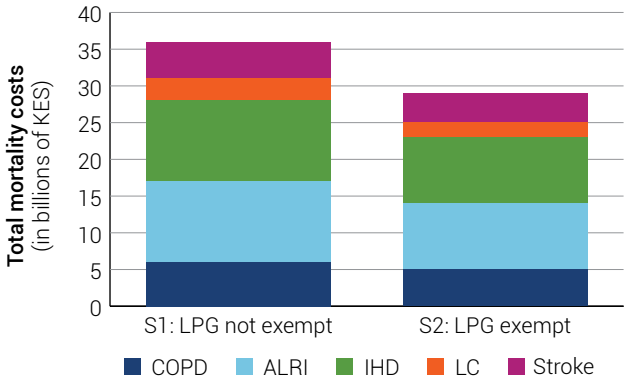

Figure 3. Total mortality costs from the VAT on ICS and clean fuels from 2020-2030. **COPD** = Chronic obstructive pulmonary disease; **ALRI** = Acute lower respiratory infection; **IHD** = Ischemic heart disease; **LC** = Lung cancer

			Gains due to VAT	Changes unclear	Losses due to VAT			
			Public revenue increases	Net money costs for fuels and stoves	Higher morbidity & mortality	Increase in CO2 emissions	Time losses	Wood fuel stock loss
S1	VAT on LPG	VAT on stoves	+48.6	-37.2	-37.8	-12.4	-6.2	-1.0
S2	No VAT on LPG	VAT on stoves	+13.5	+6.1	-30.7	-11.4	-5.0	-0.9

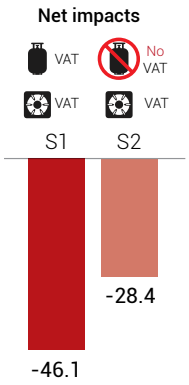

Figure 4. Net effects of the VAT policy scenarios. All totals are in billions of KES, undiscounted over the period 2020–2030. S1 is the scenario with both ICS and LPG fuel not exempt (per the policy starting in 2021); S2 is the scenario with ICS not exempt and LPG fuel exempt (per the current policy in 2020).

in cooking (*figure 3*). The morbidity costs represent the public and private costs associated with these illnesses.[10]

The VAT mostly increases household stove and fuel costs

Over the 10-year period, net stove and fuel costs increase for Kenyan households by KES 37.2 billion in Scenario 1 but decrease by KES 6.1 billion in Scenario 2 (*figure 4*). There are four reasons for these cost changes: First, households save on net stove costs by switching from higher-cost ICS to traditional technology, which is offset by increased costs for those who retain ICS and now pay the VAT. Second, in Scenario 1, households who continue to use LPG fuel pay more. Third, households switching away from more expensive fuels (namely kerosene and LPG) save money by using cheaper biomass. Fourth, consumers, mostly women, increase the time needed to harvest wood fuel, valued using the economic concept of the opportunity cost of time.

The VAT will lead to women losing hundreds of millions of hours of their time

The costs associated with time losses from reduced transitioning to cleaner cooking solutions amount to KES 6.2 billion in Scenario 1 and KES 5.0 billion in Scenario 2. This is because women spend more time cooking with inefficient technology (545 million hours in Scenario 1 and 437 million hours in Scenario 2), again valued using the economic concept of the opportunity cost of time.

The VAT will increase Kenya's emissions of climate-harming pollution

The costs associated with additional climate-forcing emissions from reduced transitioning to cleaner cooking solutions amount to KES 12.4 billion in Scenario 1 and KES 11.4 billion in Scenario 2. This is a social cost that is imposed on the globe (an additional 7.2 and 6.6 million tonnes CO2-equivalent in Scenarios 1 and 2, respectively), valued at the social cost of carbon. Note that without the VAT, Kenya might recover some or all of this amount from the sale of carbon credits. Thus, these additional emissions represent a potential loss of revenue and carbon finance for investments in the country.

The VAT will cause loss of forest stock

Finally, the wood fuel stock depleted due to slower transitioning, valued at the replacement cost for unsustainably harvested biomass, **is projected at KES 1.0 billion and KES 0.9 billion for Scenarios 1 and 2 respectively**. This loss amounts to 840 million tonnes of wood in Scenario 1 and 760 million tonnes in Scenario 2.

Revenue impacts of the VAT reform

Of course, the VAT imposed on cleaner cooking solutions will raise revenue (*figure 5*). Revenues are substantially larger when LPG fuel is taxed (Scenario 1), and this revenue grows over time because Kenyans will continue to transition to that fuel, albeit more slowly, as time goes on. In comparison,

revenues decline over time when LPG is exempt, largely because kerosene initially provides the majority of revenues but is phased out over the course of the decade. The revenue at the end of the decade in Scenario 2 therefore comes exclusively from taxed ICS sales.

