

Central & South Asia

Actions taken by governments to improve air quality

1.0 Introduction

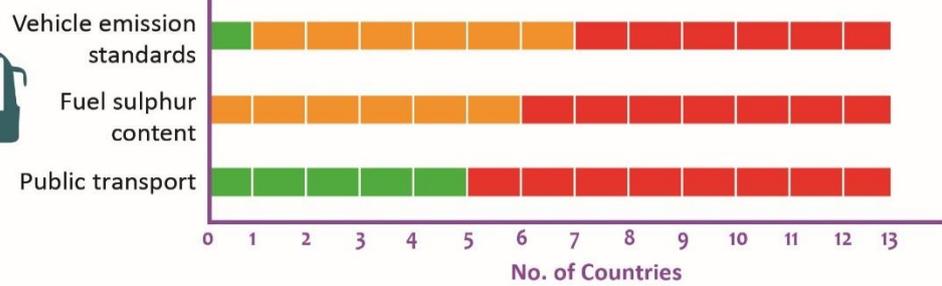
In June 2014 the United Nations Environment Assembly (UNEA) adopted resolution 1/7 *Strengthening the Role of the United Nations Environment Programme in Promoting Air Quality*. As requested in paragraph 4 and 7 of the resolution, which requested UNEP to develop a report detailing actions taken by governments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

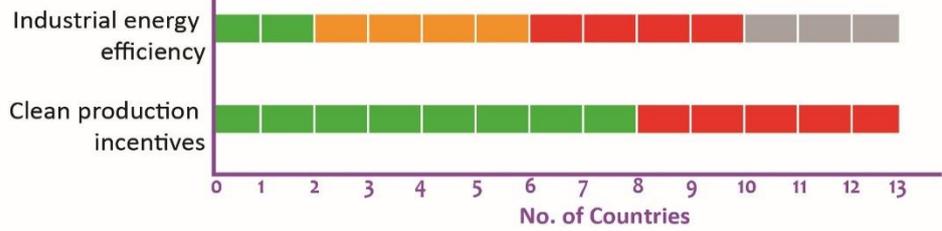
These actions are: *For Industrial activities:* 1) Establishing incentives that promote investments in renewable energy, pollution control technologies, energy efficiency and clean production mechanism; and 2) Increasing industrial energy efficiency. *For road transport:* 3) Reducing fuel sulphur content; 4) Tightening vehicle emission standards to at least Euro 4 or its equivalent; and 5) Increasing investments in public and non-motorized transport 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 clean cooking and heating fuels; and 8) Improving access to clean and 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.

CENTRAL & SOUTH ASIA POLICIES AND ACTIONS TO IMPROVE AIR QUALITY

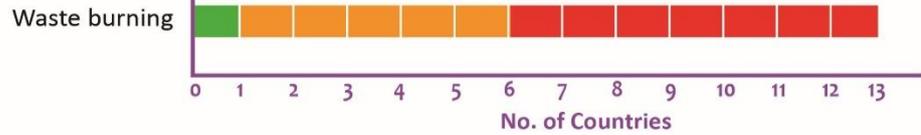
TRANSPORT



INDUSTRIES



OPEN BURNING



INDOOR AIR POLLUTION



AIR QUALITY LAWS/REGULATIONS

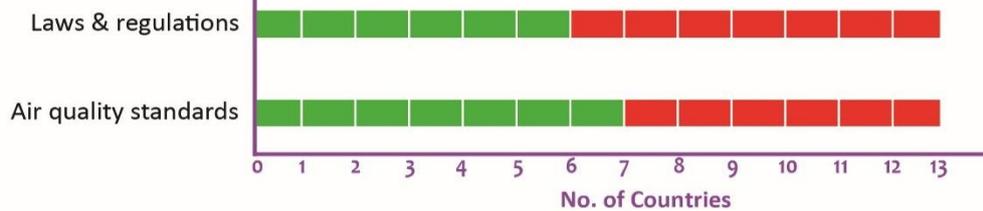


Figure 1: A summary of actions, programmes, policies, laws and regulations undertaken by governments in the sub-region to improve air quality (green = progressing to best practice; red = action still required)

2.0 Regional Overview

The Central and South Asia sub-region includes the following countries: Afghanistan, Bangladesh, Bhutan, India, Kazakhstan, Kyrgyzstan, Maldives, Nepal, Pakistan, Sri Lanka, Tajikistan, Turkmenistan and Uzbekistan. Governments in this sub-region have enacted laws and regulations on air pollution which are at different stages of implementation. Three out of the thirteen countries in the sub-region have a comprehensive ambient air quality standard with accompanying air quality policies, laws and regulations. Although much has been done to improve air quality, it still remains an issue of concern. The World Health Organisation (WHO) estimates that air pollution causes approximately 2.4 million premature deaths annually within the sub-region. Out of this, approximately 1.5 million deaths are as a result of indoor air pollution and approximately 700,000 are as a result of ambient air pollution.

