

# Eastern & Central Africa

## Actions taken by governments to improve air quality

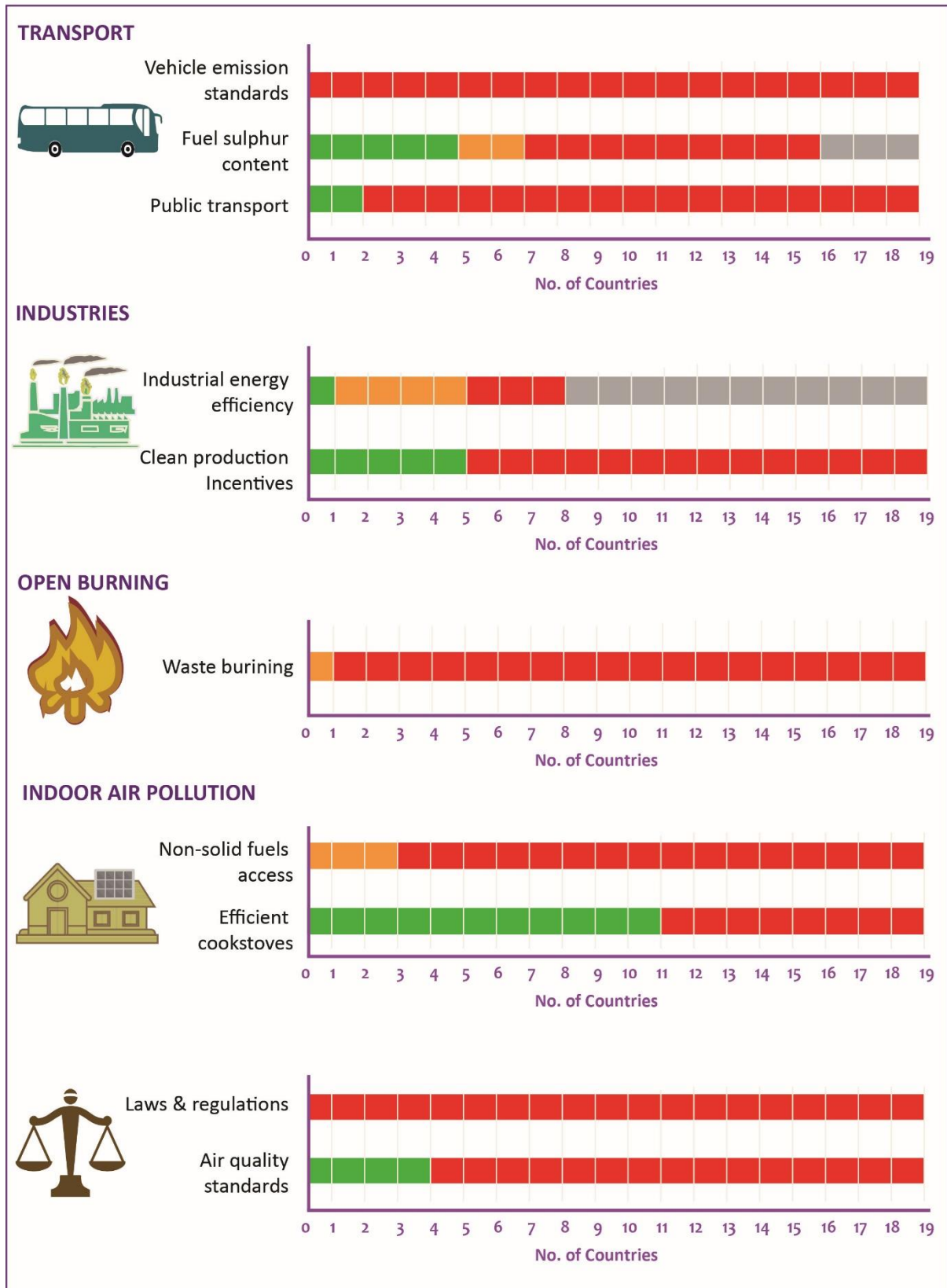
### 1.0 Introduction

In June 2014 the United Nations Environment Assembly (UNEA) adopted resolution 1/7 *Strengthening the Role of the United Nations Environment Programme in Promoting Air Quality*. As requested in paragraph 4 and 7 of the resolution, which requested UNEP to develop a report detailing actions taken by governments to promote air quality, this report details some of the major actions being undertaken by governments in Eastern and Central Africa to improve air quality.

This report summarises ten actions being undertaken in the sub-region to improve air quality. In selecting these ten actions, consideration was given to their replicability, global appropriateness to address particular air pollution challenges and potential impact. For more details, please refer to the methodology document.

