

➤ Global Alliance for Clean Cookstoves – Taxes and Tariffs Analysis in Haiti

The economic case for lowering trade barriers to cleaner and more efficient cookstoves and fuels

November 4, 2016

This project was funded by the Global Alliance for Clean Cookstoves in partnership with the Government of Canada, who are in the process of developing a large-scale plan for transforming the clean cookstoves and fuels market in Haiti. The authors' views expressed in this publication do not necessarily reflect the views of the Global Alliance for Clean Cookstoves, the Government of Canada, the United Nations Foundation, or its partners.



Table of contents

Contents	Page
Framing, objectives and methodology	3
Executive summary	8
Observations about Haiti's cookstoves market	13
Key findings on cookstoves taxes and tariffs	23
Economic analysis and policy arguments	32
Country case studies	59
Advocacy toolkit	65
Annex materials	78

Taxes and tariffs fit into a broader set of strategic considerations for Haiti's clean cooking sector

Major strategic questions

What is the future **vision for clean cooking** in Haiti?

- What would a more sustainable, cleaner, and more efficient stove mix for Haiti look like in 5 years? How might that evolve over a 10 year time horizon?
- What would a more sustainable fuel mix for Haiti look like in 5 years? How might that evolve over a 10 year time horizon?

What **levers can be pulled** to achieve this vision?

- How can Haiti's entrepreneurial ecosystem be strengthened to support local manufacturers and sow the emergence of more innovative clean cooking solutions?
- What infrastructure investments are required to improve access to cleaner stoves and fuels?
- How can lower taxes and tariffs impact Haiti's clean cookstoves market?
- What roles can consumer education, public awareness, access to consumer financing, and trial incentives play in increasing access – and sustained usage – of clean cookstoves?

Focus of this project and of this document

Which **stakeholders need to be bought** into this vision?

- Which government ministries are essential for buy-in, and what are their most pressing priorities and concerns?
- What role is there for external actors (e.g. Global Affairs Canada, USAID), and can GACC play a role in coordinating those organizations?

What **role should donors, foundations, and alliances play** in light of this vision and stakeholder priorities?

- Which organizations and companies should be supported to develop Haiti's clean cooking market, and in what capacity (e.g. business planning, stakeholder connections, etc.)?
- To what extent should foreign organizations put forth a perspective on Haiti's clean cooking future, versus remain neutral on both stoves and fuels, and support existing government priorities?

This document outlines the economic case for lowering taxes and tariffs to increase uptake of clean and efficient cookstoves and fuels

The objectives of this document are to:

- 1 Synthesize market-level observations about Haiti's cookstoves and fuels market, particularly regarding consumer usage, fuel-specific attitudes and government outlooks, and the overall policy environment
- 2 Articulate key findings on taxes and tariffs in Haiti, including policies, annual revenue generated, tax and tariff exemption processes, and distill the implications of these policies on specific fuel and stove types
- 3 Build the economic case for lower trade barriers for clean cookstoves by modeling the impact on consumer usage, employment, annual government revenue and Haiti's trade balance
- 4 Based on the economic case, share an advocacy toolkit comprised of a policy agenda with tailored arguments, key talking points, and suggestions on sequencing

It contains five sections, some of which are internal to GACC and others that can be distributed externally

Sections	Main contents	Primary audience
Market observations	<ul style="list-style-type: none"> • Observations about the charcoal, carbonized briquettes, ethanol, and LPG markets • Key ministry stakeholders and their interests and priorities • Implications of these market observations on taxes and tariffs policies 	<ul style="list-style-type: none"> • GACC
Key findings on taxes and tariffs	<ul style="list-style-type: none"> • Tax and tariff policies for cookstoves, stove components (e.g. kilns, industrial equipment), and fuels • Estimated revenue generated from cookstoves taxes and tariffs • The process for gaining an exemption from taxes and tariffs • Potential considerations for GACC given key findings about taxes and tariffs 	<ul style="list-style-type: none"> • GACC
Economic analysis and policy arguments	<ul style="list-style-type: none"> • Analysis of the impact of lower taxes and/or tariffs on consumer usage, employment, government revenue, and the trade balance • Based on the economic impact, relevant policy arguments including points of resistance and potential talking points • Suggestions on sequencing and next steps for each fuel type 	<ul style="list-style-type: none"> • GACC • External audiences
Country case studies	<ul style="list-style-type: none"> • Relevant case studies on lower trade barriers with lessons that can be applied to the Haitian context 	<ul style="list-style-type: none"> • GACC • External audiences
Advocacy toolkit	<ul style="list-style-type: none"> • High-level slides that GACC and policy advocates can use in conversations with Haitian ministers 	<ul style="list-style-type: none"> • GACC • External audiences

GACC may also decide to share specific slides with external audiences depending on the sensitivity of the information

The findings and recommendations draw from a combination of desk research, in-person stakeholder interviews, and economic modeling

	Key activities	Main outputs
Desk research	<ul style="list-style-type: none"> • Researched the Haitian cookstoves market to better understand individual consumer and market characteristics • Conducted a desk review of the mandated and applied tariffs and taxes on cookstoves as well as socio-economic benefits, to inform the economic model 	<ul style="list-style-type: none"> • A database and targeted hypotheses to test in stakeholder conversations • An economic model adapted to the Haitian context
Stakeholder interviews in Haiti	<ul style="list-style-type: none"> • Led 20+ in-person interviews with Haitian government ministers, cookstoves manufacturers, cookstove distributors, fuel importers, and fuel producers • Tested various economic, social, and environmental arguments with the Haitian government to assess which policy arguments might be most palatable 	<ul style="list-style-type: none"> • Specific data points to inform development of the economic model • Increased understanding of various Ministry priorities and outlooks
Economic modeling and analysis	<ul style="list-style-type: none"> • Modeled the economic impact of lower cookstove taxes and/or tariffs on consumer usage, employment, government revenue, and Haiti's trade balance • Developed tailored policy arguments based on the economic analysis 	<ul style="list-style-type: none"> • An advocacy toolkit comprised of fuel-specific economic analysis, talking points, points of resistance, and thoughts on sequencing

The annex contains a list of stakeholder interviews and sources consulted over the course of this project

Table of contents

Contents	Page
Framing, objectives, and methodology	3
Executive summary	8
Observations about Haiti's cookstoves market	13
Key findings on cookstoves taxes and tariffs	23
Economic analysis and policy arguments	32
Country case studies	59
Advocacy toolkit	65
Annex materials	78

Executive summary (1/4)

THE VISIBLE – AND INVISIBLE – EFFECTS OF SOLID FUEL COOKING

This study explores the impact of trade barriers on Haiti's clean cooking market and the extent to which lowering taxes and tariffs on clean cookstoves and fuels affects consumer usage, employment in the cookstoves sector, government revenue, and Haiti's trade balance. Lowering trade barriers is one lever that Haitian policy makers can pull to decrease the cost of clean cookstoves; this document builds an economic case and articulates policy arguments to compel policy makers to do so.

Haitian policy makers and clean cooking advocates should explore all avenues to make cookstoves more affordable and accessible to the population. Indeed, despite the health, environmental and household economic benefits, over 90% of Haitian households continue to use wood or charcoal as their primary cooking fuel. Solid fuel cooking results in household air pollution, the third largest risk factor for mortality in Haiti, causing more than 6,000 deaths annually. Furthermore, solid fuel cooking has negative economic household effects; some Haitian households spend up to 30% of their daily income on fuel for inefficient stoves. Finally, Haitian women and girls bear the brunt of solid fuel cooking, due to the physical hardship of carrying wood and the risks of assault when searching for wood.

The status quo of Haiti's cooking sector is untenable. Haitians consume an estimated 2.2M metric tons¹ of charcoal annually and charcoal is now the most widely used cooking fuel with 49% of households (and 80% of urban households) now using it as their primary fuel. Trends suggest that demand for charcoal will only continue to rise.

BARRIERS TO CLEAN COOKING IN HAITI

While migrating away from solid fuel cooking offers individual, household, and country-wide benefits, ensuring that households can reliably acquire and consistently use clean cookstoves and modern fuels will prove challenging due to multiple barriers.

- **First, charcoal is deeply embedded in Haiti's economy and culture.** Haitians rely on charcoal production to help ease economic shocks and estimates indicate that approximately 250,000 Haitians are involved in the charcoal value chain in some capacity at any given point.¹ The employment impact of charcoal notwithstanding, many Haitian families prefer cooking certain foods, such as beans, with charcoal due to cultural traditions and taste preferences.

¹Estimates based on primary data aggregated from stove and fuel manufacturers and distributors, academics, and government agencies, with multiple inputs from Carbon Roots, D&E Green, Haiti's Ministry of the Environment, and Dr. Andrew Tarter at the University of Florida. ESMAP's April 2007 analysis of Haitian charcoal use provided a historical baseline. Full calculation methodology featured on slide 18.

Executive summary (2/4)

- **Second, many Haitian consumers are unable to finance the high upfront cost of a more efficient stove.** For example, a basic improved cookstove costs \$9, representing an upfront cost of 2x daily household income. More expensive LPG stove setups can cost over \$100 (including the burner(s), connectors, and tank) and are out of reach for the large majority of Haitians.
- **Third, many stove technologies that are present in other developing countries are either nascent or do not yet exist in Haiti.** Of intermediate improved biomass cookstoves, only portable rocket stoves exist, and their presence is very limited. Few advanced improved biomass stoves exist in the Haitian market, and only LPG is widely used among modern fuels. The high upfront costs of more efficient stoves, coupled with the dearth of advanced cookstoves players, means that Haitians lack reliable access to cleaner and more efficient stoves.
- **Fourth, Haitian ministry stakeholders have strong perspectives about Haiti's fuel future, which influences the extent to which certain fuel alternatives can be explored.** For example, government stakeholders are enthusiastic about sustainable charcoal options; however, even if consumers shifted to 'greener' charcoal options, Haiti's rapidly urbanizing population would drive increase in charcoal demand. Similarly, government stakeholders are enthusiastic about LPG, despite the high stove price which renders it inaccessible for most Haitians. Ethanol – a clean and price-competitive fuel – faces skepticism about its health impact and viability as a long-term cooking solution.

Within the context of these barriers, there are policies that the Haitian government can enact to decrease stove prices, notably lower taxes and tariffs. However, convincing the Haitian government to lower trade barriers may prove challenging in light of the revenue that cookstoves generate and the potentially negative impacts on employment and Haiti's trade balance.

TAXES AND TARIFFS: POLICIES AND FISCAL IMPACT

The Haitian government collects an estimated \$1.2M annually in taxes and tariffs on stoves and cooking fuels, amounting to nearly 0.1% of annual revenue.¹ Among fuels, charcoal and LPG are exempt, while briquettes face a 10% value-added tax on all sales. Ethanol fuel is most severely disadvantaged since importers face a 10% value-added tax in addition to 21% of customs and other fees. While denatured ethanol fuel is supposed to be exempt from tariffs, incorrect classification renders ethanol fuel subject to medical tariffs which amount to 15%, in addition to administrative and other fees.

¹Estimated through Dalberg analysis, combining information from interviews with stove & fuel importers and producers on prevailing tax and tariff rates as applied, interviews with Haitian government ministries on stove & fuel import volumes, and WTO data on all of the above.

Executive summary (3/4)

However, taxes and tariffs on stoves are more problematic since accessing an affordable stove remains the biggest barrier to clean cooking in Haiti. All stoves are subject to a 10% value-added tax, although some companies have secured exemptions. LPG and ethanol stoves face other trade barriers, rendering their effective rates at 26% and 27%, respectively. Cookstoves and fuel companies struggle to advocate for trade exemptions because (i) disaggregating each of the specific taxes/tariffs that comprise the effective rate is challenging and (ii) customs officials exercise high degrees of discretion in the application of these fees.

Aside from the revenue considerations, lowering trade barriers will have major employment and trade balance implications. Lowering taxes and tariffs makes intermediate ICS, ethanol, and LPG stoves less expensive, and may shift consumers away from basic improved cookstoves which places basic ICS stove manufacturers at risk of unemployment. Estimates indicate that between 2,500 and 2,800 Recho Mirak manufacturing jobs would be lost if trade barriers were removed¹. In addition, lowering all trade barriers would stimulate an increase in demand of ethanol and LPG stoves, both of which rely on fuel imports. In fact, removing LPG stove taxes would lead to an additional \$2M in stove and fuel imports, or a worsening of the cookstoves trade deficit by 1.4%. Thus, while lowering trade barriers offers benefits to consumers, there are employment and fiscal ramifications which will need to be addressed for any policy change to be palatable. In discussions with Haitian ministers, clean cooking advocates will need to both articulate the household and country-level benefits of clean cooking, and tailor their arguments to address specific concerns that key government influencers have.

POLICY ARGUMENTS TO COMPEL THE GOVERNMENT TO ACT

Given divergent government outlooks on fuels, the Global Alliance and clean cooking advocates will need to tailor their approach and specific arguments accordingly.

- **Approach and policy arguments for biomass stoves:** The main challenges facing Haiti's biomass cooking market are (i) few affordable biomass options and (ii) high costs of production for charcoal alternatives due to 40% tariffs on industrial equipment. Lowering trade barriers may be an opportunity to convince high-quality, international ICS and ACS manufacturers to view Haiti as a more viable market, thereby increasing the supply of available biomass options for consumers. In addition to helping to increase the efficiency of Haiti's biomass cooking market, a policy agenda should pursue (i) tax and tariff exemptions for industrial equipment (e.g. kilning equipment) and (ii) a VAT exemption on sales of green charcoal and briquettes to incentivize consumers to move away from traditional charcoal. Biomass-focused policy arguments may need to address concerns that lower trade barriers will hurt local manufacturers and/or that lower stove prices will further contribute to Haiti's dependence on charcoal. By highlighting that new high-end ICS and ACS biomass stoves would target a different customer segment and that a biomass stove policy would be combined with a push for briquettes and green charcoal, advocates may succeed in assuaging government concerns.

¹Estimated through economic analysis which considers elasticity of demand and productivity to estimate employment

Executive summary (4/4)

- **Approach and policy arguments for LPG stoves.** The biggest barrier to LPG usage is the high cost of the stove: one-burner stoves with small tank sizes cost approximately \$45 and more premium products can exceed over \$100 when the costs of the cylinder deposit and other stoves accessories are included. While lowering trade barriers on LPG stoves would make them more affordable, they remain more expensive than ethanol and biomass moves that are currently on the market and thus, inaccessible to a large portion of Haitian society. Within this context, the Haitian government has launched previous initiatives to convert households to LPG; thus, GACC may seek to work alongside the Haitian government and suggest trade barrier shifts to help them achieve their goals. Government excitement about LPG notwithstanding, taxes and tariffs on all LPG stoves generate approximately \$1M annually which points to a need to articulate how – and when – the Haitian government can expect to recoup any lost revenue.¹ If GACC and advocates pursue an LPG pathway, they can point to lower government expenditure on healthcare due to deaths averted by LPG users as a major financial and health benefit.
- **Approach and policy arguments for ethanol stoves.** The potential of ethanol as a cooking fuel remains largely unexplored due to lack of education, few players, high price points for stoves, and government skepticism about its health and long-term viability. Thus, before broaching a discussion on trade barriers, GACC and its partners will need to (i) invest in government education and address their concerns about the viability of ethanol as a critical first step and (ii) build a coalition to interface with key government influencers such as the Ministry of Environment, the Ministry of Agriculture, and the Bureau of Mines and Energy. In addition to questions about health and viability, GACC and ethanol advocates may need to address questions about the amount of land needed for domestic ethanol production and the extent to which ethanol production will divert resources away from agriculture in a country in which nearly 40% of the population is food insecure. Only after these concerns are addressed should GACC seek to pursue an exemption on ethanol fuel and stoves.

MOVING FORWARD

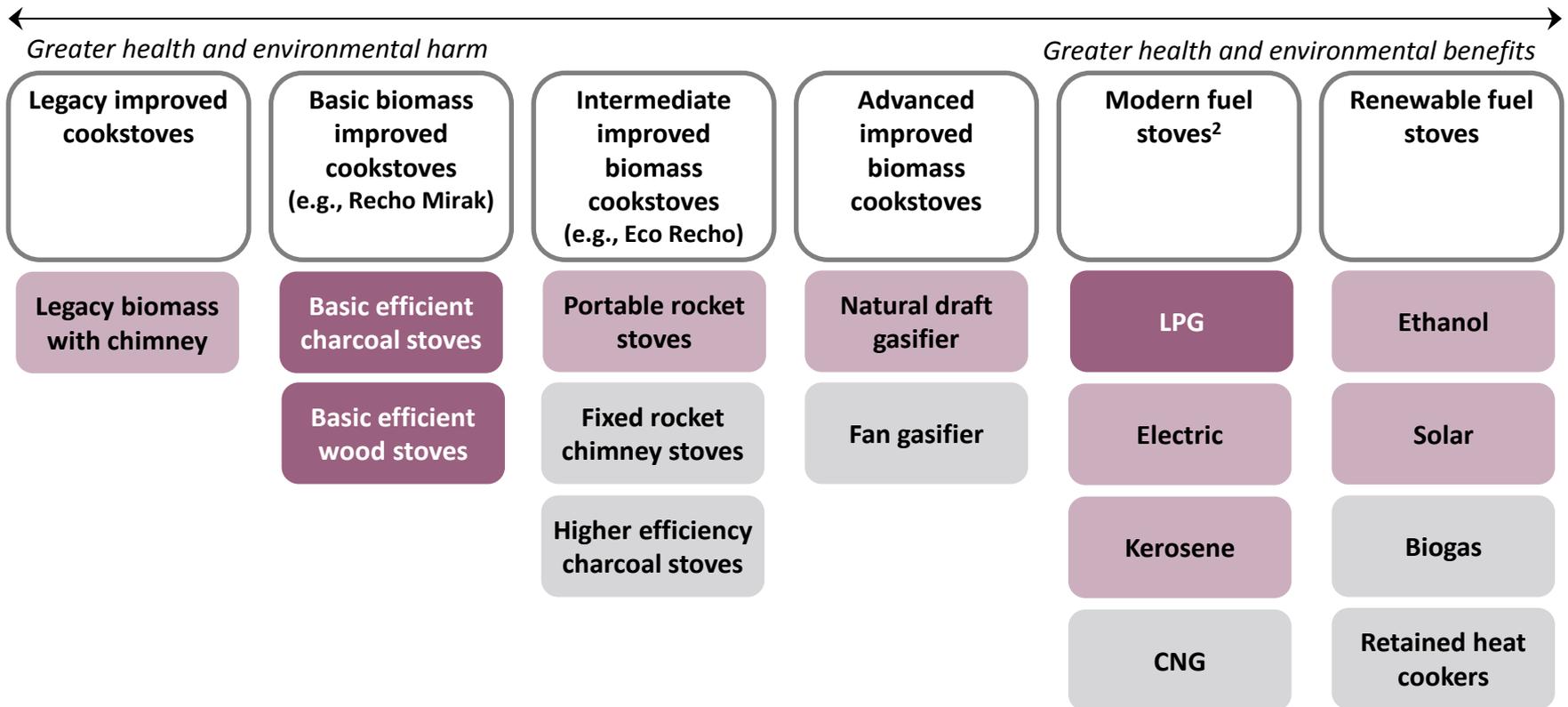
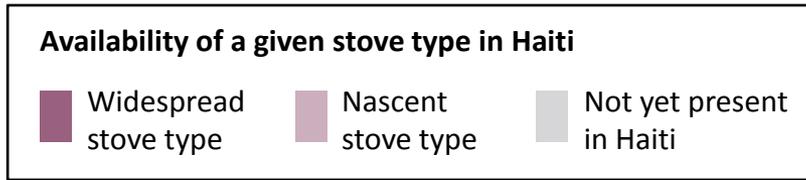
Changing trade policy will require action on the part of both the Global Alliance and clean cooking advocates. The Global Alliance can increase its chances of success by prioritizing a few trade policy positions, identifying local champions, curating relationships, and continuing to reassess its policy stance on an ongoing basis based on government receptiveness. Clean cooking advocates will need to build local relationships – particularly within the Center of Facilitation of Investments, the Bureau of Mines and Energy, and the Ministry of Environment – to cultivate local champions who can help advocate on their behalf. Finally, all parties will need to maintain ongoing communication; doing so will ensure consistent messaging, allow more opportunities to share progress, and improve the likelihood that trade barriers will be lowered and that a more vibrant clean cookstoves market can flourish in Haiti.

¹Estimated through Dalberg analysis, combining information from interviews with stove & fuel importers and producers on prevailing tax and tariff rates as applied, interviews with Haitian government ministries on stove & fuel import volumes, and WTO data on all of the above.

Table of contents

Contents	Page
Framing, objectives, and methodology	3
Executive summary	8
Observations about Haiti's cookstoves market	13
Key findings on cookstoves taxes and tariffs	23
Economic analysis and policy arguments	32
Country case studies	59
Advocacy toolkit	65
Annex materials	78

Haiti's clean cooking market is still developing, and some technologies are either nascent or not yet present¹

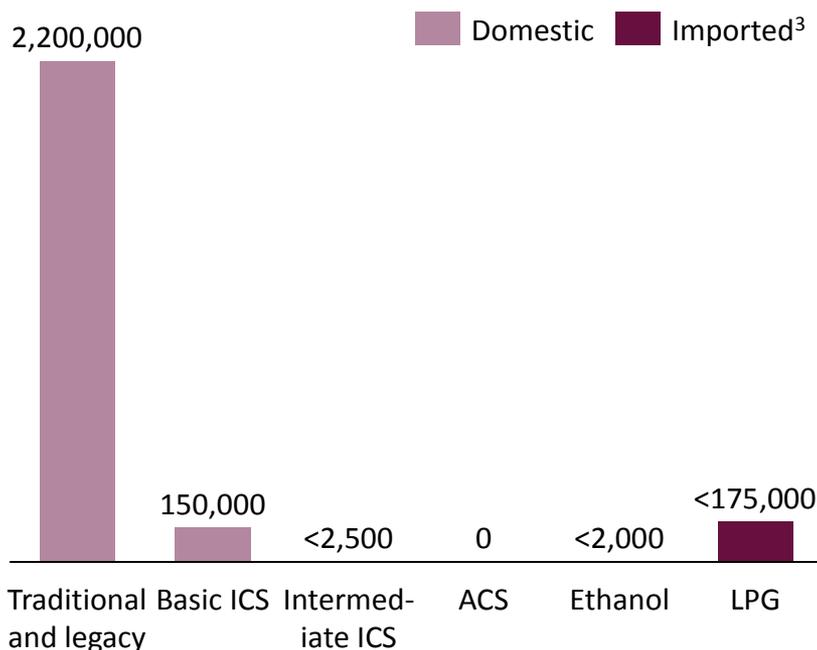


Notes: (1) This spectrum is a directional simplification. There are major health and environmental improvements between basic biomass stoves and intermediate biomass stoves. Further along the spectrum to renewable fuel stoves, the benefits are smaller by each stove type. (2) While kerosene is classified as a modern fuel stove, recent research has shown that it is not very clean despite low PM emissions. In addition, while this framework suggests greater health and environmental benefits for renewable fuel stoves, modern and renewable fuels have similar health benefits.

