REPUBLIC OF MALAWI

The Ministry Of Natural Resources, Energy And Mining

NATIONAL CHARCOAL STRATEGY

2017–2027

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FOREWORD

More than 97% of households in Malawi rely on illegally and unsustainably sourced biomass (charcoal and firewood) for domestic cooking and heating energy. This has resulted in high levels of deforestation and forest degradation throughout the country, with downstream negative impacts on water availability, hydropower-generating capacity, and more broadly, vulnerability of Malawians to climate change. While recognizing that charcoal and firewood may continue to feature highly as a source of energy in Malawi in the immediate future, Government seeks to address this challenge in order to arrest and reverse the rate of deforestation and forest degradation. Government specifically seeks to promote alternative cooking fuels and more efficient cook stoves to decrease pressure on deforestation.

The National Charcoal Strategy (NCS) presents a multi-sectoral framework and approach, focused on pillars that define opportunities to incrementally address problems of charcoal production and demand in the near, medium and long term. It aligns with Malawi's Vision 2020, the Malawi Growth and Development Strategy, and other national strategies and policies that promote broad objectives of reducing deforestation, forest degradation and dependence on solid biomass fuels. The Strategy also supports the implementation of various global initiatives and goals, including the UN Sustainable Energy for All (SE4ALL) by 2030.

The NCS is a product of a wide consultative process and incorporates views of many stakeholders at all levels of the Malawian society as well as lessons and experiences drawn from research at the national and international scale. I am certain that implementation of this strategy will propel Government's efforts in addressing the critical issues of environmental conservation and household energy demand, effectively and efficiently.

Bright Msaka, SC

Minister of Natural Resources, Energy and Mining

PREFACE

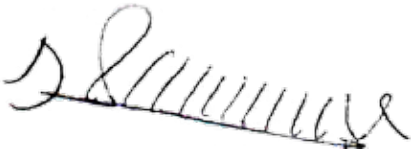
Malawi faces serious and worsening linked problems of unsustainable energy supply and environmental problems that significantly undermine economic development potential. With dependency rates on charcoal and firewood already among the highest in the world, alternative energy sources underdeveloped, and population growing rapidly, biomass fuels will remain a major part of Malawi's energy mix for decades to come.

Drivers of charcoal production and use are many, complex, and cross-sectoral. They include rural and urban poverty, a readily-available urban market for charcoal tied to a lack of reliable, affordable alternatives, and weak law enforcement. Charcoal in Malawi is largely an urban fuel used by 11.3% of all households nationally and 54% of urban households in 2015. Still, charcoal supports livelihoods of many rural Malawians, and our rural communities bear the disproportionate burden of deforestation, reduced wood supply and environmental degradation. To date, corrective efforts have focused narrowly on prohibition of charcoal production, which has promoted illegality in production, transportation and marketing.

The NCS clearly defines the need for multiple solutions covering both supply and demand. It aligns with recent government efforts including adoption of new Forestry Policy (2016) and National Climate Change Policy (2016), Malawi REDD+ Program, and review and pending approval of The Forests (Charcoal) Regulations to guide legal charcoal production under the Forest Act 1997, draft Malawi Biomass Energy Strategy (BEST), National Energy policy, and SE4ALL Action Agenda. Revisions of the Forestry Act (1997) and development of a Malawi Renewable Energy Strategy are underway.

Development of the NCS follows convening of the National Charcoal Forum by the Department of Forestry (DoF) in September 2015 with funding from USAID through the PERFORM project and Christian AID. It brought together more than 150 experts and diverse stakeholders including community members to build a shared understanding of the challenges and possible solutions. In October 2015, Directors of the DoF and Department of Energy Affairs (DoE) met and committed to work together, with other government departments and ministries, to develop a cross-sectoral national charcoal strategy. They established a multi-sectoral taskforce to develop the strategy with support from the PERFORM project. NCS Task Force members come from the DoF (Chair), the DoE (Co-chair), Environmental Affairs Department, Department of Economic Planning and Development, Ministry of Finance, Economic Planning and Development, Ministry of Gender, Children, Disabilities and Social Welfare, and the Ministry of Natural Resources, Energy and Mining. Task Force members collected information from diverse stakeholders using individual interviews, focus groups, consultation visits to eight districts in all three regions, consultation workshops in each region, and a study tour to Rwanda to learn from their experiences, observations, and review of literature.

This resulting NCS prioritizes short-, medium- and long-term strategies and action plans for 2017-2027 under seven interrelated pillars. I thank everyone who contributed to the production of the strategy and look forward to its successful implementation.



Patrick C.R. Matanda

Secretary for Natural Resources, Energy and Mining

EXECUTIVE SUMMARY

Nearly every Malawian household (97%) relies on firewood or charcoal as their primary source of cooking and heating fuel. With alternative fuel sources underdeveloped, firewood and charcoal will continue to form a significant part of Malawi's energy mix for the next few decades. Firewood remains the most used cooking fuel (88% of households), but charcoal now predominates in urban areas (54%). Within this context the demand for charcoal and firewood is driving deforestation and forest degradation in Malawi, and is undermining agricultural productivity and food security, water security, and hydroelectric generating capacity—leaving the country more vulnerable to climate shocks.

The goal of the National Charcoal Strategy (NCS) is to provide a framework to address the linked problems of increased deforestation and increased demand for household cooking fuel, with defined and prioritized short-term, medium-term and long-term actions. Aligned with the Forestry Policy (2016), Forestry Act (1997), Energy Policy (2003), draft National Energy Policy (2016), Energy Act (2004), and the Climate Change Policy (2016), the NCS supports Government's objectives to *arrest and reverse deforestation and forest degradation and to reduce energy overdependence on solid biomass fuels*.

The NCS has been developed through a highly consultative process with national, regional, district and local community stakeholders. It also draws on previous research, experiences and innovations from Malawi, and lessons learned from other countries. The NCS recognizes that the linked charcoal and energy challenges are complex and *no single solution exists*. With this recognition the NCS reflects a holistic government-wide approach that addresses the linked problems from both supply and demand. The development of the NCS utilized an evidenced-based approach to ensure that the strategy builds on past experiences, successes and failures, from Malawi and more broadly across sub-Saharan Africa.

The NCS is organized around seven inter-related pillars:

Pillar 1: Promote Alternative Household Cooking Fuels. Effective control of illegal charcoal and reduction of dependence on biomass fuels is impractical without affordable, reliable, and readily available alternative energy sources, along with private sector involvement in energy production and distribution, and fiscal incentives to enhance affordability of promising alternative energy sources, focusing on:

- **Electricity:** Strengthen the electricity supply industry and make it more efficient and capable of providing adequate, affordable and reliable electricity supply that enables industrialization, rural transformation, sustainable economic development and wealth creation.
- **Liquefied petroleum gas (LPG):** Promote adoption of LPG for urban and semi-urban domestic and institutional/industrial cooking and heating.
- **Briquettes and pellets:** Foster the development of commercially viable briquette/pellet production, with market linkages to proximate industrial and institutional buyers (e.g., tobacco estates, hospitals, schools, etc.).
- **Biogas:** Facilitate promotion of tubular biogas digesters that utilize sewerage/human waste to meet institutional cooking/heating needs. At least initially the focus should be on public institutions with large populations (e.g., prisons, schools, hospitals, etc.).

Pillar 2: Promote Adoption of Fuel-Efficient Cookstove Technologies. The objective of this pillar is to *promote the adoption of improved charcoal and firewood cookstoves for household cooking and heating*. In recent years Malawi has achieved gains in adoption of more fuel-efficient firewood cookstoves, especially in urban areas where the large majority of the population purchase (instead of collect) fuelwood. In rural areas, adoption of more fuel-efficient cookstoves remains quite low (although this is variable from one region to another). Urban resi-

dents who use charcoal almost exclusively use a version of the Jiko charcoal cookstove introduced from Kenya in the late 1980s and 1990s. Adoption of newer, more efficient charcoal cookstoves is almost non-existent. Increasing adoption of fuel-efficient charcoal and firewood cookstoves presents the most immediate option for slowing deforestation and forest degradation.

Pillar 3: Promote Sustainable Wood Production. Firewood harvested for commercial purposes is largely sourced illegally from forest reserves and, almost without exception, wood for charcoal production is harvested illegally within or adjacent to forest reserves. Across much of Malawi, demand for firewood and charcoal is driving deforestation and forest degradation. Wood for firewood and charcoal is already deficient in the Lilongwe and the Blantyre/Zomba supply areas. According to current projections, by 2030 there will not be enough biomass in the country to meet demand for firewood and charcoal. Given the level of reliance on biomass energy and the time required to develop and scale-up alternatives, this is a very challenging situation that can only be met by focused efforts that significantly increase and sustain wood production for biomass energy at scale. Hence, the primary objective of this pillar is to *promote large-scale/commercial cultivation of fast growing tree species and/or alternative feedstock suitable for charcoal and commercial firewood production, through concessions or other appropriate means.*

Pillar 4: Strengthen Law Enforcement. In recent decades, law enforcement related to charcoal production and marketing has been inadequate, inconsistent and ineffective. While Malawi's laws clearly distinguish what is legal from what is illegal, these laws have not been applied effectively. This failure makes illegal charcoal made from "free" indigenous wood readily available and unrealistically cheap. This illegal charcoal market discourages private investment in legal, sustainable/"green" charcoal production. The objective of this pillar is to *enhance enforcement of existing laws and regulations in order to reduce illegal wood harvesting and charcoal production and to create a market for sustainable wood and charcoal production.*

Pillar 5: Regulate Sustainable Charcoal Production. Placing a "ban" on charcoal in the absence of affordable alternative cooking and heating fuels leads to illegal charcoal production and marketing. The objective of this pillar is to *establish a professional and regulated charcoal value chain that promotes sustainable and efficient production of charcoal in Malawi based on a business model.*

Pillar 6: Enhance Livelihoods. Government recognizes the role that livelihoods and income generation play in charcoal production and marketing and, with this recognition, will strive to secure livelihoods for legal producers and find alternative livelihoods for others through pillars 1-5.

Pillar 7: Promote Information, Awareness and Behavior-Change Communications. Government will work with partners to develop and disseminate information and raise awareness in order to transform the behaviors of users and other key stakeholders needed to achieve the goals and to sustain activities in pillars 1-5.

Cross-Cutting Issues: Applying the considerable lessons learnt, a cross-cutting objective of the NCS is to *incentivize and promote private sector investment in both supply and demand solutions, including but not limited to: the promotion of alternative cooking and heating fuels; scaling-up adoption of improved charcoal and firewood cookstoves; increasing and sustaining wood production for charcoal and firewood; and, increasing legal production of sustainable charcoal.* Recommendations include a review and possible revision of incentives to promote sector investment, and public-private partnerships. The recommended actions are made to achieve solutions at scale that can be sustained through active regulation—building immediately on what exists.

Another cross-cutting objective of the NCS is to address *the needs of men, women, children and vulnerable groups.* Recommended actions include mainstreaming gender issues within proposed interventions, including: modernizing household fuel supply, and scaling-up adoption of improved charcoal and firewood cookstoves that reduce labor (fuel collection), reduce cost (fuel purchase), and reduce the leading source of household air pollution contributing to respiratory illness. Similarly, implementation of the NCS will seek to identify equal opportunities for men and women in energy sector jobs.