These actions are: *For Industrial activities*: 1) establishing incentives that promote investments in renewable energy, pollution control technologies, energy efficiency and clean production mechanism; and 2) increasing industrial energy efficiency. *For road transport*: 3) reducing sulphur content in diesel and petrol; 4) tightening vehicle emission standards to at least Euro 4/IV-equivalent; and 5) increasing investments in public and non-motorized transport infrastructure and systems. *For open waste burning*: 6) reducing open burning of both agricultural and municipal waste through provision of legislation, monitoring, enforcement and municipal waste management systems. *For Indoor air pollution*: 7) improving access to cleaner cooking and heating fuels; and 8) improving access to cleaner, more efficient cook/space heating stoves. *For general legislative efforts*: 9) establishing and continuously tightening ambient air quality standards to meet WHO recommendations; and 10) establishing laws and regulations to support efforts to meet ambient air quality standards, and strengthen monitoring and enforcement. Figure 1 provides a summary of these actions for the sub-region.

## EASTERN & CENTRAL AFRICA POLICIES AND ACTIONS TO IMPROVE AIR QUALITY



**Figure 1:** A summary of actions, programmes, policies, laws and regulations undertaken by governments in the sub-region to improve air quality (green = progressing to best practice; red = action still required).

## **2.0 Regional Overview**

The Eastern and Central Africa sub-region consist of: Burundi, Cameroon, Central African Rep., Chad, Comoros, Republic of Congo, Democratic Republic of Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Kenya, Rwanda, Sao Tome and Principe, Somalia, South Sudan, Sudan, Tanzania and Uganda. Indoor air pollution is the most important driver of air quality related morbidity and mortality in the sub-region. The World Health Organisation (WHO) estimates that indoor air pollution is responsible for approximately 270,000 premature deaths annually.

However, in the recent past ambient air pollution has become a major issue of concern as countries grow in both population and economic output. It is estimated that ambient air pollution is responsible for 57,000 premature deaths annually.

Use of solid fuels to meet household energy demand is the most important driver of deteriorating air quality, and it is responsible for around 80% of all premature deaths linked to air pollution in the sub-region. Even though use of solid fuels is responsible for the biggest portion of indoor air pollution, it is also a considerable contributor to outdoor air pollution. Therefore, to effectively manage air quality in the sub-region, governments and their partners have to ensure access to clean energy for both rural and urban households.

Only three countries out of the 19 in East and Central Africa have access to non-solid fuels at rates greater than 35%. Djibouti has the highest non-solid fuels access rate at approximately 84%.

In addition to indoor air pollution, other emissions sources such as transport and industry are on the rise especially in urban areas where these sectors tend to be concentrated. The current contribution of vehicular emissions to the overall air quality in East and Central Africa is considerable. Due to the projected economic growth, transport will become more important in the foreseeable future, as more people will be able to afford vehicles. These countries therefore have an opportunity to ensure that the projected growth in vehicle numbers will not compromise air quality significantly. This can be achieved by enacting laws and regulations that will ensure vehicles being imported into the sub-region have at least

Euro 4 emission standards and that fuel sulphur content is below 50ppm, and by increasing investment in public and non-motorised transport.

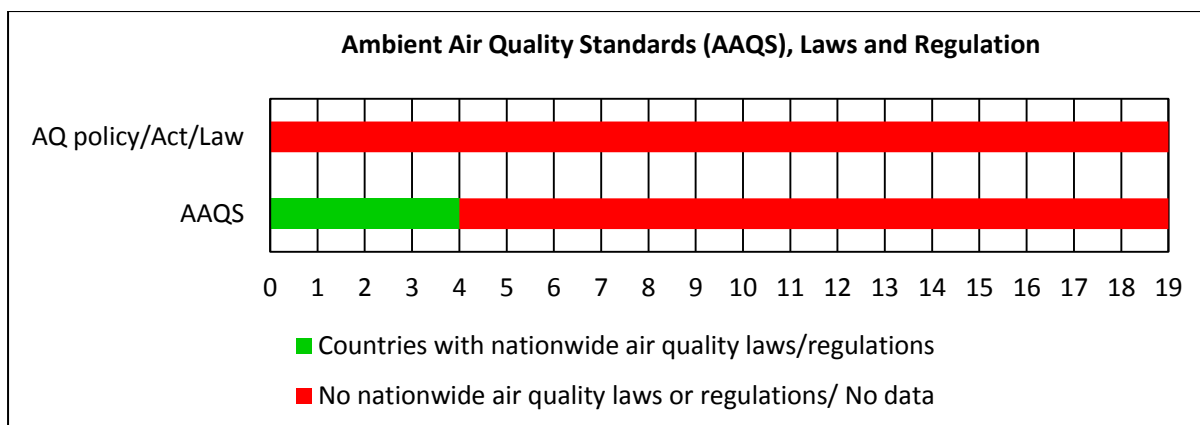
Open burning of waste is another major source of air pollution in the sub-region, with eighteen out of the nineteen countries in the sub-region still practicing some level of open burning of agricultural and municipal waste. Only one country, Rwanda, has effectively managed to reduce municipal waste burning through waste management and collection systems, although agricultural waste burning is still practiced in some regions.