Central and South Asia has some of the most polluted cities, for instance, PM10 levels in 180 Indian cities were found to exceed WHO standards by a factor of six. While regulations have become stronger, implementing and enforcing them remains a challenge. For example, open burning of household waste is common in India, as cities are not complying with the Municipal Solid Waste (Management & Handling) Rules 2000, leaving residents with few other options. The main sources of air pollution are fuel wood and biomass burning (these are a significant contributor to Asian brown cloud¹), fuel adulteration, vehicle emissions, and crop residue burning. Improvements have been made: between 1995 and 2008, the average nationwide levels of major air pollutants in India have dropped by 25 – 45%. Stronger air pollution regulations are associated with these improvements; their success however has been linked with high demand by citizens for better air quality, indicating that strong public support allows environmental regulations to succeed.

¹ The Indian Ocean brown cloud or Asian brown cloud is a layer of air pollution that recurrently covers parts of South Asia, namely the northern Indian Ocean, India, and Pakistan.

Almaty, Kazakhstan was rated as the 9th most polluted city in the world; ten out of eleven cities tested for PM₁₀, SO₂ and NO₂ had concentrations many times higher than WHO limits, indicating very high exposure levels. While Maldives has no appreciable number of polluting activities, and the sea breeze clears the air, Male is experiencing increased pollution from land and sea vehicles, diesel power generation and construction. While there is a policy framework for environmental protection, sectoral legislation has not been enacted, and there is a lack of monitoring and enforcement.

Use of solid fuels to meet household energy demand is the most important driver of deteriorating air quality, and it is responsible for around 70% of all premature deaths linked to air pollution in the sub-region. Solid fuel use is also an important source of ambient pollution. To effectively manage air quality in the sub-region, governments have to enact policies and regulations that promote access to clean energy for both rural and urban households. Four countries in the sub-region have an electrification rate and non-solid fuels access rate greater than 85%.

The transport sector is the second most important source of air pollution in Central and South Asia. Some of the major driving factors for the high emission levels from this sector include emissions from old and aging fleet, high Sulphur content in fuel or adulterated fuels and unpaved roads among others. Governments are taking steps to address this including establishment of vehicle emissions standards, improving fuel quality, improving public transport and improving traffic flow. In India for example the introduction of odd-even number plate policy (where numbers plates with odd/even numbers are restricted from entering the city in some days) halved black carbon concentrations.

Industrial emissions are also important sources of air pollution. In the former Soviet countries (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan), aging factories with outdated equipment and inefficient processes are significant point sources of air pollution. In Bangladesh brick kilns are among the largest sources of air pollution, followed by construction, steel re-rolling and cement production. Although Bhutan has a relatively low level of industrial activity, the capital Thimphu City has seen increased construction activities, which impacts air quality. Three out of the four cement plants run without

modern emission controls. However, the government has prioritised conservation of natural resources and the environment as one of the four pillars for Gross National Happiness.

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

Based on the UNEP Air Quality Policy Catalogue, seven out of thirteen countries - Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka - have ambient air quality standards, although not all meet WHO guidelines. Six countries - Afghanistan, India, Kyrgyzstan, Pakistan, Turkmenistan and Uzbekistan - have some nationwide legislation, law, policy or act specifically for air quality. Figure 2 shows the number of countries in the sub-region that have established national laws and regulations on air quality management.

