

Caribbean

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 paragraphs 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 the Caribbean 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.

CARIBBEAN POLICIES AND ACTIONS TO IMPROVE AIR QUALITY

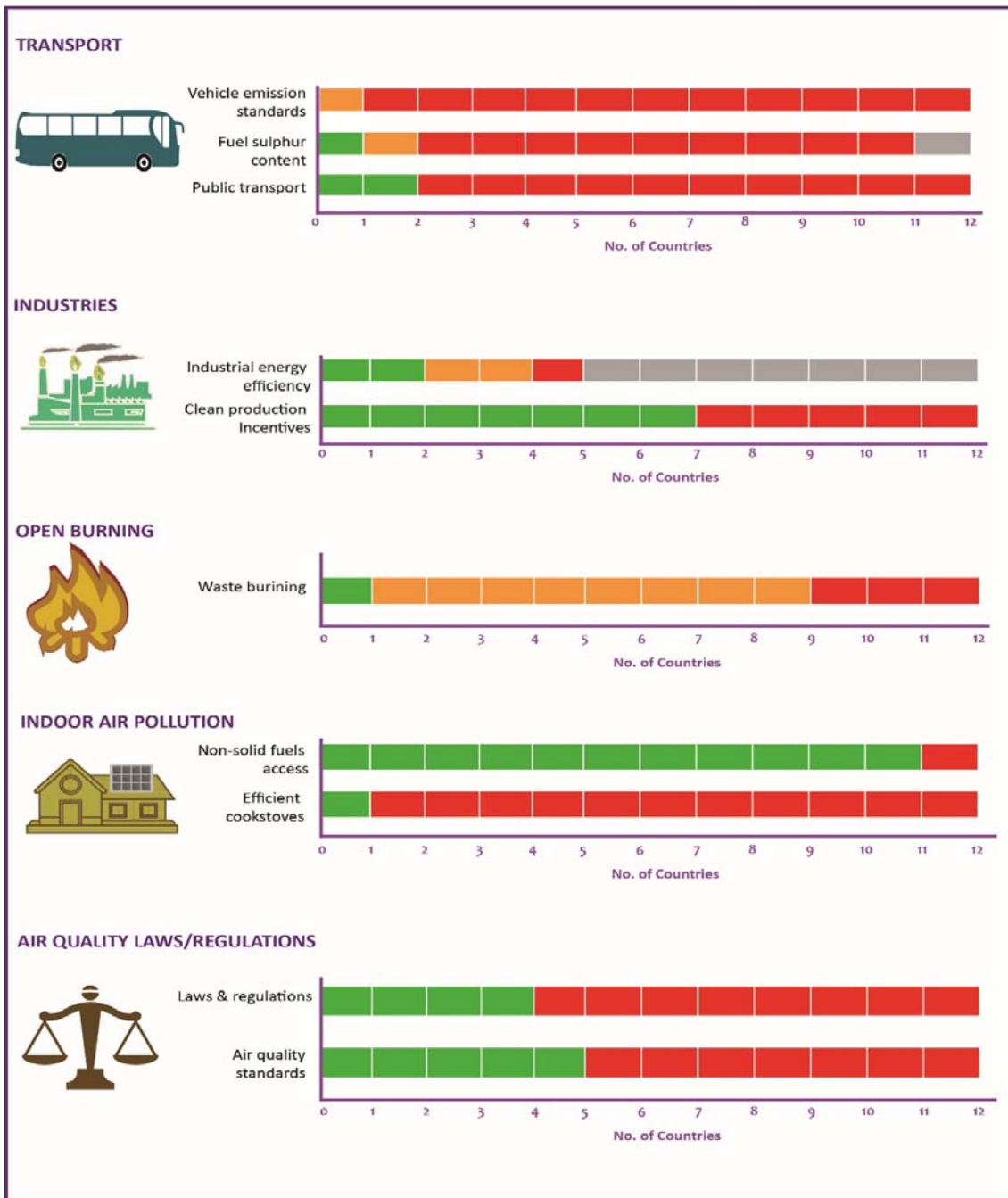


Figure 1: A summary of actions, programmes, policies, laws and regulations undertaken by governments in the sub-region to improve air quality (green = progressing to best practice; red = action still required)

2.0 Regional Overview

The Caribbean sub-region consists of twelve countries: Antigua & Barbuda, Bahamas, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Trinidad & Tobago, Haiti, Jamaica, Saint Kitts and Nevis, and Saint Lucia. Most governments in the sub-region have enacted laws and regulations on air pollution which are at different stages of implementation. Three out of the eleven countries have comprehensive ambient air quality standards with accompanying air quality policies, laws and regulations.