Progress has been made in different areas in different countries, and there are several positive case studies to be found across the sub-region. There are however specific areas in each country that can be improved, while standards need to be established and continuously tightened, public transport expanded, the use of best practice increased etc. In addition, for policies and legislation to lower air pollution, countries must also improve implementation and enforcement, without which actions to improve air quality will not achieve their potential impact.

### **3.0 Actions Taken to Improve Air Quality**

#### **3.1 National air quality standards & regulations**

Based on the UNEP Air Quality Policy Catalogue, four out of the nineteen countries in the sub-region have established ambient air quality standards (AAQS), although most of these standards do not meet WHO guidelines. All the other countries have partial air quality protection laws or regulation that tend to be more sector specific. Although some countries in the sub-region have established AAQS, none of the countries have a nationwide air quality law or regulation to facilitate a comprehensive air quality management. Figure 2 shows countries within the sub-region that have enacted laws and policies to manage air quality.



**Figure 2:** Number of countries in the sub-region that have enacted some form of air quality laws and regulations, and the number of countries that have enacted and promulgated Ambient Air Quality Standards (AAQS).

In the sub-region, Kenya, Rwanda, Tanzanian and Cameroon have established Ambient Air Quality Standards (AAQS) although they are at very different stages of implementation. Rwanda has fully implemented the standards while the other countries are still in the process of enacting supporting regulations to fully implement the standards.

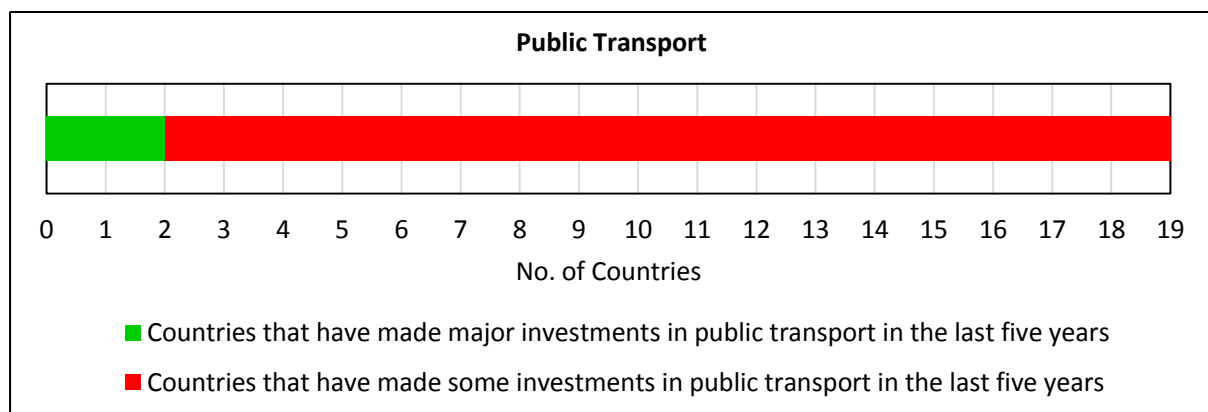
While the four countries have established Ambient Air Quality Standards (AAQS), they lack National Air Quality Policies to help in developing a strategic direction of implementing the established standards. In addition, these standards are contained in the Environmental Management and Coordination laws or regulations.

### 3.2 Transport

The rapid growth in the number of vehicles in major cities within the sub-region has put substantial pressure on urban transport systems. For instance in Kenya the number of vehicles doubles every six years. This has in turn led to increased traffic congestion and emissions in urban settings. This situation is worsened by the lack of vehicle emission standards in the sub-region, which translates to heavy emissions from the transport sector.

Actions and policies being implemented in the sub-region to reduce vehicular emission include the expansion of public and non-motorised transport infrastructure and systems. Given the increased congestion experienced in many urban areas, maintaining and increasing the modal share of public transport is essential to increase mobility while

decreasing transport emissions. For instance the governments of Tanzania and Ethiopia are currently developing mass transport systems composed of Bus Rapid Transit (BRT) and light rails. Tanzania has implemented a BRT system project to improve urban mobility and accessibility in the city of Dar es Salaam. The BRT is expected to carry up to 495,000 passengers per day and reduce travel time. In addition, the use of modern BRT, which use cleaner fuels, will significantly reduce roadside concentration of various emissions. Figure 3 shows the number of countries in the sub-region that have initiatives and programmes to significantly expand public and non-motorised transport.