1.0 INTRODUCTION

1.1 Background to the National Charcoal Strategy

More than 97% of Malawian households use charcoal or firewood for cooking and heating, making Malawi one of the most biomass energy-dependent countries in the world.[1] In Malawi's rapidly-growing urban centers, biomass energy remains the primary cooking and heating fuel for 88% of the population, and charcoal is now the primary source of fuel for the majority (54%) of urban households. Across rural Malawi, households continue to rely almost exclusively on firewood. While efforts are currently underway to upgrade the hydroelectric power generating capacity and expand the electricity distribution network, the percentage of households using electricity for cooking actually decreased between 1998 and 2012, and again between 2012 and 2014. Alternative cooking and heating fuels remain underdeveloped, with less than 1% of Malawian households using any alternative to firewood, charcoal or electricity for cooking and heating (see Appendix 1).[1] In the medium-term, as Malawi's population continues to grow and to migrate to urban centers, the demand for charcoal and firewood will remain high and may even increase in the absence of viable alternatives. In this context, the question facing our country is *how can we best meet and sustain our essential household energy needs?* The NCS was developed in response to this question, and recognizes that there is no single solution to the complex and linked problems of energy demand and deforestation.

The National Charcoal Strategy (NCS) is a holistic, government-wide strategy resulting from a highly consultative process that was led by a multi-sectoral NCS Task Force that was co-chaired by the Department of Forestry (DoF) and the Department of Energy Affairs (DoE). The Task Force included membership from a wide range of ministries and departments, including: the Ministry of Finance, Economic Planning and Development (MoF); Department of Economic Planning and Development (EP&D); Ministry of Gender, Children, Disability and Social Welfare; Department of Community Development; Environmental Affairs Department (EAD); and Department of Mines. The NCS is an evidence-based strategy developed to address the linked problems of increased deforestation (with downstream impacts that include water scarcity, reduction in hydropower generating capacity, and more broadly increased vulnerability to climate change), and the growing unsustainable demand for cooking and heating fuel. Importantly, the NCS presents an evidence-based approach that is focused on the best opportunities to incrementally address challenges of supply and demand in the near-term, medium-term and long-term.

1.2 Process and Methods for Development of the NCS

The NCS was developed with support from the USAID/Malawi-funded Protecting Ecosystems and Restoring Forests in Malawi (PERFORM) Project. The NCS was developed through a highly consultative process with key national, regional, district and local community stakeholders to understand the complexities of the energy-deforestation problems and to begin identifying possible solutions. The stakeholders included experts and decision-makers in key government ministries and departments, the private-sector, NGOs, academic institutions, donor agencies, politicians including members of the Parliamentary Committee on Climate Change, Environment and Natural Resources, traditional leaders and local community members (farmers, charcoal and alternative energy producers, and others) from ten districts and three cities across Malawi (see Appendix 2).

The NCS Task Force, supported by a consultant provided by PERFORM, used diverse methods for consultation and information collection, including group meetings, focus group discussions, individual interviews, field visits and observations, and semi-formal presentations. To further learn from current challenges and future intervention options, the NCS Task Force also sought input and validation from diverse stakeholders through three regional consultation workshops and one national workshop.

These efforts were supplemented by a thorough review of experiences from Malawi, and more broadly from across sub-Saharan Africa to understand "what has worked" (and why) and "what has not worked" (and why), in an effort to ensure that actions proposed are evidence-based, realistic, appropriate, and cost-effective. To further ground-truth the strategy, members of the NCS Task Force also completed a learning visit to Rwanda to better understand the steps taken by the Government of Rwanda and its partners that have resulted in: increased adoption of alternative cooking and heating fuels; increased adoption of fuel-efficient charcoal and firewood cookstoves; a well-regulated charcoal value chain; and, increased wood production for biomass energy. Lessons learned and recommendations from the learning visit were used to make final revisions to the NCS.

1.3 Vision, Goal and Pillars of the National Charcoal Strategy

1.3.1 Vision

The NCS vision is a more climate-resilient Malawi with sufficient supply of affordable, safe and reliable sources of energy for cooking and heating, where deforestation has been reversed and a larger share of cooking and heating energy comes from modern sources of energy.

1.3.2 Goal

The goal of the National Charcoal Strategy is to provide a framework for the Government of Malawi to address the linked problems of increased deforestation and growing demand for cooking and heating fuel, with defined and prioritized near-term, medium-term and long-term actions.

1.3.3 Problem Statement

Malawi's demand for charcoal and firewood is increasing faster than the adoption of alternative energy sources. Unregulated production of charcoal and firewood from indigenous forests, coupled with inefficient consumption of charcoal and firewood, present significant development challenges that will impact Malawi in the near- and medium-terms. First, demand will outpace supply by 2030—meaning there simply are not enough trees in Malawi to meet the charcoal and firewood demand from Malawi's population beyond 2030. Second, as wood supply continues to decrease (and as near-urban wood supplies become depleted, and transportation costs increase) the price of charcoal and firewood will continue to increase. While this will impact everyone who buys charcoal and firewood, the economic hardship will be most impactful on poorer urban residents. Third, heavy reliance on charcoal and firewood will continue driving deforestation and forest degradation (D&D) which negatively impacts: agricultural production and food security; water quantity and quality (for consumptive and productive uses, as well as downstream hydroelectric production); and, vulnerability to climate change. Fourth, as indicated in the National Energy Policy (2016), household air pollution from charcoal and firewood is the leading health risk factor for respiratory illness in Malawi, and most significantly impacts women and children (pneumonia is the leading cause of death for children under five years or age in Malawi, and is one of the leading causes of morbidity—approximately

300 per 1,000 children under 5 are diagnosed with pneumonia every year). In addition to the obvious human toll, this also results in a considerable expense for families and the Government. Lastly, the informal nature of the charcoal and commercial firewood value chains means the Government loses a potentially important source of revenue that could be used to support domestic development priorities.

The continued loss of forest as charcoal and firewood demand grows will affect every Malawian adversely through:

- Declining availability of wood for charcoal, firewood, timber, and poles—increasing costs for these items;
- Decreasing soil fertility and water retention for farmers—increasing food insecurity;
- Increasing incidence of floods due to increased water runoff—increasing livelihood vulnerability; and
- Declining hydropower productivity—decreasing investment and Malawi's long-term growth potential.

Underdeveloped alternative energy sources in Malawi retards transition from biomass fuels and remains a major barrier to controlling illegal charcoal production. Electricity, the most obvious alternative, has a penetration rate of 2.0% nationally as a primary cooking fuel. This penetration rate is indicative of electricity's price and availability. Available electricity falls well short of present demand, and has become decreasingly reliable over the past five years (as evidenced by power disruptions, and frequent and often long periods of load shedding). All cooking and heating fuel alternatives to charcoal, firewood and electricity (including LPG, biogas, briquettes and pellets, paraffin and solar) collectively are used by less than 1% of households. This means that biomass fuels, including charcoal, will remain a dominant part of the energy mix for cooking well into the future.

Issues of energy security go beyond challenges of quantity and quality to broader issues of energy services that provide for broader social well-being, including nutrition and gender equality. For instance, energy insecurity in the form of cooking-energy shortages and/or high prices can undermine nutrition, food security and health (e.g., undernutrition and malnutrition among children under five years of age) by favoring fast-cooking over slower-cooking food (i.e., eliminating longer-cooking more nutritious foods such as beans), or may lead to fewer cooked meals per day.[10] Further, women and girls bear a disproportionate share of the burden of biomass energy collection. This burden is only exacerbated by deforestation, and exposure to smoke-based pollutants and diseases. Improving cookstove efficiency and switching to cleaner, modern sources of energy also empowers women by easing their burdens.

Recognizing the complexity of the problems highlighted above, the NCS offers a realistic and holistic approach to address them. While there will be challenges in implementation, particularly on the supply side, the strategy sets the country on a realistic path toward addressing the hitherto ignored charcoal/energy problem. The strategy breaks down the large, complex problem into components that can be addressed in the short- to medium-term, while building momentum for the slower acting but transformational and sustainable changes required in the charcoal value chain (CVC). Under the NCS, all of this work is being done to strengthen the CVC while simultaneously promoting adoption of alternative cooking fuels and cookstove technologies. The past two decades have taught Malawi that doing nothing about the charcoal problem is not a solution. The time for action is now.

1.3.4 A Holistic Approach—The Pillars of the NCS

The consultation and evidence-collection process defined seven strategic pillars that aim to address the charcoal/energy-related issues from both the demand/use and the production/supply side, including alternative fuels to charcoal and firewood. The pillars, described in more detail in Section 4 seek to:

1. Promote adoption of alternative cooking and heating fuels;
2. Stimulate wide-scale adoption of fuel-efficient charcoal and firewood cookstoves;
3. Significantly increase sustainable wood production, specifically for biomass energy production;
4. Effectively enforce laws and regulations to limit, and eventually stop illegal charcoal production;
5. Promote and regulate legal (licensed) charcoal production, transport and sale;
6. Enhance the livelihoods of Malawians in ways that can be sustained over time; and,
7. Ensure that the information, awareness and communications required to change behavior and increase adoption are available.

2.0 THE CONTEXT FOR THE CHARCOAL SUB-SECTOR

2.1 Population and Demographic Factors

Malawi's population was estimated at 16.8 million people in 2016. Between 2010 and 2015 the population grew at an average annual rate of 3.1%, and is projected to exceed 43 million by 2050. While Malawi's population remains largely rural (84%), the country has one of the highest urbanization rates in sub-Saharan Africa (3.7%).[2]

2.2 Social and Economic Context

Malawi's Gross Domestic Product (GDP) was $4.258 billion in 2014.[13] Agriculture accounted for 80% of total export earnings,[12] a third of Gross National Income (GNI), and employed 75% of the adult population in 2015.[13] After a period of high annual economic growth rates during 2006-2008, Malawi's economic growth has slowed down significantly due to macroeconomic instability and extreme weather conditions (drought and floods). Gross National Income per capita was only $250 in 2014, and 50.7% of the population lived below the national poverty line.[1,13] The economy is very closely tied to the agriculture sector, and specifically a relatively small number of export crops (tobacco, sugar, tea and cotton) and rain-fed smallholder agriculture.

2.3 The Policy, Institutional and Regulatory Context for Charcoal in Malawi

2.3.1 Policy and regulatory framework overview

The NCS aligns with several government policies and laws, and broader national and international goals, policies and obligations. The most directly relevant are the Forest Policy (2016), Forestry Act (1997), draft Forest (Charcoal) Regulations (2015), Energy Policy (2003), Energy Act (2004), draft National Energy Policy (2016), draft Malawi Renewable Energy Strategy (MRES); and the Climate Change Policy (2016).