Although much has been done to improve air quality in the sub-region, it still remains an issue of concern. The World Health Organisation (WHO) estimates that it causes approximately 13,600 premature deaths annually in the sub-region. Indoor air pollution is by far the most dominant cause of air quality related premature deaths in the sub-region.

Use of biomass to meet household energy demand is the predominant driver of air quality related health effects in the sub-region. Use of solid fuels is also a considerable contributor to outdoor air pollution. Therefore to effectively manage air quality in the sub-region, governments have to enact policies, regulations and programmes that promote access to clean energy and/or clean cooking stoves for both rural and urban households. Currently, eleven out of the twelve countries in the sub-region have more than 85% of their citizens accessing non-solid fuels.

Emissions from other sectors such as transport are also important in the sub-region, although their current health impacts are minimal. However, as the sub-region grows economically, emissions from these sectors will become more important. These countries therefore have an opportunity to ensure that the projected growth will not compromise air quality significantly by enacting policies and programmes that will prevent air quality deterioration in the future. For instance for the transport sector, this can be achieved by enacting laws that will ensure vehicles being imported into the sub-region have at least Euro 4 emission standards, that fuel is low sulphur, and by increasing investment in public and non-motorised transport.

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. 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

Five out of eleven countries in the sub-region have ambient air quality standards, although not all meet WHO-recommended ambient air quality standards or have standards for PM_{2.5}. Four countries in the sub-region (Antigua & Barbuda, Dominica, Dominican Republic, and Jamaica) have nationwide legislation, laws, policy or Act specifically addressing air quality. Figure 2 below shows countries within the sub-region that have enacted laws and policies to manage air quality. In the sub-region less than 50% of the countries have enacted air quality management laws.

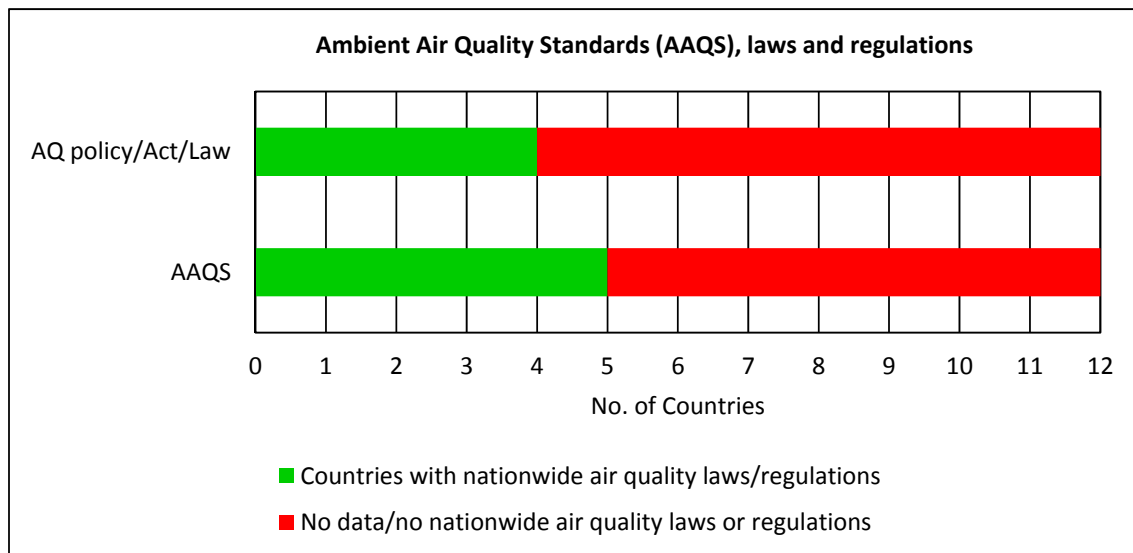


Figure 2: Number of countries in the sub-region that have enacted some form of air quality laws and regulations, and also the number of countries that have enacted and promulgated Ambient Air Quality Standards (AAQS).