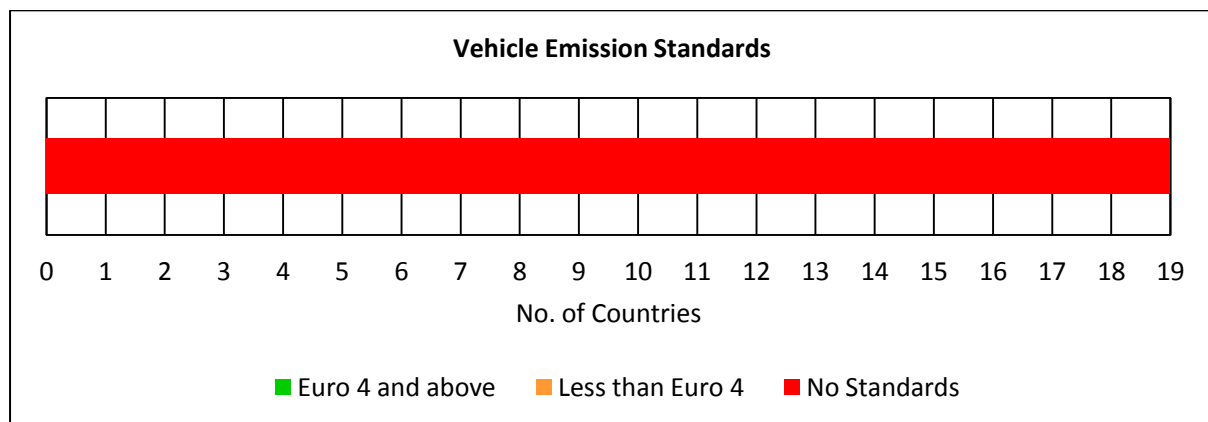


**Figure 3:** Number of countries in the sub-region that have initiated programmes and initiatives to significantly expand public transport.

In all countries in the sub-region, use of public and non-motorised transport is high, but more needs to be done to improve the safety and overall condition of walking and biking facilities especially in the large urban centres. Although the use of non-motorised transport is currently high in the sub-region, this might change over time as the economic situation of the citizenry improves, unless they are provided with safe and reliable options.

Improved fuel quality and implementation of vehicle emission standards are also required to minimise emissions from the transport sector. In the sub-region vehicle emissions are controlled mostly by imposing an age limit for second hand car importation. For instance, this age is set at 8 years in Kenya. Although this policy may reduce vehicle emissions, its overall effectiveness in improving air quality may be limited as the fleet numbers increase over time. Figure 4 shows some vehicle emission standards in the sub-region. In the sub-region, legislation regulating vehicle emission standards is still in its infancy, with several

countries proposing to enact standards in the coming years, as is the case for Kenya and Rwanda.

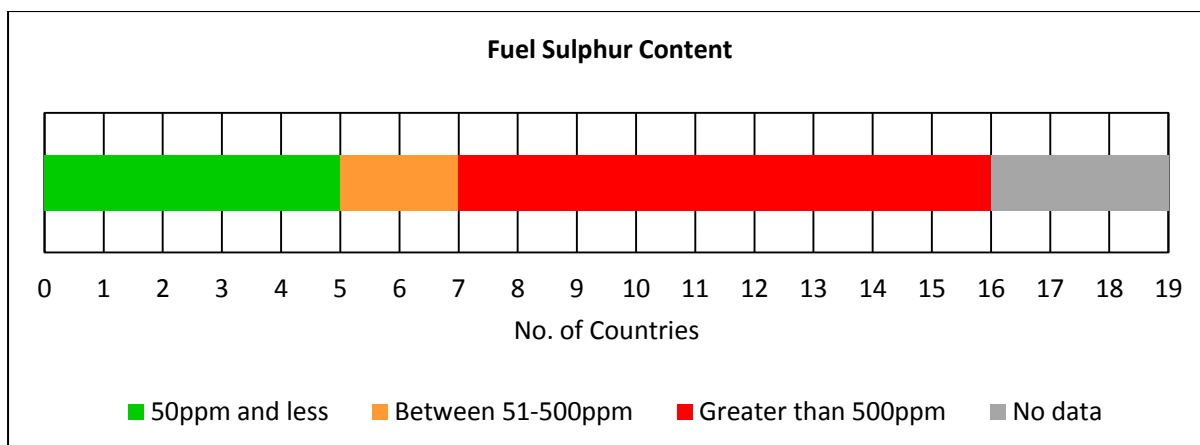


**Figure 4:** Number of countries in the sub-region that regulate vehicle emission at Euro 4 (or equivalent) standards.

Fuels and vehicles work as a system; in order to benefit from improved vehicle standards, low sulphur fuels are needed as these allow the advanced pollution control devices to work optimally.

