

North America

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 North America 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.

NORTH AMERICA POLICIES AND ACTIONS TO IMPROVE AIR QUALITY

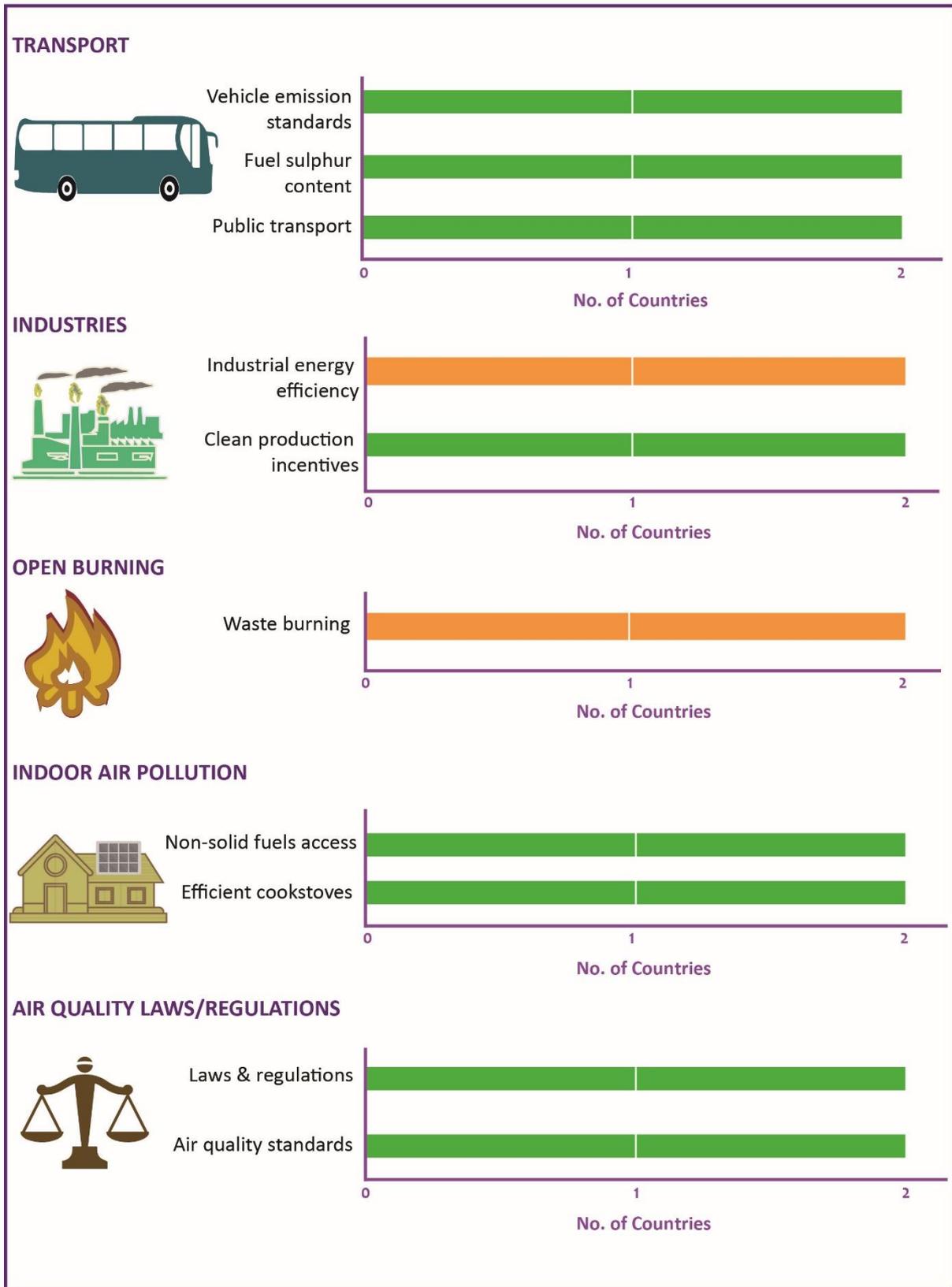


Figure 1: A summary of actions, programmes, policies, laws and regulations undertaken by governments in the sub-region to improve air quality (green = progressing to best practice; red = action still required).

2.0 Regional Overview

The North America sub-region consists of two countries: the United States of America (USA) and Canada. Information from air quality monitoring stations across the sub-region indicates that air quality has generally improved over the last few decades; however, it still remains an issue of concern, causing approximately 44,000 premature deaths annually. In addition, specific exceedances of legal or recommended values in certain places still occur, especially for particulate matter (during wintertime) and ozone (in summer months).