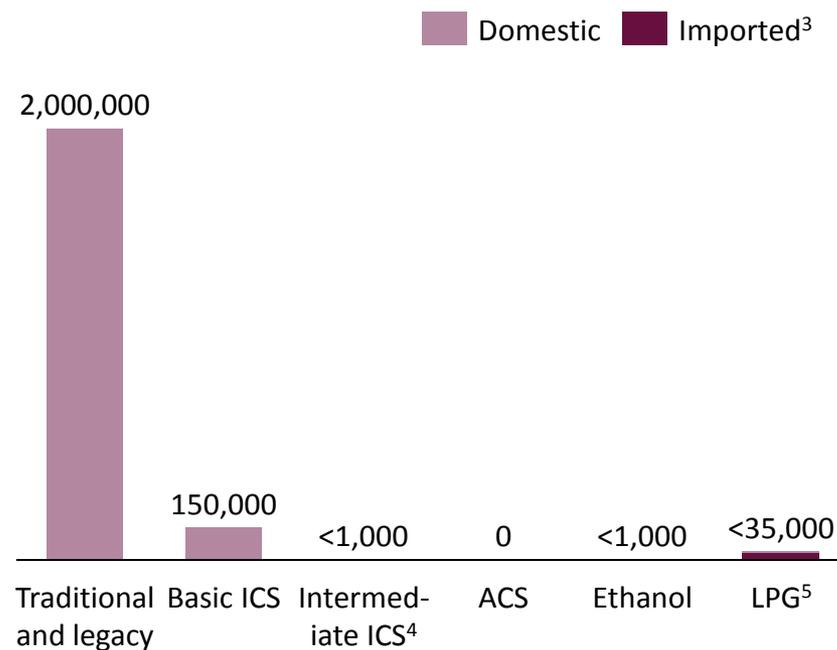
Source: World Bank 2015 – Clean and Improved Cooking in SSA; GACC Haiti Cookstoves Landscape Assessment; interviews with D&E Green and other importers and manufacturers.

Indeed, traditional and legacy stoves still dominate the market, despite limited ICS and LPG presence

Haiti cookstoves ownership (primary), # stoves¹
(2016 estimate²)



Annual sales, number of stoves
(2016 estimate²)



% of market in 2016

87.0% 6.0% 0.1% 0.0% 0.05% 6.9%

% of stove sales in 2016

91.4% 7.0% 0.05% 0.0% 0.04% 1.5%

Notes: (1) LPG includes kerosene, electric, solar, and other stoves. There was insufficiently granular data available on non-LPG modern fuels and stoves so they were combined in this analysis. Other modern stoves likely represent less than 10% of the modern stove segment. (2) Figures are estimated to the nearest thousand to account for assumptions. (3) All intermediate ICS, ACS and ethanol stoves are imported. (4) Figures are based on D&E Green figures and growth estimates (5) Valerio Canez sells 20,000 LPG stoves annually with 50-60 of the market. This figure is based on that estimate Source: Dalberg analysis; producer and importer interviews with data on stove sales, annual growth, and stove shelf life from POET, D&E Green, SWITCH, Valerio Canez, and Palmis Eneji; DHS-Haiti 2012.

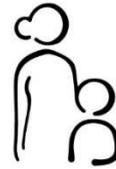
Low uptake in efficient stoves is exacerbated by multiple barriers to consumer access, chief among which is affordability

Main barriers to purchasing an improved cookstove

High upfront costs

Average annual per capita income in Haiti is \$350/year, or less than \$1/day. A basic improved cookstove costs \$9, or an **upfront cost of 2X daily household income** (assuming 4-5 people per household)

Haitian consumer



Households buying fuel spend up to **30-50% of their daily income on fuel for inefficient stoves.**¹ However, they lack access to more efficient (improved) cookstoves due to multiple barriers.

Low access to consumer credit

Given the high upfront cost, most Haitians need credit to purchase the stoves. However, there is a **dearth of consumer credit**, which renders many improved cookstoves inaccessible.

Limited options

Consumers **lack affordable, intermediate options** between lower-end basic improved cookstoves and more expensive modern fuel cookstoves; intermediate and advanced cookstoves are not widely available in Haiti.

No warranties

Since there is no warranty, Haitians are reluctant to purchase a more expensive stove, out of fear that, if/when the product breaks, **they will be unable to recoup their costs.**

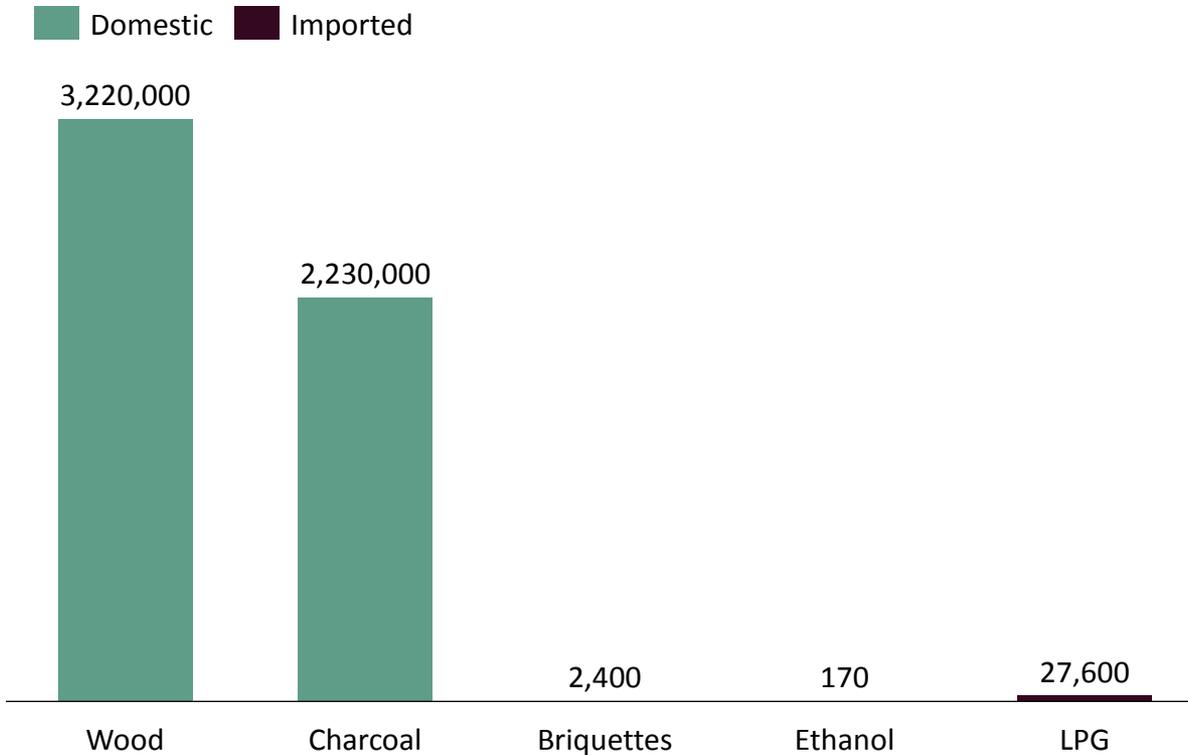
In addition to the barriers above – of which high upfront costs and consumer credit are the most prominent – other factors such as low education about stove options and fuel savings, traditions regarding cooking certain foods, and fewer points of sale impede uptake of more efficient stoves among Haitians

¹Of those households that have income. Validated using (1) household surveys conducted by ILF and WorldStove in 2010, and (2) surveys conducted for the University of Kentucky's "The impact of improved clean cookstoves on households in Southern Haiti," February 2015.

In the case of fuels, Haitians consume over 2.2M metric tons of charcoal annually

Consumption of cooking fuels by households

Annual consumption by current household owners, MT (2016 estimate)



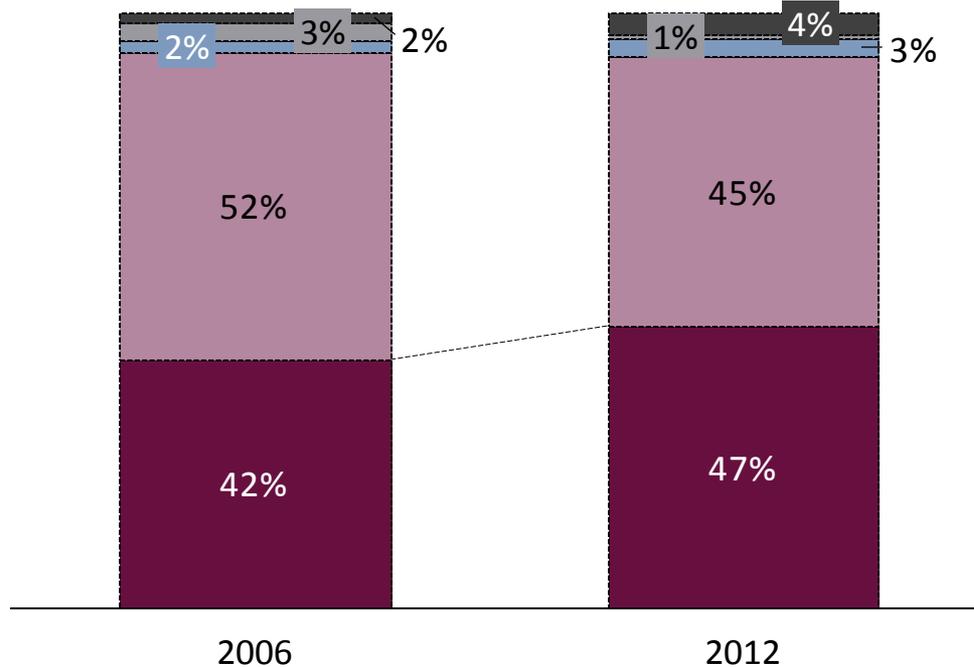
Solid fuel cooking continues to dominate the Haitian market, with very few consumers using renewable or modern cooking fuels

Notes: (1) These figures estimate household consumption and do not account for large users in addition to households. Hence this does not fully represent charcoal consumption on a country-wide basis. Source: Dalberg analysis; producer and importer interviews with data on fuel sales and fuel usage per meal from POET, D&E Green, SWITCH, Carbon Roots International, Valerio Canez, and Palmis Eneji; DHS 2012.

In fact, estimates indicate that Haitians cooking with charcoal has increased by at least 5 percentage points over the past decade

Share of households cooking with a given fuel as their primary fuel (% estimates)

Others Kerosene LPG Wood Charcoal



While charcoal alternatives – like briquettes – and modern fuels like LPG have increased in market share over the past 10 years, charcoal is now the leading cooking fuel. More than 80% of urban households use charcoal as their primary fuel, and Haiti’s urban population growth rate is 3.4%, compared to the overall population growth rate of 1.4%. This suggests that the percentage of Haitians using charcoal as their primary cooking fuel will only grow in the absence of targeted interventions

Up to ~280k Haitians are involved in the charcoal value chain in some capacity which equates to 55-65k low-quality, full-time jobs

Haiti's charcoal market: market sizing

Number of Haitians involved in some capacity

Production

Haitians engage on charcoal production intermittently to help ease financial shocks.¹ During production, the time commitment is 3 hours each day twice/month². This amounts to 1.5 hours of full time labor each day, requiring **215,000 – 250,000 people** at any given point



Transportation

A single truck holds 3 tons of charcoal, and requires one driver and 2-3 others for support. Assuming 6,100 tons consumed daily and 2,000 trucks, transport requires **~6,000 additional people** daily³



Distribution

20% of sacks are sold at wholesale markets to families buying in bulk. The remaining 4,880 tons – or 150,000 sacks – are distributed³. While the same 6,000 truck drivers transport charcoal to depots, an additional **7,500 inter-urban drivers** are required, assuming 1 driver can distribute 20 sacks to a retailer¹



Sales

There are an estimated **20,000** retailers selling charcoal in stores, as well as an additional **10,000** retailers selling charcoal on the street in some capacity³

An estimated **250,000-280,000** people are involved in the charcoal value chain on a daily basis in some capacity

Full-time employment in the charcoal value chain

Production

Haitian households consume 6,100 tons of charcoal daily, of which an estimated 4,880 (80%) is produced domestically⁴. Production requires **40,000 – 48,000 FTEs** (assuming 25-30 people produce 3 tons²)



Transportation

Transportation services are required for no more than 3 hours/day given centralized charcoal hubs. This amounts to **2,000 – 2,500 full time drivers** needed daily³



Distribution

Similar to transportation from large markets, distribution requires approximately 3 hours per day. While the same 2,000 - 2,500 truck drivers are required, there are an additional **2,500 – 3,000 inter-urban, full-time drivers** needed daily³



Sales

Street vendors do not sell anything aside from charcoal given cultural norms. Few other retailers would only sell charcoal given low margins. Thus, full-time retail would amount to **10,000³**

Full time employment in the charcoal value chain is estimated at **55,000–64,000 daily jobs**, most of which are low-quality⁵

Notes: (1) Dr. Andrew Tarter (2) Carbon Roots International; (3) Data point from Carbon Roots International and confirmed by Dr. Andrew Tarter; (4) While estimates about domestic charcoal production vary, D&E Green and Dr. Andrew Tarter confirmed that 80% is a fair estimate; (5) The quality of these jobs is low, as many of them are part-time and generate a meager salary (e.g. 150 gourdes/worker for production, 50-200 gourdes/day for retail). This slide is intended to be a directional estimate, and figures may shift based on additional research. Source: Stakeholder interviews with D&E Green, Carbon Roots International, and Andrew Tarter; Dalberg analysis

In addition to charcoal value chain employment, there are other fuel-specific considerations which will influence GACC's trade policy agenda

Fuel specific observations

Observations about Haiti's cookstoves market

- Charcoal is **deeply embedded in Haiti's economy and culture**, and shifting to alternatives will require more than an economic argument
- While 250,000+ Haitians are involved in the **charcoal value chain** at any given point, most jobs are part-time and of low-quality, and people move in and out of production over extended periods of time
- While LPG has major government buy-in, **the market for individual households is hampered by high stove prices**
- Ethanol, on the other hand, faces **low government buy-in** and skepticism, due to concerns about its safety and viability as an alternative fuel

Implications for GACC's trade policy agenda

- Highlighting the **full-time, high-quality employment potential of ethanol and LPG** under lower trade barriers may resonate with government stakeholders who are wary of charcoal job losses
- Removing trade barriers for LPG stoves will **disproportionately benefit high-income Haitians**, who likely already use cleaner cookstoves
- Without a push by GACC, Haiti's ethanol market will stagnate. However, **ethanol trade policy should only be broached following stakeholder education and coalition building**

Furthermore, consumer usage patterns and Haiti's policy environment have implications for how GACC broaches taxes and tariffs



Notes: (1) Estimates on the charcoal industry range from 80,000 up to 280,000

Source: Interviews with government ministries, importers, and manufacturers; Dalberg analysis

Successfully navigating Haiti's policy environment will require understanding the priorities and dynamics of ministry stakeholders

Perspectives and main priorities by ministry stakeholder

Most essential to engage

Ministry of Economy and Finance

- More fuel-agnostic than other ministries, but does not believe the environmental impact of cleaner cookstoves to be compelling
- Wary of any trade policy that damages local industry and further disrupts Haiti's trade balance

Bureau of Mines and Energy

- Skeptical toward ethanol with a belief that cookstoves policy should focus on briquettes, cleaner charcoal, and to a lesser extent, LPG
- Belief that cookstoves policy has suffered from too many outside interventions without sufficient inclusion of Haitian experts

Ministry of Environment

- Interested in briquettes and a belief that broaching Haiti's charcoal industry is politically infeasible
- Desire to see gradual, progressive change to cleaner fuels combined with education of both government stakeholders and citizens

Ministry of Agriculture

- Potentially important stakeholder to engage if ethanol is incorporated into Haiti's cookstoves strategy
- May have an interest in developing a domestic ethanol industry to export fuel to neighboring countries in the Caribbean

Ministry of the Interior

- Potentially important stakeholder to engage depending on the extent to which charcoal is smuggled across the DR/Haiti border

Cookstoves policy in Haiti has no central owner and government ministries have competing interests. Shifting trade policy will require an **internal champion with strong relationships and credibility** among each of these ministries

Table of contents

Contents	Page
Framing, objectives, and methodology	3
Executive summary	8
Observations about Haiti's cookstoves market	13
Key findings on cookstoves taxes and tariffs	23
Economic analysis and policy arguments	32
Country case studies	59
Advocacy toolkit	65
Annex materials	78

Taxes and tariffs differ by stove and fuel type, but disadvantage LPG, briquettes, and ethanol most severely

	Stoves			Fuels		
	Taxes	Tariffs	Total	Taxes	Tariffs	Total
Wood (Traditional and legacy)	0% (most are artisanal)	0% (all are domestically produced)	0%	0% (informal sales or not sold)	0% (exempt from tariffs)	0%
Charcoal (Traditional and legacy, ICS, ACS)	10% VAT (D&E Green stoves are exempt)	0% (exempt from tariffs)	Up to 10%	0% (assumed informal sales)	0% (exempt from tariffs)	0%
Briquettes (ICS, ACS)	--	--	--	10% VAT	5% ¹	15%
LPG	10% VAT, 6% 'territorial tax'	5% import tariff, 5% other tariffs (SWITCH is not charged these other tariffs)	21%-26% <i>Tax codes list</i> <i>15% combined rate</i>	0% (exempt from VAT)	0% (exempt from tariffs)	0%
Ethanol	10% VAT (D&E Green stoves are exempt)	10% import tariff and 7% other tariffs (D&E Green stoves are exempt)	27% <i>Tax codes list</i> <i>20% combined rate</i>	10% VAT	21% customs and other fees ²	31% <i>Tax codes list</i> <i>10% combined rate</i>

While Haitian policy dictates the taxes and tariffs above, applied taxes and tariffs differ since there are few standards and customs officials exercise high degrees of discretion

Notes: (1) Tariffs of 5% and 10% VAT are applied to PV panels. (2) Though there is a tariff on briquettes, they are not currently imported. (3) Formally denatured ethanol should be exempt from tariffs. However, POET's ethanol imports are classified as pharmaceuticals and thus subject to a 15% tariff for pharmaceutical ethanol, in addition to a 5% administrative fee.

Source: Manufacturer and importer interviews with D&E Green, Palmis Eneji, SWITCH, Valerio Canez, Carbon Roots International, and POET/Novogaz; WTO Tariffs Database; Haiti government tax policy documents, 2014.

Furthermore, trade policies on stove components, infrastructure, and equipment similarly disadvantage LPG, briquettes, and ethanol

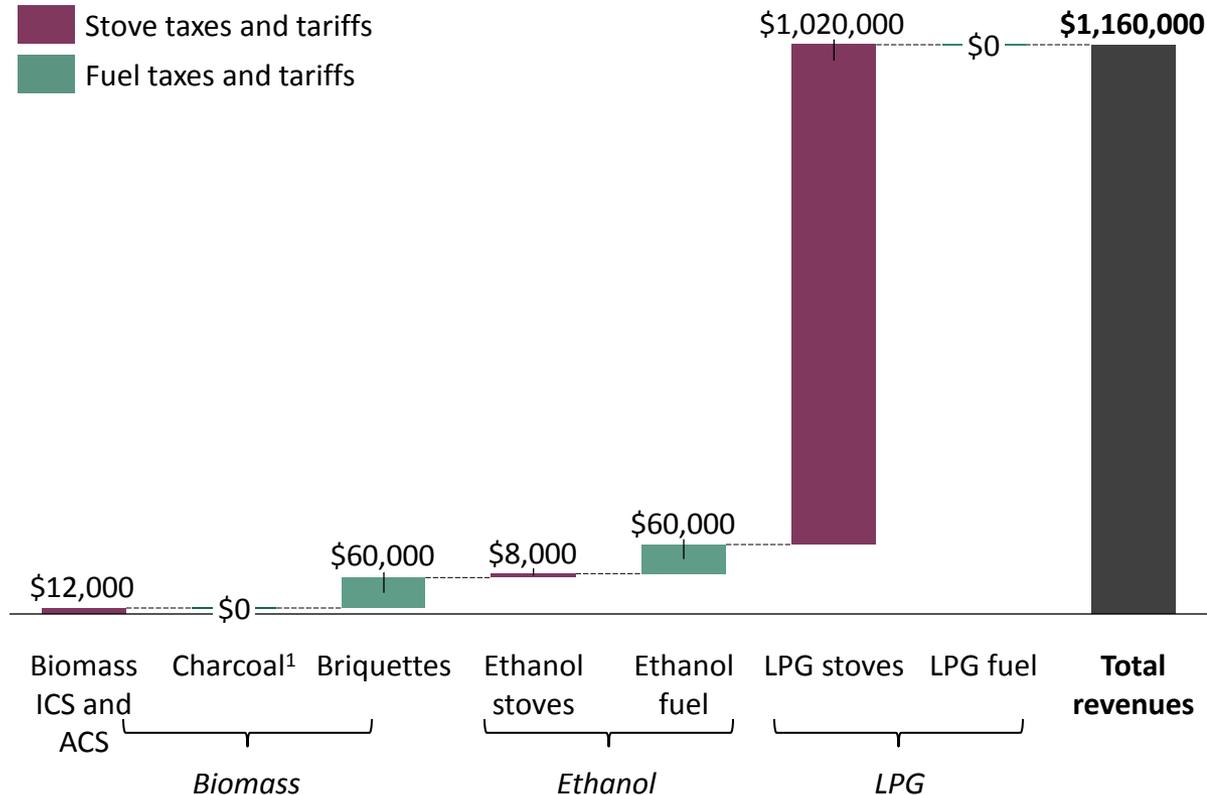
	Stove <u>components</u> and fuel accessories		Infrastructure and equipment	
	Tax and tariff rate	Explanation	Tax and tariff rate	Explanation
Charcoal (Traditional and legacy, ICS, ACS)	0%	Biomass stoves in the Haitian market are either exempt or their components are manufactured domestically, which means there are no taxes or tariffs applied to biomass stove components	33% - 40%	The maximum tax rate for kilning equipment is 33%. However, customs officials sometimes include transportation and insurance costs in the cost of kilning equipment, which can increase the applied tariff rate to 40% of the total cost
Briquettes (ICS, ACS)	N/A	There are no components to briquettes; this no taxes or tariffs are applied	40%	Briquette-making equipment is classified as industrial equipment which is subject to a 40% tariff
LPG	5%	Tariffs for stove components are lower than those for finished stoves to encourage domestic assembly. However, if stove components arrive all together (i.e. in the same box), then importers face the same tariff rates as for finished stoves ¹ . LPG cylinders are exempt	Unclear	LPG stove manufacturers remarked that LPG storage equipment is taxed, but could not provide the exact rate
Ethanol	5%	Ethanol stoves components are classified like LPG stoves. If components arrive in the same box, importers face the same tariff rates as for finished stoves	N/A	The only domestic manufacturers of ethanol stoves (D&E Green) have an exemption. Imported equipment for ethanol micro-distilleries (including the requisite cookers, fermenters, pumps, stills, and tank(s)) would collectively be subject to a 5% tariff

Notes: (1) Based on interview with Haiti SWITCH, an LPG stove distributor.