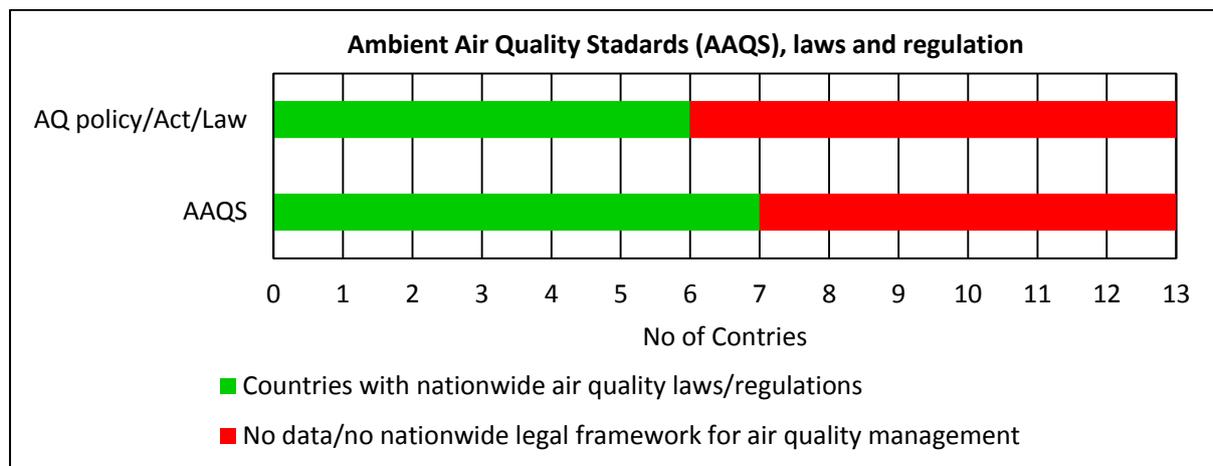


Figure 2: Number of countries in the sub-region that have enacted some form of air quality (AQ) laws and regulations, and also the number of countries that have enacted and promulgated ambient air quality standards (AAQS).

Several countries in Central and South Asia have taken steps towards regulating and managing air quality. For instance, India has strengthened its air pollution regulations, and witnessed improvements in air quality. There has also been a high demand by citizens for better air quality, indicating that strong public support allows environmental regulations to succeed. Kazakhstan has a pro-environmental legal framework and its Environmental Code obliges the government to provide public access to results of environmental self-monitoring and permit compliance control.

Some of the countries in the sub-region have managed to significantly improve air quality, for instance, Yale's Environment Performance Index rated Sri Lanka best in South Asia for air quality management. Although most countries have made steps towards improving air quality, air pollution remains a big challenge.

3.2 Transport

Increased investment into, and promotion of, public and non-motorised transport is essential to increasing mobility while avoiding increased congestion and emissions from growing numbers of private vehicles.

In Bangladesh for example, the Clean Air and Sustainable Environment Project has included transport in its mandate, and it has completed the construction of 70km of sidewalks. In India, the Ministry of Road Transport and Highways has introduced a scheme for strengthening public transport systems by providing financial assistance for the latest technologies and assistance for preparing state-level mobility plans. The City of Almaty's Sustainable Transport Strategy 2013-2023 includes the introduction of a Bus Rapid Transit (BRT) system, increased bus service to cover all villages, and the expansion of the subway system and light rail transit line.

Pakistan has a new BRT in Lahore and Islamabad, and the government subsidises ticket price to encourage usage. Another BRT system is under construction in Multan, and with other

systems proposed for Faisalabad, Peshawar and Karachi. Sri Lanka’s Public Transport master plan includes measures for electrifying and widening railways, developing an urban railway, and conducting feasibility studies to launch the BRT in urban areas. Figure 3 below shows the number of countries that have invested in expanding public and non-motorised transport.

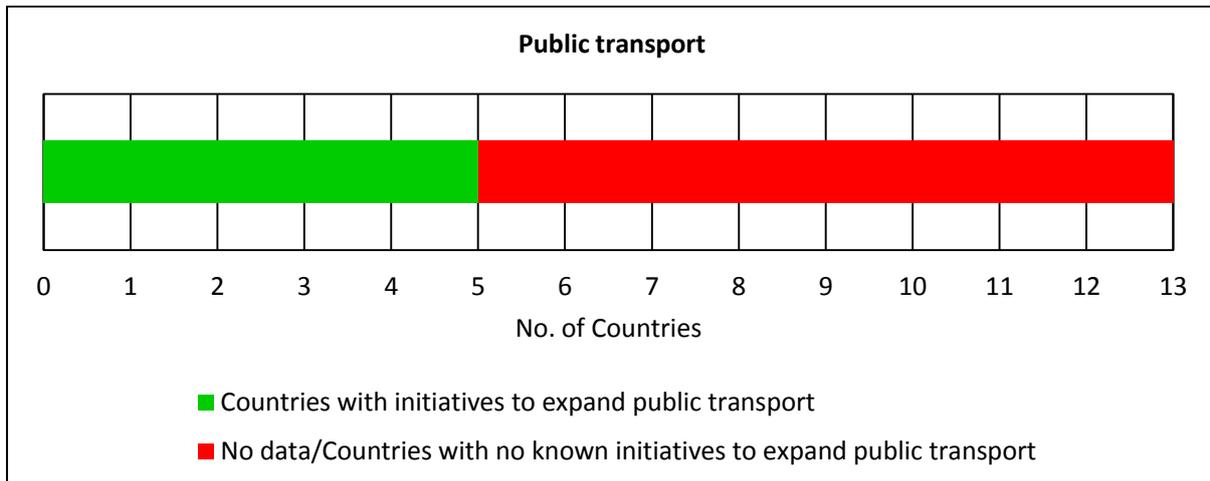


Figure 3: Number of countries in the sub-region that have initiated programmes and initiatives to expand public transport.