In Canada, the federal government sets the ambient air quality objectives and standards in conjunction with the provinces, while the provincial governments apply these standards through a wide range of environmental management tools. The World Health Organisation (WHO) estimates that outdoor air pollution causes approximately 2,700 premature deaths annually; however, a study by the OECD reviewed this number upwards to 7,469 in 2010.

In the United States, air quality has greatly improved in the last few decades due to regulations, technology improvements and economic changes. Since the passage of the Clean Air Act in 1970, the United States has cut down on air pollutants by 69 percent as of 2014, according to the EPA. However, approximately 57million people still live in areas with unhealthy levels of air pollution. Topography and weather conditions are some of the external factors that aggravate air pollution in the United States, especially in urban centres. WHO estimates that outdoor air pollution causes approximately 40,600 premature deaths annually; however, a study by the OECD reviewed this number upwards to 110,292 in 2010.

The main sources of air pollution in the region are industries, heating of homes with biomass (particularly wood burning stoves and boilers), and transport (which is often the main source of urban air pollution). In Figure 2, other anthropogenic sources of air pollution have considerable impact on human health. This category includes agriculture which is a major source of direct air pollution and also a source of precursor gases that after undergoing atmospheric processing become air pollutants with potential to impair human health.

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

Both USA and Canada have in place ambient air quality standards (AAQS) (Figure 2); the maximum allowable concentrations for Ozone, PM2.5 and PM10 in both countries meet WHO interim targets, while NO2 and SO2 do not. Under the American Clean Air Act, penalties can be levied on states that exceed AAQS. Under the Canadian Environmental Protection Act, 1999, the standards are voluntary objectives with no legal consequences if not met; there are no legally binding national air quality standards.

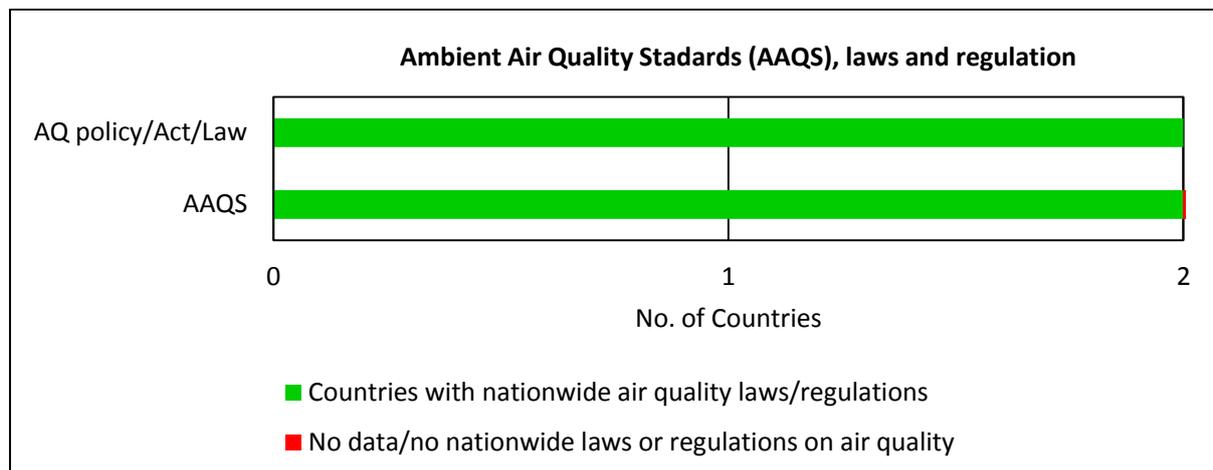


Figure 2: Number of countries in the sub-region that have enacted nationwide air quality laws and regulations, and have enacted Ambient Air Quality Standards (AAQS).

The USA Clean Air Act (CAA) provides the principal framework for national, state, tribal and local efforts to protect air quality, public health and welfare nationwide. The law requires the US Environmental Protection Agency (EPA) to establish national ambient air quality standards (NAAQS) based on the latest science, and requires states to adopt enforceable plans to achieve the standards.

In Canada, goals for air quality are based on the risk to key biological receptors (humans, plants, animals, and materials). However while the objectives are intended to be primarily effects-based, they also reflect the incorporation of technological, economic and societal information.