3.2 Transport

The transport sector has seen substantial growth in the Caribbean sub-region, with increases in vehicle ownership, passenger numbers and freight activity. Actions and policies being implemented in the sub-region to reduce vehicular emission include the expansion of public and non-motorised transport. 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.

The Dominican Republic has constructed the Santa Domingo Metro, which is a rapid transit system that serves the capital and other localities within the capital. The network presently has two lines with thirty stations and a total track length of 27.4 kilometres. The Government of Saint Lucia is planning to expand the Castries-Gros Islet Highway, which will include sidewalks, ten footbridges and safe drop-off points for public transport. Figure 3 below shows the number of countries in the sub-region that have invested in expanding public and non-motorised transport.

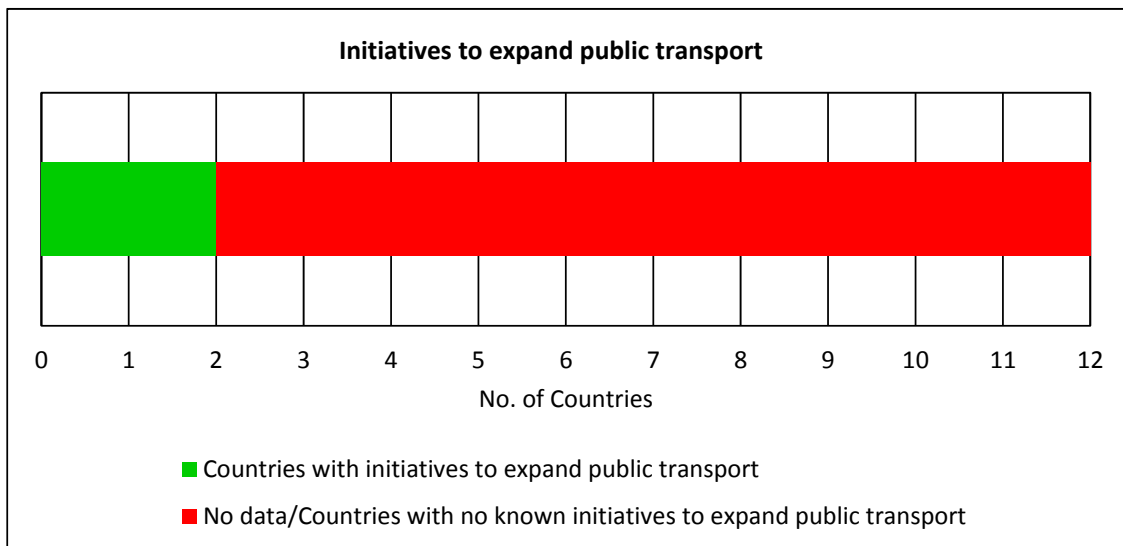


Figure 3: Number of countries in the sub-region that have initiated programmes and initiatives to expand public transport.

Improved fuel quality and implementation of vehicle emission standards are also required to minimise emissions created from transport. In the sub-region, Bahamas has established

pre-Euro 4 vehicle emission standards. Figure 4 below shows the number of countries in the sub-region that have enacted and promulgated vehicle emission standards. In the figure, Euro 4 standards and above are indicative of the current best practice in vehicle emission control.

Some of the countries in the sub-region address vehicle emissions by imposing restrictions on second hand cars importation and also charging importation duty on vehicles depending on their engine capacity. For instance, in Saint Lucia, a higher import tax is imposed on older vehicles and vehicles with larger engine capacity.