In a 2013 workshop, the East African Community (EAC) began discussions on the implementation of harmonized low sulphur fuel standards for East Africa. Participants were informed by the EAC Secretariat that the harmonized low sulphur standards would be gazetted before the end of 2013, with the Climate and Clean Air Coalition (CCAC) providing support for the enactment of low sulphur standards before the effective date of implementation - 1 January 2015. As a result of this EAC decision, the five East African member states - Burundi, Kenya, Rwanda, Tanzania and Uganda – now have a fuel sulphur content limit of 50ppm.

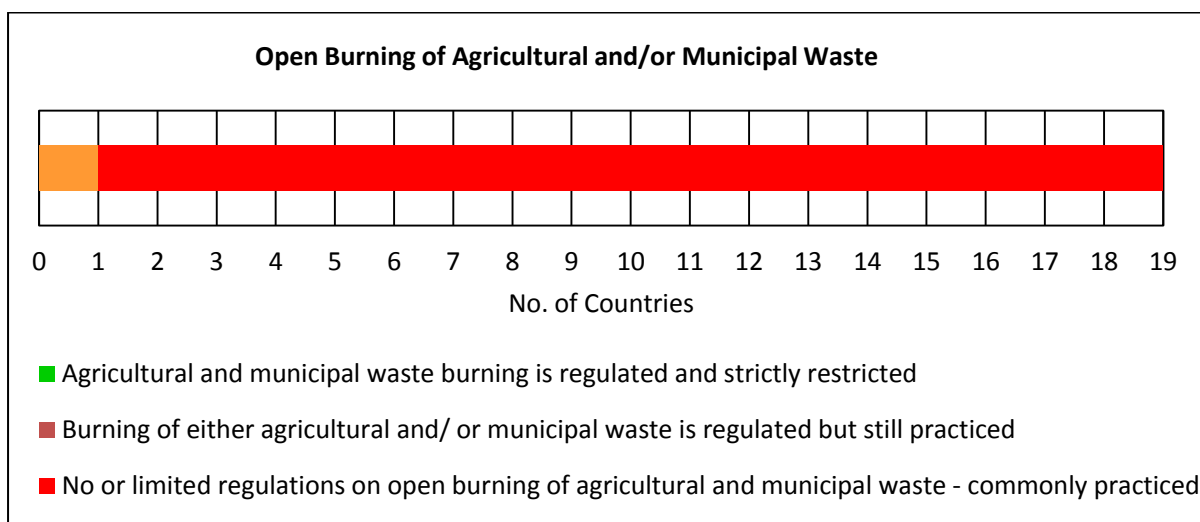
The remaining fourteen countries in Eastern and Central Africa regulate fuel sulphur content at 500ppm and above (Figure 5).



**Figure 5:** Number of countries in the sub-region that regulate fuel quality using Sulphur content as a proxy for fuel quality

### 3.3 Open burning of waste

Uncontrolled open burning of both agricultural and municipal waste is a common practice in all the countries within the sub-region (Figure 6). This is attributable to the low waste collection efficiency in most large cities. Most countries in the sub-region have established policies and legal frameworks to manage municipal solid waste, although implementation is weak. Hence, households resort to either private waste collection or illegal disposal through dumping and burning.



**Figure 6:** Number of countries where laws, regulations and actions to ban and regulate open waste burning have been implemented.