3.2 Transport

Transportation contributes significantly to air pollution, given that personal vehicle use is the predominant mode of transport in both countries. Both Canada and the USA have amongst the highest motor vehicles per capita in the world. More importantly, most people in this sub-region use these vehicles as their primary mode of transportation, with the USA having a significantly higher per capita annual vehicle travel than other industrialised nations. Given the increased congestion experienced in many urban areas, maintaining and increasing the modal share of public transport is essential for increasing mobility while decreasing transport emissions.

There has been increased investment to expand public transport (Figure 3). In the USA for example, public institutions are encouraged to employ various methods that reduce emissions from the use of personal cars, such as telecommuting, flexi time, compressed workweeks, staggered work hours, and ridesharing.

Major cities in the sub-region have made considerable investment in public and non-motorised transport. For instance New York City has a bike sharing system and 31,000 bike routes from which to choose. Canada has the continent's first electric streetcar (Windsor, Ont.), the first modern light rail line (Edmonton, Alta.), the first rubber-tired subway (Montreal, Que.), and the first line-haul automated people mover (Vancouver, B.C.). On a

global scale, Canadians can claim one of the world’s first bus rapid transit systems (Ottawa, Ont.) and the first wind-powered light rail system (Calgary, Alta.).

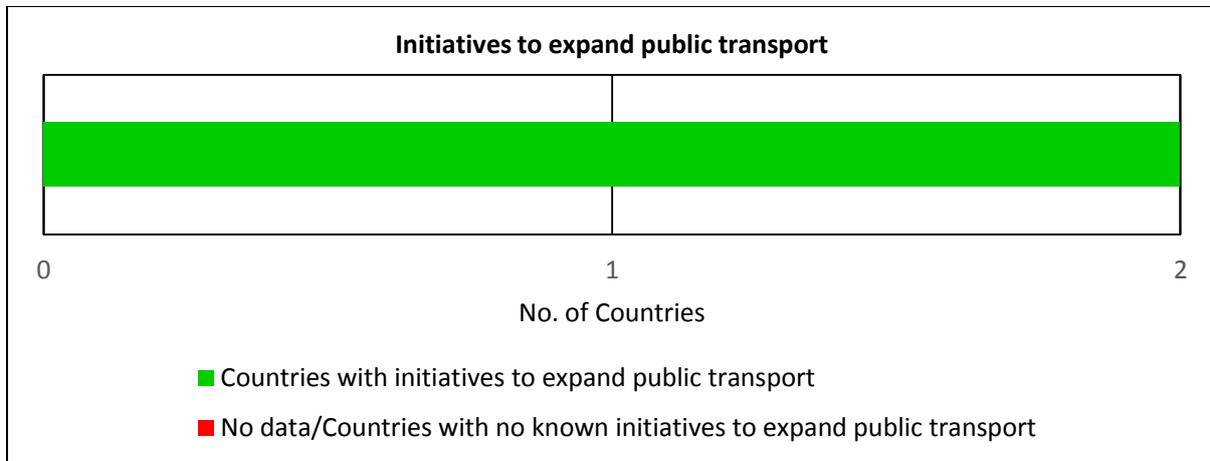


Figure 3: Number of countries in the sub-region that have initiated programmes and initiatives to significantly expand public transport.

Improved fuel quality and implementation of vehicle emission standards are also required to minimise emissions created from transport. 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. Both countries have stringent vehicle emission standards that are equivalent to Euro 5 / 6, while the maximum allowable fuel sulphur standard is 15ppm for both petrol and diesel fuels (see Figures 4 and 5).