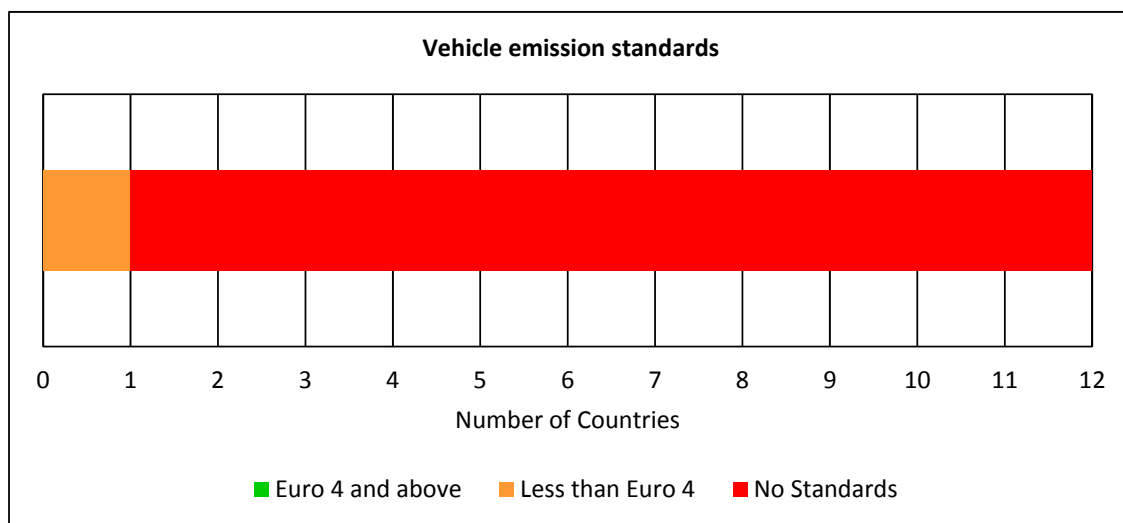


Figure 4: Number of countries in the sub-region that regulate vehicle emission at Euro 4 (or equivalent) standards.

As fuels and vehicles work as a system, fuel quality should match vehicle standards. Low and ultra-low sulphur fuels allow more advanced pollution control devices to function in vehicles. One country in the sub-region, Barbados, has established fuels quality standards restricting fuel sulphur content to below 50ppm. However, in some countries, low sulphur fuels are available in the market, even though regulations allow for high sulphur levels. For example in Jamaica, ultralow Sulphur fuel (15ppm) is available in parts of the country. Figure 5 below shows the number of countries in the sub-region that have enacted regulations to control fuel quality.

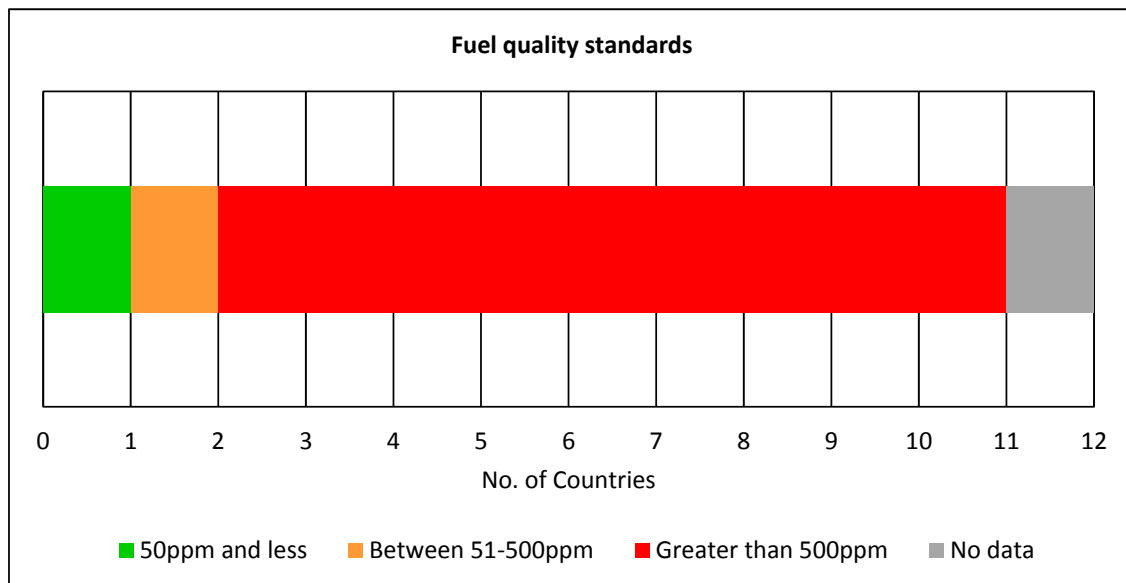


Figure 5: Number of countries in the sub-region that regulate fuel quality using Sulphur content as a proxy for fuel quality

3.3 Open burning of waste

Open waste burning can pose a significant threat to air quality and public health. In the Caribbean, open burning is commonly used to manage sugarcane fields and solid municipal waste. Two countries in the sub-region, Jamaica and Barbuda, have legal frameworks prohibiting open waste burning without permission; however, open waste burning still occurs. In all the countries within the sub-region at least one form of waste (agricultural or municipal) is burnt in open fires (Figure 6).