2.3.2 The National Forest Policy (2016) and Forestry Act (1997)

The National Forest Policy (2016) and Forest Act (1997) provide for the sustainable production and marketing of charcoal under a license issued by the Director of Forestry based on an operative forest management plan:

> *Upon application in the prescribed form, a licensing officer may, where the officer finds that the making of charcoal shall utilize plantation timber or indigenous timber or trees consistently with the applicable forest management plan or forest management agreement or forest plantation agreement, issue a license to make charcoal in such quality and from such timber or trees as may be specified in the license.* (Forest Act 1997, Article 81 (2)).

However, the lack of regulations to guide implementation and enforcement of charcoal licensing, including what constitutes an acceptable management plan or management agreement, has resulted in a *de facto* ban on charcoal production since 1997. As experienced in other African countries, issuance of a charcoal ban without provision of viable alternative fuels has not reduced illegal charcoal production or deforestation in Malawi. It has also promoted informality and illegality within the charcoal value chain (CVC), discouraged potential investment opportunities, and resulted in losses in potential government revenue.[14]

The National Forest Policy (2016) more explicitly promotes the regulation, sustainable production and efficient utilization of *(green)* charcoal. It encourages tree growing "to achieve sustainable self-sufficiency of firewood, charcoal and forest products and services" (Policy Priority Area 7), improved law enforcement to reduce illegal production, and adoption of alternative cooking energy sources. The policy also empowers local communities and individuals to participate in and benefit from sustainable forest management and utilization on customary lands and in forest reserves. It also supports livelihoods and addresses emerging climate change issues, including the role of charcoal production in greenhouse gas (GHG) emissions and global warming. Draft charcoal regulations provide mechanisms for charcoal licensing, transport and trading, including import and export.

2.3.3 Energy sector policies

The National Energy Policy (2003) aims to transform Malawi's energy economy from its current heavy dependence on solid biofuels (projected to reach 50% by 2050) to one with a high mix of modern energy sources, and to provide reliable and affordable energy for Malawi's economic development. There are no energy sector laws regulating solid biomass energy (including charcoal). The National Energy Policy (2003), currently under review, is also largely silent on biomass energy.

However, a draft National Energy Policy (NEP, 2016) partially fills this gap. The NEP's goal is to "enhance access to affordable, reliable, sustainable, efficient and modern energy for all Malawians by 2030." It promotes the sustainable production and utilization of charcoal and firewood while promoting modern alternative energy sources and the use of improved cookstoves to reduce dependence on solid biomass energy. Still, biomass is inadequately addressed in the draft NEP 2016, and there is need to develop a biomass strategy, building on the draft Malawi Biomass Energy Strategy (BEST) that was produced in 2009 but was never adopted. An early draft of the Malawi Renewable Energy Strategy (MRES, 2016) also addresses aspects of solid biomass and alternative renewable energy sources (mainly electricity, biogas, and solar).

2.3.4 Broader national and international development goals and context

The NCS fits into Malawi's broader national development goals and policies and international obligations. These include enshrinement of environmental protections and principles of sustainable development into Malawi's 1995 constitution, and inclusion in the transformational agenda of Vision 2020 and medium-term Malawi Growth and Development Strategies—MGDS I (2006/7–2010/11) and MGDS II (2011-2016) with its nine priorities. MGDS II Priorities 2 and 9 address energy, industrial development, mining and tourism, and climate change, natural resources and environmental management, respectively. Fighting poverty is a common uniting theme.

The NCS is also related to other policies and laws. These include the Environmental Management Act (1996, 2003), National Environmental Policy (2004), Decentralization Policy (1998), Land Policy (2002), Land Bill (2016), the Agriculture Sector Wide Policy (ASWAP, 2008), the National Agricultural Policy (2016), Land Resources Conservation Policy (1999), and the Gender Policy (2008).

The NCS also contributes to meeting Malawi's international obligations, including under the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change (UNFCCC), and the United Nations Convention to Combat Desertification (UNCCD). It also supports international programs, including the United Nations Collaborative Initiative on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD) implemented in Malawi through the Malawi REDD+ Program, and National Adaptation Plans of Action (NAPAs), National Mitigation Plans of Action (NAMAs), National Adaptation Programs (NAPs), and the Clean Development Mechanism (CDM). The NCS is also consistent with the United Nations Sustainable Development Goals (SDGs). SDG Goal No. 7 targets access to affordable, reliable and modern energy services for all by 2030. The NCS also contributes to the agenda of the UN Sustainable Energy for All (SE4ALL) by 2030 launched in 2011, and Malawi's draft SE4ALL Action Agenda.

3.0 CHARCOAL AND FIREWOOD IN MALAWI'S ENERGY MIX

3.1 Charcoal and Firewood in Malawi's Energy Mix

Charcoal and firewood dominate Malawi's energy mix. In 2008, these fuels constituted 88.5% of Malawi's total energy needs. Reliance on biomass energy was 83.2% and 11.9% for the household and industrial sectors, respectively.[9]

Between 1998 and 2014, the percentage of the population that relied on biomass energy actually increased from 94% to more than 97%. Over this same period, reliance on charcoal nationally increased five-fold (from 2% in 1998, to 11.3% in 2014), and charcoal surpassed firewood as the largest source of urban household cooking fuel (54.4% in 2014).

3.2 Current and Future Estimates of Charcoal and Firewood Demand

As noted above, demand for charcoal is growing considerably and will continue to do so into the foreseeable future. Further, while the percentage of households that relied on firewood as their primary source of cooking fuel decreased from 92% in 1998 to 86% in 2014, when population growth over this period is factored in, this reflects a net increase in the number of households using firewood. Based on 2008 per capita consumption data (Appendix 3), urban household demand for charcoal in 2016 is projected at more than 253,400 tonnes.[9] If we include charcoal use by rural households and industry (mainly the hospitality/service industry), then total charcoal demand in 2016 exceeds 352,000 tonnes. Meeting this demand requires 2.35 million m^3 of wet wood and could clear more than 25,000 ha of woodland. If nothing is done to arrest the situation, the BEST study projects charcoal demand to nearly double between 2008 and 2023 to reach 606,000 tonnes/year.[9]

3.3 Charcoal and Firewood—Demand Versus Sustainable Supply

Although estimates vary and updated data are not available, the BEST study estimated Malawi's total standing woodstock in 2008 at 400 million m^3 but only 29.8 million m^3 was the potential sustainable supply. While estimated annual demand was half the sustainable supply (14.9 million m^3), much of this wood is unavailable due to location in inaccessible locations or in forest reserves.[9] Significantly, demand for available wood had exceeded sustainably available supply in the Blantyre/Zomba charcoal catchment area by 25% and the Lilongwe catchment area by 31% by 2008. Only the Mzuzu catchment area showed surplus wood, but this was quickly declining. These regional variations (Appendix 3) call for geographically differentiated wood-supply strategies, prioritizing charcoal and firewood in the Blantyre and Lilongwe catchments.

3.4 Malawi's Charcoal Value Chain

The charcoal value chain (CVC) is complex. It includes the full process and the diverse set of actors involved from charcoal production to charcoal consumption. Main groups of interacting social actors in the CVC are: producers; rural and urban intermediaries (including charcoal packers, transporters by bicycle, headload, and trucks, and wholesalers); predominantly urban retailers (including women); and mostly household consumers (Appendix 3).

Charcoal producers can be split into three main categories:[5]

- **Small-scale producers:** poor subsistence rural dwellers who produce less than 30 bags per month mainly as a safety net and to address acute financial stresses (35% of production);
- **Medium-scale producers:** relatively better-off rural dwellers who produce 30-100 bags per month mainly as a business (27% of total production); and
- **Large-scale producers:** a relatively small number (estimated at 338 in 2007) of well-off, well-financed, mostly urban-based business people who produce up to 500 bags per month (27% of total production).

Several factors drive charcoal production and sale. A recent Malawi REDD+ Corruption Risk Assessment report affirmed three main underlying drivers: 1) a readily available urban market due to lack of realistic alternative sources of cooking energy; 2) poverty—lack of alternative sources of income; and 3) weak law enforcement that makes it easy to produce charcoal illegally.[15] Producers are particularly attracted to charcoal production by the low start-up capital investment (only an axe, a hoe, a *phanga* knife, and family labor), and the capacity to make relatively quick cash.[9,16,17]

Distribution of value among the main players in the CVC is uneven, and some value is lost to illicit royalties. This indicates the need for strategies that promote more even-sharing of benefits among actors and minimize corruption in the CVC. In a 2007 study, retailers in Blantyre and Lilongwe took the largest share of the final selling price of charcoal (25%–33%), followed by producers (20%–33%), and transporters (20%–25%).[5] Bribes paid to police and forestry officials to transport illegal charcoal accounted for 12-20% of the total value of charcoal (see Appendix 5).

Along with lessons from international experiences (see Appendices 6 and 7), the following section presents strategic interventions captured from the NCS process through the seven pillars.

4.0 STRATEGIES TO PROMOTE SUSTAINABLE CHARCOAL PRODUCTION AND USE AND ALTERNATIVE COOKING FUELS

4.1 Strategic Pillars of the National Charcoal Strategy

Analysis of the complex nature and gravity of the charcoal problem shows that achieving the goal of the NCS will require a holistic, multi-sectoral, and CVC-wide approach that makes transformative advances in all seven strategic pillars of the NCS (see Figure 1) in addressing the linked charcoal, energy and deforestation problem from different angles simultaneously:

1. **Promote Alternative Household Cooking Fuels.** Government will promote the introduction and adoption of affordable, safe and reliable alternative fuels for cooking and heating. Diversifying fuel sources is the most effective way to decrease charcoal and firewood consumption in the long term, and is especially important in light of the decreasing supply and increasing costs for charcoal and firewood. For a number of well-documented reasons, this will initially target middle/upper income urban households, as well as institutions (e.g., hospitals, schools, prisons).

2. **Promote Adoption of Fuel-Efficient Cookstove Technologies.** Government will promote widespread adoption of fuel-efficient charcoal and firewood cookstoves as the most effective way to slow deforestation in the near- to medium-term. Improved cookstoves will decrease consumption of charcoal and firewood by between 40% –70%, which importantly results in cost and labor savings for users. Additionally, increased adoption of improved cook stoves presents the best option to reduce the incidence of respiratory illness that most directly impacts women and children, and has flow-down impacts on household economics, education and the national healthcare system.

3. **Promote Sustainable Wood Production.** At present, demand for charcoal and fuelwood outpaces supply in key urban-supply areas, and by 2030, demand will outpace supply nationally. To address this situation, Government will focus on increasing sustainable wood production specifically for biomass energy. To achieve this at the scale required, Government will engage the private sector (e.g., through concessions) to promote large-scale production, which will provide rural employment opportunities, and can be linked to out-grower production.

4. **Strengthen Law Enforcement.** Government will effectively enforce the legal and regulatory framework to decrease (and eventually stop) illegal charcoal production, transportation and marketing. This is essential to the success of the other pillars, and will require close collaboration between a wide range of stakeholders at the national, district and local levels.

5. **Regulate Sustainable Charcoal Production.** Government will promote legally-produced sustainable charcoal, and will regulate this charcoal through production, transportation and marketing.

6. **Enhance Livelihoods.** Government recognizes the role that livelihoods and income generation play in charcoal production and marketing, and with this recognition, will strive to secure livelihoods for legal producers and find alternative livelihoods for others through pillars 1–5.

