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# "Air that We Breathe" National Symposium on Air Quality

## 5th & 6th May 2016 and Launch of the Clean Air Action Plan 2025



### 1.1 Introduction

Air is an essential basic need of all of living beings. Since air is abundantly available, in the past it was not treated as a resource in the same manner as land and water. However, air pollution has now been identified as a growing problem in Sri Lanka as in most other countries in the world. Rapid motorization has led to large increase in vehicle fleet from 1991 to 2015. The active vehicle population in Sri Lanka amounts to 3,660,685 at the end of year 2015, out of which 45% is two stroke motor cycles and 14% three wheelers. The atmospheric pollution has been highest in the Greater Colombo area, where a significant proportion of the country's population resides, and most of the industrialization has occurred. The transport sector is contributing about 60% to the air pollution especially in the Greater Colombo Area. Due to its topography, Kandy City (located in a

eliminated from gasoline in 2003, presence of Lead in paints is still a cause for indoor air pollution.

### 1.2 Industry sector

Within the last decade industrial activity in Sri Lanka has grown at a relatively rapid pace. Most of the manufacturing sector industries are concentrated in Kandy, Gampaha and Colombo districts. Air pollutants from these industries include suspended particulate matter (SPM), carbon dioxide, oxides of sulphur and nitrogen. Most industries, which were established prior to 1980, use outdated technology without proper pollution control measures incorporated. Many of these industries do not have the resources to adopt new technology or pollution control equipment and lack physical space for installation of pollution control devices. Commonly used fuels in the Industrial sector include

waste has also contributed to our domestic air pollutants mainly in the surrounding area. The burning of household waste which consists of plastics and polythene in our waste stream has huge impact on the health conditions of the house hold mainly young children, pregnant and feeding mothers. Burning of plastics and polythene at lower temperatures (normal heat of waste burning at household level is around 200-400C) at household level emit dioxins and furans which are persistent organic pollutants identified under the Stockholm (POPs) Convention.

### 1.5 Indicators of air pollution

Dust/Soot is the major source of air pollution in Sri Lanka. As identified by the Central Environmental Authority (CEA), major contributor to dust pollution is mobile and point sources. Annual average of ambient PM-10 level

laws, ensuring regulatory compliance and undertaking research and development on technology for air pollution control.

Actions were taken to provide cleaner fuel mainly for the transportation sector. This included the following.

- Since July 01, 2002 and unleaded gasoline was introduced through-out the island.
- Phasing out 10,000 ppm sulphur diesel and in 2003 3,000 ppm sulphur diesel was introduced island wide
- In addition regulations were gazetted by Central Environmental Authority under the NEA on June 30, 2003 included the following
  - Vehicular exhaust emission standards for vehicles already in use
  - Fuel standards for gasoline, diesel and super diesel
  - Vehicular exhaust emission standards for importation of vehicles

testing facilities island-wide. In June 2008, the vehicle testing programme was started in the Western province and programme was extended to Southern, Central, North Central, Sabaragamuwa and Uva Provinces and finally in 2011 December, a programme was implemented in North Western Province. By 2014, the programme was implemented islandwide including Northern and Eastern Provinces. By 2016, there are 388 emission testing centres operated by both companies. Sri Lanka Vehicle Emission Testing Trust Fund (SLVET) was established to implement the Vehicle Emission Testing Programme. The monitoring and auditing of the VET programme was done by the AirMAC. Vehicle Emission Testing Programme is continuously monitored by the Air Resources Management Centre (AirMAC) under the Ministry of Environment. The AirMAC monitoring is carried out in three ways:

office to present their vehicles to the DMT offices for emission inspection within a stipulated time.

### 2.6. Impact of VET Programme to Urban Air Quality

The Vehicle Emission Testing Programme has a direct impact on urban air quality. As an example the PM-10 values at Colombo Fort Air Quality Monitoring Station was around 72-74 ppm prior to implementation of the VET Programme. However the PM-10 values were improved since July 2008 and now it is around 62-64 ppm range. The smoky vehicles are rarely seen on the roads. Vehicle owners try to maintain their vehicles within the specified standards as continuous monitoring is carried out by the DMT and the AirMAC.