Transport (increasing number of vehicles, old and poorly maintained vehicles, high sulphur fuels, adulterated fuels, dust from unpaved roads) is listed as a major source of urban air pollution for all countries apart from Bhutan (where the vehicle numbers are still low but growing). Only Tajikistan has Euro 4 or its equivalent vehicle emission standards. Out of the other 12 countries, six have pre-Euro 4 standards: Bangladesh, Bhutan, India, Kazakhstan, Nepal, and Sri Lanka. Figure 4 shows the number of countries in the sub-region that have enacted and promulgated vehicle emission standards.

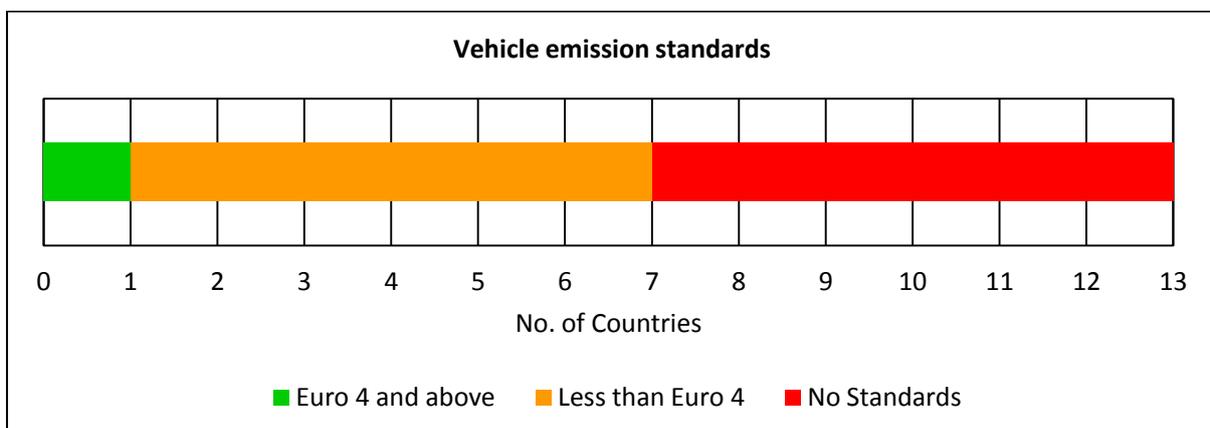


Figure 4: The number of countries in the sub-region that regulate vehicle emissions to Euro standards or its equivalent.

The sub-region lags behind in enacting regulations to improve fuel quality and none of the countries have low sulphur fuels. Seven countries have fuels with more than 500ppm Sulphur content. Of those, there are a few countries where there is a disconnect between the regulations and what is available in the market. For instance, the official standard for sulphur levels in fuel in Bangladesh is 5,000ppm; however, the Bangladesh Petroleum Corporation (BPC) has been importing 500ppm diesel fuel since 2015. Figure 5 below shows the maximum fuel sulphur content in the sub-region.

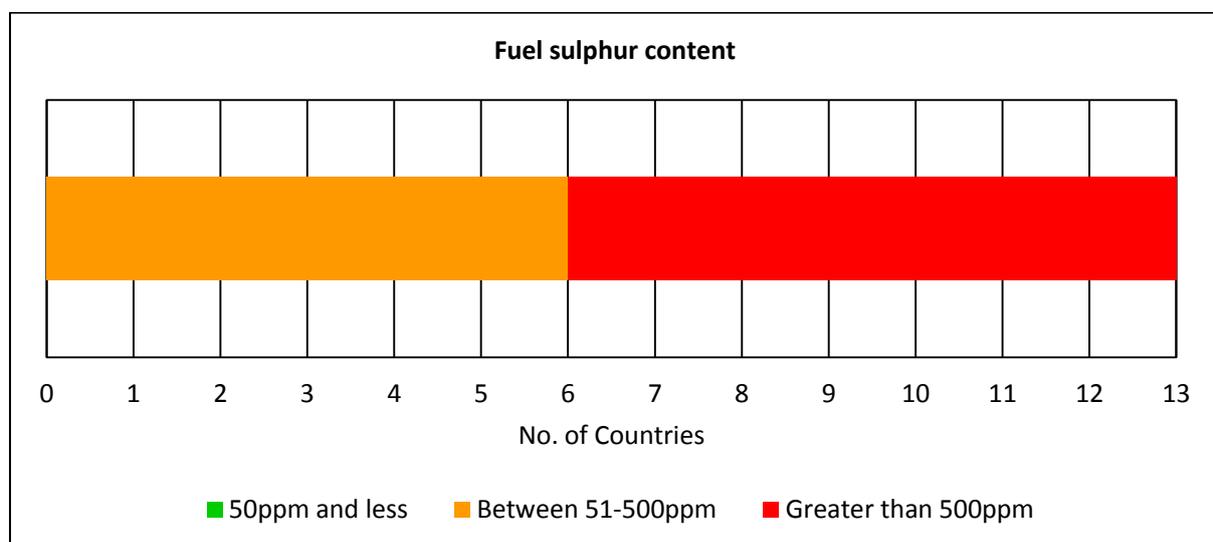


Figure 5: Number of countries in the North Asia sub-region that regulate fuel quality. Fuels Sulphur content is used as a proxy of fuel quality.