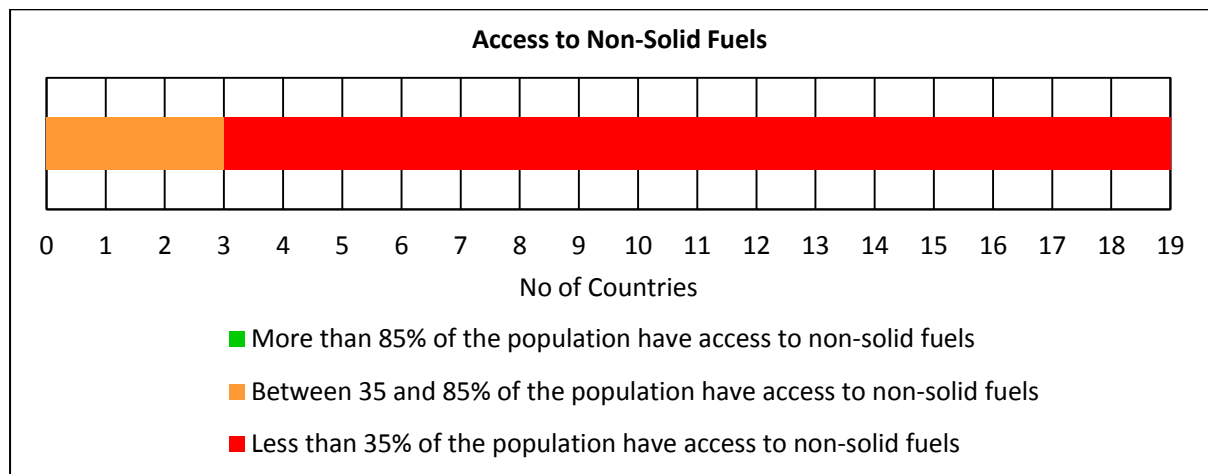


### 3.4 Indoor air pollution

Poor indoor air quality in Eastern and Central Africa poses considerable health risk for acute respiratory infections and diseases in both children and adults. Currently the majority of households in eighteen out of the nineteen countries in the sub-region use solid fuels for cooking, such as wood, charcoal, and dung.

Cooking with solid fuels - wood and other biomass - over open fires is one of the major drivers of indoor air pollution and its associated health impacts. Access to non-solid fuels can reduce indoor air pollution, depending on the quality of the fuel and stove. For instance, the use of kerosene can increase indoor air pollution, especially if it is used with leaky and inefficient stoves. Therefore, in promoting the access to non-solid fuels, consideration should be given to the fuel quality and also availability of efficient stoves to be used with this fuel.

Some governments within the sub-region are putting efforts in promoting the use of cleaner cooking fuels and stoves. These efforts have succeeded in a few countries such as Djibouti where more than 84% of the population have access to non-solid fuels, mainly liquid petroleum gas and kerosene (Figure 7).

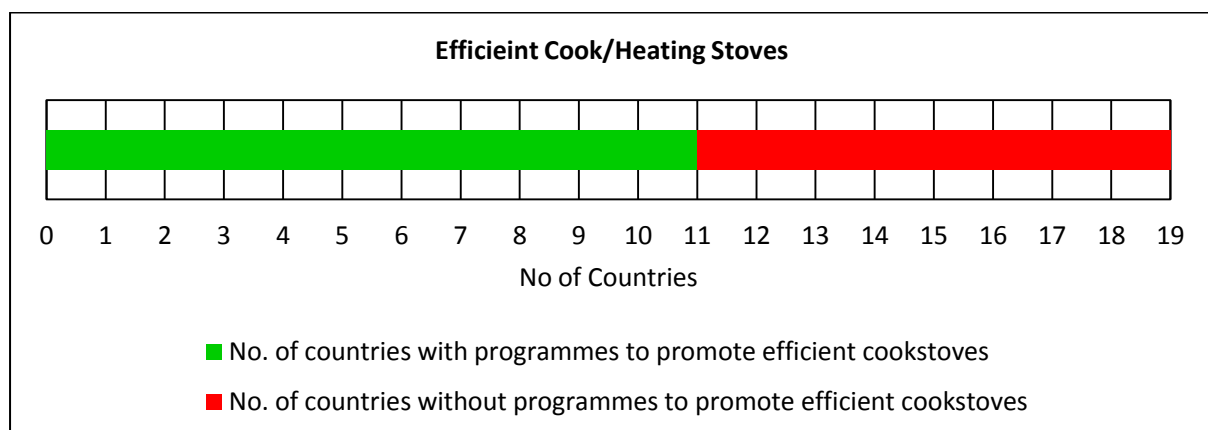


**Figure 7:** Number of countries in the sub-region that have implemented programmes and policies to improve non-solid fuels access rate, as indicated by percentage of households with access to non-solid fuels.

Cleaner cookstoves are more efficient compared to traditional open fires; this translates to less biomass use and less emissions. Due to the numerous varieties of cookstoves available

in the market, analysis of all the programmes at a national level would be resource and time consuming. Therefore, an analysis of countries promoting one type of cookstove<sup>1</sup> is presented in Figure 8. Additionally, consideration was only given to biomass-based cookstoves as the Global Cookstove Alliance considers them the most appropriate transitional cookstove for the more than 3 billion people who cook and heat their homes using solid fuels and open fires.

Other efforts carried out by governments and their partners in the sub-region to minimize exposure to indoor air pollution include the provision of efficient cook stoves which tend to emit less air pollutants compared to traditional stoves. In Kenya for instance, the Ministries of Environment and of Health are working closely with the Global Alliance for Clean Cookstoves and the Clean Cookstoves Association of Kenya (CCAK), to promote the adoption of clean cookstoves and fuels among five million households by 2020.