To put the revenue numbers in perspective, the sum of the undiscounted revenues over the whole decade is estimated to be KES 48.6 billion in Scenario 1 and KES 13.5 billion in Scenario 2. **Although this revenue is significant, the total over 10 years only represents 0.5% and 0.1% of Kenya's 2019 annual GDP in each scenario and would thus add at most 0.05% of GDP equivalent revenue in any given year. This would not substantially reduce the GoK's debt.**

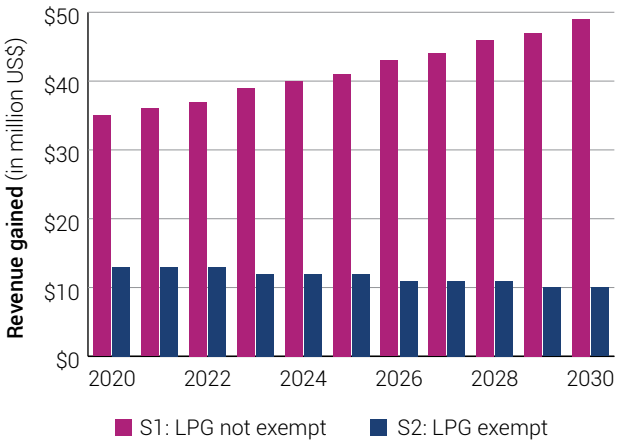

Figure 5. Government revenue gained from VAT on cleaner cooking solutions between 2020-2030.

Calls to Action

Given the results of this analysis, we recommend the following:

Recommendation 1: Reinstate the VAT exemptions for ICS solutions that were removed in 2020. The monetized time and fuel savings and environmental and health benefits of improved cooking solutions that would be lost under the VAT are at least twice the value of revenues gained. Moreover, the VAT complicates Kenya's path to meeting the SDG 7 target of universal access to clean cooking solutions and its Nationally Determined Contribution commitments, threatening billions of KES in potential carbon finance investments.

Recommendation 2: Maintain the VAT exemption for LPG fuel and allow an exemption for LPG stoves. LPG is currently the most scalable and viable clean fuel available in Kenya, and provides environmental, health, and time productivity benefits to the economy that greatly outweigh its costs. Continued aggressive promotion of this fuel is an essential part of Kenya's SDG commitments.

Recommendation 3: Commit to a five-year exemption of all taxes and duties for all clean cooking products. Maintaining exemptions on ICS, LPG, and other clean cooking products for a fixed amount of time would give the private sector the confidence to invest and set realistic, long-term growth plans. This approach has been deployed with much success in the off-grid, renewable power sector, and other nascent, socially beneficial sectors.

Recommendation 4: Maintain and work towards increasing levies on kerosene. Kerosene is a highly polluting fuel, and the GoK's efforts to move to a kerosene-free Kenya are a step in the right direction. Imposing the standard 16% VAT (kerosene currently faces an 8% reduced VAT) on household use of kerosene would speed the transition away from this fuel, generate revenue in the short term, and more than compensate for the reduced revenue from not taxing ICS.

Recommendation 5: Further enhance efforts to increase the affordability and availability of ICS and expand usage of clean fuels. Kenya is not on track to meet the SDG 7 target or the more ambitious national objective of universal access to clean cooking energy by 2028. Major efforts are needed to enhance the affordability of socially beneficial clean fuels and stoves, not only through reduced taxes, but also through subsidies and other complementary efforts. A broad array of policies that promote the viability of clean fuels like electricity, ethanol, and biogas as cooking energy sources should also be ramped up. These could include donor-supported initiatives, supply chain development, financing provided by microfinance institutions, and awareness raising campaigns—especially in rural areas.

Notes

1. In this brief, the term "improved cookstoves (ICS)" is used to refer to a broad and variable set of cooking technologies that have enhanced efficiency relative to "traditional" biomass stoves. Clean fuels are fuels that burn cleanly from the perspective of household air pollution (HAP), such as liquefied petroleum gas (LPG), electricity, ethanol, biogas, and solar cookers, consistent with the WHO definition of clean stoves, described here. "Cleaner cooking solutions" encompasses ICS and clean fuels.
2. Importantly, ICS produced in the informal sector do not pay the VAT. In practice, this creates a price wedge that may benefit informal products, which also tend to be less efficient.
3. Exchange rate applied: 1 USD to 106.4 KES
4. The WHO does not consider kerosene to be a clean fuel and therefore does not recommend it for household cooking.
5. Stoner et al 2020; KCCS 2019.
6. KCCS 2019
7. KCCS 2019
8. Other cooking fuels in Kenya are differentially subject to the VAT: Ethanol currently faces the standard 16% rate and kerosene faces an 8% reduced VAT. In contrast, woodfuels (e.g., firewood and charcoal) are locally harvested and produced and not subject to the VAT, and therefore have a relative price advantage.
9. VAT makes up about 22% of the GoK's revenue and allows the GoK to fund needed development programs and services (IMF 2021). Moreover, VAT exemptions are costly overall: the IMF estimated that Kenya lost 478 billion KES (USD 4.7 billion) in revenue in 2017 as a result of 152 VAT-exempt or zero-rated goods and services (IMF 2020).
10. For more thorough discussion of these health, time, and environmental consequences in non-monetary terms, please refer to the full study report. Note that these do not represent the total burdens associated with use of non-clean cooking solutions (which are much larger), but rather represent the incremental costs imposed only by the VAT policy.

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