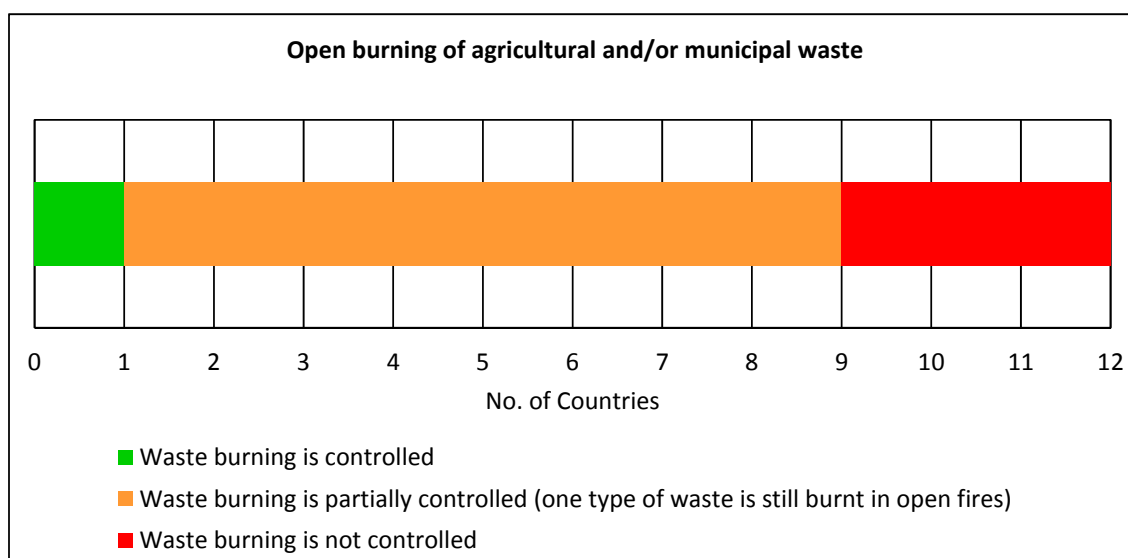


Figure 6: Number of countries where laws, regulations and actions to ban and regulate open waste burning have been implemented.

3.4 Indoor air pollution

Traditional use of solid fuels for to meet household energy demands produces high levels of indoor air pollution with a variety of health damaging pollutants. Seven of the twelve countries in the Caribbean sub-region have less than 10% of households using solid fuels for cooking. While no country in the sub-region has come up with regulations on indoor air pollution, three countries (Haiti, Dominican Republic and Cuba) have programmes aimed at reducing indoor biomass burning. Figure 7 shows the percentage of population within countries in the sub-region that have access to non-solid fuels to meet their household energy demands.

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.