7. **Information, Awareness and Behavior Change Communications.** Government will work with partners to develop and disseminate information, and raise awareness in order to transform the behaviors of users and other key stakeholders needed to sustain activities in pillars 1–5.

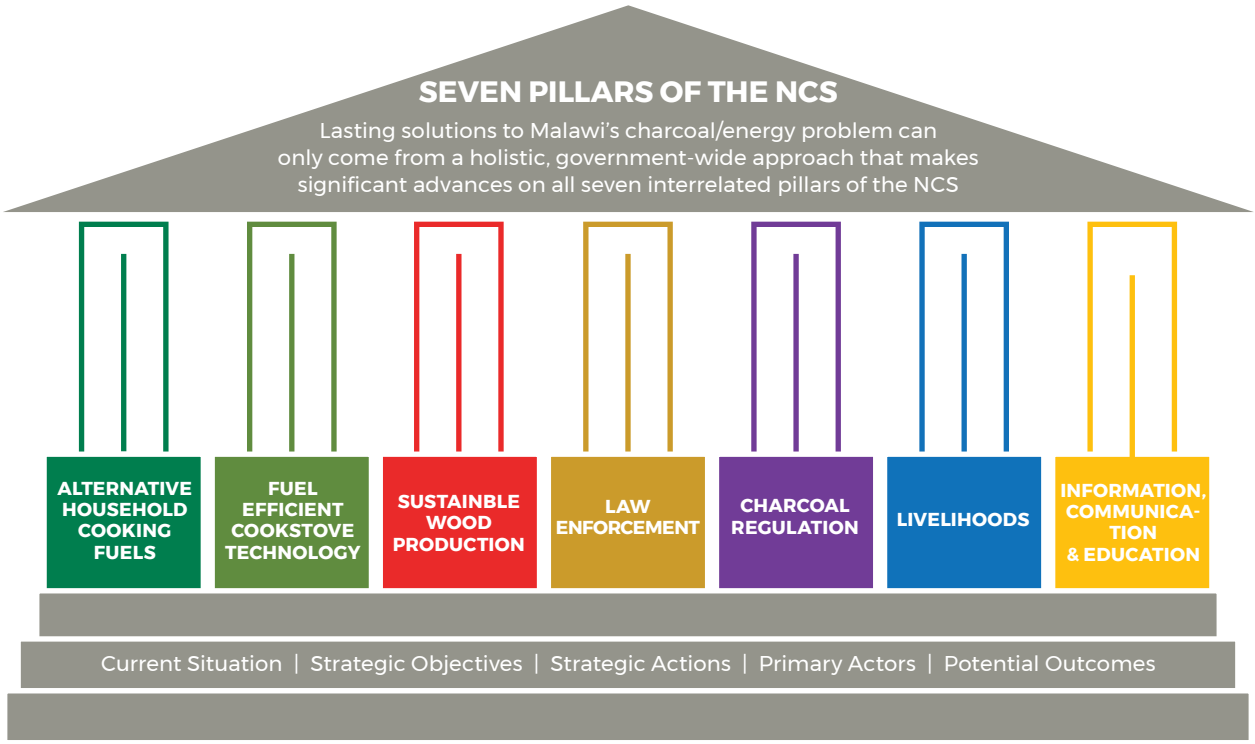
The following sub-sections describe in detail each pillar and its constituent strategic objective(s). For each pillar, a summary of the current situation is given followed by strategic objective(s), strategic actions, primary responsible actors and the potential impacts of the pillar. These are also summarized by objective, desired outcomes, lead actors, mode of delivery of the action and target audience in Appendix 8, and by strategic action and timeline in Appendix 9.

4.2 Pillar 1: Promote Alternative Cooking and Heating Fuels

4.2.1 Current situation

Household and institutional/industrial cooking and heating fuel across Malawi is largely limited to biomass energy—charcoal and firewood in urban areas, and almost exclusively firewood in rural areas. Alternatives to biomass energy, including electricity, liquefied petroleum gas (LPG), and others are limited, and all face challenges to broad-scale adoption. Nonetheless, adoption of alternative cooking fuels—espe-

Figure 1 | The Seven Pillars of the Malawi National Charcoal Strategy



cially in urban areas—is essential to reducing dependence on biomass fuels. LPG is the most promising alternative to urban charcoal use in the medium term.

4.2.2 Electricity

Current situation

Demand for electricity exceeds supply; supply is erratic; adoption and use for cooking is low; and costs of service connection, cooking appliances and tariffs remain high for most Malawians. While there are efforts to increase the generation capacity and expand the distribution network in the medium term, issues of reliability and affordability will remain constraints in the near to medium term. As a result, alternatives are needed to broaden options starting in the near to medium term.

Strategic objective

Strengthen the electricity supply industry and make it more efficient and capable of providing adequate, affordable and reliable electricity supply that enables industrialization, rural transformation, sustainable economic development and wealth creation.

Strategic actions

a. Increase electricity-generation capacity.

b. Diversify electricity-generation sources.

c. Expand, improve and modernize the electric transmission network, including sub-stations.

d. Through awareness and incentives, promote adoption of energy-efficient technologies and behaviors.

e. Provide fiscal incentives to reduce the installation fees for electricity and cooking devices (e.g., Duty and VAT) to broaden adoption of electricity for cooking in urban areas.

f. Create a fully-functioning, modern, effective and fair Independent Power Producer (IPP) framework to attract new investment in energy generation.

g. Expand rural electrification, including more trading centers under the Malawi Rural Electrification Program.

Primary responsible actors

Primary actors are: DoE, ESCOM, MERA, Ministry of Finance, Economic Planning and Development, Ministry of Industry, Trade and Tourism, EAD, and the private sector.

Potential impacts

Potential impacts include: cleaner, more efficient, healthier, and superior energy services that reduce drudgery and deforestation.

4.2.3 Liquefied Petroleum Gas (LPG)

Current situation

Adoption of LPG is low; safety fears are high; affordability is a challenge for many Malawians due to high upfront costs of the gas canister and stove; and the high cost (in cash) for refilling the canister. LPG is efficient, burns clean, and has relatively low GHG emissions. With increasing charcoal prices due to scarcity and unpredictable electricity supply, LPG is becoming more attractive to urban, middle- to high-income groups, as evidenced by increases in supply and demand and the recent growth in the private LPG sector.

Strategic objective

Promote adoption of LPG for urban and semi-urban domestic and institutional/industrial cooking and heating.

Strategic Actions

a. Conduct a market study to clarify the current status, demand/supply, barriers and opportunities for LPG and use findings in the planning and promotion of LPG.

b. Conduct a cost-benefit analysis to determine the impact of removing Duty and VAT on LPG and associated cooking devices (LPG cookstoves).

c. Provide fiscal incentives that increase adoption, including removal of Duty and VAT, for both LPG and the associated cooking devices (LPG cookstoves).

d. Develop appropriate standards and certifications for LPG canisters to ensure safety and compatibility.

e. Regulate importers and retailers of LPG, and LPG canisters.

f. Support the private sector to develop awareness campaigns to promote household and institutional/industrial adoption of LPG in urban areas, targeting cost, safety and other factors currently limiting adoption.

Primary responsible actors

Primary actors are: DoE, MERA, MBS, Ministry of Finance, Department of Economic Planning and Development, Ministry of Industry, Trade and Tourism, and the private sector.

Potential impacts

Increased adoption of LPG reduces pressure on forests and deforestation, reduces air pollution, diseases, and carbon emissions and enhances energy services, based on adequate incentives for early takeoff, but this is initially targeted for middle to high income urban dwellers, institutions and the food/hospitality industry.

4.2.4 Briquettes and pellets

Current situation

Despite considerable efforts to date, adoption of briquettes and pellets has been extremely low in Malawi. This is due in large part to designs that have focused on very small-scale production, and which have not accounted for critical factors including: limited biomass to sustain production and competition for biomass; the inability to produce quality/efficient briquettes/pellets (on par with, or more efficient than firewood); and the inability to be cost-competitive in the marketplace. Nonetheless, there is growing industrial (agricultural processing) and institutional demand for biomass energy, which could be met in part by commercially produced biomass briquettes/pellets. Briquette/pellet production from sawdust (from lumber mills) and rice husks (in lakeshore rice-producing districts) appear to present the greatest opportunity for quality biomass briquettes/pellet production as potentially sustainable raw material. If produced well, briquettes/pellets have the potential to offer a concentrated and cost effective fuel that can be renewable and cleaner than firewood.

Strategic objective

Foster the development of commercially-viable briquettes/pellet production, with market linkages to proximate industrial and institutional buyers (e.g., tobacco estates, hospitals, schools, etc.).

Strategic actions

a. Conduct an assessment of briquette/pellet production from rice husks to document product quality and cost, and the resulting ability to compete with firewood/charcoal.

b. Conduct a market assessment to quantify market demand for biomass briquettes/pellets around production areas.

c. If determined to be feasible, promote adoption within targeted production areas, with private clients and Governmental institutions.

d. Support development of briquette/pellet standards to help ensure consistent quality of production.

e. Provide fiscal incentives to support the best opportunities for market-oriented sustainable production of briquettes/pellets, possibly including: Duty/VAT waivers for efficient briquette/pellet producing machinery.

Primary responsible actors

Primary actors are: DoE, MERA, MBS, Ministry of Finance, Economic Planning and Development, Ministry of Industry, Trade and Tourism, the private sector, National Commission for Science and Technology, and TEVET.

Potential impacts

Potential impacts include sustainably-produced briquettes/pellets reducing pressure from industrial/institutional use of firewood and charcoal.

4.2.5 Biogas

Current situation

Despite their introduction approximately 20 years ago, sustained use of biogas digesters in Malawi is almost non-existent. There are numerous reasons for this, including but not limited to, limited availability of organic matter and inadequate training in operations and maintenance. This experience notwithstanding, there are now promising examples of lower-cost tubular biogas digesters being installed, used and main-

tained in sub-Saharan Africa. Building on this recent regional experience, the promotion and adoption of tubular biogas digesters in small to medium-scale institutions have the potential to significantly decrease firewood consumption in the short- to medium-term, together with biogas plants integrated into the design of new instructional buildings (e.g., hospitals, schools, prisons) to access and use the sustainable supply of sewerage as the biomass for the long term.

Strategic objective

Facilitate promotion of tubular biogas digesters that utilize sewerage/human waste to meet institutional cooking/heating needs. At least initially the focus should be on public institutions with large populations (e.g., prisons, schools, hospitals, etc.).

Strategic actions

a. Identify the best potential sites to pilot tubular biogas digesters (based on costs/benefits, availability of suitable organic matter, etc.). Initially this should focus on identifying a limited number of suitable sites within one district, in an effort to ease development and support for operations.

b. Build the capacity of technicians within the institutions/district to manage the tubular biogas digesters.

c. Provide appropriate fiscal incentives (e.g., Duty and VAT waivers) to reduce the cost of tubular biogas digesters, and associated cooking devices.

d. Develop standards for tubular biogas digesters

e. Promote

Primary responsible actors

Primary actors are DoE, MERA, MBS, Ministry of Finance, Economic Planning and Development, Ministry of Industry, Trade and Tourism, Ministry of Transport and Public Works, National Commission for Science and Technology, and the private sector.

