

# Impact of Tax Incentives on Access to Stand-Alone Solar

Policy recommendations from analysis in Malawi,  
Rwanda, and Sierra Leone

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**Africa Clean Energy**  
Catalysing Africa's Solar Markets



**TETRA TECH**  
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# Introduction

**The importance of stand-alone solar (SAS) products is now well recognized by governments who deploy a range of policies to support the growth of the sector.**<sup>1</sup> SAS products often represent the most cost-effective way of providing electricity to unserved households in sparsely populated rural areas, where it is expensive and impractical at least in the short-term to extend large grid infrastructure, and where customers often have relatively low ability to bear the financial cost of energy access.

**While many African governments have implemented Value Added Tax (VAT) and duty exemptions, not all countries provide tax exemptions, and/or these exemptions are not always effectively or consistently implemented.** This is in part because of a limited evidence base on the benefits of granting exemptions, and the financial cost and capacity development needed to consistently implement such incentives.<sup>2</sup> Therefore many governments have not assessed the impact of taxes foregone on SAS uptake and the full range of socioeconomic benefits to the different stakeholders – government, households, and the environment. Even where exemptions are granted, inconsistent application at the border remains a major challenge. Codes do not always clearly define the components of the standalone system that are exempt.<sup>3</sup>

**In the absence of an evidence base to support tax exemptions there is a risk of reversing existing policies as countries face a challenging public finance context because of the COVID-19 pandemic.** Countries that previously had exemptions are now reviewing these policies, as they need to balance priorities given the economic downturn, which is both reducing tax receipts and increasing the need for public spending. These policy changes will potentially have an adverse effect on the ability to achieve energy access targets. For example, in June 2020, the Kenyan National Assembly passed the 2020 Finance Act that introduced 14% VAT on standalone solar products which will likely erode the progress made towards the achievement of universal energy access by 2022.<sup>4</sup>

## Objective of Study and Methodology

**ACE TAF conducted a study on responsible VAT and duties for the SAS.** The analysis summarised in this brief provides public policy makers with a quick and clear understanding of the impact of VAT and duty regimes on energy access and a range of socioeconomic development outcomes. This policy brief summarises the key findings of the analysis and its application to three focus countries: Malawi, Rwanda, and Sierra Leone.

**Insights presented in this brief were informed by secondary research, quantitative analysis, and consultations with key public and private sector stakeholders.** The team reviewed government energy policies of 14 countries in SSA, previous studies on impact of taxes on SAS uptake, and over 50 reports on off-grid energy sector in SSA. This literature review was supplemented by consultations with 25 private and public sector stakeholders in the three focus countries – Malawi, Rwanda, and Sierra Leone - to develop a standardized tool to estimate the impact of SAS tax exemptions in different country contexts.

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<sup>1</sup>Johanna Diecker, Susie Wheeldon, and Andrew Scott, Accelerating access to electricity in Africa with off-grid solar: Policies to expand the market for solar household solutions, Overseas Development Institute (ODI), January 2016, [link](#)

<sup>2</sup>BloombergNEF, Sub-Saharan Africa Market Outlook 2020: Reducing risk, opening opportunities across the world's fastest growing regions, Climatescope, 2020, [link](#)

<sup>3</sup>Energy Africa – Zambia, Technical assistance to model and analyse the economic effects of fiscal policy options for off-grid technologies in Zambia, 2018, [link](#)

<sup>4</sup>GOGLA, "Policy Alert: Kenya Introduces VAT on Off-Grid Solar Products" June 26, 2020, [link](#)

Table 1: Tax scenarios compared with the baseline in each focus country.