Source: Manufacturer and importer interviews with D&E Green, Palmis Eneji, SWITCH, Valerio Canez, Carbon Roots International, and POET/Novogaz; WTO Tariffs Database; Haiti government tax policy documents, 2014.

Estimates of taxes and tariffs on cookstoves and fuels indicate revenue of nearly \$1.2M annually, or approximately 0.1% of Haiti's tax revenue

Haiti estimated annual government revenues from taxes and tariffs, by stove and fuel type



Government revenues from improved cookstoves and fuels represent **0.07% of all revenues from taxes**, which constitute 20.6% of Haiti's GDP of \$8.6Bn

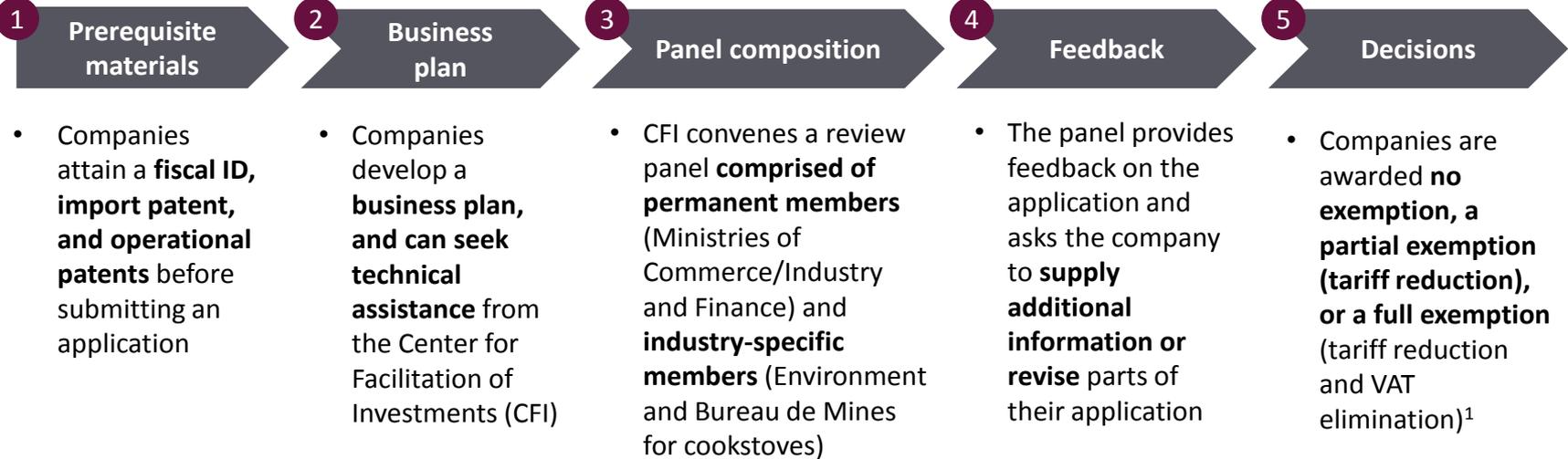
A compelling economic argument will need to articulate how this revenue will be replaced if tax and tariff exemptions are awarded, particularly for LPG stoves

Notes (1) Charcoal revenues are approximately zero because charcoal sales are almost exclusively in the informal sector but formally, charcoal sales are subject to a 10% VAT

Source: Dalberg analysis; WTO tariffs and taxes database, 2016; interviews with importers and producers on tax and tariff rates, including Carbon Roots International, POET, Valerio Canez, and Palmis Eneji; CIA World Factbook 2016-Haiti.

Tax and tariff exemptions exist, in the form of company exemptions which are awarded by the Center of Facilitation of Investments...

Process for company exemptions



Success factors for receiving an exemption

- Focus on a **single business objective with modest market size projections**; multi-purpose businesses with large financial projections attract too much attention
- Be aware of which **technical team will review/defend the proposal**, and what their priorities are
- Ensure that the benefits that the business produces for Haiti **outweigh what the government perceives to be giving up**

Potential strategies and positioning

- For all cookstoves types, partner with **local municipalities** interested in securing cleaner cookstoves for public markets; municipalities could become local champions for a company
- If GACC decides to focus on ethanol-based trade barriers, highlight the **local industry development and future export potential**, and consider partnering with the Ministry of Agriculture

Notes: (1) Even if companies receive a full exemption, they are still subject to a 5% administrative fee on all imports

Source: Interviews with Novogaz, D&E Green, and former Center for Facilitation of Investments staff; Dalberg analysis

... and industry-wide exemptions, which are more complex, requiring a credible government champion and multi-stakeholder collaboration

Process for industry-wide exemptions

1 Policy proposal introduction

- An industry-wide exemption is **introduced by a member of government**. The process can be led by the President's office, the Prime Minister's office, or by Parliament

2 Lower house approval

- The exemption must first be approved by the Lower House, or the Chamber of Deputies. **The Chamber of Deputies includes 99 government officials** who are elected every four years

3 Senate approval

- If the exemption is approved by the lower house, it passes to the **Senate which is comprised of 30 members** who are elected every six years

4 Ratification

- If the exemption is approved by the Senate, it is ratified. Following ratification, the bill would likely **require sensitizing** among customs officials to be enforced

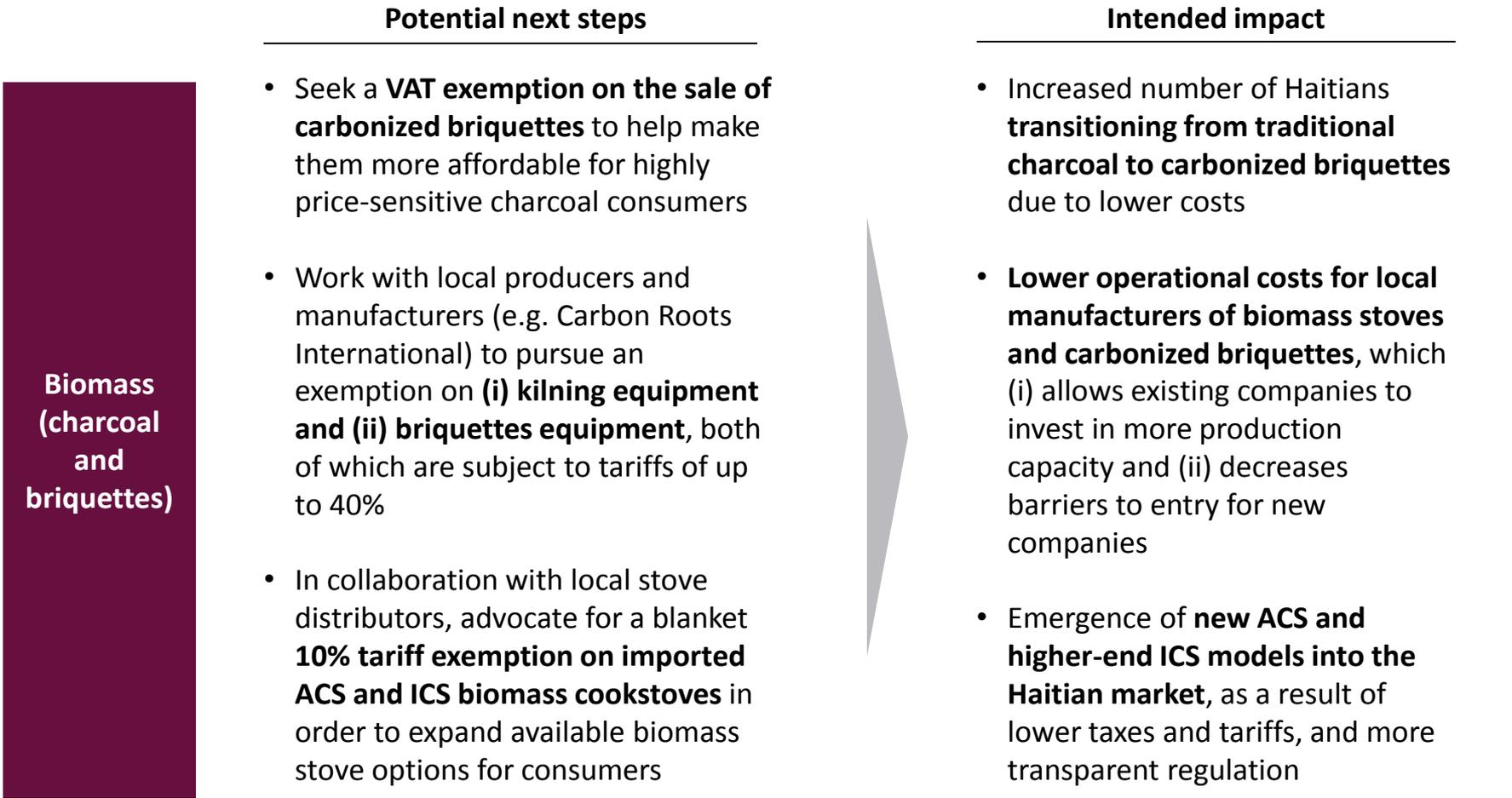
Success factors for receiving an exemption

- Get **additional company exemptions** before pursuing an industry-wide exemption
- Identify an **executive level and a Parliament level champion** with excellent relationships who can champion the exemption (e.g. the solar panel exemption legislation was led by the Governor of the Central Bank)
- Identify **civil society stakeholders with a local presence** who can consistently interface with the government

Potential strategies and positioning

- **If GACC focuses on modern fuel trade policies, it should frame them as complementary to charcoal.** Given how embedded charcoal is in Haiti's culture and economy, any policies that appear to penalize charcoal will likely be met with resistance from both the public and the private sectors
- **Avoid any legislation that would be introduced by decree,** particularly policy introduced by a powerful outsider (e.g. foreign embassies). These policies lack stakeholder buy-in and decrees can be undone when a new political administration begins

Since there is gov't buy-in for cleaner charcoal alternatives, seeking company-specific and industry-wide exemptions may be feasible



Biomass
(charcoal
and
briquettes)

Government belief that green charcoal and briquettes are the most viable alternative to traditional charcoal suggests that trade policy discussions can begin with biomass stoves

Of modern fuels, LPG has the most government buy-in and represents an opportunity for GACC to collaborate closely with the government



Potential next steps

- Begin working with the Bureau of Mines and Energy and the Haitian Institute of Energy to **better understand their specific LPG priorities** (for both stoves and fuels)
- Link LPG stove distributors like Valerio Canez and Haiti SWITCH with the Bureau of Mines and Energy to **increase private/public sector communication**, and consider supporting Valerio Canez's CFI tax exemption application
- Following a company-specific exemption, consider advocating for an **elimination of the 15% government mandated stove tax** to reduce the price and push for greater transparency in what comprises other tariffs

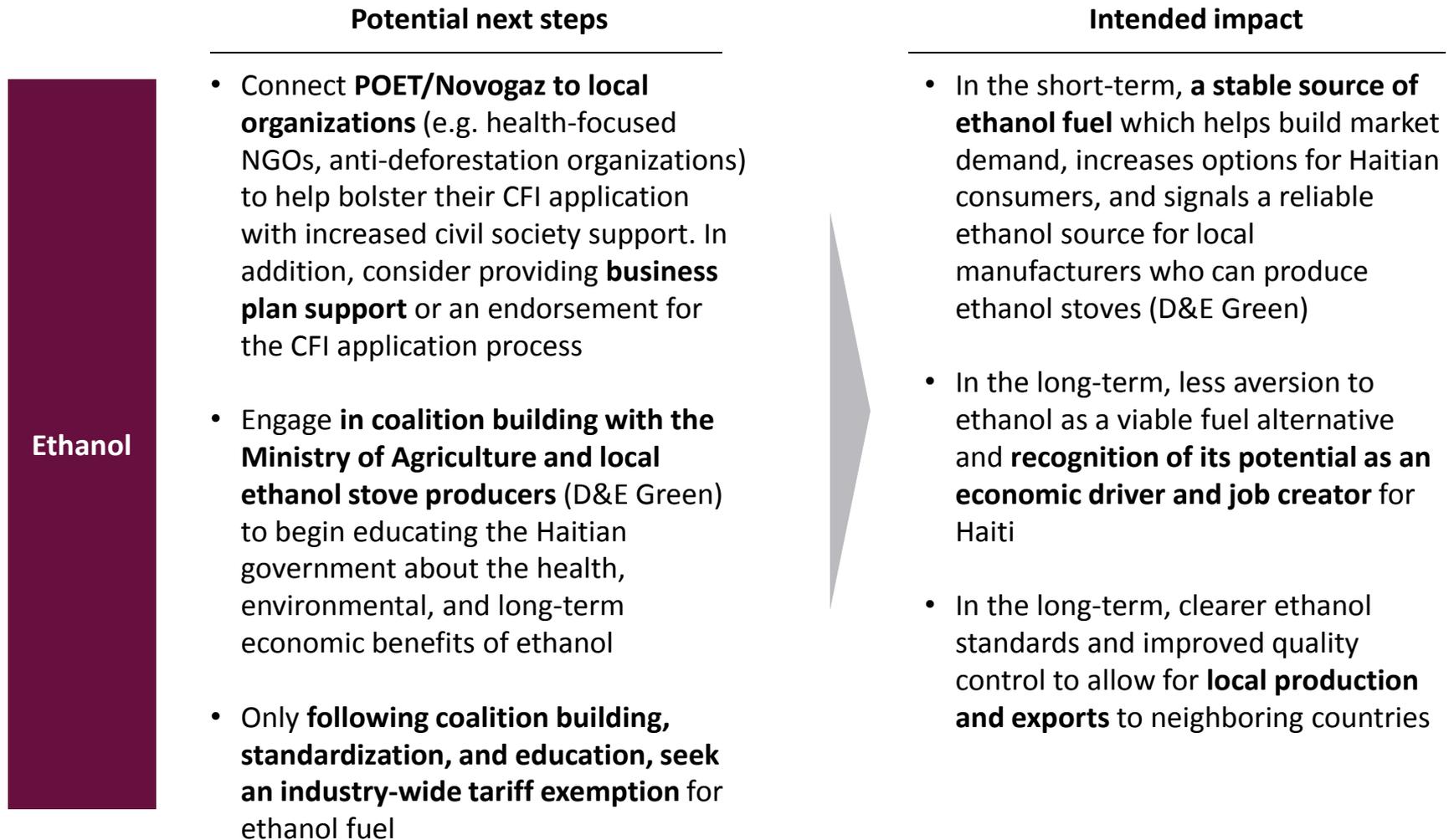
Intended impact

- **Strong signaling** on the part of GACC to work alongside the Haitian government on trade barrier-related issues
- Increased **alignment between LPG stove manufacturers and the Haitian government** with the goal of developing more market-driven solutions for LPG stoves
- Ultimately, more modern **stove options for Haitian consumers**, particularly middle class Haitians who can pay for the higher-end biomass stoves that exist in the Haitian market but cannot afford LPG stoves at current prices



Failure to collaborate with the government on a shared LPG agenda risks alienating key ministry stakeholders, and would be a missed opportunity for GACC and its partner organizations

However, broaching taxes and tariffs on ethanol will only be palatable in the long-term and will first require major coalition building



While there is government skepticism toward ethanol and doubts about its viability, GACC is uniquely positioned to help champion ethanol, recognizing that it will likely be an uphill battle

Table of contents

Contents	Page
Framing, objectives, and methodology	3
Executive summary	8
Observations about Haiti's cookstoves market	13
Key findings on cookstoves taxes and tariffs	23
Economic analysis and policy arguments	32
Country case studies	59
Advocacy toolkit	65
Annex materials	78

The economic model estimates, directionally, the impacts of lower cookstove taxes and tariffs

Methodological description

1

Calculate the base case of stoves and fuels in Haiti

- The model's basic inputs include **Haiti's current population** and an **average household size of 4.4 people**. The base case focuses on individual households versus institutions (e.g. schools) and **models the impact of the primary stove**, recognizing that many households have multiple stoves
- Other key basic into the base case include **stove market share, growth rates, and replacement rates**; sales volumes for fuels are linked to sales volumes for stoves and yearly fuel consumption is determined by the number of meals consumed per day and the amount of fuel (in kilograms) used to cook a given meal
- These inputs, along with the relevant taxes, tariffs, and import volumes are the basis of a **build a general equilibrium economic model** which bases analysis on demand elasticities.

2

Determine various tax and tariffs scenarios to model

- Each scenario models **elimination of taxes, tariffs, or both to 0% for biomass, ethanol and LPG stoves and fuel**. The elimination of taxes/tariffs interacts with data on consumer price elasticity to translate into a percentage change in stove purchases. This change is incorporated into the base case to calculate the new amount of fuel or number of stoves sold under a given scenario
- Scenarios model either stove or fuel policy changes. **Stove policy changes impact both stove and fuel usage** since consumers must shift to a new fuel if they purchase a different stove. However, **fuel policy changes are assumed to have little/no impact on stove uptake** since purchase decisions are driven by the ability to purchase the stove, not the fuel

3

Assess the economic impact of each of these scenarios

- In addition to changes in consumer usage, the scenarios model (i) changes in **government revenue** earned from cookstoves and fuels, (ii) **employment** in Haiti's cookstoves market, and (iii) **Haiti's trade balance**, based on additional stove and fuel imports that are required as a result of increased demand
- **The model provides directional forecasts of cookstove sales, employment, and trade effects; it is not designed to provide precise estimates of any given variable** (e.g., this model can accurately estimate the employment effects to Haiti of changing cookstove tariffs; it cannot estimate the precise number of ethanol stoves that will be sold in five years, or even next year).
- **Health impacts were estimated using the Global Alliance's HAPIT model**

Based on the model, lowering taxes and tariffs benefits consumers but produces a negative fiscal impact, especially in the case of LPG

	Economic impact on consumers		Economic impact on the government	
	Price	Consumer usage ²	Annual gov't revenue	Haiti's trade balance
Tax exemptions for <u>biomass</u> stoves¹	Lowers the price of basic ICS stoves by 1% and intermediate ICS stoves (both charcoal stoves and higher-end rocket stoves) by 5%	Results in >10,000 more biomass stoves purchased over a five year period	Lowers government revenue by \$0-15,000 annually	Has virtually no impact on the trade balance
Tax and tariff exemptions for <u>ethanol</u> stoves	Lowers the price of ethanol stoves from \$38 to \$28	Results in >2,000 additional ethanol stoves purchased over a five year period	Lowers government revenue by \$0-10,000 annually	Has virtually no impact on the trade balance
Tax and tariff exemptions for <u>LPG</u> stoves	Lowers the price of a one-burner stove ³ by 21% from \$45 to \$36. More premium models will remain over \$100	Results in >20,000 more LPG stoves purchased over a five year period due to high demand elasticity	Lowers government revenue by \$1M+ annually if taxes/tariffs are eliminated on all LPG cookstoves	Worsens the trade deficit by 0.1%, amounting to an estimated \$2M in additional annual imports

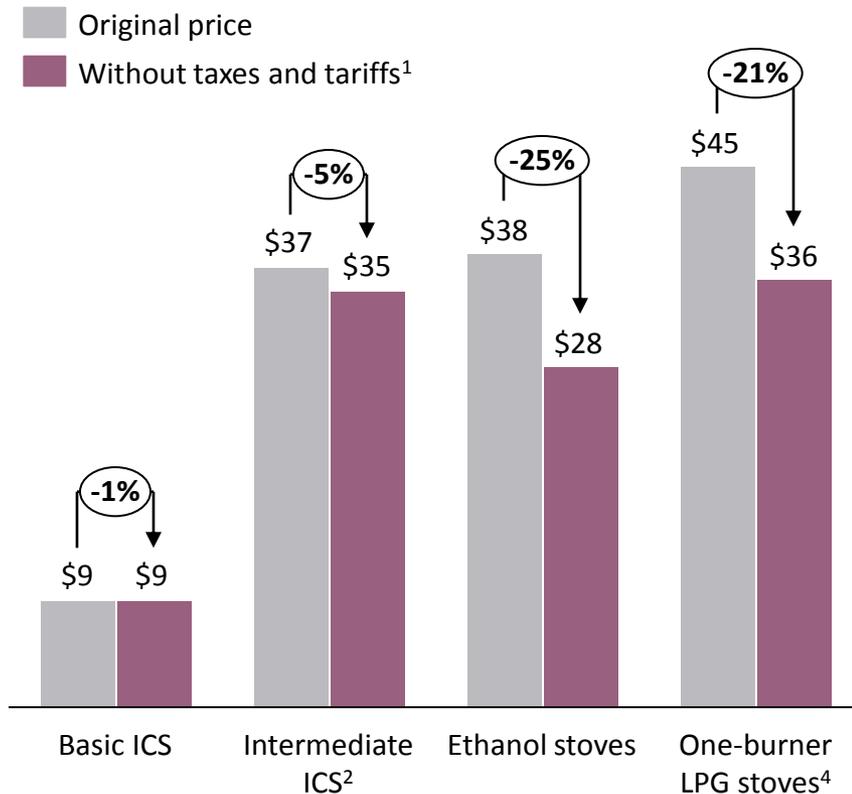
The fuel-specific economic analysis contains detailed analysis and policy implications for each of these scenarios