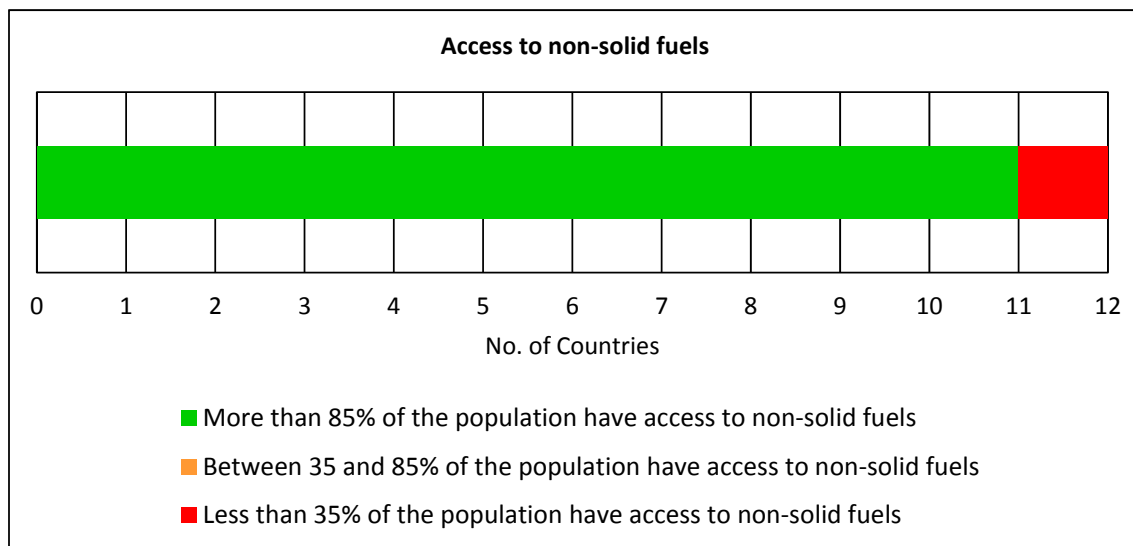


Figure 7: Number of countries in the sub-region that have implemented programmes and policies to improve non-solid fuels access rate, as indicated by percentage of households with access to non-solid fuels.

Another initiative that can lower indoor air pollution is the promotion and provision of clean cook stoves. Haiti has initiated a programme that promotes clean cook stoves that also qualify for carbon trading schemes, see Figure 8. In Haiti, USAID-financed a three-year Improved Cooking Technology Program which is expected to save more than 500 tons of charcoal a year. The Dominican Republic is developing a high efficiency stoves project. In Cuba, three million households were converted from kerosene to electricity for cooking. The Government of Saint Lucia has undertaken a number of initiatives for solar dryers and biogas digesters which promote the use of renewables as an alternative to biomass based fuels. The Caribbean is also advancing towards achieving universal electricity access. Seven countries have between 71-95% of households connected to the electric grid and four countries have greater than 95%.

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 cookstove¹ 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 cookstoves for the more than 3 billion people who cook and heat their homes using solid fuels and open fires.

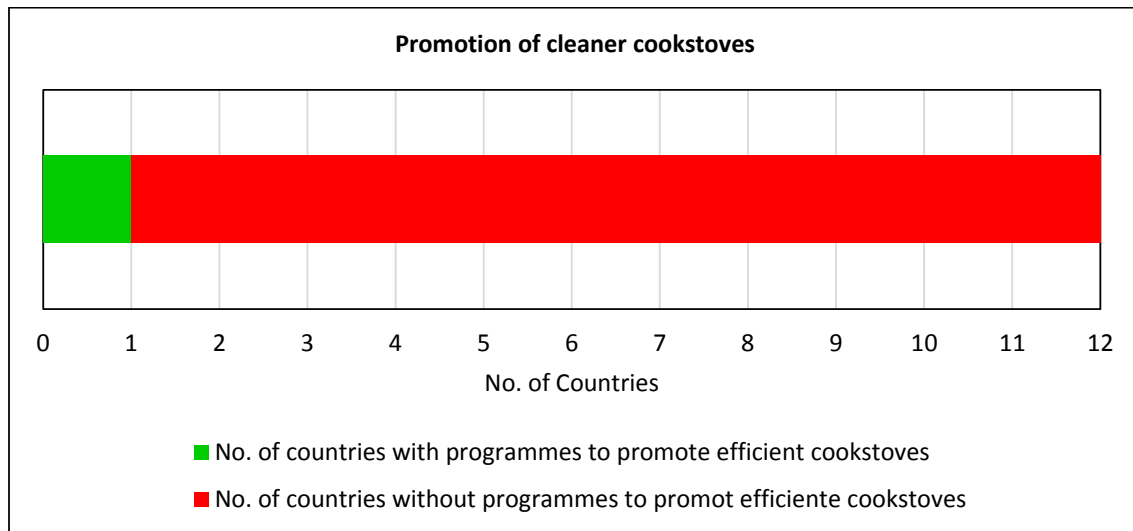


Figure 8: Number of countries in the sub-region that have programmes to promote use of efficient cook stoves.