### 2.7 Control and Ban of Two Stroke Three Wheelers

After several studies on the impact of emission created due to two stroke three wheelers the Government in 2007 decided to control and ban the use and importation of two stroke three wheelers. Accordingly importation of three wheelers powered by two-stroke petrol engines was prohibited with effect from 01.01.2008 and importation of spare parts for such engines was prohibited with effect from 01.01.2012

### 2.8 Stationary Emission Standards

The National Environmental Act (NEA) was amended in 1988 incorporating provisions for the discharge of pollutants into the environment including emission of pollutants into the atmosphere. In addition, National Environmental (Protection and Quality) Regulations of 1990 prohibits the discharge of wastes into the environment. The Central Environmental Authority with AirMAC initiated a process to prepare source emission standards with the participation of relevant stakeholders and industry experts. These standards will be gazetted during the period 2016. However, until the gazetting the standards, CEA is in the process of implementing interim standards in line with the prepared standards.

### 2.9 BAQ 2014 and 8th EST Forum, Colombo, Sri Lanka, November 2014

The "Integrated Conference of BAQ 2014 and Intergovernmental 8th Regional EST Forum in Asia" was co-organized by the Ministries of Transport and Environment of Sri Lanka, Ministry of the Environment of Japan, United Nations Centre for Regional Development, and Clean Air Asia, in partnership with the ADB, World Bank and the German International Cooperation. The theme of the Conference was "Next Generation Solutions for Clean Air and Sustainable Transport - Towards a Livable Society in Asia" ([www.baq2014.org](http://www.baq2014.org)) This Conference became another milestone in the fight against air pollution. With more than a 1000 delegates participating in the joint conference it did indeed become another milestone in the fight against air pollution and the quest for more sustainable cities and livelihoods for citizens across Asia. During BAQ 2014 Dr B M S Batagoda of Sri Lanka was honoured with this award for pioneering work on air quality management in Sri Lanka.

### 2.10 Fuel Quality Road Map

Due to increasing number of vehicles, establishment of thermal power plants there was a necessity to have much more cleaner fuel for our vehicles and industry. In 2012, the Cabinet of Minister appointed a Cabinet Sub Committee to develop a Road Map and Technical Committee was appointed to assist the Cabinet Sub Committee. The Road Map prepared included the following key components

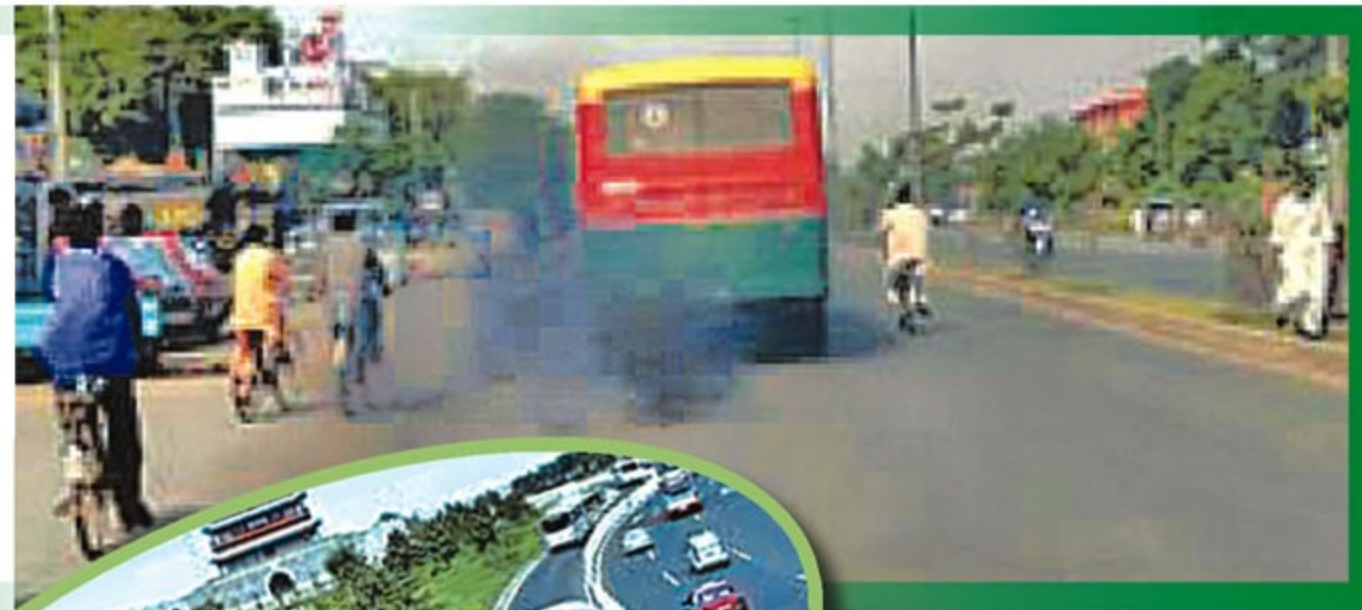
- Provision of cleaner fuel for vehicles in parallel with Euro Standards
- Provision of cleaner fuel for the industry, power plants etc
- Modernisation of Existing oil refinery and development of state of the art new oil refinery
- Establishment of laboratory facilities for testing of fuels