Potential impact

Sustainably-produced biogas reduces firewood consumption and deforestation; reduces pollution and associated respiratory diseases; and provides employment. But the scale of production must be large enough to overcome the costs of development and sustained operation.

4.3 Pillar 2: Promote Adoption of Fuel-Efficient Cookstove Technologies

4.3.1 Current situation

In recent years, Malawi has achieved gains in adoption of more fuel-efficient firewood cookstoves, especially in urban areas where the large majority of the population purchase (instead of collect) fuelwood. In rural areas, adoption of more fuel-efficient cookstoves remains quite low (although this is variable from one region to another). Urban residents who use charcoal almost exclusively use a version of the Jiko charcoal cookstove introduced from Kenya in the late 1980s and 1990s. Adoption of newer, more efficient charcoal cookstoves is almost non-existent. ***Increasing adoption of fuel-efficient charcoal and firewood cookstoves presents the most immediate option to slow deforestation and forest degradation across Malawi.***

4.3.2 Strategic objective

Promote the adoption of improved charcoal and firewood cookstoves for household cooking and heating.

4.3.3 Strategic actions

a. Building on the progress made by the National Cookstove Steering Committee, conduct secondary research on improved charcoal and firewood cookstoves and broadly disseminate the results.

b. Using social marketing and behavior-change approaches, develop and implement targeted campaigns to promote adoption of improved firewood and charcoal cookstoves, segmented for urban and rural populations. These efforts should engage extension workers from various relevant sectors (e.g., Community Development Assistants, Home Craft Workers, Community Health Workers, Agricultural Extension Development Officers, Forestry Assistants, etc.).

c. Develop minimum efficiency standards for charcoal and firewood cookstoves (to qualify as improved fuel-efficient cookstoves).

d. Conduct a cost-benefit analysis to determine the impact of removing Duty and VAT on improved fuel-efficient cookstoves, and if deemed beneficial, recommend how to do this most effectively.

e. Building on lessons from elsewhere in Africa, provide financial incentives to aid increased adoption including the removal of Duty and VAT for improved fuel-efficient charcoal and firewood cookstoves.

f. Promote appropriate financing mechanisms and market-based delivery systems (e.g., payment in installments) to catalyze mass scaling-up of improved cookstoves for households.

4.3.4 Primary responsible actors

Primary actors are: DoE, The National Cookstoves Steering Committee (NCSC), Ministry of Finance, Economic Planning and Development, MBS, Malawi National Commission for Science and Technology, Ministry of Civic Education, Culture and Community Development, Ministry of Agriculture, Irrigation and Water Development, Department of Forestry, NGOs, media, and the private sector.

4.3.5 Potential impacts

Potential impacts include: widespread adoption and use of efficient cookstoves; reduction in charcoal and firewood consumption; reduction in charcoal and firewood production resulting in decreased deforestation and degradation; reduction in air pollution resulting in improved health of women and children; labor savings, particularly for rural women and children; household income savings, particularly for urban residents; and reduced GHG emissions.

4.4 Pillar 3: Promote Sustainable Wood Production

4.4.1 Current situation

Firewood harvested for commercial purposes is largely sourced illegally from forest reserves; and most and, almost without exception wood for charcoal production is harvested illegally within and adjacent to forest reserves. Across much of Malawi, demand for firewood and charcoal is driving deforestation and forest degradation. Wood for firewood and charcoal is already deficient in the Lilongwe and the Blantyre/Zomba supply areas. According to current projections, by 2030 there will not be enough biomass in the country to meet demand for firewood and charcoal sustainably. Given the level of reliance on biomass energy, and the time required to develop and scale up alternatives, this is a very challenging situation that can only be met by focused efforts that significantly increase and sustain wood production for biomass energy at scale.

4.4.2 Strategic objective 1

Through concessions and other appropriate means, promote large-scale/commercial cultivation of fast growing tree species and/or alternative feedstock suitable for charcoal and commercial firewood production.

Strategic actions

a. Conduct secondary research and disseminate findings on fast growing tree species suitable for commercial firewood and/or charcoal production, including summaries of sound silvicultural and management practices.

b. Actively pursue the design and tendering of concessions on degraded government plantation land for commercial production of trees suitable for charcoal and/or firewood—initially prioritizing areas proximate to urban consumption centers to limit transportation costs. Local authorities should be consulted through this process. Requirements for associated out-grower schemes or corporate social responsibility should expressly stipulated in concession agreements.

c. Ensure an adequate supply of quality tree seed for identified fast-growing tree species be suitable for charcoal and/or commercial firewood production.

d. Promote trials and disseminate findings to document the potential of bamboo (various species) as a fast growing feedstock for charcoal production.

e. Research and recommend solutions for emerging pests and diseases that threaten trees grown for sustainable charcoal production, starting with recent pests (e.g., the red gum lerp psyllid and the gall wasp) that threaten Eucalyptus trees.

Primary responsible actors

Primary actors are: DoF, FRIM, academic institutions, MITC, MCCCI, and the private sector.

Potential impacts

Potential impacts are: increased sustainable wood production; reduced deforestation; increased employment opportunities; enhanced catchment management/ecosystem services; and enhanced mitigation and adaptation to climate change. However, delayed benefits could undermine investment in the near term, or may require transitional measures.

4.4.3 Strategic objective 2

Empower individuals in rural communities adjacent to large-scale/commercial operators to produce trees on private and/or customary lands following an out-grower model. In order to ensure tree growing does not compete with food production, these efforts should focus primarily on marginal lands and homesteads.

Strategic actions

a. Conduct secondary research to establish the business case for small-to medium-scale commercial tree (or other feedstock) production for commercial firewood and/or charcoal production.

b. Ensure an adequate supply of quality tree seed for identified fast-growing tree species suitable for charcoal and/or commercial firewood production (linked to commercial operators).

c. Train producers in improved silvicultural practices.

d. Train producers in business dynamics and related issues to enhance their capacity, effectiveness, and incentives in tree production.

Primary responsible actors

Primary actors are: DoF, FRIM, traditional leaders, individual producers, communities (VNRMCs), and the private sector.

Potential impacts

Potential impacts of these actions include: increased tree production for biomass energy; increased incomes from tree sales for firewood and charcoal production; reduced deforestation; enhanced ecosystem services; enhanced mitigation and adaptation to climate change. However, delayed benefits, if not managed, could undermine investment or require transitional measures, and wood could be converted to other, more profitable uses.

4.5 Pillar 4: Strengthen Law Enforcement

4.5.1 Current situation

In recent decades, law enforcement related to charcoal production and marketing has been inadequate, inconsistent and ineffective. While Malawi's laws clearly distinguish what is legal from what is illegal, these laws have not been applied effectively. This failure makes illegal charcoal made from 'free' indigenous wood readily available and unrealistically low-priced. This illegal charcoal market discourages private investment in legal, sustainable, and commercial "green" charcoal production. Also, consumers are not considered part of the problem, as illegal charcoal is generally their only option.

4.5.2 Strategic objective

Enhance enforcement of existing laws and regulations in order to reduce illegal wood harvesting and charcoal production and to create a market for sustainable wood and charcoal production.

4.5.3 Strategic actions

a. Revise the 1997 Forestry Act and develop sectoral Forestry Regulations.

b. Build the capacity of the Department of Forestry (DoF) to effectively implement the Forest Act and relevant Forestry Regulations.

c. Engage the relevant national stakeholders (including but not limited to the Judiciary, Malawi Police Service, Malawi Defense Force) to collaborate on effective enforcement of the Forestry Act and Forestry Regulations.

d. Build the capacity of district councils, traditional leaders and local communities (including community policing structures) to engage in enforcement of the Forestry Act and relevant Forestry Regulations, and to establish and implement bylaws.

e. Raise awareness of relevant policies, laws and regulations to clarify content, roles and responsibilities for enforcement.

f. Develop charcoal regulations that provide prohibitive penalties for illegal charcoal production, sale and transportation.

g. Stop the sale of illegal charcoal in markets.

4.2.4 Primary responsible actors

Primary actors are: DoF, Parliament, Malawi Police Service (MPS), Malawi Defense Force (MDF), Department of National Parks and Wildlife (DPNW), the judiciary, District Councils, traditional leaders, communities, faith community, non-governmental organizations (NGOs), and the media.

4.2.5 Potential impacts

Anticipated impacts of enhanced law enforcement are: a reduction in illegal charcoal production; increase in charcoal prices in the near to medium term; charcoal producers' investment in wood production and efficient technologies; consumer adoption of more fuel efficient cookstoves; and, consumer transition to alternative cooking fuels.

4.6 Pillar 5: Regulate Sustainable Charcoal Production

4.6.1 Current situation

Placing a 'ban' on charcoal without providing affordable alternatives leads to illegal charcoal production and marketing; criminalization of a significant sector of the national economy; loss of potential government revenue through corruption; and, loss of valuable national forest reserves and the vital ecosystem services that they provide (e.g., catchment management) as deforestation worsens.

4.6.2 Strategic objective 1

Establish a professional and regulated charcoal value chain that promotes sustainable and efficient production of charcoal in Malawi based on a business model.

Strategic actions

a. Develop measures to encourage private sector involvement in industrial charcoal production (e.g., tied to concessions for plantation establishment and management).

b. Promote licensing of small-scale charcoal producers, linked to larger licensed industrial charcoal producers where possible.

c. Promote improved charcoal kiln technologies and, where appropriate, briquette-making technologies.

d. Develop and promote best practices/guidelines for more efficient charcoal production.

e. Develop a Biomass Energy Policy/Act, or revise existing Energy Policy, to enable MERA to regulate charcoal.

Primary responsible actors

Primary actors are: DoF, Forestry Research Institute of Malawi (FRIM), Department of Energy Affairs (DoE), MERA, Ministry of Finance, Economic Planning and Development, Ministry of Industry, Trade & Tourism, Malawi Confederation of Chambers of Commerce and Industry (MCCCI), Malawi Bureau of Standards (MBS), academic institutions, and the private sector.

Potential impacts

Potential impacts of regulated, sustainable and efficient charcoal production are: increased wood production for biomass energy; increased production and marketing of legal charcoal; increased charcoal prices in the near term; increased private investment in wood production, charcoal production and efficient technologies; increased consumer adoption of fuel efficient cookstove technologies in the near-term and alternative cooking fuels in the longer-term; decline in greenhouse gas (GHG) emissions, mitigating impacts of climate change and opening potential sources of climate finance (e.g., Green Climate Fund).

4.6.3 Strategic objective 2

Establish effective control mechanisms and institutional arrangements to regulate transportation and sale of licensed charcoal.

Strategic actions

a. Develop and implement a simple chain-of-custody system to help differentiate legal charcoal from illegal charcoal.

b. Establish a network of strategically-located checkpoints to monitor and regulate charcoal transportation and sales, ensuring compliance with the Forestry Act and Forestry Regulations.

c. Introduce other practical mechanisms to report illegal activities and minimize corruption within the CVC, including the use of mobile cellphone technologies.

d. Design and implement a cost-effective monitoring and evaluation plan for the regulatory system.