Other countries within the sub-region are introducing alternative clean energy sources for its populace to substitute for traditional energy sources. For instance in the Bahamas, the Ministry of Environment launched a pilot program to distribute 100 solar water heaters and 33 residential photovoltaic systems of 2kW to electricity end-users at no cost. Consumers receiving solar panels were also able to connect to the Bahamian national power grid. Other examples include the Dominican Republic which in 2011 implemented a net metering

¹ 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 tCO₂e (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.

provision that allows customers to take advantage of solar photovoltaic (PV) technology to help reduce their electricity bills. The Jamaican government implemented a Solar Energy Pilot Project for the installation of PV systems targeting rural communities. In 2008, the Government of the Bahamas incentivized solar technologies by reducing the import duties from 42% to 10%.

3.5 Industries

The use of incentives for promoting energy efficiency, clean technology uptake, renewable energy and / or pollution control investment can be found in six out of the eleven countries. Electricity generation in the sub-region is mainly generated from fossil fuels, and this makes power generation a potential driver of air pollution. Currently only one country, Dominica, generates more than 30% of its electricity from renewable sources.

As a means of increasing energy security and renewable energy share, several governments have committed to increase generation of electricity through renewable energy sources. Such governments include Barbados, which has introduced the Renewable Energy Rider initiative. This initiative allows customers to connect to the grid and sell any excess electricity generated from renewable sources to Barbados Light and Power Company Limited. Saint Kitts and Nevis is also committed to the renewable energy path and it is adding 15.4 MW of renewable energy to the grid, enough to power Nevis; another 70 MW is planned, which would be sufficient to power the entire country.

Six governments have also come up with tax incentive policy mechanisms for accelerating increased investments on renewable energy technologies in their respective countries. Barbados has a zero value-added tax rate on all renewable energy and energy-efficient systems and products; there is also an income tax holiday of ten years for developers, manufacturers, and installers of renewable energy products. In the Dominican Republic, import duties for renewable energy equipment are waived, and investors are allowed to write off 75% of sales tax on electricity sales from renewable sources for ten years, and can deduct the tax on equipment up to 75% for that same period. Figure 9 shows the number of countries in the sub-region that apply incentives to minimise industrial emissions, and especially in the power generation industries.

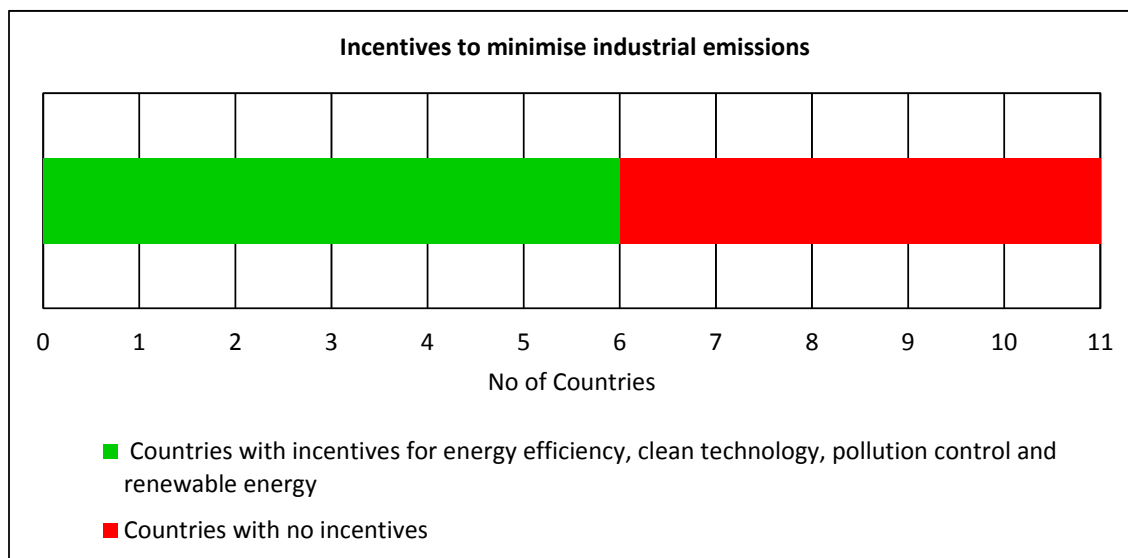


Figure 9: Number of countries in the sub-region that use incentives to encourage industrial investments in cleaner production and renewable energy generation.