Governments are taking actions to promote electric vehicle use as part of efforts towards reducing emissions from the transport sector. In Sri Lanka for example, the government is promoting the introduction of electric vehicle through the tax regime. Electric cars attract a 5% tax, instead of 100-200% tax like other conventional vehicles; the government is investing in charging stations for electric vehicles. Hybrids are also taxed at a lower rate. This preferential tax regime has resulted in the country having one of the highest shares of hybrids in the world.

Nepal has cut customs duty on electric vehicles by 50%, although there is still an 80% customs duty remaining. There are a number of charging stations and no tax on electric vehicle parts. In Kathmandu Valley, 3-wheeled diesel vehicles, vehicles more than 20 years

old and vehicles with 2-stroke engines were banned in 1999, but this ban wasn't enforced. However a ban on registration of new 2-stroke engine vehicles was implemented in Kathmandu.

3.3 Open burning of waste

Open burning of municipal and agricultural waste, which occurs in twelve out of thirteen countries (Figure 6), is another significant source of air pollution in both urban and rural settings. In the sub-region, ten countries practice opening burning of both agricultural and municipal waste, while in five countries one form of waste (agricultural or municipal) is disposed of through open burning. Turkmenistan seems to have managed to regulate the open burning of both municipal and agricultural waste.

Agricultural fires, intended to remove crop residues for new planting or clear brush for grazing, contribute a significant portion of the black carbon from biomass burning that reaches the Arctic in spring, creating an Arctic Haze that includes northern Alaska. Concentrations of black carbon from agricultural burning are highest in areas across Eurasia. One of the top emitters is Kazakhstan; while the country has officially banned open field burning at the Ministry level, fires frequently occur on agricultural lands.

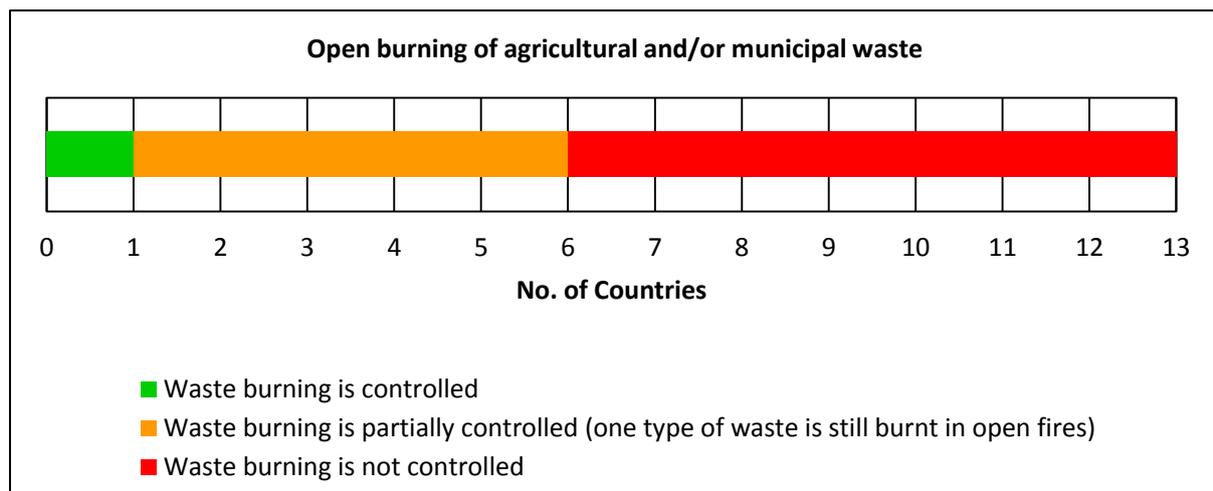


Figure 6: Number of countries where laws, regulations and actions have been implemented to prevent open burning of agriculture and municipal waste.

3.4 Indoor air pollution

Indoor air pollution is the main driver of premature mortality linked to air pollution in the sub-region, and it is directly linked to the predominant use of biomass for household energy provision. The use of biomass for cooking and heating is widespread in the sub-region with six out of the thirteen countries depending heavily on biomass as less than half of the population have access to non-solid fuels. Four countries have increased the percentage of their population with access to non-solid fuels to above 85% (see figure 7).