Primary responsible actors

Primary actors are: DoF, DoE, EAD, MPS, Ministry of Finance, Malawi Revenue Authority (MRA), City Councils, District Councils, traditional leaders, political leaders, Anti-Corruption Bureau, and the media.

Potential impacts

Potential impacts are: improved enforcement of laws and regulations leading to the displacement of illegal charcoalwith legally-produced charcoal; increased cost for legally-produced charcoal in the near term; increased private investment in wood production, charcoal production and efficient technologies; and increased consumer adoption of fuel-efficient cookstove technologies in the near-term and alternative cooking fuels in the longer-term.

4.7 Pillar 6: Support Livelihoods

4.7.1 Current situation

The Government recognizes that biomass energy production (including commercial firewood and charcoal production), transportation, and retail sale play a significant role in contributing to incomes and supporting the livelihoods of Malawians in both rural and urban areas. The rural poor tend to be more dependent on forest resources and incomes than urban Malawians. Forest-based enterprises act as a safety net and often help to address income and food insecurity in rural areas. As the Government works to slow and eventually stop illegal charcoal production, transportation and sale, efforts must be made to minimize detrimental impacts on these rural poor, and ensure that alternatives are sought for many of those who can no longer produce and sell charcoal illegally.

4.7.2 Strategic objective

Promote development of viable, sustainable and appropriate income generation activities (IGAs) including forest-based enterprises, agricultural and other economic activities to reduce poverty and dependency on charcoal as a primary source of livelihood.

4.7.3 Strategic actions

a. Promote commercially viable alternative income generating activities (IGAs). Possible IGAs include those that promote commercial tree production, forest management and related enterprises (e.g., commercial tree-nursery establishment including fruit trees, beekeeping/honey production, mushroom collection, etc.), and IGAs in the agriculture/livestock sector, especially those with potential for shorter production periods or producing multiple products (e.g., poultry). To the extent possible, IGAs should target current/former charcoal producers.

b. Train individuals and groups (including former/current charcoal producers) on entrepreneurial skills to empower them to engage in successful IGAs.

c. Link local communities to commercial investments (e.g., plantations or alternative charcoal-feedstock production) to promote direct employment opportunities for commercial engagement (e.g., trees/feedstock out-grower schemes).

d. Leverage existing sources of national/local funding (e.g., LDF/MASAF) to promote productive and sustainable investments.

4.7.4 Primary responsible actors

Primary actors are: the Ministry of Gender, Children, Disability and Social Welfare; Department of Community Development; TEVET; Ministry of Agriculture, Irrigation and Water Development; Ministry of Industry, Trade and Tourism; NGOs; and the private sector.

4.7.5 Potential impacts

Anticipated impacts include: alternative livelihoods reduce dependency on charcoal production (and commercial firewood). However, even with best efforts to enhance alternative livelihoods/IGAs, it is not likely that all illegal charcoal producers, transporters, and retailers will be reached. Fostering legal alternatives will also depend on effective enforcement of laws and regulations to reduce and eventually stop illegal commercial firewood harvesting and charcoal production.

4.8 Pillar 7: Promote Information, Awareness and Behavior-Change Communications

4.8.1 Current situation

Lack of information and awareness exist across all five technical pillars of the NCS, and will limit the desired behavioral change and ultimately the success of interventions if not adequately addressed. This includes the need for focused information and awareness on relevant policies and laws, promotion of alternative cooking and heating fuels, adoption of improved charcoal and firewood cookstoves, efficient charcoal production technologies, as well as improved silvicultural practices. Government will work with partners to develop information and raise awareness in order to change the behavior of diverse stakeholders in ways that sustain activities in pillars 1–5.

4.8.2 Strategic objective

Produce relevant information, raise awareness, and promote positive behavioral change related to NCS Pillar activities.

4.8.3 Strategic actions

a. Produce concise "briefs" that clearly communicate strategy/policy/law/regulations to target audiences (e.g., Forestry Policy/Act/Regulations).

b. Utilize a social marketing/behavior change approach in an effort to improve efficacy of key NCS Pillar actions (e.g., in promotion of alternative cooking fuels, in promotion of improved charcoal/firewood cookstoves).

c. Seek and disseminate evidence-based information, innovations and best practices to enhance implementation of strategies under all the pillars of the NCS.

d. Create fora and other opportunities for exchange of ideas, experiences, innovations and "best practices" among key stakeholders to ensure successful implementation of the NCS.

e. Create and implement a robust monitoring and evaluation system for NCS implementation and impact assessment.

4.8.4 Primary responsible actors

The primary responsible actors are: DoF, DoE, MGCDSW, Judiciary, Ministry of Local Government and Rural Development, MCECCD, Ministry of Education, Science and Technology, Malawi Institute of Education, academic institutions, NGOs, media, traditional leaders, District Councils, local communities, and the private sector.

4.8.5 Potential impacts

Anticipated outcomes are that information, awareness and effective communication complement pillar activities, enhance the chances of achieving intended outcomes, and monitoring and evaluation provide the mechanism for corrective action where success falls short or the situation changes.

5.0 CROSS-CUTTING ISSUES

5.1 Engagement and Promotion of Private Sector Involvement

5.1.1 Current situation

There is very little formalized (e.g., legal and regulated) private sector involvement in the biomass energy sector, including charcoal and commercial firewood. The formal private sector has been somewhat more engaged in recent years in the provision of household cooking and heating alternative energies (in particular, LPG), and marketing and sale of improved cookstoves (in particular, firewood cookstoves). The Government, beyond providing a conducive policy and legal framework for such private sector involvement, has limited capacity, resources, and role in promoting private sector engagement. However, one exception exists in the case of the NCS—the provision of incentives that support private investment in NCS Pillar activities—particularly the development and promotion of energy alternatives, adoption of improved charcoal and firewood cookstoves, establishment of industrial-scale plantations specifically for charcoal and firewood, and commercial production of legal charcoal. In this regard, the NCS also supports specific provisions and strategies to promote private-sector investment in the National Forest Policy (2016), National Energy Policy (2003 and draft 2016), the draft MRES and draft Action Agenda for Malawi in support of SE4ALL (2016).

5.1.2 Strategic objective

Incentivize and promote private sector participation that promotes adoption of alternative cooking and heating fuels; improved charcoal and firewood cook stoves; commercial production of wood; and production of licensed sustainable charcoal.

5.1.3 Strategic actions

a. Review (to assess costs and benefits), and where compelling and feasible establish fiscal incentives (e.g., Duty and/or VAT waiver) to promote private sector investment in NCS Pillar areas, including:
   - development and promotion of energy alternatives;
   - adoption of improved charcoal and firewood cookstoves;
   - establishment of industrial-scale plantations specifically for charcoal and firewood; and
   - commercial production of licensed charcoal (including improved kiln technology).

b. Through MoF, MITC and others, encourage the development of partnerships between the private sector and public agencies, Malawian communities, and entrepreneurs, to clarify and scale up local benefits of investments—especially those that focus on increasing sustainable wood production for charcoal and firewood, and increased production of licensed charcoal. This should also include collaborative effort and partnership with Malawian companies that could benefit from improved watershed services, including ESCOM and the Water Boards.

5.1.4 Primary responsible actors

The primary actors are: MoF, Ministry of Industry, Trade and Tourism, MITC, DoF, DoE, ESCOM, Water Boards, the private sector, National Cook Stoves Steering Committee, Development Partners, NGOs, Ministry of Local Government and Rural Development, and political leaders.

5.1.5 Potential impacts

All efforts that scale-up adoption of NCS Pillar activities will reduce dependence on charcoal and firewood and bring commercially-viable technical solutions to the Malawian alternative energy market, and scale-up commercial wood production for charcoal and firewood and production of licensed sustainable charcoal. However, effective regulation of such activities will take time.

5.2 Gender Dynamics and Equity

5.2.1 Current situation

Men and women have differentiated needs and roles in the choice and use of cooking energy, and use of the energy sources has differentiated impacts on men and women. Women and girls often bear the disproportionate burden of collecting firewood, and in large parts of the country, are now having to walk longer distances and spend more time collecting wood[17]. Women also primarily engage in cooking, and as such are exposed to the health risks (pollution and associated diseases) associated with cooking with firewood and charcoal. Despite this, women often have little voice in household energy planning and decision-making. The illicit CVC has favored the participation and benefit of men over women in charcoal production, transport and trading. Thus, all steps must be taken to ensure that the costs and benefits of implementing this NCS are shared equitably among men and boys, women and girls. This strategy supports gender mainstreaming provisions of the National Gender Policy (2008), National Forest Policy (2016), the Energy Policy (2003 and draft 2016) and draft MRES, in all the pillars.

5.2.2 Strategic objective

Ensure that the needs of men, women, children and vulnerable groups are addressed, and the costs and benefits of the NCS are shared equitably by all stakeholders.

5.2.3 Strategic actions

a. Mainstream gender issues in all technical pillars of the NCS to enhance the participation of men and women in NCS-related activities.
b. Use social marketing and behavior-change approaches that differentiate male and female audiences and decision-makers.

5.2.4 Primary responsible actors

The primary actors are: DoF, DoE, academic institutions, Ministry of Agriculture, Irrigation and Water Development, NGOs, traditional leaders, local communities, political leaders, the private sector, and all key actors identified for each of the pillars, with MGCDSW playing a more significant role.

5.2.5 Potential impacts

Anticipated impacts include: interventions that capture the complementary but differentiated needs, knowledge, roles and contributions of men, women and children; the burden of labor is decreased and adverse health impacts reduced (and adverse trickle down impacts on the productive sectors), especially among women, girls and other vulnerable groups.

6.0 CONCLUSIONS

Given the complexity and gravity of the linked challenges of sustainable energy supply and deforestation, inaction is no longer an option. Immediate action is required, and this must be sustained in the years and decades ahead. The NCS provides a framework to address these linked problems of increased deforestation and increased demand for household cooking fuel. Successful implementation of the strategy will help to set Malawi on a path toward a diversified, sustainable and regulated household energy sector, while reducing deforestation and the associated adverse impacts on rural livelihoods and the national economy.

The development of this NCS acknowledges that the desired change will not be easy, nor will it be fast. Success will require continued commitment over time, and the productive collaboration across relevant Government agencies, as well as with civil society and importantly the private sector. In this vein, the NCS offers a holistic, no-regrets approach that breaks down what can appear to be an insurmountable problem into prioritized phased strategic elements (pillars), each with actions to be addressed in the short term (0–2 years), medium term (3–5 years) and long term (more than 5 years). While the NCS targets a ten-year period (2017–2027), for some actions a longer horizon is more realistic. Nonetheless, the strategy should be reviewed periodically to incorporate lessons learned through the process of implementation.

Lastly, strong, political support and technical leadership are also essential for success. The collaboration in the development of this strategy has been a promising first step. This must be sustained, and in fact expanded, in order to achieve the desired results. The need for a sustainable, affordable and reliable supply of charcoal (and firewood) for household (and institution/industrial) cooking and heating into the near future is known and real. The adverse impacts of deforestation on our country are also well established, as is the role of charcoal and firewood in driving this deforestation. The time for action is now. Together we can make a difference.