Based on the above road map 10ppm sulphur diesel was provided island wide replacing 500 ppm sulphur diesel from July 2014. It is expected to provide 350ppm sulphur diesel as normal diesel to be provided island wide by year 2020 replacing the present 3000 ppm sulphur normal diesel.

**Anura Jayatilake - Director Air Resource Management Centre (AirMAC) Ministry of Mahaweli Development and Environment**

Coordinated by **Thilak K Illeperuma**

# Air quality management in Sri Lanka



valley) has been revealed to have worse air quality than Colombo.

Air pollution can occur from both from stationary as well as mobile sources. Major stationary sources are those in the industrial and domestic sectors. Even to date fuel-wood dominates as the cooking fuel in Sri Lanka with more than 75% of the households using it as the fuel. Other energy sources used for cooking in the domestic sector are liquefied petroleum gas (LPG), electricity and kerosene.

Air quality monitoring in Sri Lanka has focused mainly to the Colombo City where most of the economic and urbanization activities are centred. Air quality monitoring in other regional cities such as Kandy, Anuradhapura, Puttalam, Kurunegala etc. are very limited or has been carried out for specific reasons, research purposes etc.

Recent studies reveal that indoor air quality, open burning of waste and related impacts needs more and more attention. Indoor air quality monitoring is very limited when compared with the urban (ambient) air quality monitoring in Sri Lanka. Even though Lead has been

electricity, furnace oil, diesel, firewood and coal used in power plants. Emission of Carbon dioxide occurs in various industrial processes including cement and lime manufacture, petroleum refining and handling, power generation and activated carbon manufacture. Therefore the air pollutants from industries can be categorized into two types -emissions associated with processing of raw materials (eg cement dust, lead particulates from lead smelting furnaces, acid fumes and mist from acid processing plants) and emissions from energy generation processes (i.e. in furnaces and boilers).

### 1.3 Transport sector-Vehicular emissions

Emissions of Carbon monoxide (CO), hydrocarbons (HCs) and oxides of nitrogen (NOx) from mobile sources have an adverse impact on human health. In addition to their direct impacts, they are precursors to the formation of secondary pollutants (e.g. photochemical smog and acid rain) which again impact public health and the environment. Reactions of NOx and HCs with hydroxyl radicals in the presence of ultraviolet light lead to the formation of Ozone (O<sub>3</sub>), a principal component of photochemical smog in the lower atmosphere. Rapidly increasing vehicle population and fuel consumption, particularly diesel, high proportion of old and reconditioned vehicle usage in transportation and poor vehicle maintenance, usage of cheaper oil to reduce cost and high rate of urbanization are contributing factors to high pollution levels in Sri Lanka. However usage of electric and hybrid vehicles in recent years has contributed to maintain urban air quality levels within reasonable levels even with the increasing number of vehicles on the road. Still urban air quality levels in our major cities mainly Colombo is above the gazetted ambient air quality level.

### 1.4 Domestic Sector air pollutants

In developing countries like Sri Lanka indoor pollution comes mainly from burning of biomass fuels such as wood and agricultural waste used in domestic cooking. Indoor air pollution due to usage of various building materials, biomass and other fossil fuels such as kerosene, LPG and diesel constitutes many elements. They are nitrogen dioxide, carbon monoxide, radon, formaldehyde, asbestos, mercury, man-made mineral fibres and volatile organic compounds, and health damaging organisms such as bacteria. Domestic air pollution problem is aggravated when there is no proper ventilation in the cooking environment. In addition open burning of solid

in Colombo over the years has remained within the range 72-82 µg/m<sup>3</sup> peaking in 2001. These values, however, consistently exceeded WHO latest guideline of 20 µg/m<sup>3</sup> for PM-10 and barely complied with WHO interim-1 target of 70µg/m<sup>3</sup> showed an unhealthy situation in relation to the particulate pollution in the Colombo City. However after the implementation of the Vehicle Emission Testing Programme in 2008, the ambient PM-10 level in Colombo has been decreased within the range of 62-65 µg/m<sup>3</sup> and even with the increased of number of vehicles this level is remaining in that range.