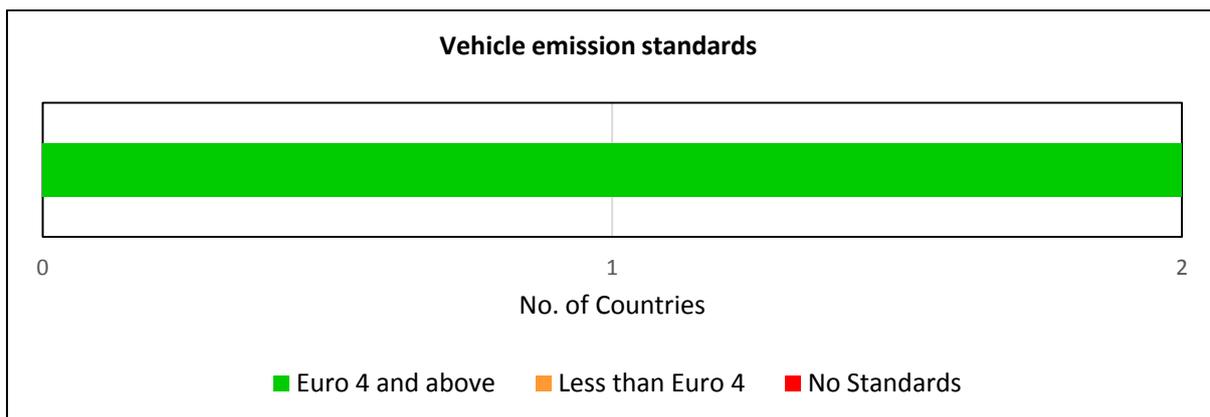


Figure 4: Number of countries in the sub-region that regulate vehicle emission at Euro (or equivalent) standards

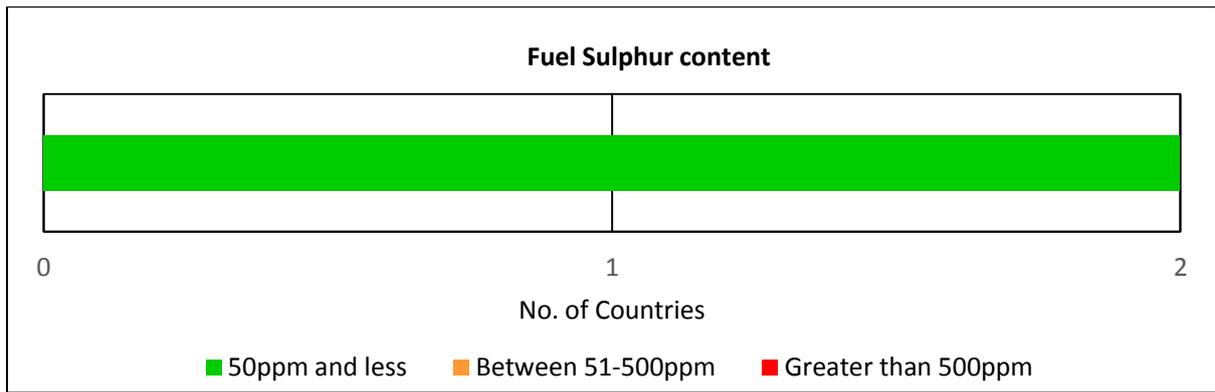


Figure 5: Number of countries in the sub-region that regulate fuel quality using Sulphur content as a proxy for fuel quality

3.3 Open burning of waste

The United States and Canada have rules varying by state and province that aim to limit the impact of agricultural fires on air quality and surrounding property, while allowing some burning to take place. Agricultural fires, intended to remove crop residues for new planting, contribute a significant portion of the black carbon from biomass burning that can sometimes reach all the way to the Arctic during spring, creating an Arctic Haze.

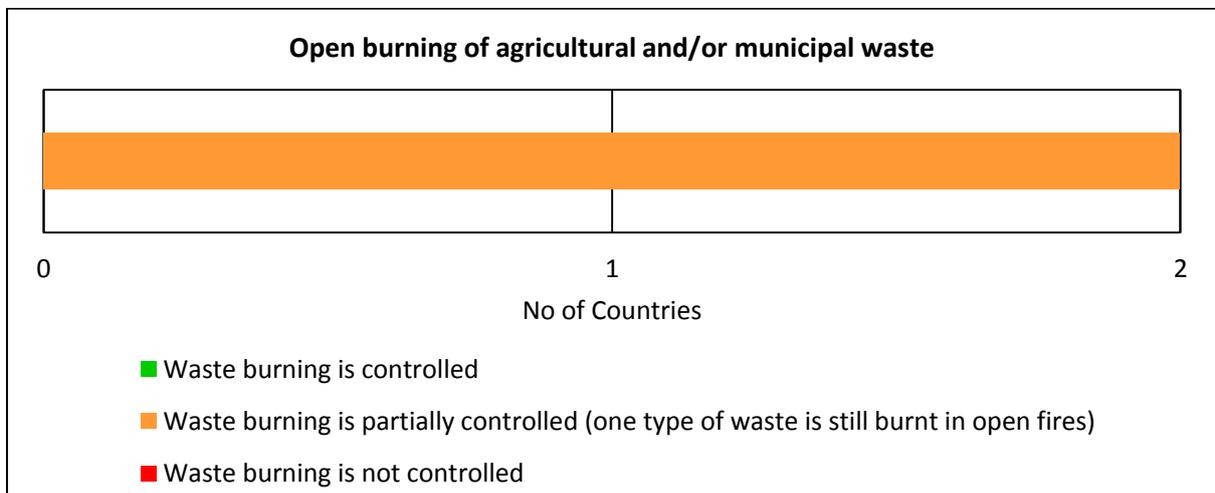


Figure 6: Number of countries where laws, regulations and actions to ban and regulate open waste burning have been implemented.