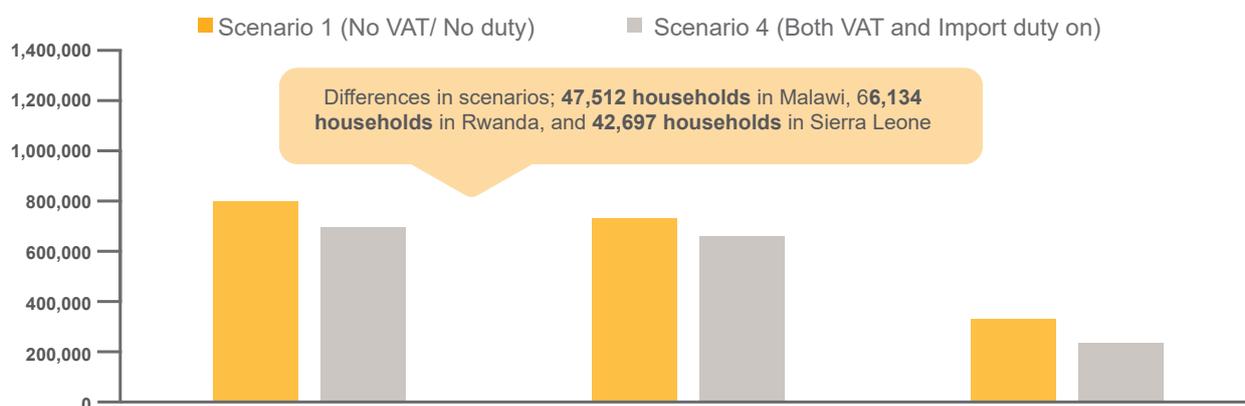
Scenarios	Description
<b>Scenario 1 (No VAT/ No duty)</b>	Does not include taxes on any solar generation components of SAS systems.
<b>Scenario 2 (Duty on/ No VAT)</b>	Includes Duty of 25% on all components of SAS systems without VAT
<b>Scenario 3 (VAT on/ No duty)</b>	Includes VAT of 18% on all components of SAS systems without duty
<b>Scenario 4 (Both VAT and Duty on)</b>	Includes Duty of 25% and VAT of 18% on all components of SAS systems

Analysis and research led to the findings shown in the section that follows.

## Findings of the Study

**VAT and duty exemptions have a significant effect on countries' ability to achieve their access targets and reach the poorest and most remote households.** For example, in Malawi, where the baseline SAS percentage uptake was 10% in 2019, introducing VAT and duty will lead to 14% less households getting access to SAS over the 6 years compared to this baseline. In absolute terms this translates to 47,512 households (as shown in figure 1) or over 200,000 people by 2025

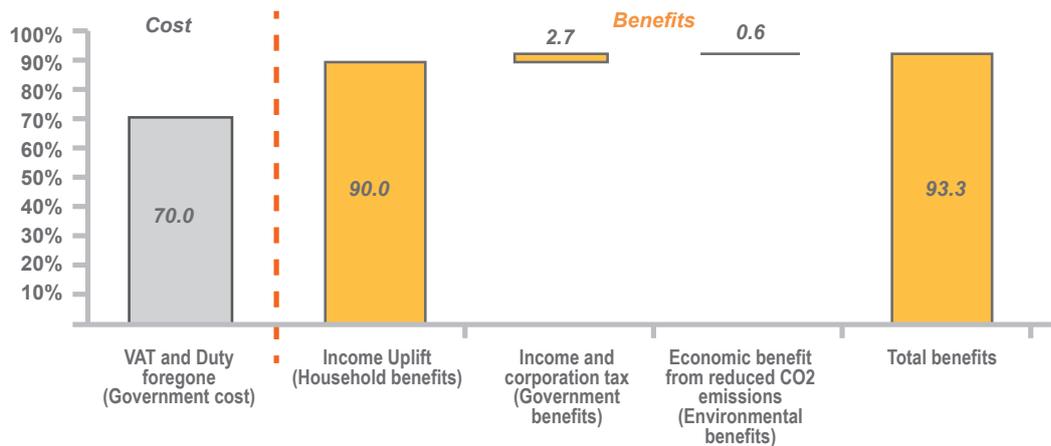
Figure 1: Comparison between projected number of households in 2025 with access to SAS systems, scenarios 1 and 4



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**The gains to households from accelerated access to SAS technologies greatly outweigh the foregone tax revenues and environmental benefits.** Figure 2 compares the combined cost of exemptions to the three focus countries, with the combined benefits to households, government, and the environment across the three focus countries.

Figure 2: Cost benefit analysis of VAT and Duty Exemptions across the three focus countries, USD Millions



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**Households, especially those in rural areas where the majority of the SAS products are sold, stand to gain the most economic benefits.** This study considers three key economic benefits to households – the total of which is shown as income uplift in figure 2:

-  Additional income from new and pre-existing businesses because of SAS systems.
-  Additional income from extra hours spent at work.
-  Income from new upstream jobs.

Other benefits to households and the environment are highlighted below.