Positive Negligible Negative

Notes: (1) Biomass stoves in Haiti are already classified as 'exempt' from tariffs'; (2) Stoves purchased over a five year period are estimated by calculating the shift in demand in Year 1, applying today's growth rate over a five year period, and subtracting the difference between five year projections without the tax/tariff exemption; (3) While there are many LPG stove varieties, this demand elasticity analysis uses a \$45 price point to ensure an 'apples to apples' comparison with comparable ethanol stoves

Indeed, lower trade barriers decrease ethanol and LPG stove prices by 20%+, making them accessible to more Haitian consumers

Predicted changes in stove price after removal of stove taxes and tariffs



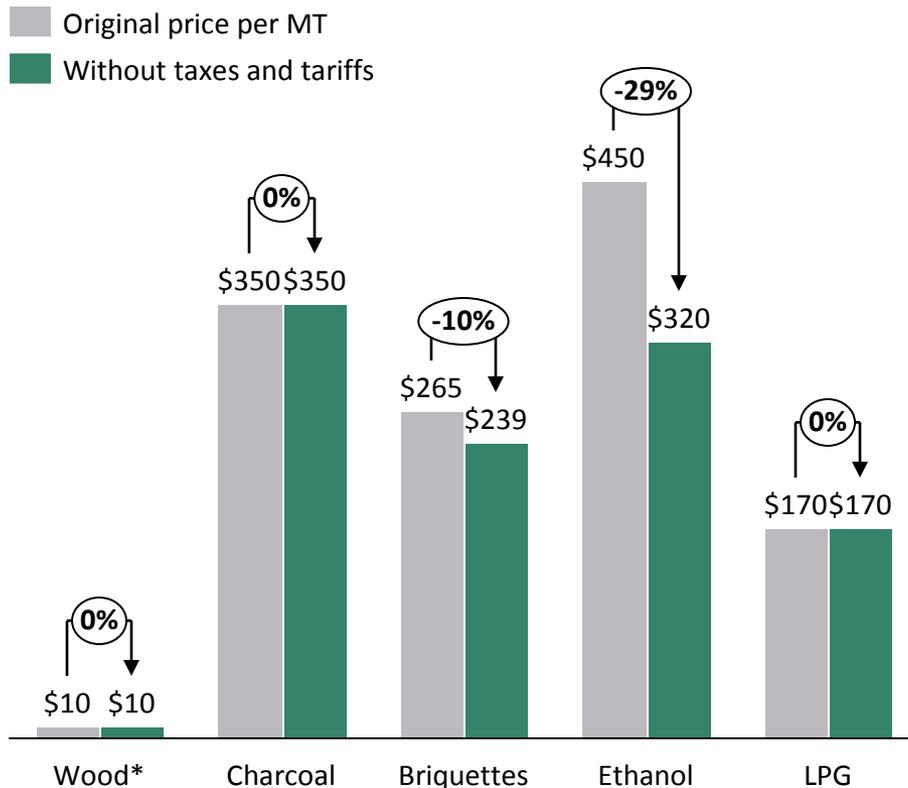
- The basic ICS stoves (priced at \$9)³ and intermediate charcoal ICS (priced at \$12) are already tariff exempt. Since these comprise the majority of ICS stoves in the Haitian market, **lowering trade barriers will have minimal impact on their price** and on the biomass stove market in Haiti
- Modern fuels, such as **ethanol and LPG stand to benefit the most from lower trade barriers**. At a lower price point, ethanol stoves and one-burner LPG stoves could serve as an alternative to intermediate charcoal ICS stoves with more substantive health and environmental improvements

Due to lower prices, annual sales of improved cookstoves are projected to increase by 13% from 185,000 to 209,000

Notes: (1) Prices are a weighted average of multiple stove types, including those that are already exempt. The price without taxes and tariffs averages the price of stoves that are already exempt with those that would be newly exempt under a tax and tariff reduction (2) This price point is an average of intermediate charcoal stoves (\$12) produced by D&E Green and more expensive built-in rocket stoves (\$60) which currently exist in Haiti and are sold by Palmis Eneji but not widely due to their higher price point. (3) Refers to Recho Mirak.. (4) Note that multi-burner stoves are more expensive and can sell for upwards of \$150. These stoves would still be priced at over \$100 if taxes and tariffs were removed. Sources: D&E Green, Palmis Eneji, Dalberg analysis

While lower trade barriers will enable consumers to buy briquettes and ethanol fuel more cheaply, stove choice will still drive their fuel usage

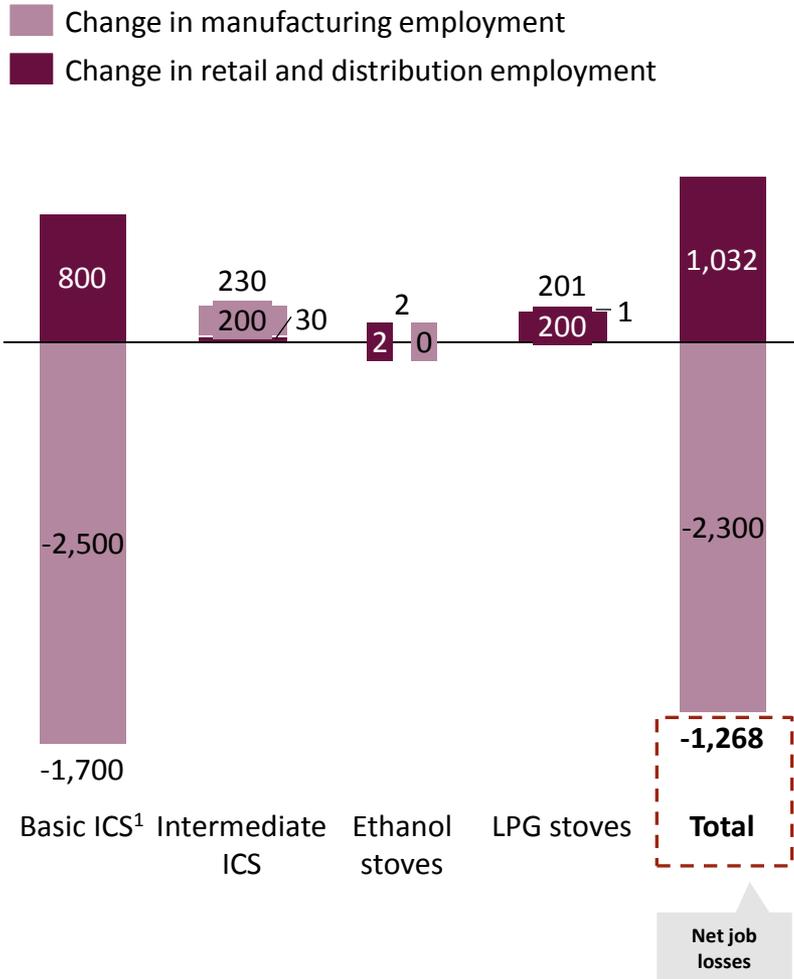
Predicted changes in fuel price after removal of fuel taxes and tariffs



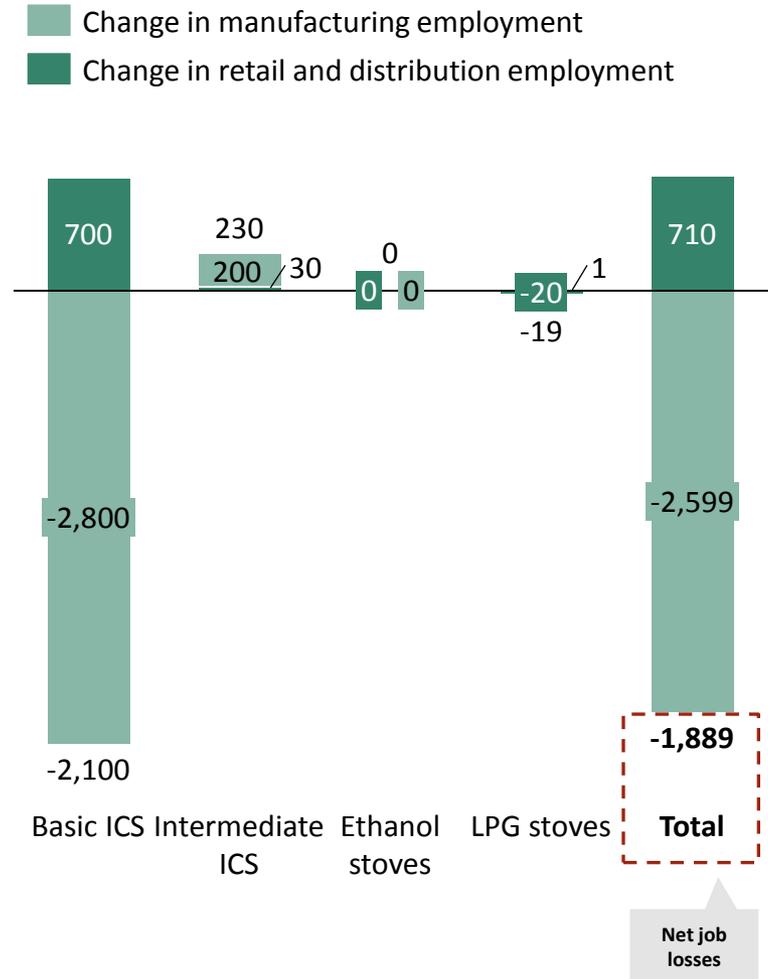
- Eliminating taxes and tariffs on the remaining fuels (briquettes and ethanol) **decreases import and production costs and allows firms to decrease the selling price to consumers.** However, uptake in cleaner stoves and fuels will **still be driven by the sale of corresponding stove types**, rather than by lower fuel prices, since fuel price is inelastic and consumers make fuel choices based on the stove they own
- These changes in fuel price notwithstanding, **a long-term trade policy that focuses on stoves – rather than fuels –** has the potential to shift Haitians to cleaner and more efficient stoves

Individual consumers may benefit from lower trade barriers; but those employed in cookstoves manufacturing are at risk of unemployment

Predicted changes in domestic stove and fuel sector employment after removal of taxes and tariffs for all stove types



Predicted changes in domestic stove and fuel sector employment after removal of taxes and tariffs for all fuel types

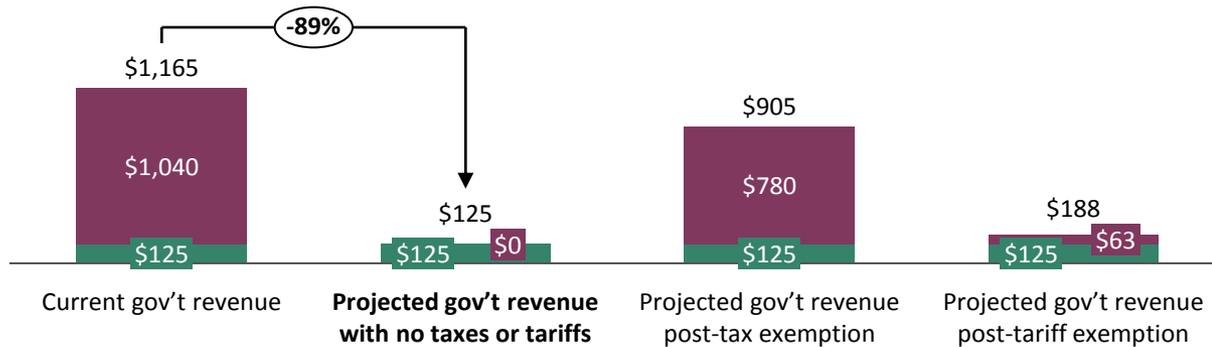


Note: (1) Refers to jobs occupied by Recho Mirak manufacturers; (2) Manufacturers tend to become more mechanized as they grow and are able to access more working capital for machinery; however, the rate at which this will occur in Haiti, and the subsequent impact on employment, is difficult to predict. Job estimates for the ethanol retail and distribution are based on distributor estimates of their existing and future capacity. Source: Dalberg analysis

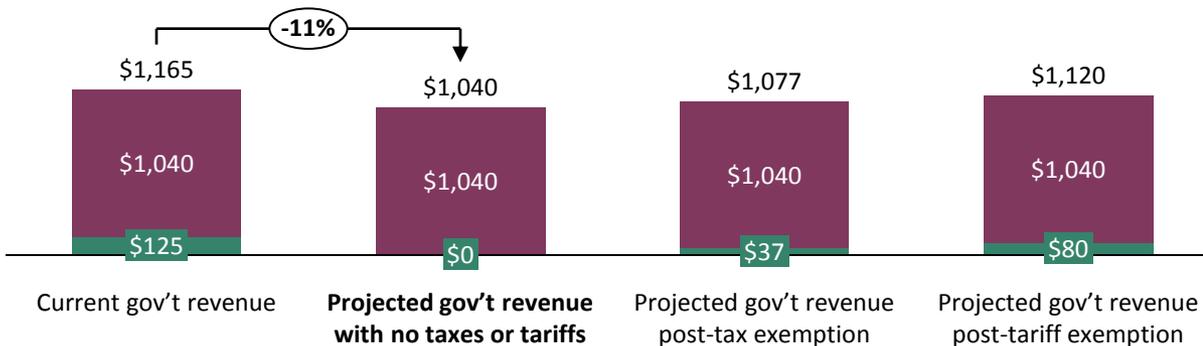
Beyond near-term job losses, lowering all trade barriers will slightly decrease government revenue

Predicted changes to government revenue after removal of taxes and tariffs for all stove types

■ Stove taxes/tariffs ('000 USD) ■ Fuel taxes/tariffs ('000 USD)



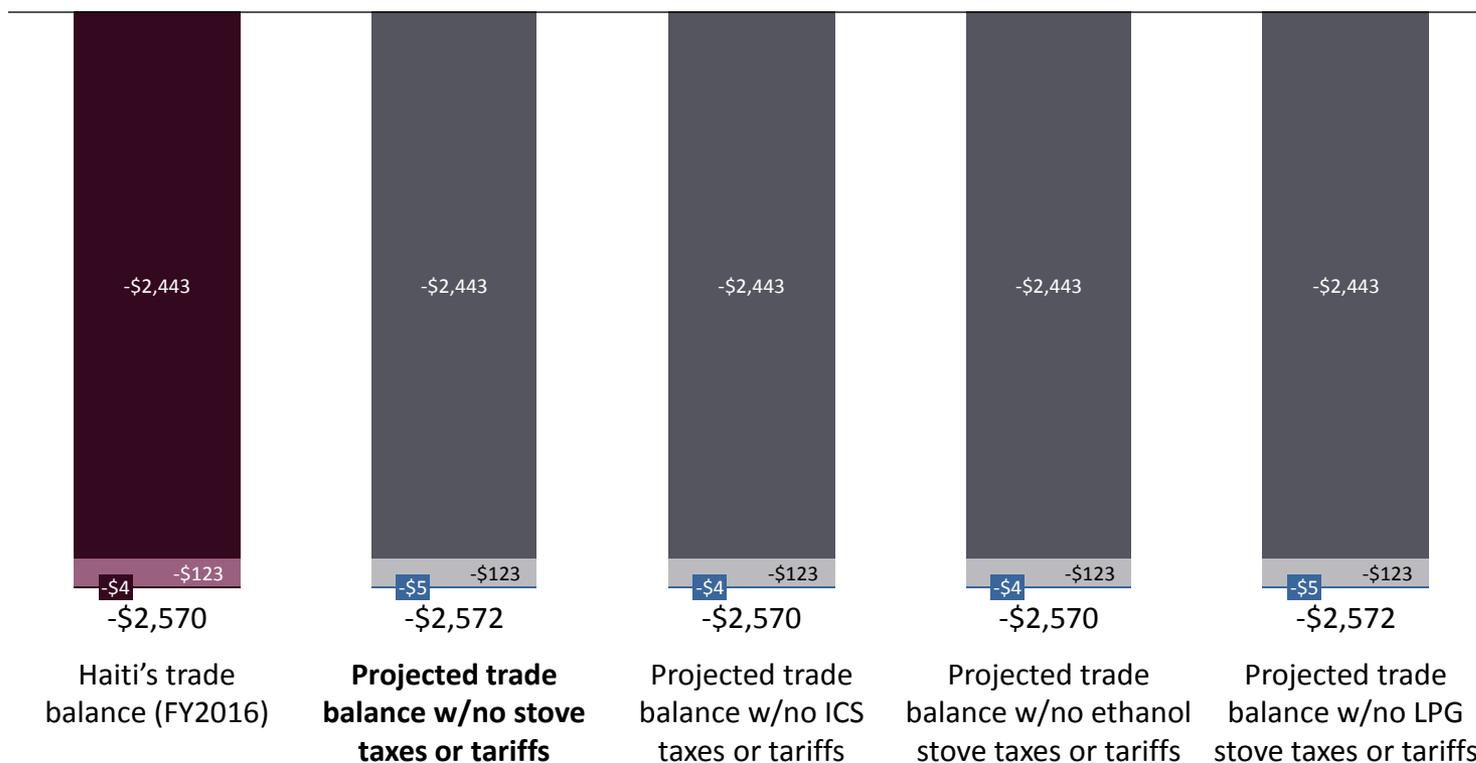
Predicted changes to government revenue after removal of taxes and tariffs for all fuel types



- Eliminating all taxes and tariffs on cookstoves poses a major challenge for the Haitian government, resulting in a ~\$1Mn loss in annual revenue. Taxes on additional **fuel sales will not be able to compensate for lost revenue** since neither LPG nor charcoal are taxed
- While **reducing taxes and tariffs on fuels is less problematic** from a government revenue standpoint, it is also **less catalytic** since stove price will be the key driver of a shift to more efficient stoves and fuels
- A phased approach that **makes stoves tax free before broaching tariffs** will likely resonate with government stakeholders

Lowering tariffs and taxes on stoves and fuels will have a negligible effect on Haiti's trade balance, tantamount to a rounding error

Haitian Trade Balance (Exports - Imports), current and projected
separated by stove, fuel, and other contributors



Other contributors to Haiti's trade balance (Mn USD)
 Fuel trade balance (Mn USD)
 Stove trade balance (Mn USD)

Yet to successfully shift trade policy, arguments will need to mitigate concerns about the negative fiscal impact among other success factors

Success factors	Description
Tailor arguments based on the specific government outlooks	<ul style="list-style-type: none">The Haitian government has diverse outlooks for each fuel, with more buy-in for charcoal/briquettes and LPG than for ethanolThus, policy arguments should be fuel-specific to account for the different perceptions and stages of each of these fuels in Haiti
Propose policy shifts that are most likely to shift Haitians to cleaner stoves and fuels	<ul style="list-style-type: none">Purchase of the stove is the main barrier to shifting Haitians to cleaner cooking solutions. Consumers make fuel choices to accommodate their stoveWhile eliminating taxes/tariffs on fuels has some benefits, the policy arguments that follow focus on removal of trade barriers for stoves given the higher potential for impact if they are removed
Address concerns about fiscal impact, among other points of resistance	<ul style="list-style-type: none">The Haitian government will likely express concerns about lost revenue and policy arguments should articulate how shifting to cleaner stoves might result in cost savings elsewhere. Fuel-specific responses are included in the following slidesAt the same time, advocates should be prepared to address other fuel-specific points of resistance
Sequence steps accordingly	<ul style="list-style-type: none">Policy arguments and related strategies (e.g. coalition building), will need to be sequenced accordingly to ensure that when discussions about trade policies are broached, Ministry stakeholders are ready to engage

Fuel-specific analysis and policy arguments

Biomass stoves – approach, economic analysis, and policy arguments

Ethanol stoves – approach, economic analysis, and policy arguments

LPG stoves – approach, economic analysis, and policy arguments

Policy arguments for biomass stoves should focus on the potential to expand the market for new ACS stoves with lower trade barriers

Overview

- Haiti's main biomass stove producer, D&E Green, already has an exemption from taxes and tariffs. Thus, the objective of lowering trade barriers is not to benefit companies currently operating in Haiti. Rather, **the goal is to expand the market for new, improved biomass stoves which are currently absent from the Haitian market**. Indeed, lower trade barriers might compel international ACS manufacturers to consider Haiti a viable market if regulatory constraints and trade barriers were lowered.

Government outlook

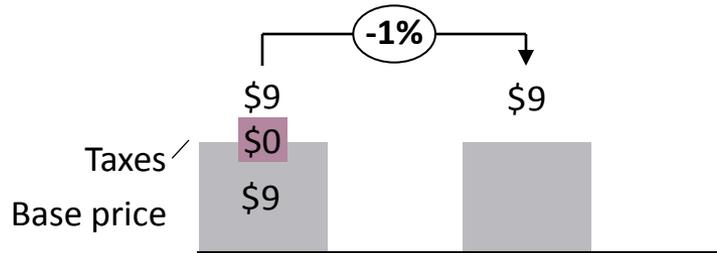
- Haitian government ministers have expressed enthusiasm about the **potential of briquettes and green charcoal as alternatives to traditional charcoal**, and Haiti's Ministry of Environment has developed briquettes with the goal of distributing them to consumers who use wood and charcoal as their primary cooking fuel.
- Beyond developing briquettes, the Haitian government has initiated **several initiatives focused on improved charcoal**. The Bureau of Mines and Energy's Haiti National Energy Sector Development plan sought to inject 166,000 new biomass stoves into Haiti's cookstoves market. In addition, the Ministry of Environment articulated a plan to replace traditional charcoal stoves with fuel-efficient stoves by 2015. While neither plan received sufficient funding to be sustainable, they signal a desire to increase the availability of improved biomass stoves on the part of the government. This political momentum focuses on domestically produced improved stoves; government stakeholders may resist advocacy for increasing imports.

Proposed approach

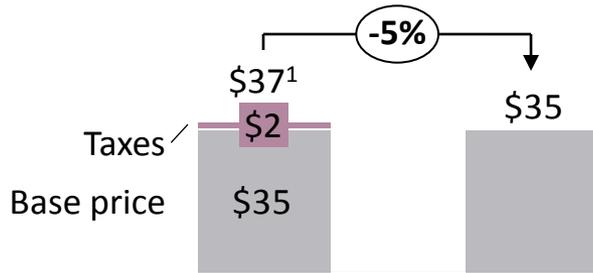
- Given the Haitian government's aversion to any 'fuel future' without a charcoal/briquette component, **a policy argument that does not articulate a plan to shift to more sustainable charcoal will likely be met with heavy resistance**; conversely, a plan that incorporates a move toward sustainable charcoal may be met with goodwill.
- A biomass-focused trade policy agenda should seek to (i) **open up the market for new ACS stove entrants** with a blanket VAT exemption for biomass stoves, (ii) **set the precedent for tax/tariff-exempt industrial equipment**, as a way of decreasing costs for current and future briquette/green charcoal manufacturers, and (iii) ensure that Haitians can continue to access green charcoal and briquettes by **advocating for a VAT exemption on sales**.
- For this policy argument to gain traction, GACC will likely need to **build a private sector** coalition comprised of local and international biomass stove manufacturers, offer **targeted support to local companies**, and build upon the resulting momentum to push for exemptions on biomass stoves, industrial equipment, and eventually sales of green charcoal and briquettes.