3.4 Indoor air pollution

This region has been able to address the issue of indoor air pollution by ensuring that all its citizens have access to clean energy sources for their domestic energy demands (Figure 7). For instance the electrification rate in this region is 100%.

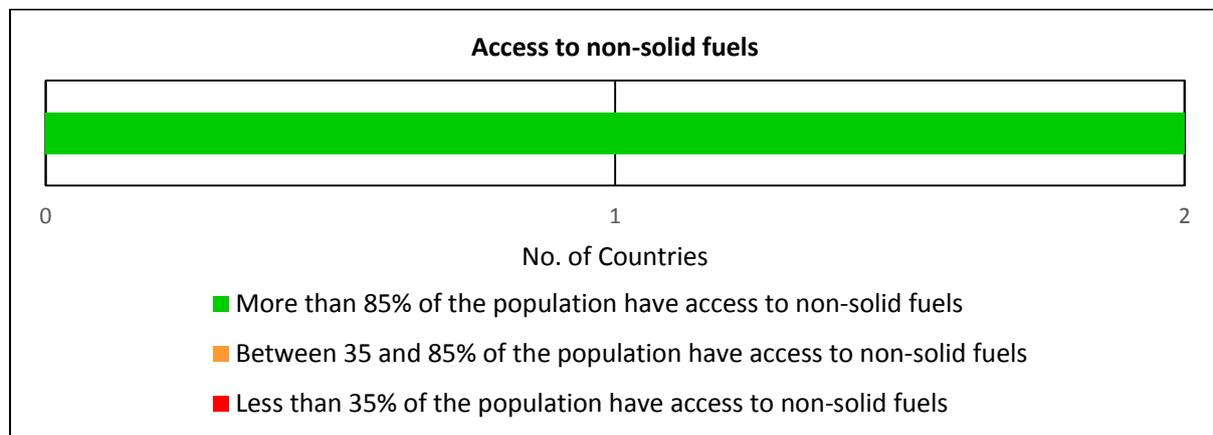


Figure 7: Number of countries in the sub-region that have implemented programmes and policies to improve non-solid fuels access rate, as indicated by percentage of households with access to non-solid fuels.

In Canada, around 6% of households use wood or wood pellets for heating, while in the USA around 10% of the population use wood pellets for space heating. In February 2015, The USA Environment Protection Agency (EPA) promulgated new source performance standards for residential wood heaters to make new heaters significantly cleaner. Canada has similar regulations governing solid fuel stoves and fireplaces; in addition, many municipalities have bylaws regulating wood stoves.

Minimising energy use through increased energy efficiency in homesteads is another focus area for governments in the sub-region. For instance, in the USA a federal government programme to increase household energy efficiency was initiated in 2008. In addition, the energy efficiency labelling programme helps consumers to make informed decision when purchasing appliances.

3.5 Industries

Electricity generation is one of the major sources of air pollution in the sub-region. Renewable energy accounts for more than 50% and 12% of electricity production in Canada

and USA respectively. Canada participates in the IEA's Implementing Agreement on Renewable Energy Technology Deployment (IEA-RETD) to facilitate the development and sharing of information on topical policy issues surrounding the deployment of renewable power, and to ensure access to global best practices policies and initiatives. To further accelerate the rate of investments on renewable energy technologies, both governments have established tax incentives to help attract and advance energy production from renewable sources.

While fossil fuels remain the main source of electricity production in USA, the federal government and most state and local governments have legislation to support and incentivize the use of renewable energy. In Canada, a Green Municipal Fund supports environmental projects, while tax incentives are offered to promote investments in renewable energy projects. Different provinces also offer incentives and grants to promote use of solar and wind power, energy efficiency, small-scale renewable electricity production and pollution control.

In the sub-region, industrial energy efficiency (measured as GDP generated per unit energy) is moderate (Figure 8), with both countries having an energy efficiency greater between USD 5 and 9 per unit of energy, measured as constant 2011 PPP \$ per kg of oil equivalent. However, governments in this region are taking steps to increase industrial energy efficiency. For instance, the Canadian Industry Program for Energy Conservation (CIPEC), aims at working with industries to identify ways in which they can reduce their energy use by increase the facility's energy efficiency.