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ACRONYMS

BEST	Biomass Energy Strategy
BMC	Block Management Committee
CBFM	Community Based Forest Management
CDM	Clean Development Mechanism
CPA	Charcoal Producer Association
CVC	Charcoal Value Chain
DA	District Assembly
D&D	Deforestation and Degradation
DoE	Department of Energy Affairs
DoF	Department of Forestry
DNPW	Department of National Parks and Wildlife
EAD	Environmental Affairs Department
ECRP	Enhancing Community Resilience Program
ESCOM	Electricity Supply Commission of Malawi
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GoM	Government of Malawi
GVH	Group Village Head
FAO	Food and Agricultural Organization of the United Nations
FBE	Forest-Based Enterprises
FRIM	Forest Research Institute of Malawi
HOBK	Half-Orange Brick Kiln
IFMSLP	Improved Forest Management for Sustainable Livelihoods Program
IHS	Integrated Household Survey
LFMB	Local Forest Management Board
LUANAR	Lilongwe University of Agriculture and Natural Resources
M&E	Monitoring and Evaluation
MBS	Malawi Bureau of Standards
MCFW	Malawi College of Forestry and Wildlife
MGCDSW	Ministry of Gender, Children, Disabilities and Social Welfare
MIRTDC	Malawi Industrial Research and Technology Development Center
MK	Malawi Kwacha
MNREM	Ministry of Natural Resources, Energy, and Mining
MoF	Ministry of Finance, Economic Planning and Development
MRV	Measurement Reporting and Verification
NAMA	National Adaptation Plan of Action
NHBG	National Herbarium and Botanical Gardens
NCS	National Charcoal Strategy
NEP	National Energy Policy
NGO	Non-Governmental Organization
NOCMA	National Oil Company of Malawi
NSO	National Statistical Office
PERFORM	Protecting Ecosystems and Restoring Forests in Malawi
PIL	Petroleum Importers Ltd.
REDD+	Reducing Emissions from Deforestation and Forest Degradation Plus
SDG	Sustainable Development Goal
SE4ALL	Sustainable Energy for All
SSA	Sub-Saharan Africa
UNFCCC	United Nations Framework Convention on Climate Change
UN-REDD	United Nations Collaborative Initiative on Reducing Emissions from Deforestation and Forest Degradation
USAID	United States Agency for International Development
USD	United States Dollar
VFA	Village Forest Area
VNRMC	Village Natural Resources Management Committee
WMS	Welfare Monitoring Survey
WICO	Wood Industries Corporation

APPENDICES

Appendix 1: Trends in Main Household Energy Use for Cooking, 1998 – 2014

Energy source	Level or socio-economic status	Households using source (%), 1998	Households using source (%), 2005[1]	Households using source (%), 2011[2]	Households using source (%), 2014[3]
FIREWOOD	National	94	89.9	87.7	86.0
	Rural	-	97.0	96.2	94.5
	Urban	-	37.9	41.9	33.8
	Blantyre City	-	85.8	19.5	
	Lilongwe City	-	72.5	40.2	
	Mzuzu City	-	49.2	65.5	
	Zomba City	-	50.8	45.4	
	Poorest 20%	99	98.4	97.7	
	Riches 20%	77	72.0	66.2	
CHARCOAL	National	2	6.8	8.9	11.3
	Rural	-	1.2	2.3	4.2
	Urban	-	48.2	44.6	54.4
	Blantyre City	-	10.4	59.7	
	Lilongwe City	-	13.8	49.6	
	Mzuzu City	-	33.5	24.5	
	Zomba City	-	43.3	39.5	
	Poorest 20%	0	0.5	0.5	
	Richest 20%	7	18.4	23.9	
ELECTRICITY	National	3.1	1.7	2.5	2.0
	Rural	-	0.4	0.6	0.4
	Urban	-	11.5	12.6	11.4
	Blantyre City	-	3.8	19.2	
	Lilongwe City	-	11.3	9.4	
	Mzuzu City	-	14.2	9.9	
	Zomba City	-	5.5	14.5	
	Poorest 20%	0.1	0.1	0.1	
	Richest 20%	12.2	7.4	8.9	
	Proportion with electricity within 100m	-	16.0	21.2	
	Proportion of poorest 20% with electricity within 100m	-	8.0	11.3	
	Proportion of richest 20% with electricity within 100m	-	29.0	37.6	
PARAFFIN			0.2		
CROP RESIDUES			1.1		
SOLAR					0.1
GAS					0.0
OTHER			0.3		0.7

Sources: [1]IHS 2 (NSO 2005)[19]; [2]IHS [3](NSO 2012)[20]

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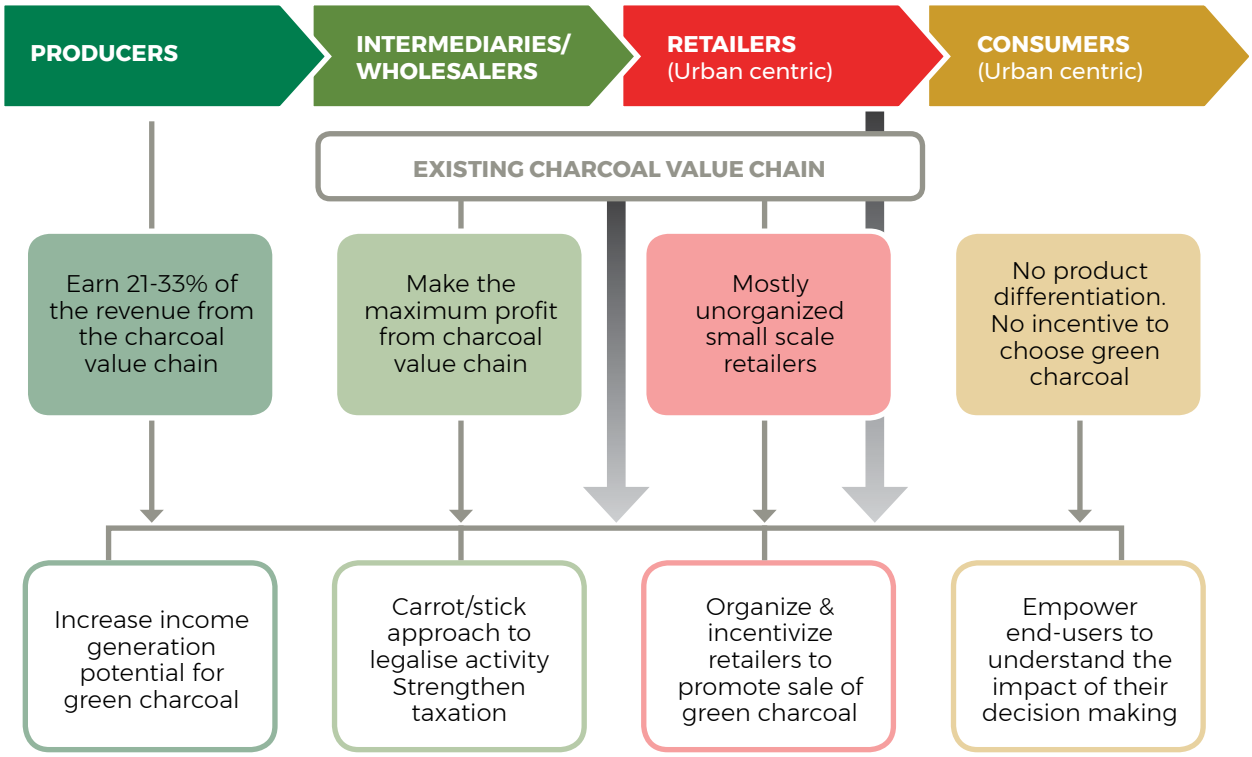
Participants Southern Region Consultation and Awareness Workshop, (Malawi Sun Hotel, Blantyre, 21 June 2016)	35 stakeholders from government, parastatal, NGO, private, and academic agencies, and traditional leaders and local community groups.	
Participants Central Region Consultation and Awareness (Crossroads Hotel, Lilongwe, 16 June 2016)	53 stakeholders from government, parastatal, NGO, private, and academic agencies, and traditional leaders and local community groups.	
Participants Northern Region Consultation and Awareness Workshop (Mzuzu Hotel, 21 June 2016)	31 stakeholders from government, parastatal, NGO, private, and academic agencies, and traditional leaders and local community groups.	

Appendix 3: Estimated Consumption of Biomass Energy by Fuel and Sector, Actual Units

Sector	Charcoal			Firewood & sawdust		Residues (includes molasses)		Total[2]	
	TONNES	TJ[1]	PERCENT	TONNES WOOD	TJ	TONNES, RESIDUES	TJ	TJ	PERCENT
Rural house-holds	81,470	2,363	27	6,794,790	105,319	238,510	2,981	**110,663**	79.9
Urban house-holds	218,620	6,340	72	681,290	10,560	880	11	**16,911**	12.2
Industrial sector	1,070	31	0	264,000	4,092	470,185	5,877	**10,000**	7.2
Transport sector	-	-	0	-	-	33,605	420	**420**	0.3
Service sector	3,530	102	1	22,600	350	-	-	**452**	0.3
Total	**304,690**	**8,836**	**100**	**7,762,680**	**120,321**	**743,180**	**9,289**	**138,446**	**100.0**

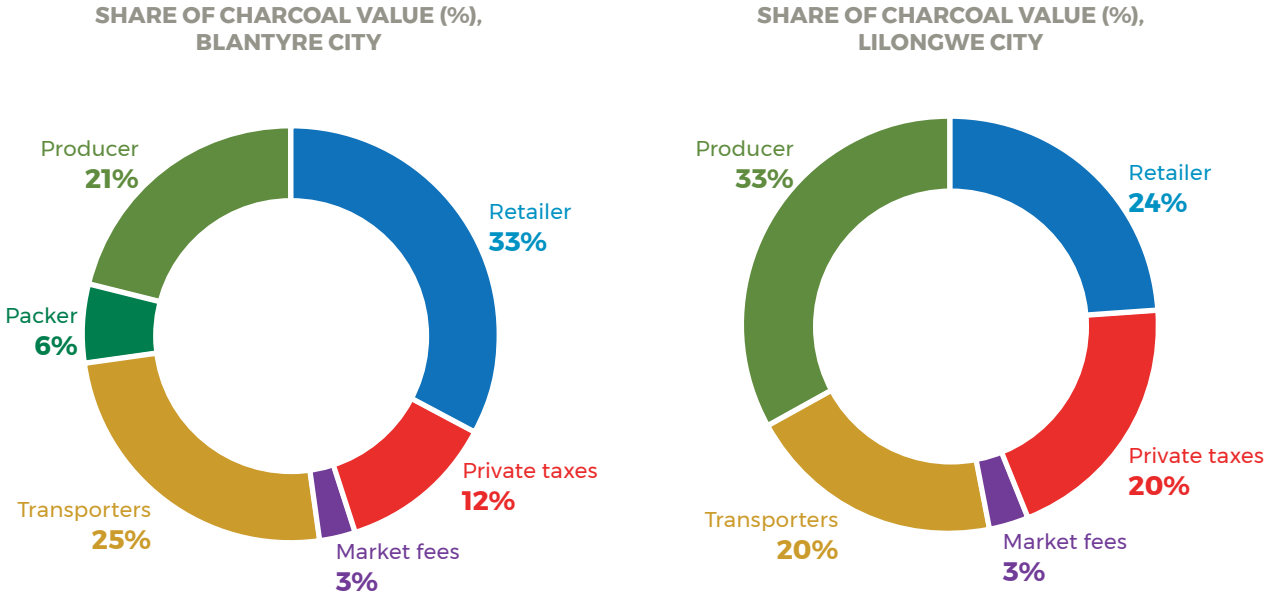
Source: Adapted from Malawi Biomass Energy Study, 2009 (MARGE, 2009)[9]
[1] TJ = Terajoules (a million joules of energy)
[2] The table does not include energy used in cottage industries, estimated conservatively at 57 TJ of charcoal (approximately 2000 tonnes), 851 TJ of firewood and 22 TJ of residues for a total of 930 TJ.