Foregoing net tax receipts of **USD 70 Million** over 6 years across focus countries - Malawi, Rwanda, and Sierra Leone



Reaching an additional **156,343 households** (743,339) by 2025, particularly the most vulnerable and hardest to reach.



**1,461 jobs** created in the SAS value chains



**13,000 tonnes** of CO2 emissions avoided



**395 jobs** created in the SAS value chain **for women**



Reducing expenditure on other energy access products by **USD 40 million**



**4 million study hours** gained for children in rural households



Providing critical services to vulnerable communities which will reduce strain on public sector services, including social safety net, health care provision, unemployment programs e.t.c.

## Select key assumptions and notes to support interpretation of findings:



**Households:** Each new SAS system sold will serve 1 household



**Emissions avoided:** 1 litre of kerosene produces 2.5 kgs of CO<sub>2</sub> and each household uses 2 litres of kerosene per month.<sup>5,6</sup> Purchase of SAS systems does not lead to a full substitution of kerosene.



**Reducing expenditure on other energy access products:** Household expenditure on energy is split between, battery powered devices, and kerosene lamps, all of which are widely used alternatives in rural areas across the focus countries.<sup>7</sup>



**Upstream jobs (jobs in the SAS value chain) and jobs for women:** Used a weighted average of employment factors computed for management and other jobs per 1,000 by GOGLA. Women take on 27% of the jobs created in the SAS value chain.<sup>8</sup>



**Study hours:** Each SAS system leads to 2 hours of additional study time for children in a household.<sup>9</sup>

In addition to the quantitative costs and benefits of taxes shown above, it is important for policy makers to consider the factors presented below when reviewing the findings of this study. These factors are especially critical when comparing the study findings to other assessments of fiscal strategies such as direct and indirect subsidies.

### Applicability to market stage of growth.

- **Market building.** Companies are better able to commit to market entry and investment with tax incentives in place. In terms of timing, taxes are essential at earlier stages of market development as compared to developed markets where more nuanced approaches are required.
- **Limiting market distortions.** Taxes minimize market distortion since they do not create a system where customers are facing different prices / using vouchers to afford their system.

### Ease of delivery to target population segment.

- **Transparency and low administration cost.** The cost of tax implementation is lower compared to more targeted schemes, and easy for consumers and providers to respond to.
- **Progressive taxation.** Governments can collect taxes on profits and salaries without affecting the section of the population that needs energy access the most. This allows for potential consumers with the lowest ability to pay, who either pay a tax that represents a significant share of income or can no longer afford access to clean and modern energy access, to have access to SAS.

### Other

- **This analysis is best interpreted “at the margin”, not market wide.** It shows the impact of a price change based on price sensitivity of current consumers in the focus countries. It therefore by nature is biased to current consumers and not those who are currently not served by off-grid solar products.

<sup>5</sup>Walker, SM, Burns, S, Chirwa, M, et. al, Scoping of Opportunities and Institutional Assessment for Malawi's Engagement in the Carbon Markets, Winrock International, August 2012, [link](#)

<sup>6</sup>Energy Private Developers, Annual Report 2019: Rwanda Energy Sector, 2019 [link](#)

<sup>7</sup>Bryan, BK, Dana R, Elisa P, et. al, Rwanda: Beyond Connections, World Bank, 2018, [link](#)

<sup>8</sup>Vivid Economics, Off-grid Solar. A growth engine for jobs, GOGLA, [link](#)

<sup>9</sup>Altai Consulting, Improving the Quality of Life of Kenyan Households with Off-Grid Solar Home Systems, Shell Foundation, 2020 [link](#)

## Recommendations on Responsible Taxation Design and Implementation



Governments should continue to provide VAT and duty exemptions for quality certified SAS products to ensure the SAS sector delivers its full potential economic and wider benefits.

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Explore additional fiscal strategies such as subsidy programs to support low-income and disadvantaged groups especially women to increase access to solar home systems.

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Clarity and consistency in tax policy decision making processes must be put in place to provide confidence to investors over a 5-10 year timeframe.

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Set clear pre-conditions for reconsidering exemptions as appropriate in future.

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Improve implementation of current tax exemptions by training officials involved in tax implementation and working with private sector stakeholders and industry associations.

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Governments should leverage the ACE-TAF excel-based tool to conduct a cost-benefit analysis when exploring future revisions to tax incentives for the SAS sector.



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