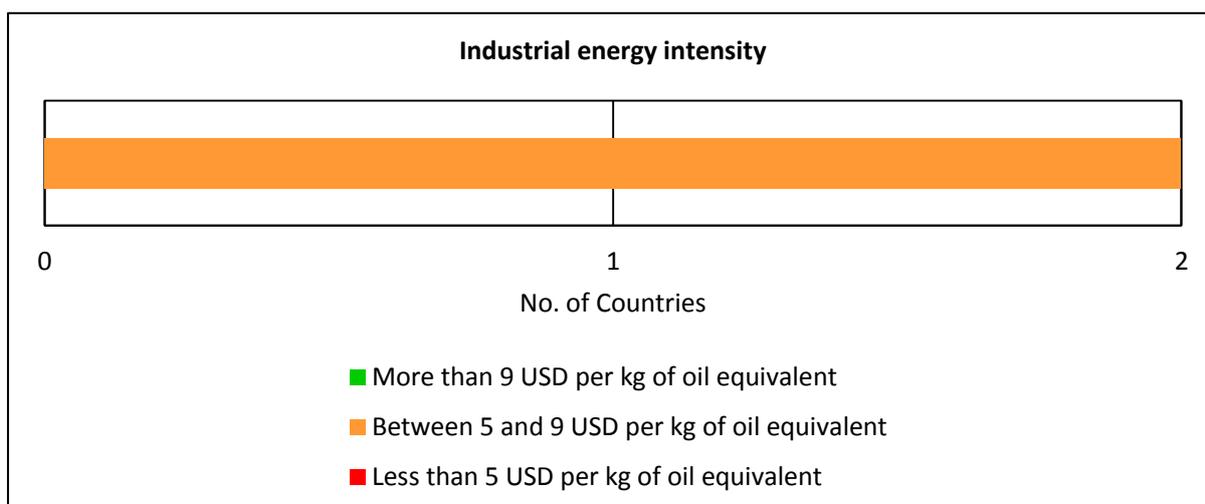


Figure 8: Number of countries in the sub-region with their corresponding industrial energy efficiency. Energy efficiency is calculated as GDP per unit of energy use at constant 2011 PPP \$ per kg of oil equivalent

In terms of industrial emission regulations and enforcement, both countries have put in place the necessary regulatory frameworks that have helped to minimize the levels of industrial pollution in the region. In USA, the Clean Air Act requires Environmental Protection Agency (EPA) to regulate emissions of listed toxic air pollutants from a published list of industrial sources referred to as "source categories." As required under the Act, EPA has developed a list of source categories that must meet control technology requirements for these toxic air pollutants.

EPA uses civil and criminal enforcement for violations that threaten communities and the environment. Compliance and enforcement programmes encompass a range of actions and activities including: compliance monitoring; administrative, civil and criminal enforcement; compliance assistance; compliance incentives and auditing; planning and results; data systems; and environmental justice.

Canada does not have an analogous federal system for applying emissions requirements to industrial facilities; provincial governments apply source-based standards. For example, Alberta regulates air emissions from industrial sources through setting standards based on: the baseline (existing) ambient air quality; ambient air quality guidelines or prescribed ambient levels; source emission standards based on the nature of the air contaminant, the process industry and best available demonstrated or best available air pollution technology;

and the results of air dispersion modelling which takes into account the local meteorology and terrain, and surrounding emission sources.

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/pcfiv/>
- 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/>
- Natural Resources Canada <http://www.nrcan.gc.ca/energy/funding/efficiency/4947>
- Environment Canada <http://www.ec.gc.ca/default.asp?lang=En&n=56D4043B-1&news=A4B2C28A-2DFB-4BF4-8777-ADF29B4360BD>,
<https://www.ec.gc.ca/air/default.asp?lang=En&n=A3EA44BA-1>,
<https://www.ec.gc.ca/energie-energy/default.asp?lang=En&n=6766D86C-1>
- Statistics Canada <http://www.statcan.gc.ca/pub/11-526-s/2010001/part-partie1-eng.htm>
- BC Air Quality <http://www.bcairquality.ca/topics/wood-stove-laws.html>
- Biomass Magazine <http://biomassmagazine.com/articles/8181/eia-more-households-heating-with-woody-biomass-this-winter>
- <http://www.planetizen.com/node/58169>