Appendix 4: A Representation of the Malawi Charcoal Value Chain



Source: Adapted from Mutimba, S. & J. Kamoto (2013)[21]

Appendix 5: Distribution of Value Among Actors in the Charcoal Value Chain, Blantyre and Lilongwe Cities



(Data source: Kambewa et al., 2007[5])

Appendix 6: Summary of Efforts to Regulate Charcoal Production from Selected Sub-Saharan African Countries

Country	Commercial utilization rights	Legislated Licensing Scale	CBFM commercial rights
Cote d'Ivoire	■ There are clear use rights for different forest types. ■ Commercial charcoal production permits are issued for wood from natural and plantation wood. ■ Taxes: A fee is paid for each permit and an additional annual fee for company, enterprises and association at twice the rate for individuals. ■ Forest owners often require an additional tax per bag of coal produced.	National, municipality local.	Individual and through associations.

Notes:

- For plantations, detailed guidelines allow charcoal production by individuals and companies and from own or others' wood with contract or agreement with the third party.
- For natural forests, any licensee must reforest a compensation hectare of land per permit, and a certificate of reforestation is issues locally (municipality)
- A contract is needed with owner/forest-right holder for natural forests.
- Exploitation zones are defined as a minimum of 25,000 ha of forest.
- Promotes formalization of the charcoal sector and improvement of charcoal production efficiency yields
- Provides reductions in import duties and value added tax for investments in energy production, protection of the environment and the forestry sector.
- Promotes charcoal production from waste wood.
- Charcoal NAMA proposes a Charcoal Unit, a Charcoal Fund to partially fund it, and an Inter-ministerial Steering Committee for discussion and coherent coordination for improvement of the charcoal value chain.

Ghana	■ A Bulk Charcoal Production License for producers of 100+ tonnes per year ■ A Bulk Charcoal Transportation License for license holders to transport charcoal ■ Charcoal Wholesale Storage License (for storage by license holders) ■ Charcoal Export License for each consignment though online application	National, district	Through registered associations

Notes:

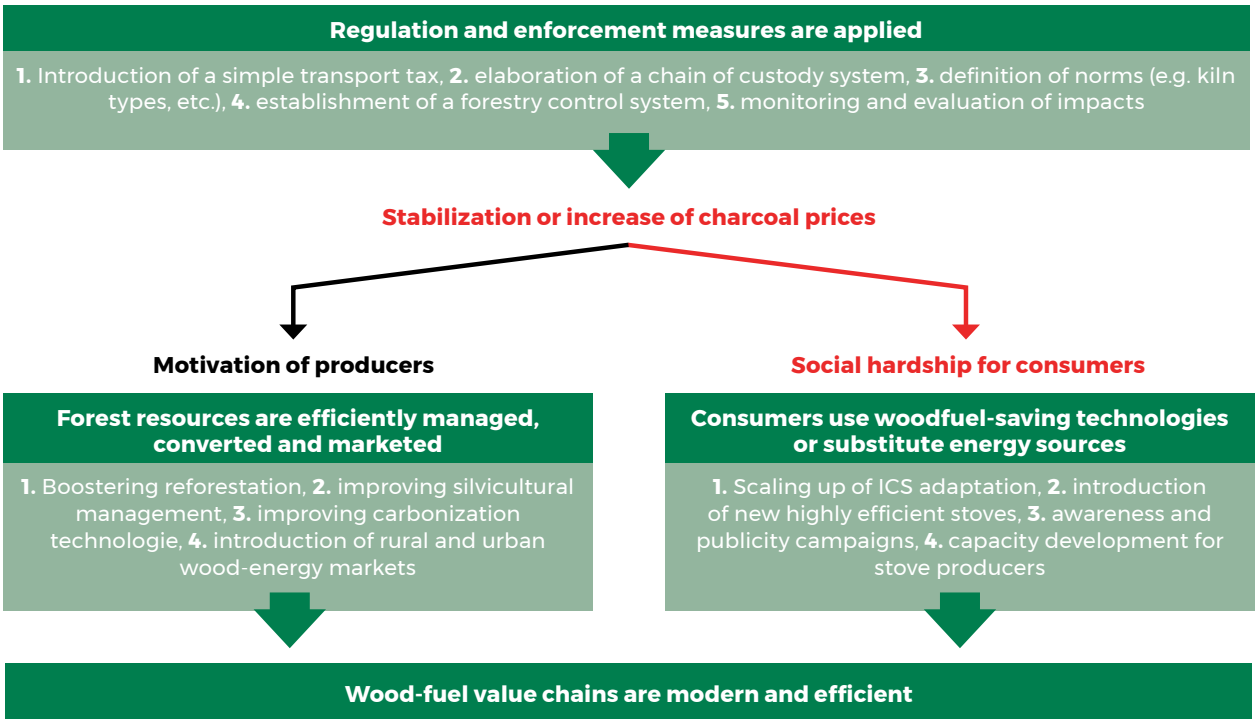
- Proposed charcoal licensing is through pre-purchased black (through registered association) non-sustainable) and green (sustainably produced) bags. Illegal charcoal has neither bags.
- A proposed charcoal Fund to partly finance Charcoal Unit.
- An Interdisciplinary Committee discusses and advises on issues of charcoal.
- Expanded eco-labeling for charcoal (black and green bags for charcoal, quality and type), efficient cookstoves, efficient kilns and the Promotes registered association.
- A private non-profit agency, the Energy Foundation promotes energy efficiency and renewable energy mainly in urban areas.
- A Renewable Energy Fund and a strategy seeks to reduce woodfuel demand.
- Growing of bamboos to reduce deforestation and provide an alternative for wood fuel and charcoal production.
- A Forest Plantation Development Fund provides financial assistance for development of private commercial plantations.
- Improved carbonization and cookstoves technologies.

Country	Commercial utilization rights	Legislated Licensing Scale	CBFM commercial rights
Kenya	■ Licenses (harvesting, production, transportation) based on sustainable harvesting (reforestation/conservation plan)	National (Kenya Forest Service),Provincial/local administration	Must be member of charcoal association
Notes: ■ Pilot charcoal rules were introduced in 2008 in 5 districts ■ Charcoal is to be sold in designated areas ■ Has designated areas for harvesting ■ Also protects endangered species, encourages use of invasive species and agriculture waste for charcoal, briquettes from charcoal dust ■ Inspections, record keeping are required, with fines ~$150 and prison sentence or breach ■ Include transportation rules ■ ENERGY Kenya funds forestry to plant trees for energy and catchment areas.			
Mozambique	■ Licenses, concessions. ■ Transportation fee to transporters per bag and 15% restocking fee	Provincial	None
Notes: ■ License fees supposed to go into Agrarian Development Fund to promote small-scale rural development/ economic activities, e.g. reforestation. ■ Use checkpoints on main roads into cities to collect fees ■ They are testing taxing of producers, not only transporters			
Rwanda	■ Licenses, concessions (industrial production) ■ Licensed/regulated transportation. ■ Regulated retail sales	National/Local government	Large private concessions to achieve the scale of production required by the market (and an economy of scale in production. Private concessions/ producers linked to outgrower schemes, employment and other benefits.
Notes: ■ Developed a Supply Master Plan for Firewood and Charcoal ■ Most of wood stock is (bought) from large industrial plantations (eucalyptus, with mean wood age 6-8 years), and conversion in large efficient kilns. ■ In 2013 wood producers had highest profit in CVC (22%), then dealers/retailers (13%), transporters (10%), charcoal makers (7%), taxes and other costs (48%). ■ There has been an increase in adoption of improved charcoal kilns (e.g., Casamance) ■ Government trains charcoal producers on best carbonization practices; provides fast growing tree seedlings eucalyptus); enforces laws and regulations; links small-scale producers to industrial producers, and to micro-finance institutions ■ Cooperatives buy charcoal from member producers and sells to wholesalers & retailers			
Senegal	■ Licenses (wood cutting, transportation, storage), concessions, professional permits, quotas/management plans	Region, Rural Councils	Have licensing rights (licenses, permits, concessions. Keep 70% of fines, sales
Notes: ■ Govt. forestry taxes go to govt. controlled National Forestry Fund meant to help forest rehabilitation ■ Quotas based on forest inventory and management plan ■ Commercialization banned in non-managed areas ■ Urban elites monopolize contracts in collusion with forestry officials, rarely follow conditions of permit			

Country	Commercial utilization rights	Legislated Licensing Scale	CBFM commercial rights
Sudan	■ Concessions, tender to charcoal association, taxes for traders	National	None Villagers can grow crops for few years in harvested forests
Notes: ■ Government-run, plantations based production of wood for charcoal production ■ Producers organized into Sudan Charcoal Association ■ Separate Sudan National Corporation regulates charcoal production and trading			
Tanzania	Licenses and permits on harvesting and transportation	Rural Councils (village-groups), Central Government	Communities have licensing rights (licenses, permits)
Notes: ■ Has long history of decentralized village governance ■ Has requirements for sustainable feedstock, forest/reforestation plans. ■ Has designated areas for harvesting ■ Also protects endangered species, encourages use of invasive species and agriculture waste for charcoal, briquettes from charcoal dust ■ Inspections, record keeping are required, with fines ~$150 and prison sentence or breach ■ Include transportation rules (e.g., only during day) ■ Some studies show success in sustaining wood supply and benefits in community –controlled charcoal production			
Uganda	Licenses	District, sub-district councils	Licenses, permits
Notes: ■ Commercialization is banned from Central Forest Reserves (all forests 100 hectares or more), allowed in buffer zones ■ Very little forest land for local management			
Zambia	Licenses and permits Charcoal conveyance fee (US$0.10/bag)	National, district, village	Have licensing rights (licenses, permits)
Notes: ■ Has charcoal cooperatives. ■ Use checkpoints on main roads into cities to collect fees			

Sources: Basu, 2014; FAO, 2007; Lund, 2007; Mugo and Ong, 2006; Ribot, 2009; SEI, 2002; UNDP 2014a; UNDP, 2014b;Peter and Sander, 2009; World Bank 2012.[22-32]

Appendix 7: Framework for Formalizing the Charcoal Value Chain, Rwanda Case



Source: World Bank, 2012[32]