In the current market, eliminating taxes on biomass stoves could decrease prices by up to 5% and increase sales by 2% over five years

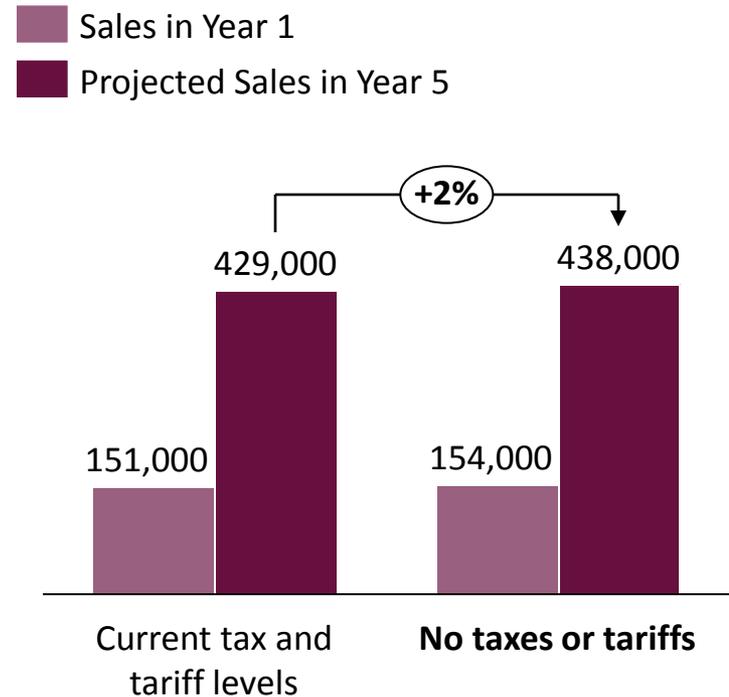
Removing taxes on basic ICS would lower the price by less than 1%



Removing taxes intermediate ICS stoves would lower prices by ~5%



The lower stove prices could lead to ~10K more biomass stoves purchased over 5 years²

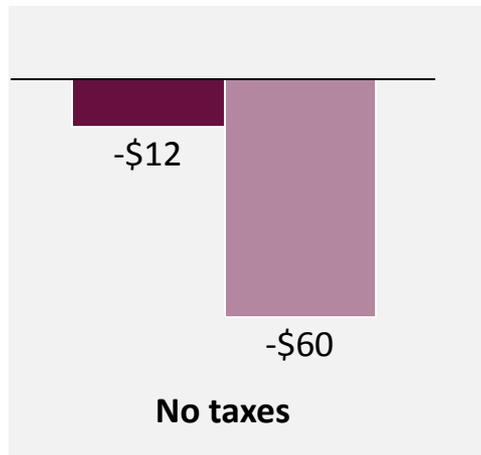


Trade policy insight: The market for intermediate ICS (rocket) stoves is most likely to benefit from lower trade barriers since basic and charcoal ICS are produced by local manufacturers that already have an exemption

While eliminating taxes and tariffs on biomass stoves decreases government revenue by ~\$12k, it could save \$16k in health costs

Removing taxes and tariffs on biomass stoves would lower government revenue by \$12,000 annually...

- 1 year change in gov't revenue ('000 USD)
- 5 year change in gov't revenue ('000 USD)



...but it would result in 6 averted deaths and 260 averted DALYs each year*



6 deaths averted could save **\$3K to \$28K** in funeral costs** (in the short term)



260 averted DALYs could save up to **\$16K** in averted healthcare expenditure annually^

(Assumes full conversion to ICS stove use for primary users)

Notes: (*) Compared to continued use of traditional and legacy stoves. (**) The average cost of a funeral in Haiti was \$540 in 2007, while some estimates indicate costs of \$5,000 per person. While \$5,000 per person is expensive, funerals in Haiti are almost always paid by international remittances. A range is indicated here. (^) Healthcare expenditure per capita in Haiti was \$61 per year in 2014, but the costs are conservative since those suffering from Household Air Pollution are more likely to incur higher health care costs compared to healthier individuals. Source: Dalberg analysis; GACC HAPIT model; World Bank – Healthcare expenditure per capita, 2014 (USD); Guardian 2012 – “The economic costs of violent crime in Haiti;” Crudem Foundation 2016.

Nonetheless, biomass-focused policy arguments may need to justify the need for a blanket tariff exemption on all biomass stoves

Point of resistance

Responses and potential talking points

The major domestic biomass stove manufacturer already receives exemptions, so there is no need for others

- While D&E Green is exempt from taxes and tariffs, other biomass stove manufacturers are still subject to high taxes and tariffs on kilning equipment, which is capped at 33% but reaches 40% when insurance and transportation are taken into account. These policies raise operational costs which impede the ability of other local stove manufacturers to produce biomass stoves at a lower cost
- A blanket tax/tariff exemption on biomass stoves will allow small scale producers/ local entrepreneurs to more easily shift to producing more complex, higher-quality biomass stoves
- Finally, a large scale exemption can prime the market for new, international ACS market entrants who are interested in Haiti but currently deterred by the unfavorable trade policy

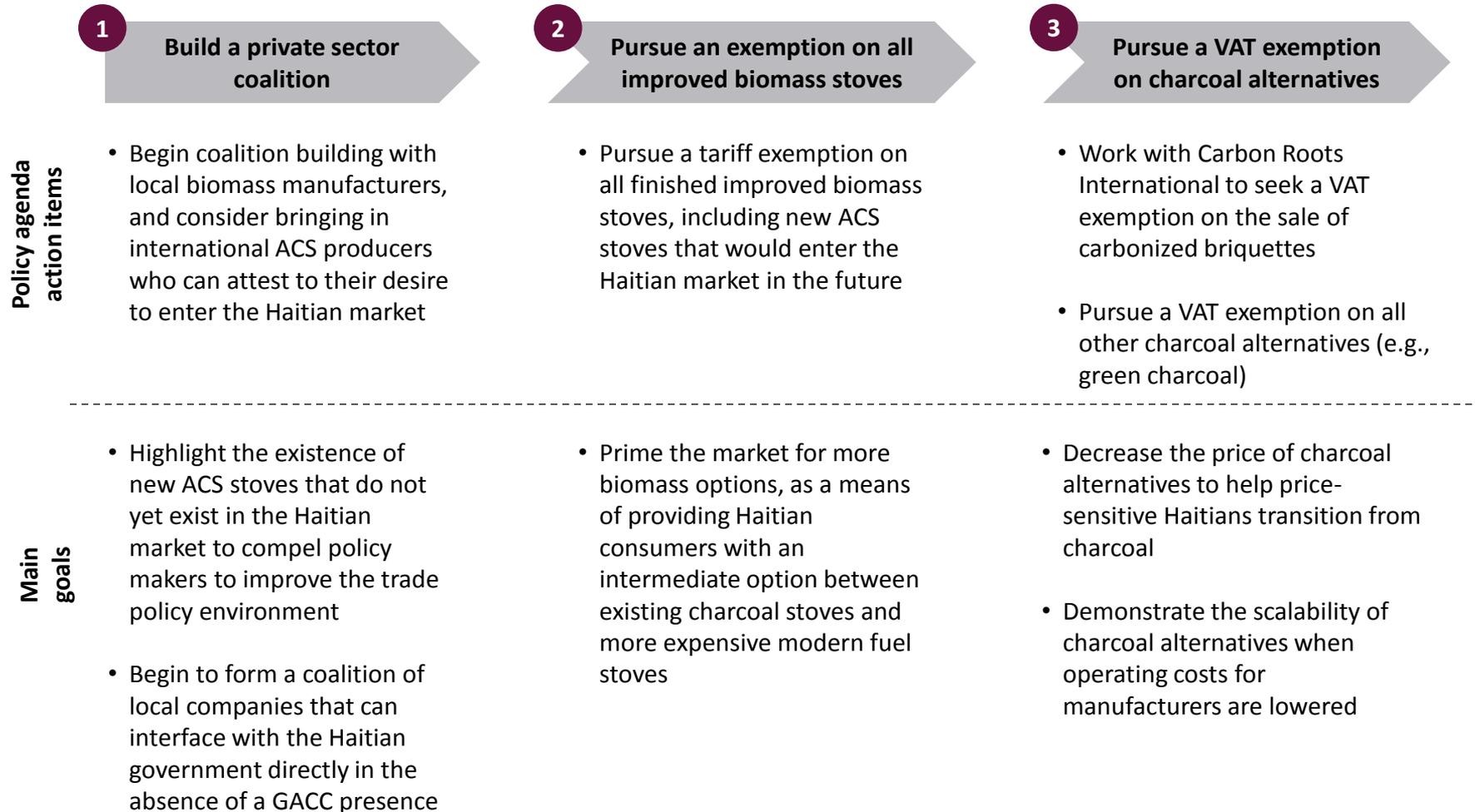
Lowering trade barriers on biomass stoves will hurt local manufacturers

- New ACS biomass stoves would enter the market at a higher price point and would target a different customer segment. Thus, these new stoves would not compete with existing ICS stoves and would have minimal impact on local ICS manufacturers
- If/when the Haitian ACS market grows, local producers like D&E Green will be able to manufacture ACS stoves given their existing customer base and the opportunity to convert their customers higher-end, more efficient advanced cookstoves. This will eventually make the ACS market in Haiti more competitive which stands to benefit local producers, in addition to Haitian consumers

Decreasing the price of biomass stoves will further contribute to Haiti's dependence on charcoal

- It will not if a biomass trade policy also advocates for tax and tariff exemptions on industrial equipment for manufacturing of briquettes and green charcoal. Currently, these producers face tax and tariff burdens of nearly 40% for the equipment, which raises their operational costs and impedes them from offering their products at a price point lower than traditional charcoal
- Furthermore, improved cookstoves use less charcoal per meal than basic cookstoves. Even in the absence of briquettes and green charcoal, opening up the market to more biomass options will lessen Haiti's dependence on charcoal

A powerful biomass policy agenda should begin with building a coalition, and then pursuing stove and – eventually – fuel exemptions



Fuel-specific analysis and policy arguments

Biomass stoves – approach, economic analysis, and policy arguments

Ethanol stoves – approach, economic analysis, and policy arguments

LPG stoves – approach, economic analysis, and policy arguments

Haitian policy makers will require significant education before considering ethanol as a viable fuel alternative to traditional charcoal

Overview

- The potential of **ethanol as a cooking fuel in Haiti remains largely unexplored due to lack of education, few existing players, and the high price point of the stoves** which makes them inaccessible to many Haitians. However, if taxes and tariffs were lowered, ethanol fuel would be at parity with other cooking fuels and stove prices would be less expensive than an average intermediate improved cookstove.
- Ethanol – unlike LPG – has major employment potential in Haiti, and could position the country as a supplier of ethanol fuel to neighboring Caribbean countries. Indeed, in the long-term, Haiti’s ability to produce ethanol domestically **could correct for its growing trade deficit and help develop a local industry** that creates high-quality manufacturing and service-oriented jobs.

Government outlook

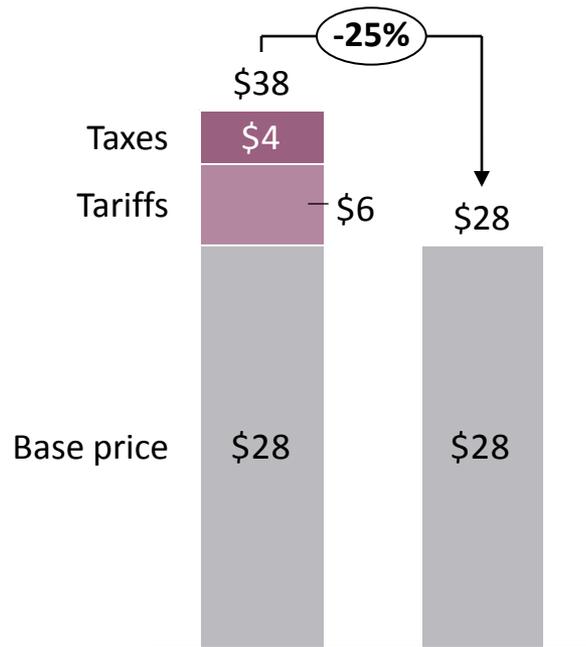
- The benefits notwithstanding, positioning ethanol as a viable fuel alternative will **require significant stakeholder education and sensitizing among both government stakeholders and consumers**. Various Haitian ministries are skeptical of the health, environmental, or economic benefits of ethanol; while previous government energy strategies have put forth initiatives for LPG and cleaner charcoal, none have included ethanol.
- Aside from a lack of previous plans or initiatives, **the two ministries whose buy-in is most essential remain the most skeptical of ethanol**. The Bureau of Mines and Energy sees no room for ethanol among alternatives in Haiti’s fuel future, and the Ministry of Environment described ethanol as ‘infeasible’ in Haiti.

Proposed approach

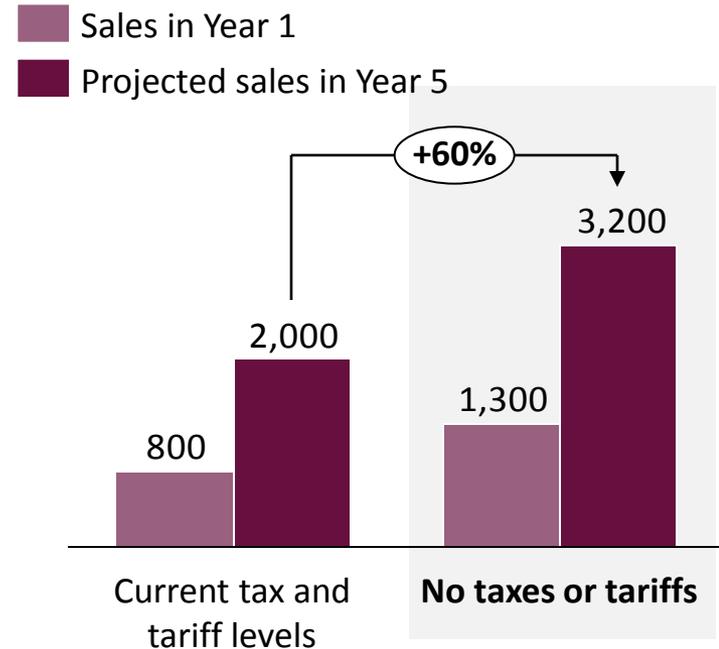
- Before broaching a discussion about trade barriers, GACC should pursue (i) education among government stakeholders about the potential of ethanol cooking, perhaps by **drawing in examples from analogue countries**, and (ii) consumer education as a means of stimulating demand.
- After initial buy-in increases and the government becomes more receptive to considering ethanol, GACC can **engage in coalition building** and then consider broaching tax/tariff reductions on ethanol stoves and fuel. One potential internal champion might be Haiti’s Ministry of Agriculture. While additional conversations will be required to fully understand the Ministry’s perspective on ethanol, some stakeholders¹ suggest that the Ministry might support local ethanol production given the opportunity to employ local farmers and export ethanol to neighboring countries.

Lower taxes and tariffs on ethanol stoves would decrease price by 25%, making them more affordable to a larger segment of the population

Removing taxes and tariffs on ethanol stoves would lower prices by ~25%, making them more affordable than some ICS models

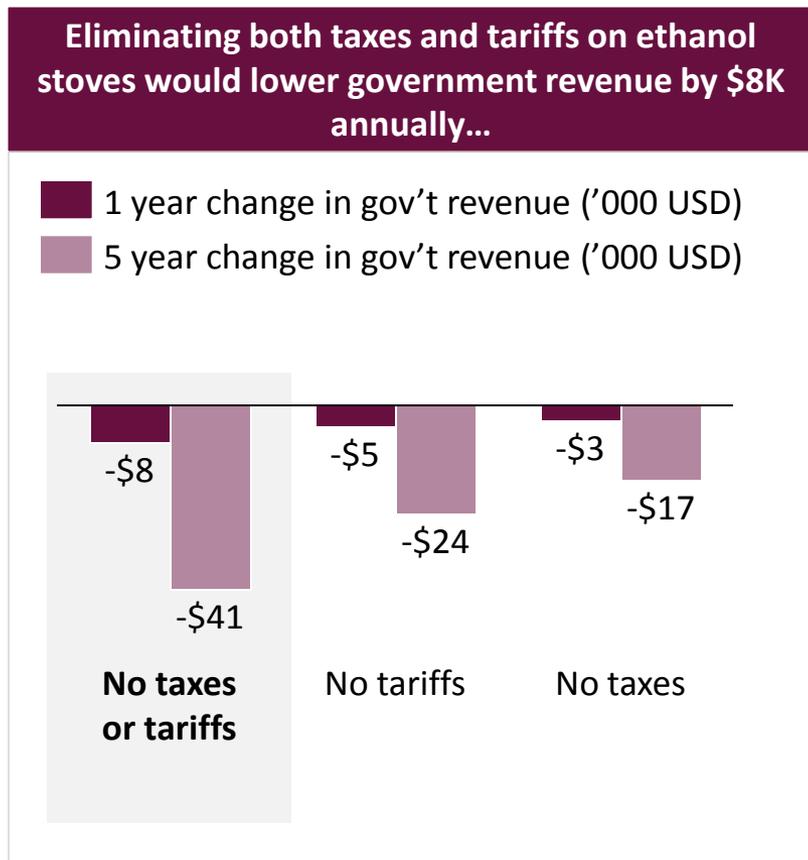


The lower ethanol stove price could lead to an increase of 500 stoves purchased in Year 1 and an additional ~1,000+ stoves purchased over 5 years



Trade policy insight: Decreasing taxes and tariffs on ethanol stoves makes them \$7 less expensive than an average intermediate biomass stoves and generates much greater environmental and health benefits

And, while lower trade barriers might decrease government revenue by ~\$8k annually, averted health care spending could be 8x that amount



...but it would result in over 20 averted deaths and 1,080 averted DALYs each year*



24 deaths averted
could save **\$13K to \$120K** in funeral costs** (in the short term)



1,082 averted DALYs
could save up to **\$66K** in averted healthcare expenditure annually^

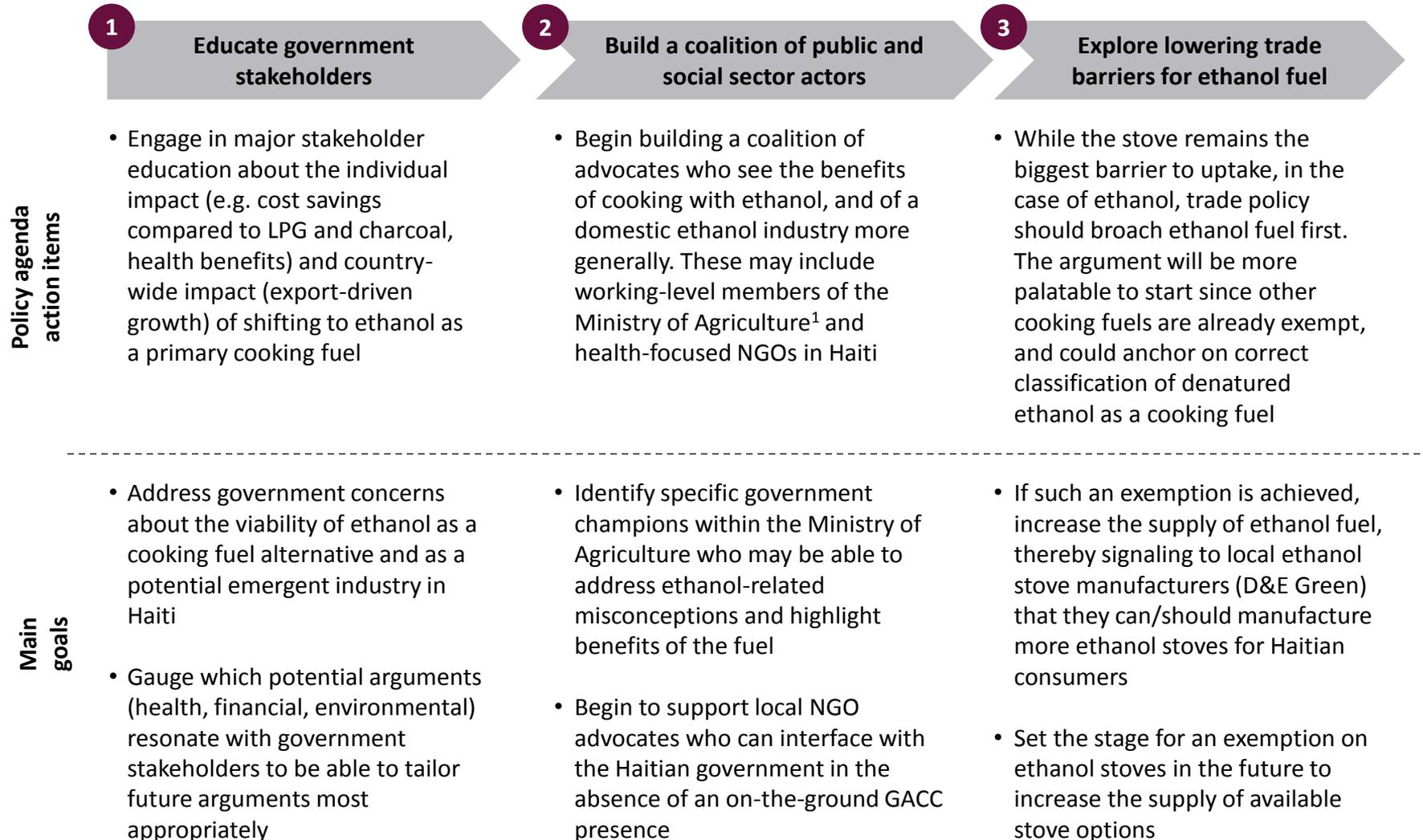
(Assumes full conversion to ethanol stove use for primary users)

Notes: (*) Compared to continued use of traditional and legacy stoves. (**) The average cost of a funeral in Haiti was \$540 in 2007 while some estimates indicate costs of \$5,000 per person. While \$5,000 per person is expensive, funerals in Haiti are almost always paid by international remittances. A range is indicated here. (^) Healthcare expenditure per capita in Haiti was \$61 per year in 2014, but the costs are conservative since those suffering from Household Air Pollution are more likely to incur higher health care costs compared to healthier individuals. Source: Dalberg analysis; GACC HAPIT model; World Bank – Healthcare expenditure per capita, 2014 (USD); Guardian 2012 – “The economic costs of violent crime in Haiti;” Crudem Foundation 2016.