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.

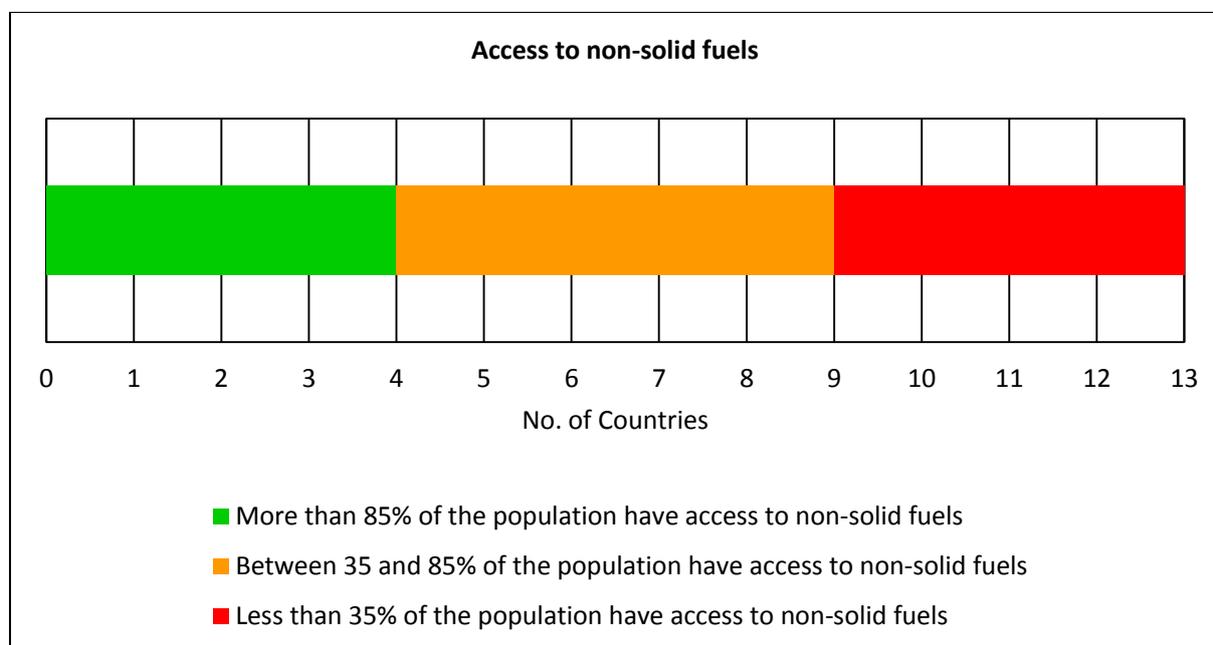


Figure 7: Number of countries in the sub-region that have implemented programmes and policies to improve non-solid fuels access rate, as indicated by percentage of households with access to non-solid fuels.

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 cook stove² 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.

Some countries are also taking steps to increase use of efficient cook stoves used by the majority of the population. For instance, Bangladesh's Country Action Plan for Clean Cook stoves plans to distribute clean and efficient cook stoves to 30 million households by 2030. The government has provided USD 4.5million to promote cleaner cook stoves, and approximately six hundred thousand households are now using improved stoves. Figure 8 shows the number of countries in the sub-region that are promoting the use of clean, efficient cook stoves. 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.

² 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.