**Figure 8:** Number of countries in the sub-region that have programmes to promote use of efficient cook stoves. Due to lack of reliable data on clean cook stove, only programmes aimed at promoting cook stoves that also qualify for carbon trading schemes are represented here.

Other efforts aimed at increasing access to clean energy in the sub-region include electrification of households. In the sub-region, electrification rates are also very low, which

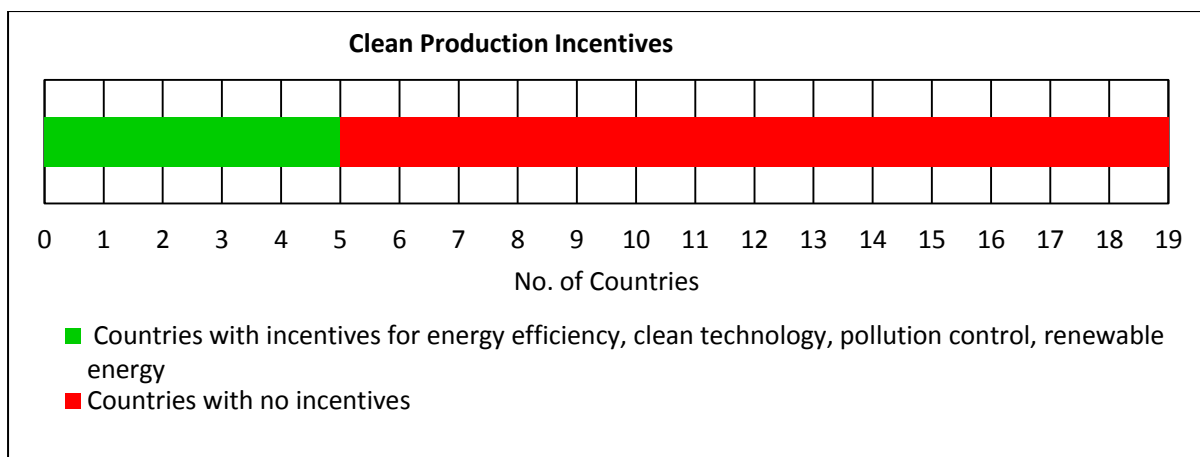
<sup>1</sup> Due to the different definitions of efficient cook stoves, Figure 8 only shows countries with programmes to promote efficient cook stoves that also qualify for carbon trading schemes. Cookstoves that qualify for Certified Emission Reductions (CERs) under the Clean Development Mechanism are considered efficient as they are estimated to reduce emissions by 1 to 3 tCO<sub>2</sub>e (carbon dioxide equivalent) per year, which also translates to reduced emissions of other air pollutants. Therefore, Figure 8 does not necessarily represent all countries that are implementing programmes aimed at promoting clean and efficient cookstoves. As such the number of countries promoting the use of clean and efficient cookstoves might be higher than indicated in the figure.

encourages the use poor lighting and cooking fuels. However, governments in the sub-region are working to improve the electrification rates especially in rural communities. For instance, four countries within the sub-region - Kenya, Cameroon, Equatorial Guinea and Chad - have developed programmes and policies aimed at increasing electricity connection.

As part of its national Vision 2030, Kenya aims to increase rural electricity access to 20%. Cameroon's Rural Electrification Master Plan (PDER) aims at connecting 660 localities through the extension of the interconnected grids, the rehabilitation and construction of isolated diesel power plants and mini-hydro plants as well as the development of a sub-regional grid. By 2020, the Government aims to achieve a 48% countrywide electrification rate. Equatorial Guinea's "Light for Everyone" programme aims to connect the whole country with a constant, quality, and low-cost electricity for everyone. Chad's National Poverty Reduction Strategy places special significance on strategies to ensure strong and sustainable growth that helps to reduce poverty, in particular by: (a) developing infrastructure to support power generation, (b) making electricity available to users at a more reasonable cost, and (c) promoting alternative sources of energy (solar, wind, etc.) to limit the cutting of firewood.