Despite this potential, an ethanol policy agenda will need to mitigate concerns about the perceived health risks and its ability to scale

Point of resistance	Responses and potential talking points
Ethanol poses major health risks for Haitians	<ul style="list-style-type: none">• Cooking with ethanol benefits public health more than cleaner charcoal and has health benefits on par with LPG. While ethanol can indeed be dangerous if ingested or ignited, it is quite safe compared to LPG, which kills thousands globally every year through cylinder explosions. Moreover, ethanol ingestion is now even less of a risk given the use of bittering agents to dissuade consumption.
Ethanol usage will remain small scale, with low potential to scale	<ul style="list-style-type: none">• The ethanol market can grow larger than the LPG market given its lower price point. Indeed, tax/tariff-exempt one-burner LPG stoves are projected to cost \$8 more than comparable ethanol stoves, and prices for more premium products will remain at over \$100.• In the near-term, ethanol usage will remain low since charcoal and LPG are starting from a stronger position. In the long-term however, it has the potential to grow and can be a more viable and affordable fuel options to Haitians.
Ethanol will further disrupt Haiti's trade balance since both fuel and stoves will need to be imported	<ul style="list-style-type: none">• While ethanol fuel and stoves will be imported in the near term, it can improve the trade balance in the long-term. Companies such as POET are committed to catalyzing local production of ethanol fuel, and Haiti has sugar cane stock which can be used to produce sufficient ethanol to help supply the domestic market. Indeed, developing local production capacity of ethanol will be essential to building a local market and decreasing imports and donations of ethanol fuel, both of which Haiti currently depends on.• While companies such as Novogaz will import ethanol stoves, domestic companies like D&E Green already produce ethanol stoves and have voiced a desire to increase production if there were a reliable ethanol fuel source in country.
Developing ethanol in Haiti would be too time and cost intensive	<ul style="list-style-type: none">• While investment in a domestic ethanol industry will require time and resources, the long-term return-on-investment would be positive. In addition to building local industry and creating high-quality employment, Haiti might expect to see additional Foreign Direct Investment for ethanol production, as other Latin American and Caribbean countries (Cuba, Suriname) have.

Thus, before broaching lowering trade barriers, GACC and its partners should identifying local champions and build stakeholder buy-in



Notes: (1) Vladimir Laborde, formerly of the Center for Facilitation of Investments, suggested that the Ministry of Agriculture might be supportive of local ethanol production based on his experience in Haiti. However, additional conversations will be required to better understand their position

Fuel-specific analysis and policy arguments

Biomass stoves – approach, economic analysis, and policy arguments

Ethanol stoves – approach, economic analysis, and policy arguments

LPG stoves – approach, economic analysis, and policy arguments

Despite its high price point in comparison to other fuels, LPG has government buy-in as a viable modern fuel alternative to charcoal

Overview

- The biggest barrier to LPG usage is the cost of the stove which ranges from \$45 for one-burner stoves to more than \$100 in some cases. While lowering trade barriers on LPG stoves makes them more affordable, **one-burners remain more expensive than ethanol and biomass stoves** that are currently in the Haitian market, and **more premium two- or three-burner stoves will remain inaccessible to most Haitians**.
- In spite of the high price points, the Haitian government is keen to explore LPG as a modern fuel alternative. Previous public-sector led approaches have failed due to **insufficient funding**. Thus, a more sustainable shift to LPG will require a market-based approach that allows for more LPG stove manufacturers to enter – and thrive in – the Haitian market. Lower trade barriers are one part of the solution.

Government outlook

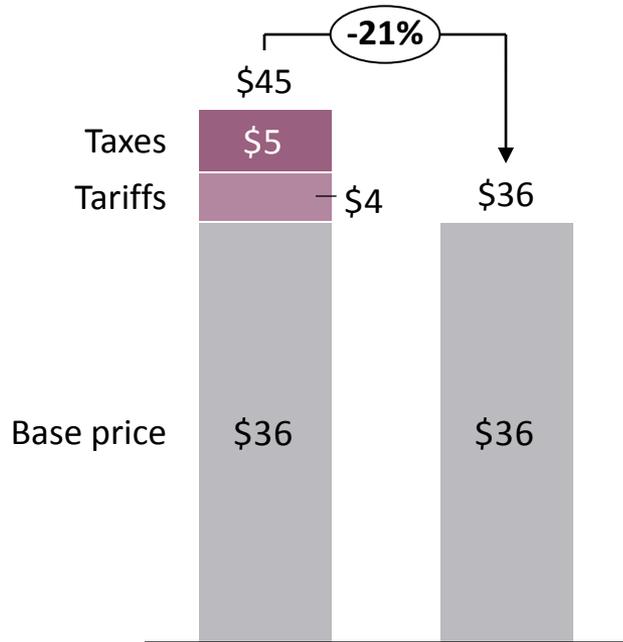
- Haiti's National Energy Sector Development plan sought to convert **660,000 households to LPG by 2017** and the World Bank's ESMAP program's stated objective was **to double LPG consumption between 2007 and 2017**. A separate government plan intended to increase the percentage of Haitians using cleaner fuels (including LPG) to 26%.
- Given that the main roadblocks to successful implementation have been insufficient financial resources, the Haitian government might be keen to **explore a market-based approach that more actively engages the private sector**.

Proposed approach

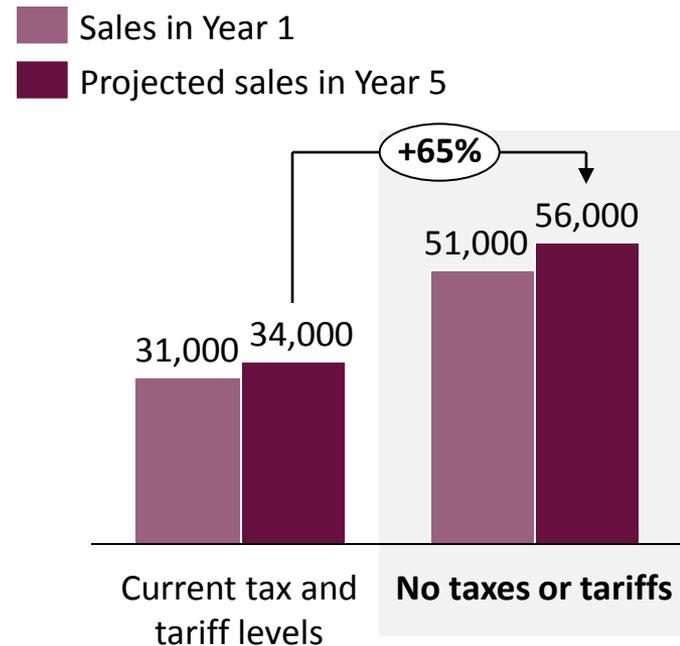
- Since LPG stove imports are a revenue generator for the Haitian government, gaining an industry-wide exemption for LPG stoves will prove challenging. However, given the government's desire to shift consumers to LPG, GACC has an opportunity **to support government initiatives as a way of building rapport** and signaling a desire to collaborate in the future.

Eliminating taxes and tariffs on one-burner LPG stoves could decrease prices by 20% and increase LPG stove usage over 65%

Removing taxes and tariffs on one-burner LPG stoves would lower prices by ~20%, but they would still be higher than other stoves



The lower stove price for a one-burner could lead to an increase of ~20k stoves in year 1, as well as cumulatively, over a five-year period¹



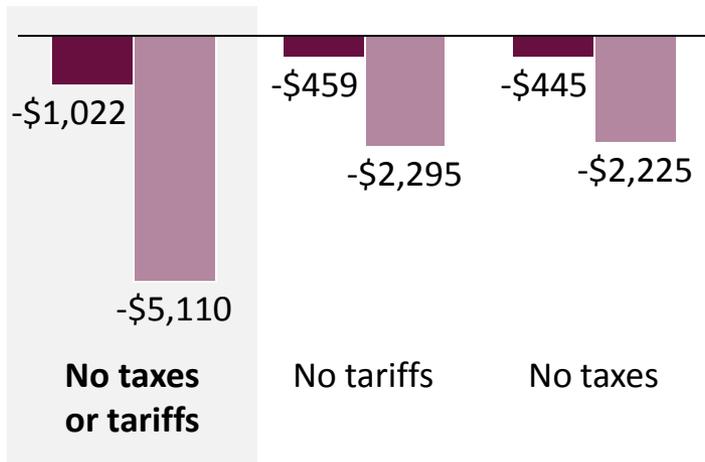
Trade policy insight: While lowering taxes and tariffs on one burner stoves makes them more affordable, more premium LPG stoves (e.g. three burner stoves with large tanks) will remain unaffordable to the majority of the Haitian population

Notes: (1) This analysis shows the increase in demand for low-cost LPG, one burner stoves that are available in the market. However, the 32,000 figure estimates all LPG stoves sold in the Haitian market, not just one-burners. See annex for explanation of the methodology on price elasticity and market share growth over time. Sources: Stakeholder interviews with Palmis Eneji, Valerio Canez, and Haiti Switch; Dalberg analysis

However, the Haitian government stands to lose \$1M in annual revenue, alongside averted funeral costs and health care expenditures

Removing taxes and tariffs on all LPG stoves would lower government revenue by \$1M annually

■ 1 year change in gov't revenue ('000 USD)
 ■ 5 year change in gov't revenues ('000 USD)



...but it would result in over 900 averted deaths and 40,800 averted DALYs each year¹



907 deaths averted could save **\$490K to \$4.5 million** in funeral costs² (in the short term)



40,810 averted DALYs could save up to **\$2.5 million** in averted healthcare expenditure annually³

(Assumes full conversion to LPG stove use for primary users)

Notes: (*) Compared to continued use of traditional and legacy stoves. (**) The average cost of a funeral in Haiti was \$540 in 2007 while some estimates indicate costs of \$5,000 per person. While \$5,000 per person is expensive, funerals in Haiti are almost always paid by international remittances. A range is indicated here. (^) Healthcare expenditure per capita in Haiti was \$61 per year in 2014, but the costs are conservative since those suffering from Household Air Pollution are more likely to incur higher health care costs compared to healthier individuals. Source: Dalberg analysis; GACC HAPIT model; World Bank – Healthcare expenditure per capita, 2014 (USD); Guardian 2012 – “The economic costs of violent crime in Haiti;” Crudem Foundation 2016.

Given that LPG stoves make up the bulk of imports, policy arguments will need to address concerns about revenue and the trade balance

Point of resistance	Responses and potential talking points
<p>There are already existing initiatives to shift consumers to LPG; lowering trade barriers will add little value</p>	<ul style="list-style-type: none">• While the government has launched initiatives to increase usage of LPG stoves, previous plans have not attracted sufficient funding, and thus have not been able to convert consumers as planned• In order to shift consumers to LPG on a permanent basis, Haiti will require a more robust LPG private sector that offers a market-based solution. Lowering trade barriers can help lay the groundwork for the emergence of such a market
<p>The loss in government revenue is extreme, since LPG stove revenue represents the bulk of cookstoves revenue</p>	<ul style="list-style-type: none">• Admittedly, the bulk of cookstoves revenue comes from LPG stove imports. However, what the government loses in tariff revenue, it may earn in averted health care expenditure due to lower household air pollution and fewer deaths• In fact, averted health care expenditure could be invested to strengthen Haiti's public health systems to help address household air pollution-related illnesses more holistically
<p>Shifting to LPG will further disrupt the trade balance and make Haiti more vulnerable to external energy shocks</p>	<ul style="list-style-type: none">• There are two issues at hand: LPG fuel and LPG stoves. In the near to medium term, Haiti will be unable to produce LPG fuel domestically which may further disrupt the trade balance. In the case of LPG stoves, lowering taxes and tariffs will decrease prices, stimulate demand, and enable local stove manufacturers with the capacity to produce LPG stoves in Haiti (D&E Green, Haiti SWITCH to increase production). This will eventually make Haiti less dependent on LPG stove imports and help offset an increase in fuel imports• In addition, there may be potential for Haiti to export locally-manufactured LPG stoves to the DR if Haitian costs of production are lower
<p>Scaling up LPG fuel supply will be dangerous</p>	<ul style="list-style-type: none">• While there are dangers associated with LPG, they can be mitigated with (i) improved standards and classification and (ii) regulation that is enforced. Haiti's new government agency focused on standards and classification can play a key role in developing clear regulatory policies as LPG usage increases

GACC's LPG strategy may begin with convening, and strengthening linkages between domestic LPG producers and the government

1

Strengthen linkages between the government and private sector

2

Seek an elimination of the 15% tax on LPG stoves

Policy agenda
action items

- Link local private sector manufacturers and/or importers such as Valerio Canez to BME and the Ministry of Environment, and begin to play a convening role to help increase communication between government ministries and the private sector

- Following increased understanding the Haitian government's priorities, advocate for an elimination of the 15% government mandated LPG stove tax alongside a coalition of stove manufacturers (Valerio Canez), LPG distributors, and social enterprises (Palmis Eneji, Haiti SWITCH)

Main
goals

- Bridge ties between the private sector the government, as a means of supporting a market-based approach and strengthening the convening authority of GACC
- Improve understanding of the government's LPG priorities in order to build rapport with them and increase the opportunity for collaboration in the future

- Empower both private and public sector actors to interface with the Haitian government on an ongoing basis
- Increase communication between various LPG stove distributors/manufacturers since the Haitian market is very fragmented

Table of contents

Contents	Page
Framing, objectives, and methodology	3
Executive summary	8
Observations about Haiti's cookstoves market	13
Key findings on cookstoves taxes and tariffs	23
Economic analysis and policy arguments	32
Country case studies	59
Advocacy toolkit	65
Annex materials	78

Kenya offers a lesson in how to lower trade barriers on stoves and fuels by using a tiered approach and building a large government coalition

Overview

- Estimates indicate that **14,300 Kenyans died annually due to household air pollution** as a result of cooking with solid fuels such as charcoal and wood. While LPG was available in the market, fewer consumers used it due to the **higher price point** compared to solid fuels and kerosene.
- To help stimulate demand, the Kenyan government first removed **all taxes on domestically-manufactured LPG appliances**. Then, the government reduced import duties on LPG cylinders from 25% to 0%.
- After lowering trade barriers on LPG stoves, the Kenyan government **removed VAT on LPG to make the fuel more affordable**, and at the same time, reduced imports on energy efficient stoves to (i) decrease import costs for manufacturers/distributors and (ii) increase consumer access to cleaner stoves.

Intended impact

- The goal of this policy change is to help shift **eight million consumers to LPG** over the next 3-4 years.
- In addition, the government hopes to **encourage additional private sector investment in LPG handling and storage** by improving the enabling environment.

Relevant lessons Haiti's cookstoves market

- The Kenyan government took a **tiered approach to making both stoves and fuels more accessible to consumers**. Elimination of trade barriers can successfully build upon each other (e.g. starting with components, then fuels, then finished stove products).
- Building a **government-wide coalition comprised** of cabinet members, government ministries and Parliament is most likely to lead to large-scale policy change.

Ukraine – while geographically remote – is an example of how to link tariff exemptions with industry certifications for biofuels

Overview

- In 2009, Ukraine's Department of Engineering and Technical Supply and Ministry of Agrarian Policy instituted a **duty exemption on biofuels machinery and equipment**. The duty exemption will last until 2020.
- In addition to an exemption on biofuels equipment, the policy also offered **income tax exemptions on sales of biofuels products**, agricultural machines that would be fueled by biofuels, and **construction machinery that would be used to build ethanol-focused businesses**.
- Raw ethanol imports were also made tariff-free. However, in order to qualify for the exemption, companies had to **undergo registration to certify that there were involved in biofuels production** in some capacity.

Intended impact

- The goal of the exemption is to increase the share of energy produced by renewable sources to **20% by 2020**.

Relevant lessons Haiti's cookstoves market

- Tariff exemptions can be done on a **temporary basis** to assess the impact on the market. In the case of Ukraine, the biofuels duty exemptions last until 2020, at which point the country **can assess the impact and course-correct** if necessary.
- **Linking exemptions with registration can help to mitigate concerns about quality control**. In Haiti, micro-distilleries sold ethanol with no adherence to a regulatory framework; the Ukraine example is particularly apt if Haiti decides to pursue a tax exemption on ethanol sales.

Case studies from other sectors – such as solar products in Jamaica – are an example of how to address indirect subsidies to dirty fuels

Overview

- The goals of the 2009-2030 Jamaica National Energy policy were to **increase energy security, diversify energy usage, and reduce the country's carbon footprint** by shifting to renewable energy.
- At the same time, Jamaica sought to **improve its trade balance; the country spent \$1.3BN annually on petroleum imports** and was at risk of energy instability due to its reliance on countries like Venezuela for its energy supply.
- Traditionally, **solar power had not been cost-competitive** in Jamaica due to direct and indirect subsidies to fossil fuels.
- To level the playing field, Jamaica made a **variety of solar products and product components tax exempt** including panels and tubes, solar fans, and solar refrigerators.

Market impact

- The policies succeeded in making solar energy much more cost-competitive with other forms of energy. For example, **solar panel prices have decreased by 80%** and the prices of certain components decreased by 45%.

Relevant lessons Haiti's cookstoves market

- There is value in **reducing taxes/tariffs on both components and finished products**. Low taxes and tariffs on components can stimulate local manufacturing. At the same time, tax-free finished products are more likely to stimulate demand among consumers.
- In instances where there is an **indirect subsidy** on a fossil fuel, targeted action is required to bring the price of alternative fuels to parity.

In fact, many African countries have reduced taxes and tariffs on solar products and have seen vibrant domestic growth as a result

Country case studies: solar

Country	Tariff and tax exemption	Impact
Kenya	<ul style="list-style-type: none"> In 2009, Kenya reduced VAT on solar products to zero. After a brief repeal in 2013, Kenyan Treasury Secretary Henry Rotich exempted solar products from all taxes and import duties in May 2014 	<ul style="list-style-type: none"> Kenya's market moved from donor-funded to a thriving private marketplace, with 700K solar lanterns sold in the last 3 years Demand is outpacing supply for local employees in solar distribution and service
Uganda	<ul style="list-style-type: none"> In 2011, Ugandan Minister of Finance Maria Kiwanuka amended Uganda's tax code and customs management to reduce import duties and VAT on solar to 0% 	<ul style="list-style-type: none"> As of 2015, the Ugandan solar market is vibrant and growing, with over 30K solar installations per year. SolarNow, a Ugandan company, leads the market with 30% share of sales and distribution.
Tanzania	<ul style="list-style-type: none"> In 2005, Tanzanian Minister of Finance, Basil Mramba, lowered VAT on solar from 20% to 0% and reduced solar import duties to 5% 	<ul style="list-style-type: none"> Installed solar capacity in Tanzania tripled from 2003 to 2009 Tanzania now has a robust solar distribution sector; Helvetic Solar Contractors alone boasts sales of >US\$10M/year
Rwanda	<ul style="list-style-type: none"> In 2006, Rwanda's Minister of Finance exempted all solar goods from import duties and taxation 	<ul style="list-style-type: none"> Gigawatt Global recently launched a US\$23.7M solar energy plant in Rwanda Two home-grown solar companies compete in the Rwandan market

These solar exemptions have also accelerated technology transfer, helping African nations kick-start their own manufacturing base

Country case studies: solar

Technology transfer: example investments in...