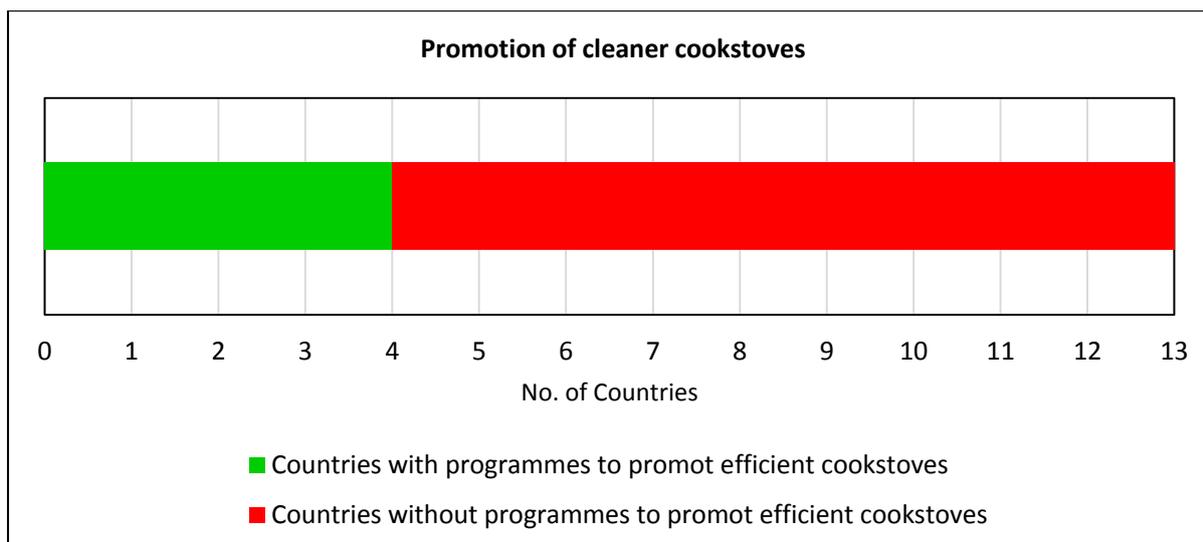


Figure 8: Number of countries in the sub-region that have programmes to promote use of efficient cook stoves. Due to lack of reliable data on clean cook stoves, only programmes aimed at promoting cook stoves that also qualify for carbon trading schemes are represented here.

Another action that governments are taking to reduce indoor air pollution is connecting the population to electricity, which provides a cleaner fuel for lighting homes and in some instances for cooking and for space heating. In the sub-region this policy action has been successful for the most part as eight out of the thirteen countries have an electricity connection rate above 85%.

3.5 Industries

Eight out of thirteen countries use incentives for promoting investment in energy efficiency, clean technology uptake, renewable energy and / or pollution control: Bangladesh, India, Kazakhstan, Kyrgyzstan, Maldives, Nepal, Pakistan and Sri Lanka.

More than 50% of the electricity generating capacity of five countries - Afghanistan, Bhutan, Kyrgyzstan, Nepal and Tajikistan – comes from renewable energy (mainly hydro). Nine of the countries in the sub-region have more than 10% renewable energy in their electricity mix. Use of incentives to encourage renewable energy production is common in the sub-regions. For instance, India promotes renewable energy through feed-in tariffs, exemptions from customs and excise duties and state-level tax exemptions for renewable energy equipment.

In addition, accelerated depreciation of equipment can be claimed by projects. There are also incentives to purchase energy efficient equipment, while a credit-linked capital subsidy scheme encourages small-scale technology upgrades.

Kazakhstan also plans to develop 1040MW of alternative and renewable energy by 2020, mostly from wind, with a long-term goal of generating 50% of all power from alternative sources; currently, less than 1% of electricity comes from renewable sources. To this end, there are a number of incentives for renewable energy investments: exemptions from transmission service fee; exemptions from custom duties for imported materials; and tax deductions. Maldives' Renewable Energy Investment Office has goal to make the country carbon neutral by 2020. Import duties are waived for solar panels and batteries, and for super-efficient appliances. Thirty wind turbines are being installed near Male. In Kyrgyzstan, the project 'Introduction of Solar Technologies in Rural Areas' seeks to replace diesel pumps with solar pumps for water supply.

In Bangladesh the Renewable Energy Policy 2009 exempts equipment and spare parts related to renewable energy from duty and 5% VAT; there is also a five year income tax exemption for renewable energy projects. To provide further support, Bangladesh Bank (the central bank) provides soft loans for industries using environmentally friendly technology (solar panels, bio-gas plants and industrial effluent treatment plants).

Renewable energy projects in Pakistan are provided with various enticements, including no import duties on equipment and other tax benefits. There are several wind power and solar power projects, and the government has a target for 10% energy from renewable power plants. Punjab subsidises biogas and tube wells fitted with solar-powered pumps.

Other policies and actions being undertaken by governments in this sub-region to limit industrial emissions include encouraging industries to use clean production technologies and to increase their energy efficiency. In Nepal the use of old brick kiln technology has been banned within Kathmandu Valley, and the government has initiated a project to introduce cleaner Vertical Shaft Brick Kiln technology which provides energy cost savings, better quality bricks and less pollution. The Industrial Enterprises Act grants 50% reduction in taxable income for three years for companies that invest in industry process or equipment that controls pollution.

In Bangladesh where brick kilns are one of the biggest polluters, the Clean Air and Sustainable Environment project seeks to introduce cleaner brick making technology, while the Brick Manufacturing and Kiln Construction (Control) Act 2013 has been enacted to reduce emissions from brick kilns.