Currently, all the Caribbean Islands rely mainly on fossil fuels for electricity generation with minimal investments in renewable energies. Therefore minimising energy demand from the industrial sector is one of the best ways to manage air pollution from energy generation. Two out of the twelve countries have an industrial energy efficiency² greater than USD 9 per unit of energy. This suggests that industrial technology used in the sub-region is relatively inefficient. 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.

² Measured as GDP (at constant 2011 PPP \$) generated per kg of oil equivalent

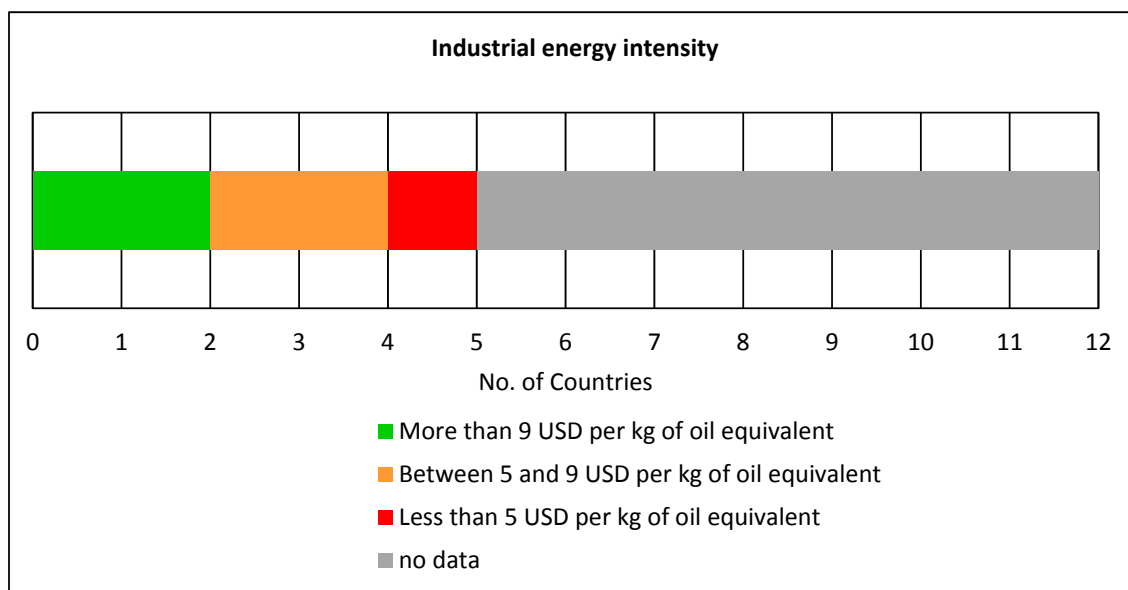


Figure 11: Number of countries in the sub-region with their corresponding industrial energy efficiency. Energy efficiency is calculated as GDP per unit of energy use at constant 2011 PPP \$ per kg of oil equivalent

Three countries in the sub-region were identified as having regulations on industrial emissions. The Dominican Republic has emission standards for air pollutants from fuel combustion and industrial processes outlined in Environmental Standards on Air Quality and Air Emissions Control. In the Bahamas, regulations on industrial emissions for industries exist under Environmental Health Services Act, while in Jamaica under the polluter pays principle, licensed facilities are required to pay a fee according to their level of emission. Out of the three countries having industrial emission regulations, only two countries (Jamaica and Bahamas) have formulated policy mechanisms to ensure compliance with regulations/laws through monitoring, enforcement, fines among other approaches. In Jamaica, a fee not exceeding \$50,000 and/or 12 months imprisonment may be imposed by a resident magistrate for breaches of the regulations against industrial emissions while in Bahamas.

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/
- UNEP <http://www.unep.org/Transport/new/pcfvt/>
- Various government reports, websites
- Energypedia https://energypedia.info/wiki/Main_Page
- Reegle <http://www.reegle.info/countries/>
- www.BRTdata.org
- Global Coalition for Clean Cookstoves <http://catalog.cleancookstoves.org/stoves>
- Air Quality Catalogue <http://www.unep.org/transport/airquality/>