- After VAT exemptions, a consortium of Kenyan and Chinese investors launched the China-Kenya Solid State Lighting Technology Transfer Center
- Kenyan engineers learn how to manufacture, assemble, and maintain solar products for their own future enterprises
- Investors are expanding the center into a local plant



- VAT exemptions helped make the case for China to invest US\$550K in solar kits to jumpstart the Rwandan solar market
- China's governments has committed to training 10,000 African engineers in solar technology by 2020
- Rwandans are trained on the installation, operation, and maintenance of solar equipment

Table of contents

Contents	Page
Framing, objectives, and methodology	3
Executive summary	8
Observations about Haiti's cookstoves market	13
Key findings on cookstoves taxes and tariffs	23
Economic analysis and policy arguments	32
Country case studies	59
Advocacy toolkit	65
Annex materials	78

For advocates: The following slides can be printed out for policy discussions with Haitian stakeholders

Major points to keep in mind in policy discussions:

- The following slides are duplicate and/or simplified versions of the economic analysis slides. These slides will allow a government stakeholder to more easily digest the information and absorb major points
- Slide selection should be tailored depending on the audience and the advocate's fuel focus. For example, biomass-focused importers and manufacturers should arm themselves with biomass-focused slides and supplement the analysis with their own experiences for more context
- The annex contains a slide with the methodology used for this analysis. However, given that – in many cases – applied taxes and tariffs differ from the actual policy, advocates can expect some government stakeholders to disagree with some of the figures and rates

For advocates: There are four main success factors to consider in your policy arguments

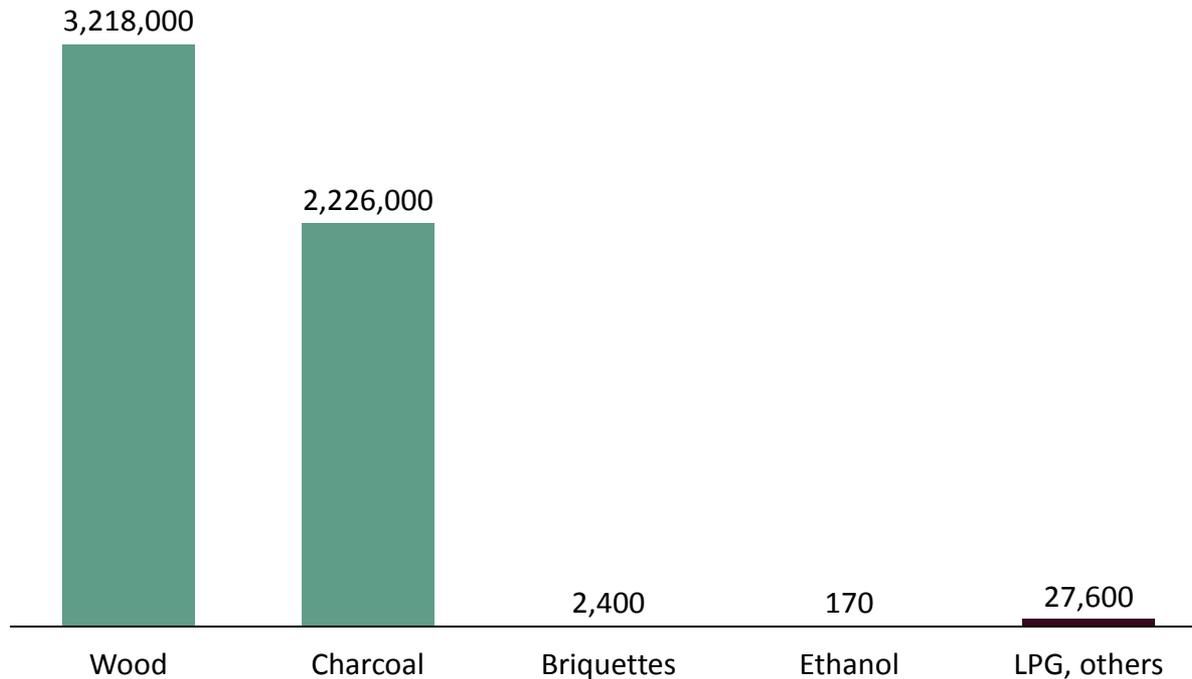
Success factors	Description
Tailor arguments based on the specific government outlooks	<ul style="list-style-type: none">The Haitian government has diverse outlooks for each fuel, with more buy-in for charcoal/briquettes and LPG than for ethanolThus policy arguments should be fuel-specific to account for the different perceptions and stages of each of these fuels in Haiti
Propose policy shifts that are most likely to shift Haitians to cleaner stoves and fuels	<ul style="list-style-type: none">Purchase of the stove is the main barrier to shifting Haitians to cleaner cooking solutions. Consumers make fuel choices to accommodate their stoveWhile eliminating taxes/tariffs on fuels has some benefits, the policy arguments that follow focus on removal of trade barriers for stoves given the higher potential for impact if they are removed
Address concerns about decreased fiscal impact, among other points of resistance	<ul style="list-style-type: none">The Haitian government will likely express concerns about lost revenue, and policy argument should seek to articulate how shifting to cleaner stoves might result in cost savings elsewhereAt the same time, advocates should be prepared to address other fuel-specific points of resistance
Sequence steps accordingly	<ul style="list-style-type: none">Policy arguments and related strategies (e.g. coalition building), will need to be sequenced accordingly to ensure that when discussions about trade policies are broached, Ministry stakeholders are ready to engage

For Haitian ministers: Haitians consume more than 5M metric tons of wood and charcoal annually

Consumption of cooking fuels by households

Annual consumption by current household owners, MT (2016 estimate)

■ Domestic ■ Imported



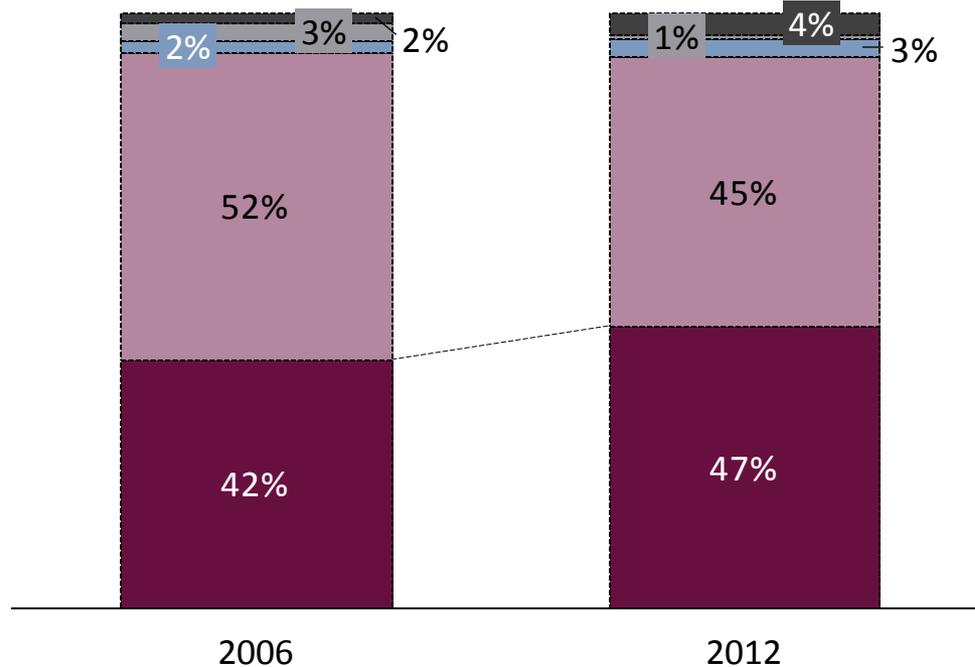
Solid fuel cooking continues to dominate the Haitian market, with very few citizens using renewable or modern cooking fuels

Notes: (1) These figures estimate household consumption and do not account for large users in addition to households, hence this does not fully represent charcoal consumption on a country-wide basis. Source: Dalberg analysis; producer and importer interviews with and data on fuel sales and fuel usage per meal from POET, D&E Green, SWITCH, Carbon Roots International, Valerio Canez, and Palmis Eneji; DHS 2012.

For Haitian ministers: The percentage of Haitians cooking with charcoal has increased by 7 percentage points over the past 10 years

Share of households cooking with a given fuel as their primary fuel (% estimates)

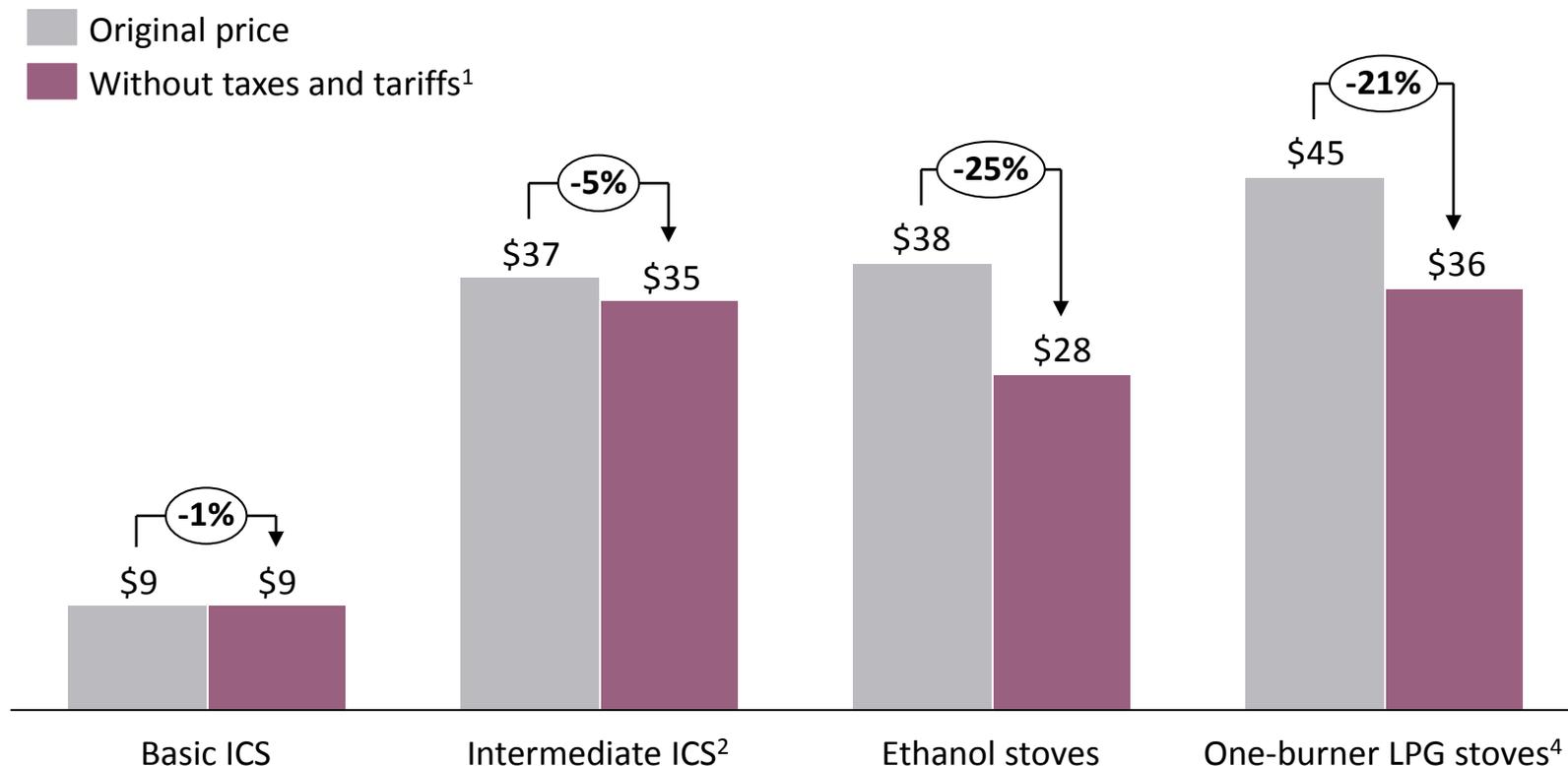
Others Kerosene LPG Wood Charcoal



More than 80% of urban households use charcoal as their primary fuel, and Haiti's urban population growth rate is 3.4%, compared to the overall population growth rate of 1.4%. This suggests that **the percentage of Haitians using charcoal as their primary cooking fuel will only grow**

For Haitian ministers: Lowering taxes and tariffs would decrease stove prices significantly, especially for ethanol and LPG stoves

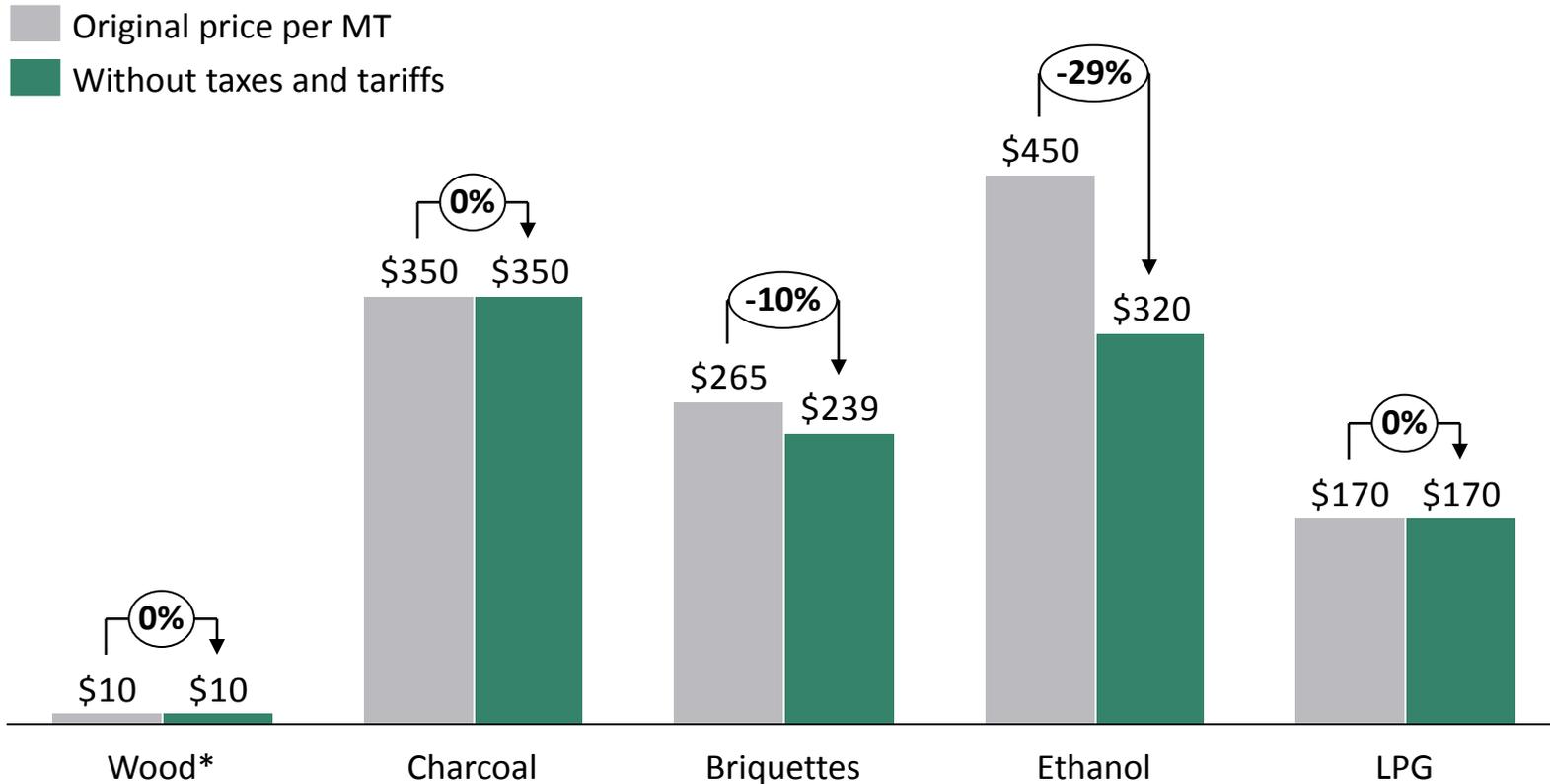
Predicted changes in stove price after removal of stove taxes and tariffs



Notes: (1) Prices are a weighted average of multiple stove types, including those that are already exempt. The price without taxes and tariffs thus average the price of stoves that are already exempt with those that would be newly exempt under a tax and tariff reduction (2) This price point is an average of intermediate charcoal stoves (\$12) produced by D&E Green and more expensive built-in rocket stoves (\$60) which currently exist in Haiti [Dalberg](#) 69 but are not yet sold widely due to their higher price point. Sources: D&E Green, Dalberg analysis

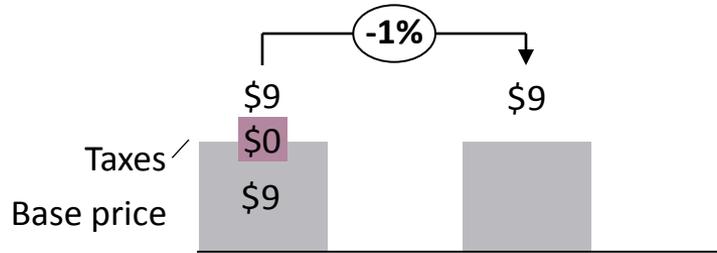
For Haitian ministers: Lowering taxes and tariffs would also decrease fuel prices, most notably for ethanol

Predicted changes in fuel price after removal of fuel taxes and tariffs

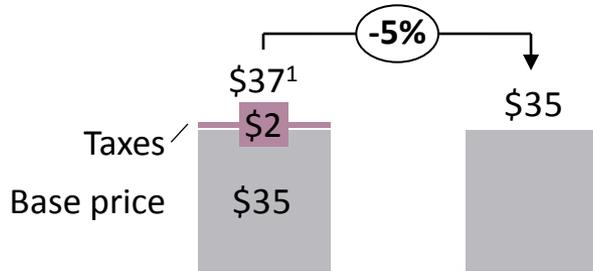


For Haitian ministers: Eliminating taxes on biomass stoves could decrease prices by up to 5% and increase sales by 2% over five years

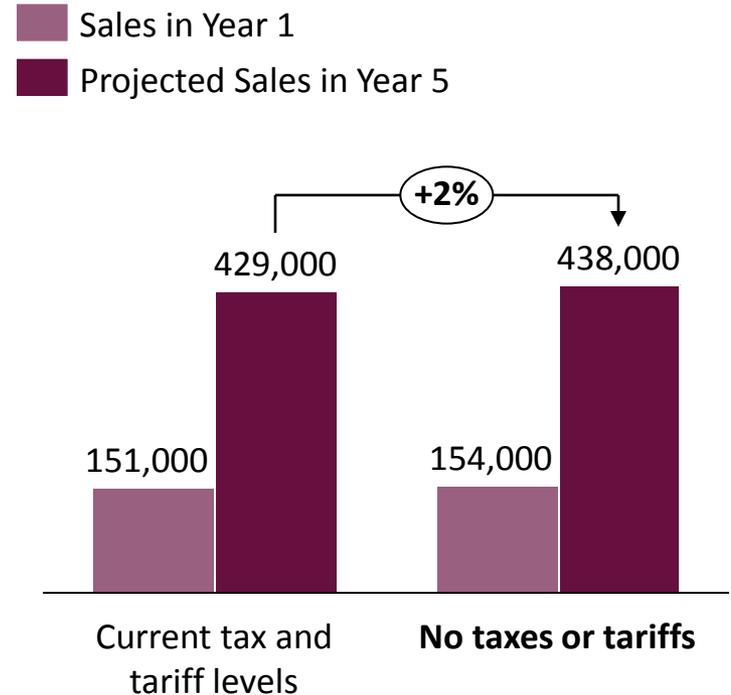
Removing taxes on basic ICS would lower the price by less than 1%



Removing taxes intermediate ICS stoves would lower prices by ~5%



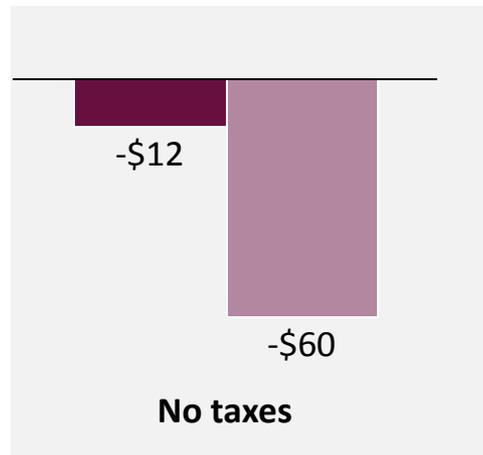
The lower stove prices could lead to ~10K more biomass stoves purchased over 5 years²



For Haitian ministers: Eliminating taxes on biomass stoves decreases government revenue by ~\$12k, but could save \$16k in health costs

Removing taxes and tariffs on biomass stoves would lower government revenue by \$12,000 annually...

- 1 year change in gov't revenue ('000 USD)
- 5 year change in gov't revenue ('000 USD)



...but it would result in 6 averted deaths and 260 averted DALYs each year*



6 deaths averted could save \$3K to \$28K in funeral costs** (in the short term)



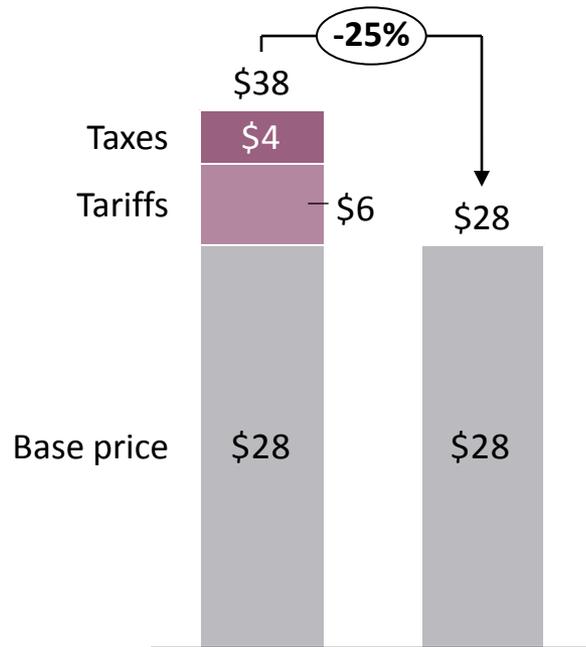
260 averted DALYs could save up to \$16K in averted healthcare expenditure annually^

(Assumes full conversion to ICS stove use for primary users)

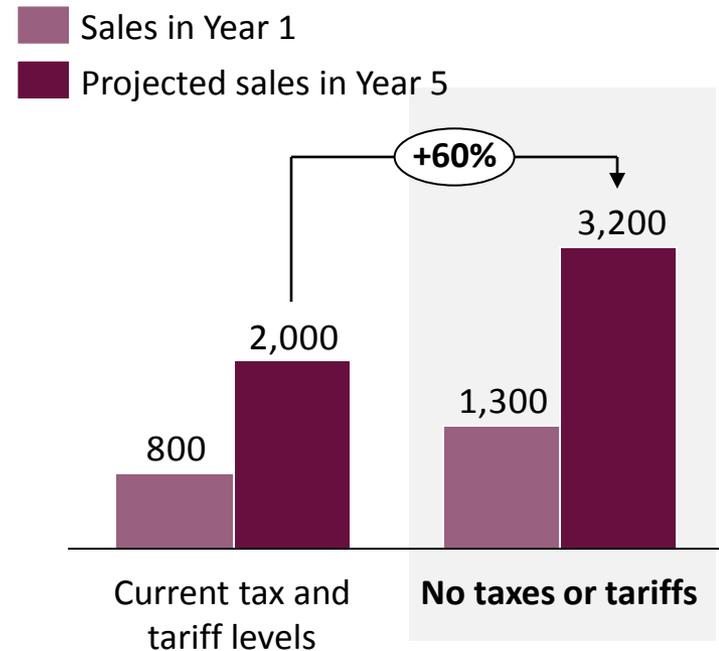
Notes: (*) Compared to continued use of traditional and legacy stoves. (**) The average cost of a funeral in Haiti was \$540 in 2007, while some estimates indicate costs of \$5,000 per person. While \$5,000 per person is expensive, funerals in Haiti are almost always paid by international remittances. A range is indicated here. (^) Healthcare expenditure per capita in Haiti was \$61 per year in 2014, but the costs are conservative since those suffering from Household Air Pollution are more likely to incur higher health care costs compared to healthier individuals. Source: Dalberg analysis; GACC HAPIT model; World Bank – Healthcare expenditure per capita, 2014 (USD); Guardian 2012 – “The economic costs of violent crime in Haiti;” Crudem Foundation 2016.