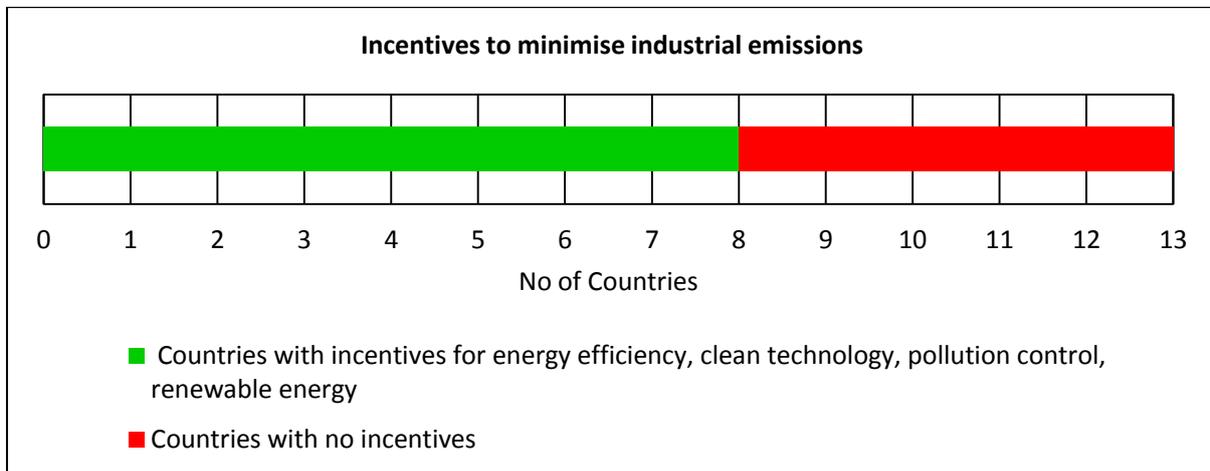


Figure 9: Number of countries in the North Asia sub-region that use incentives to encourage industrial investments in cleaner production and renewable energy generation.

In the sub-region, industrial energy efficiency measured as GDP generated per unit energy is relatively low, as indicated in Figure 10. Bhutan’s Environmental Assessment Act (2000) requires new industries to use only new and state-of-the-art machinery and technology, and to limit air pollution within the interim ambient air quality standards. However these requirements aren’t applied retroactively to older facilities which are often using obsolete technologies.

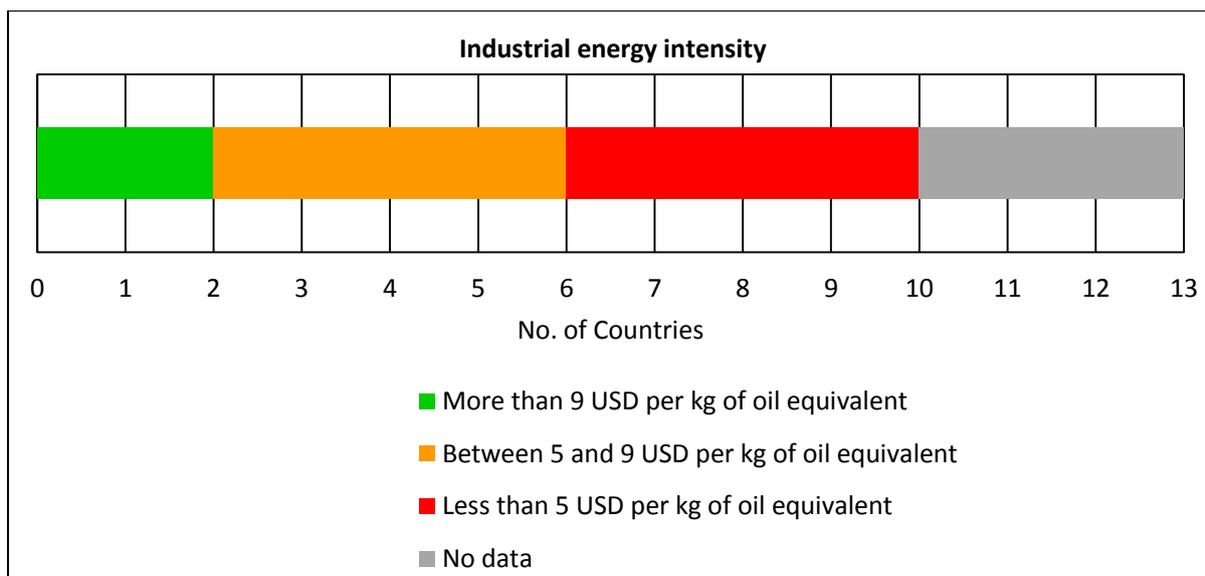


Figure 10: Number of countries in the Central & South Asia sub-region with policies aimed at improving energy efficiency.

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>
- Asian Development Bank
- World Health Organisation
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
- 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/>
- <http://kathmandupost.ekantipur.com/news/2015-10-05/fuel-shortages-electric-vehicles-spark-interest.html>
- http://www.myrepublica.com/portal/index.php?action=news_details&news_id=79389
- Mercer Human Resource Consulting
- http://www.catf.us/resources/publications/files/Agricultural_Fires_and_Arctic_Climate_Change.pdf