### 2. Interventions in Air Pollution Control

Sri Lanka has taken important policy interventions in mitigating air pollution in the past, through establishment of necessary legal and regulatory mechanisms, institutional strengthening and carrying out necessary capacity development activities.

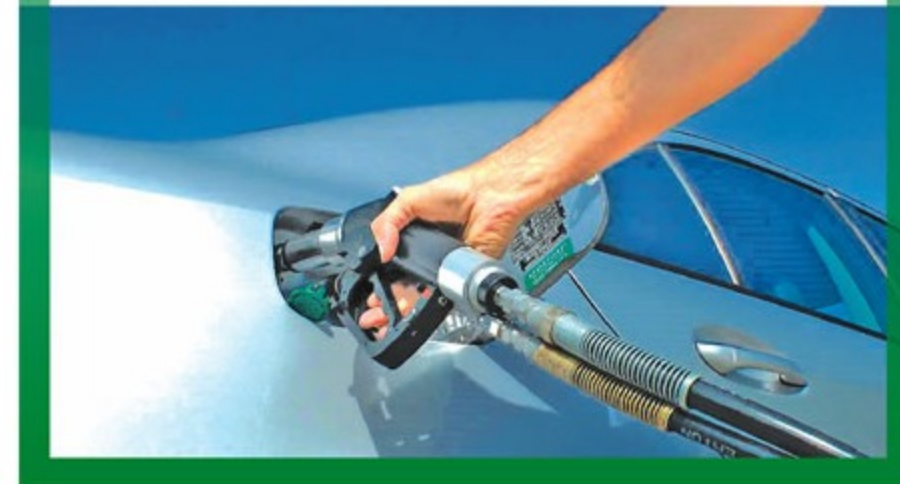
#### 2.1 Establishment of Central Environmental Authority

The National Environmental Act (NEA) No 47 was enacted as a overriding legislation for the protection, conservation and management of the environment of Sri Lanka. The Central Environmental Authority was established in 1981 to implement the provisions of the NEA.

In December 1994, national ambient air quality standards for Sri Lanka were gazetted under the National Environmental Act. These regulations do not, however, address vehicular air pollution. However, Central Environmental Authority in 2000, 2003,2007 and 2014 gazetted regulations under the NEA included provisions for vehicular emission standards for the vehicles in use, and vehicle imports, and fuel quality standards.

#### 2.2 Clean Air 2000 Action Plan

Under the Metropolitan Environment Programme (MEIP), Clean Air 2000 Action Plan was prepared to restore the gradually deteriorating air quality of Colombo Metropolitan Area. Clean Air 2000-Action Plan called upon existing institutions dealing with urban air pollution control, to play different roles ranging from policy making to air quality monitoring, together with enforcing



#### 2.3 Establishment Air Resources Management Centre (AirMAC)

To facilitate Air Quality Management (AQM) programs in Colombo and the country, the Air Resource Management Centre (AirMAC) was formed in July 2001. Since then, AirMAC has been instrumental in improving stakeholder participation in the country. The mission of the Air Resource Management Center is to provide leadership to manage the air resources by mitigating the air pollution in order to improve the health of public and quality of environment. AirMAC stakeholders included relevant state agencies, private sector, universities and research organisations.

#### 2.4 Implementation of Vehicle Emission Testing Programme

After careful study, stakeholder consultations, capacity assessment and training of various stakeholders, it was decided to start vehicle emission testing program as a public private partnership. After open tender procedure, two private sector companies were selected to implement the program in 2005. The two companies established fixed and mobile emission

reports to VET office, technical capacities of centre personnel etc are inspected during this process.

#### Road side Emission Testing Programme

Road side Emission Testing Programme is carried out by AirMAC officials with the help of Traffic Police, Department of Motor Traffic (DMT) and Technicians from Orugodawatte Technical Training Institute. The emissions of vehicles are checked on the road and any vehicle even CTB buses that exceed the emission standards are asked to repair their vehicles.

#### Smoky Vehicle Spotter Programme

Smoky Vehicle Spotter Programme is carried out by AirMAC officials with the Department of Motor Traffic (DMT)/ VET office. The officers are trained to identify smoky vehicles by visual inspection of vehicles on the road. The identified high emitting vehicles are photographed and times spotted are recorded. Owners of these identified smoky vehicles are informed by the VET

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