### **3.5 Industries**

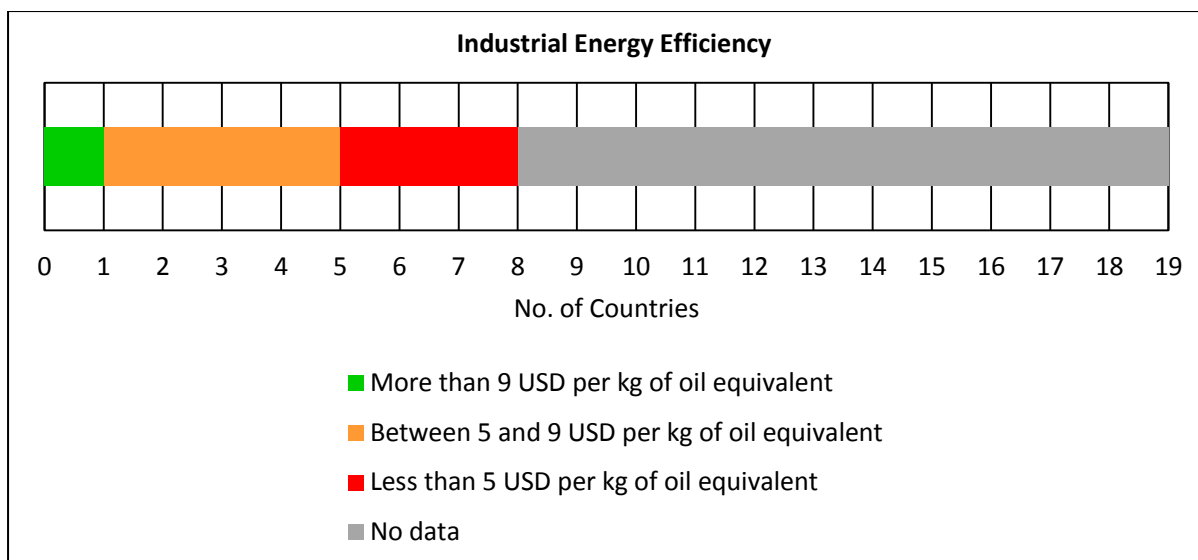
The use of incentives to increase investment in energy efficiency, renewable energy, clean technology and pollution control is low, with only five countries (Kenya, Rwanda, Sudan, Tanzania and Uganda) having any programme and policies in this area. In Uganda, the renewable energy policy goal is to increase the use of renewable energy from the current 4% to 60% of the total energy consumption by the year 2017. Kenya's energy policy of 2004 encourages implementation of indigenous renewable energy sources to enhance the country's electricity supply capacity. The policy is implemented through the Energy Act of 2006, which provides for mitigation of climate change, through energy efficiency and promotion of renewable energy. In addition, the Feed in Tariffs (FITs) energy policy of 2008 (revised 2012) promotes investments in the generation of electricity from renewable sources. It applies to geothermal, wind, small hydro, solar and biomass. Figure 9 shows the number of countries in the sub-region that use incentives to reduce emissions from industrial installations.



**Figure 9:** Number of countries in the sub-region that use economic incentives to stimulate cleaner production in the industrial sector.

Currently, the most dominant industries contributing to poor air quality in the sub-region are petroleum, natural gas, light industries, mining, electrical, petrochemical and food processing. Emission regulations controlling industrial air pollution in the sub-region are generally in their early stages of development, with limited actions to ensure compliance. Currently five countries - Cameroon, Ethiopia, Kenya, Tanzania and Sudan - have established industrial emission regulations for some of the pollutants, although these regulations are not yet fully operationalized.

In the sub-region, industrial energy efficiency (measured as GDP generated per unit energy) is low. This suggests that industrial technology used in the sub-region is outdated, which translates to energy wastage and unnecessary air pollution emission from these facilities. Generally low efficient industries tend to emit more air pollutants directly and indirectly compared to equivalent more efficient technologies. Figure 10 below shows a summary of industrial energy efficiency in the sub-region. An industrial energy efficiency of USD 9 per unit of energy and above is used to indicate better energy efficiency.



**Figure 10:** Number of countries in the sub-region with their corresponding industrial energy efficiency. Energy efficiency is calculated as GDP per unit of energy use at constant 2011 PPP \$ per kg of oil equivalent

#### 4.0 Data sources

Data indicating progress or current status of each of the top ten actions was obtained from various sources:

- Airlex <http://airlex.web.ua.pt/>
- World Bank <http://data.worldbank.org>
- World Health Organisation  
[http://www.who.int/quantifying\\_ehimpacts/national/countryprofile/en/](http://www.who.int/quantifying_ehimpacts/national/countryprofile/en/)
- UNEP <http://www.unep.org/Transport/new/pcfvl/>
- Various government reports, websites
- Energypedia [https://energypedia.info/wiki/Main\\_Page](https://energypedia.info/wiki/Main_Page)
- Reegle <http://www.reegle.info/countries/>
- [www.BRTdata.org](http://www.BRTdata.org)
- Global Coalition for Clean Cookstoves <http://catalog.cleancookstoves.org/stoves>
- Air Quality Catalogue <http://www.unep.org/transport/airquality/>