For Haitian ministers: Eliminating taxes and tariffs on ethanol stoves would decrease prices by 25% and increase sales by ~60% over 5 years

Removing taxes and tariffs on ethanol stoves would lower prices by ~25%, making them more affordable than some ICS models



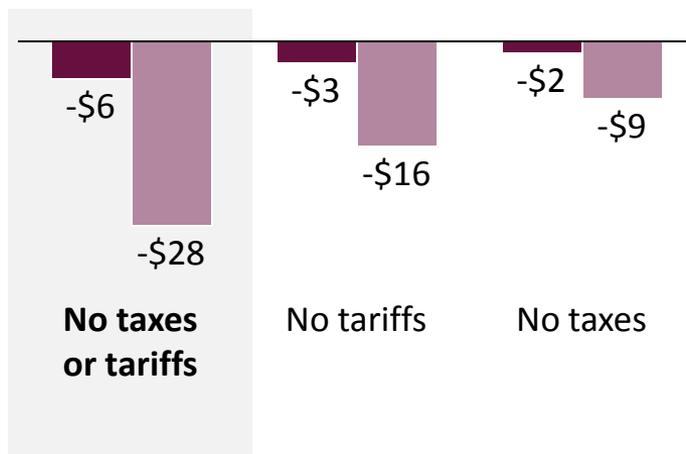
The lower ethanol stove price could lead to an increase of 500 stoves purchased in Year 1 and an additional ~1,000+ stoves purchased over 5 years



For Haitian ministers: Lowering taxes might decrease gov't revenue by ~\$6k, but averted health care spending would be 10x that amount

Eliminating both taxes and tariffs on ethanol stoves would lower government revenue by \$6K annually...

■ 1 year change in gov't revenue ('000 USD)
 ■ 5 year change in gov't revenue ('000 USD)



...but it would result in over 20 averted deaths and 1,080 averted DALYs each year*



24 deaths averted could save **\$13K to \$120K** in funeral costs** (in the short term)

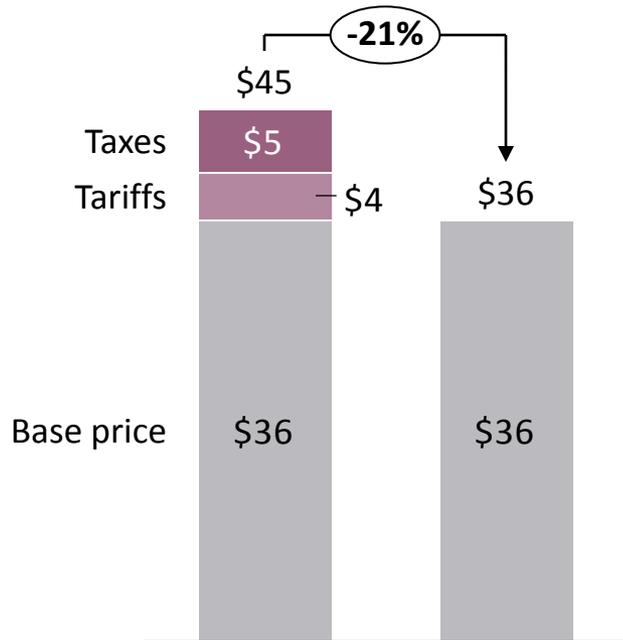
1,082 averted DALYs could save up to **\$66K** in averted healthcare expenditure annually^

(Assumes full conversion to ethanol stove use for primary users)

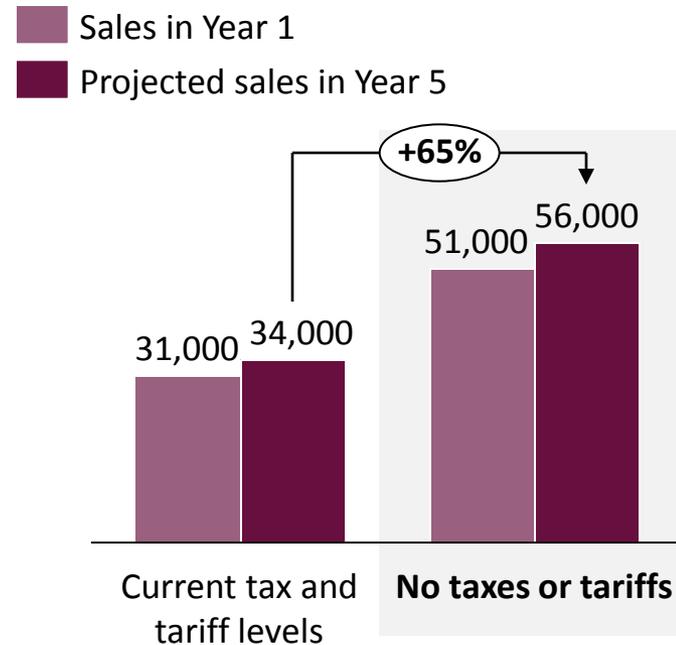
Notes: (*) Compared to continued use of traditional and legacy stoves. (**) The average cost of a funeral in Haiti was \$540 in 2007 while some estimates indicate costs of \$5,000 per person. While \$5,000 per person is expensive, funerals in Haiti are almost always paid by international remittances. A range is indicated here. (^) Healthcare expenditure per capita in Haiti was \$61 per year in 2014, but the costs are conservative since those suffering from Household Air Pollution are more likely to incur higher health care costs compared to healthier individuals. Source: Dalberg analysis; GACC HAPIT model; World Bank – Healthcare expenditure per capita, 2014 (USD); Guardian 2012 – “The economic costs of violent crime in Haiti;” Crudem Foundation 2016.

For Haitian ministers: Lowering taxes and tariffs on LPG stoves could decrease prices by 20% and increase stove sales by over 60%

Removing taxes and tariffs on one-burner LPG stoves would lower prices by ~20%, but they would still be higher than other stoves



The lower stove price for a one-burner could lead to an increase of ~20k stoves in year 1, as well as cumulatively over a five-year period¹

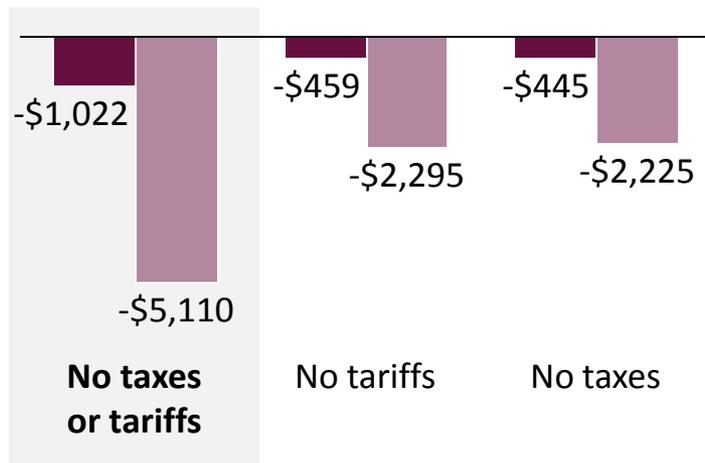


Notes: (1) This analysis shows the increase in demand for low-cost LPG, one burner stoves that are available in the market. However, the 32,000 figure estimates all LPG stoves sold in the Haitian market, not just one-burners. See annex for explanation of the methodology on price elasticity and market share growth over time. Sources: Stakeholder interviews with Palmis Eneji, Valerio Canez, and Haiti Switch; Dalberg analysis Dalberg 75

For Haitian ministers: The government would lose \$1M in annual revenue, but see averted health care costs of \$2.5M annually

Removing taxes and tariffs on LPG stoves would lower government revenue by \$1M annually

■ 1 year change in gov't revenue ('000 USD)
 ■ 5 year change in gov't revenues ('000 USD)



...but it would result in over 900 averted deaths and 40,800 averted DALYs each year¹



907 deaths averted could save **\$490K to \$4.5 million** in funeral costs² (in the short term)

(Assumes full conversion to LPG stove use for primary users)



40,810 averted DALYs could save up to **\$2.5 million** in averted healthcare expenditure annually³

Notes: (*) Compared to continued use of traditional and legacy stoves. (**) The average cost of a funeral in Haiti was \$540 in 2007 while some estimates indicate costs of \$5,000 per person. While \$5,000 per person is expensive, funerals in Haiti are almost always paid by international remittances. A range is indicated here. (^) Healthcare expenditure per capita in Haiti was \$61 per year in 2014, but the costs are conservative since those suffering from Household Air Pollution are more likely to incur higher health care costs compared to healthier individuals. Source: Dalberg analysis; GACC HAPIT model; World Bank – Healthcare expenditure per capita, 2014 (USD); Guardian 2012 – “The economic costs of violent crime in Haiti;” Crudem Foundation 2016.

Table of contents

Contents	Page
Framing, objectives, and methodology	3
Executive summary	8
Observations about Haiti's cookstoves market	13
Key findings on cookstoves taxes and tariffs	23
Economic analysis and policy arguments	32
Country case studies	59
Advocacy toolkit	65
Annex materials	78

Annex 1: Tax codes and product classification, 2012 - 2014

Product	HS code description	HS code	Applied MFN in 2012	Applied MFN in 2013	Applied MFN in 2014
Gas appliance	Appliances for baking, frying, grilling and cooking and plate warmers, for domestic use, of iron or steel, for gas fuel or for both gas and other fuels (excl. large cooking appliances)	7321.11	5%	5%	5%
Liquid fuel appliance	Appliances for baking, frying, grilling and cooking and plate warmers, for domestic use, of iron or steel, for liquid fuel (excl. large cooking appliances)	7321.12	5%	10%	10%
Solid fuel appliance	Appliances for baking, frying, grilling and cooking and plate warmers, for domestic use, of iron or steel, for solid fuel or other non-electric source of energy (excl. liquid or gaseous fuel, and large cooking)	7321.19	5%	5%	5%
Gas stove	Stoves, heaters, grates, fires, wash boilers, braziers and similar appliances, of iron or steel, for gas fuel or for both gas and other fuels (excl. cooking appliances, whether or not with oven, separate ovens, plate warmers, central heating boilers, geysers and hot water cylinders and large cooking appliances)	7321.81	5%	5%	5%
Liquid fuel stove	Stoves, heaters, grates, fires, wash boilers, braziers and similar appliances, of iron or steel, for liquid fuel (excl. cooking appliances, whether or not with oven, separate ovens, plate warmers, central heating boilers, geysers, hot water cylinders and large cooking appliances)	7321.82	5%	10%	10%
Solid fuel stove	Stoves, heaters, grates, fires, wash boilers, braziers and similar domestic appliances, of iron or steel, for solid fuel or other non-electric source of energy (excl. liquid or gaseous fuel, and cooking appliances, whether or not with oven, separate ovens, plate warmers, central heating boilers, hot water cylinders and large cooking appliances)	7321.89	5%	0%	0%
Cookstoves parts and components	Parts of domestic appliances non-electrically heated of heading 7321, n.e.s.	7321.90	5%	5%	5%

Annex 2: Tax codes and classification on the Administration Generale des Douanes

Overview of the Administration Generale des Douanes

- The Haitian Ministry of Economy and Finance's [Administration Generales des Douanes](#) has received authority to set and modify tariffs as it sees fit, with some restrictions, under Haiti's 1987 [Code Douanier](#).
- The administration posts the current level of these tariffs in a database online
- The [database](#) allows users to search by HS codes. DD which refers to 'douanes' (tariffs) represent the applied MFN rate. TCA represents the sales tax
- An screen shot of the codes and associated taxes/tariffs for cookstoves is below
- The policy basis for the application of VAT can be found in *Code Fiscal mis a jour 1998, by Joseph Paillant. Port-au-Prince : Imprimerie Deschamps, 1998.*

Screenshot of HS codes for appliances and stoves

CODE	DESCRIPTION	US	DD	DAA	FV	TCA	CFG
73211200	APPAREILS DE CUISSON ET CHAUFFE PLATS À COMBUSTIBLES LIQUIDES	11	10	0	5	10	2
73211100	APPAREILS DE CUISSON ET CHAUFFE PLATS À COMBUSTIBLES GAZEUX OU À GAZ ET AUTRES C ...	11	5	0	0	0	2
73211900	AUTRES APPAREILS DE CUISSON ET CHAUFFE PLATS,Y COMPRIS LES APPAREILS À COMBUSTIB ...	11	5	0	5	10	2
73218900	BARBECUES, BRASEROS, RÉCHAUDS À GAZ, CHAUFFE PLATS ET APPAREILS NON ÉLECTRIQUES ...	11	0	0	5	10	2
73218100	BARBECUES, BRASEROS, RÉCHAUDS À GAZ, CHAUFFE PLATS ET APPAREILS NON ÉLECTRIQUES ...	11	5	0	5	10	2
73218200	BARBECUES, BRASEROS, RÉCHAUDS À GAZ, CHAUFFE PLATS ET APPAREILS NON ÉLECTRIQUES ...	11	10	0	5	10	2
73219000	PARTIES DES ARTICLES DU NO 7321	2	5	0	5	10	2
84732100	PARTIES ET ACCESSOIRES DES MACHINES À CALCULER ÉLECTRONIQUES DES NOS 8470.10, ...	2	5	0	5	10	2

Annex 3: Methodology on fuel-specific economic analysis

Overview of the economic model and key data inputs:

The economic analysis is based on an equilibrium model that estimates percentage changes in demand based on price. The primary input into the model is data sourced from stakeholder interviews about stove and fuel prices, consumer demand elasticity, market growth rates, and employment breakdowns. It is important to keep in mind that:

- There are limited actors in Haiti, so the data comes from a limited sample size.
- Many data points can neither be confirmed nor disaggregated at an appropriate level by Haitian stakeholders. In those instances, Dalberg triangulated data and in select cases used analogue data points from comparable cookstove markets in Africa.

Major assumptions regarding calculations:

- **Stove ownership.** Recognizing that many Haitians own multiple stoves, the economic model focuses on primary stove usage since this is likely to drive most sales.
- **Biomass and ethanol stove prices and analysis.** Stove prices are calculated by averaging the price of all stoves of a particular type (e.g. all intermediate biomass stoves) based on stakeholder data. The 'post tax and tariff' price is reflective of the new price if taxes and tariffs were removed. However, some of these stoves are already tax/tariff exempt because of company-specific exemptions. In this case, the new average stove price is a composite of stoves that are already exempt and those that would be exempt following tax and tariff reductions.
- **LPG stove prices and analysis.** To ensure an 'apples to apples' comparison of the most basic LPG stove and the most basic ethanol stove, we modeled changes in consumer usage based on the cheapest one-burner LPG stove available which costs \$45 according to Palmis Eneji. However, estimated tax revenue generated from LPG stoves is based on the overall market including stoves that are sold at a higher price point (e.g. LPG stoves that cost upwards of \$125-\$150).
- **Consumer price elasticity.** We based consumer price elasticity on data provided by manufacturers and distributors. Manufacturers and distributors estimated projected differences in sales based on price changes. For example, since Novogaz is the main ethanol stove distributor in Haiti, price elasticity for ethanol stoves is based on Novogaz sales data. We also validated fuel-specific consumer price elasticity with other manufacturers if/when possible (e.g. we validated ethanol stove price elasticity with D&E Green since they also manufacture and sell ethanol stoves).
- **Level of precision regarding outputs.** Given the assumptions above and limited data, calculations are estimated to the nearest significant figure (in most cases, the nearest thousandth). All outputs from the economic analysis should be interpreted as rough, directional estimates and refined as more data becomes available.

Annex 4: Methodology on cookstoves ownership, annual cookstoves sales, and cookstoves employment

Methodology for estimating cookstoves ownership and annual sales (slide 14)

- Beyond conducting taxes and tariffs analysis, this document captures broader observations about the Haitian cookstoves market, two of which are primary stove ownership and estimated annual sales. In both cases, Dalberg used the economic model described in 'Annex 2' to estimate both figures.
- We began with DHS data from 2012 and applied stove-specific growth rates to each segment based on (i) stakeholder interviews and (ii) other available data (e.g. USAID's cookstoves program evaluation report from 2015). This provided us with a rough estimate of the total number of 'primary' stoves in the market in 2016. We validated findings with local stakeholders who also provided input into the percentage of stoves that are domestically produced versus imported for each stove type.
- We then applied estimated stove replacement rates to these figures to estimate total purchases in 2016. Like other data points throughout the document, it is important to keep in mind that data is based on local stakeholders, all of whom can only provide rough, directional estimates.

Methodology for estimated fuel and stove employment pre and post-tax/tariff exemption (slide 36)

- Fuel and stove employment are estimated using the economic model that the Dalberg team built that assesses shifts in employment based on labor intensity and employee productivity for manufacturing and retail/distribution jobs.
- The analysis begins with price elasticity of demand and predicts changes in fuel/stove sales based on lower prices if taxes/tariffs are removed. The model assumes that (i) consumers will shift from one stove to another based on differences and price and (ii) this will result in employment changes for both manufacturing and retail/distribution jobs. Similar to other analyses, data is based on stakeholder estimates on the number of people they would need to hire versus the extent to which additional demand could be met by existing capacity (e.g. ethanol manufacturers and distributors are operating far below capacity; thus, increases in ethanol stoves will have minimal impact on ethanol stove/fuel jobs).
- Due to time constraints, we did not speak with all major manufacturers and distributors about their employment structure; in these instances, we assumed similar employment structure across the entire stove/fuel value chain.

Annex 5: Stakeholder mapping slide for external purposes

Perspectives and main priorities by ministry stakeholder

Ministry of Economy and Finance

- The priority of the Ministry of Economy and Finance is to ensure that Haiti improves its trade balance and that local industry (e.g. cookstoves manufacturing) has an opportunity to grow. Thus, framing a policy argument around the potential to develop local jobs might be compelling.

Bureau of Mines and Energy

- Given the Bureau of Mines and Energy's enthusiasm for briquettes, cleaner charcoal and LPG, a compelling policy argument should highlight the role that each of these fuels play in Haiti's 'fuel future'. In addition, the Bureau of Mines and Energy is particularly interested in how efforts build upon the work of Haitian experts.

Ministry of Environment

- The Ministry of Environment has developed a briquettes solution and typically counsels stakeholders to pursue gradual, progressive change that is consensus-based to ensure buy-in across multiple government agencies.

Ministry of Agriculture

- Haiti's Ministry of Agriculture might be interested in exploring the potential of ethanol given the ability to employ farmers and build local industry. For ethanol producers in particular, initial conversations with the Ministry of Agriculture would be helpful.

Ministry of the Interior

- There are still debates about the extent to which charcoal is imported from the DR. Given the nature of these questions and the potential security implications, we recommend engaging the Ministry of the Interior on any trade policy that would result in significant shifts in charcoal usage.

Annex 6: List of primary stakeholders interviewed (1/2)

NAME	ORGANIZATION	DATE
Dan Seals	POET	September 19
Brady Luceno	POET	September 19
Maxwell/Kalinda Magloire	Haiti SWITCH	September 19
Duquesne Fednard	D&E Green Enterprises	September 20, October 7
Gregory Solomon Monrose	Ministry of Environment ¹	September 20
Jean-Pierre Auguste	Valerio Canez	September 20
Rene Max Auguste	Valerio Canez	September 20
Nicolas David	Palmis Eneji	September 21
Ryan Delaney	Carbon Roots International	September 22
Alexandre Anglade	Carbon Roots International	September 22

(1) In addition to Director General Monrose, two other representatives from the Ministry of Environment were present although we did not get their contact information. One attended the Global Alliance's market assessment and the other is leading the briquettes project

Annex 6: List of primary stakeholders interviewed (2/2)

NAME	ORGANIZATION	DATE
Al Shelton	D&E Green Enterprises	September 22
Jimmy Bruce	D&E Green Enterprises	September 22
Raymond Coles	Novogaz	September 22
Abel Metellus	Ministry of Economy and Finance	September 22
Jean Robert Altidor	Bureau of Mines and Energy	September 22
Claude Prepit	Bureau of Mines and Energy	September 22
Vladimir Laborde	Independent consultant	September 29
Megan Rapp	USAID	October 4
Andrew Tarter	University of Florida	October 11

Annex 7: List of sources consulted (1/2)

- [Haiti: Enquete Mortality, Morbidite et Utilisation des Services, 2005-2006](#). Demographic and Health Surveys, USAID
- [Haiti: Enquete Mortality, Morbidite et Utilisation des Services, 2012](#). Demographic and Health Surveys, USAID
- [Household Air Pollution Intervention Tool for Comparing Health Impacts of Cooking Technologies](#), Global Alliance for Clean Cookstoves
- Haiti Cookstoves and Fuels Market Assessment: Preliminary Report, 2016, Global Alliance for Clean Cookstoves
- [Audit of USAID/Haiti's Improved Cooking Technology Program](#), Office of the Inspector General, 2014, USAID
- [Tariff Download Facility](#), World Trade Organization
- [International Classification of Non-Tariff Measures](#), 2012, United Nations Conference on Trade and Development
- [The State of the Global Clean and Improved Cooking Sector: Technical Report](#), Energy Sector Management Assistance Program
- [Clean and Improved Cooking in Sub-Saharan Africa](#), 2014, The World Bank
- [Health expenditure, total \(% of GDP\)](#), The World Bank
- [Population growth \(annual %\)](#), The World Bank
- [GDP per capita \(current US \\$\)](#), The World Bank
- Sagbo, Nicaise S., '[Economic Analysis and Willingness to Pay for Alternative Charcoal and Clean Cookstoves in Haiti](#)', 2014. Theses and Dissertations – Agricultural Economics, Paper 28
- [Haiti: Strategy to Alleviate the Pressure of Fuel Demand on National Woodfuel Resources, 2007](#). Energy Sector Management Assistance Program
- Ministry de L'Economie et des Finances: [Administration Generales des Douanes](#)
- [Center for Facilitation of Investments](#) in Haiti
- [Haiti Outreach](#)
- [Haiti – The World Factbook, 2016](#), Central Intelligence Agency
- [Haiti: Chambre des Deputes](#), Inter-Parliamentary Union
- [Haiti | Economic Indicators](#), Trading Economics

Annex 7: List of sources consulted (2/2)

- [The Economic Costs of Violent Crime in Haiti](#), The Guardian, 2012
- [Death In Haiti](#), The Crudem Foundation
- [Jamaica's National Energy Policy, 2009-2030](#), The Ministry of Energy and Mining
- [Jamaica Sustainable Energy Roadmap: Pathways to an Affordable, Reliable, Low-Emission Electricity System](#), 2013, Worldwatch Institute
- [Ukraine: Biofuel Producers Enjoy Tax Benefits](#), USDA Foreign Agricultural Service, 2010
- businessGreen, "[Kenya Shelves Tax on Solar Power](#)," June 2014
- [Climate Innovation Center Kenya](#), "Tax Regimes on Solar Products in Kenya"
- Coastweek, "[Kenya Solar Panel Manufacturers Worry At 'Tax Exempted' Imports](#)," September 2014