

FACTSHEET ON MORE MEASURES TO IMPROVE SINGAPORE'S AIR QUALITY

Announcement

Early Turnover Scheme (ETS)

- Given the good response to the ETS, the Government has decided to further enhance the scheme to improve air quality.
- The Early Turnover Scheme (ETS) will be further enhanced.
- Additional incentives for Cat C diesel vehicle owners who turnover to cleaner Euro VI models.

Industrial Emissions Standards

- NEA to tighten industrial emissions standards for better air quality.

Update

- Tightening of emissions standards for new diesel vehicles and petrol vehicles.

1 Air quality is a basic ingredient in our quality of life. The Ministry of the Environment and Water Resources (MEWR) together with the National Environment Agency (NEA) is stepping up measures to address air pollution. According to the World Health Organisation (WHO), the risks from air pollution are far greater than previously thought, particularly for heart diseases and stroke¹ (refer to **Annex A** on the health impact of criteria air pollutants). Improving the quality of the air we breathe is hence essential in ensuring a good quality of life in Singapore (refer to **Annex B** for Singapore's air quality targets for 2020).

Key Air Quality Abatement Measures

Further Enhancement of the Early Turnover Scheme (ETS)

2 Vehicles contribute 57 per cent of local PM_{2.5} emissions. The Early Turnover Scheme (ETS) was implemented in April 2013 by MEWR and the Ministry of Transport to help reduce vehicular emissions to achieve Singapore's air quality targets. The scheme encouraged owners of Pre-Euro and Euro I diesel vehicles to turnover their cars to cleaner models (See **Annex C** for details on the emissions standards for diesel commercial vehicles). In March 2014, enhancements to the ETS were announced – to raise the COE bonus and to extend the scheme by another year to 30 April 2016. (See **Annex D** for a detailed chronology of the ETS.) Since its implementation, a total of about 6,200 units of vehicles have benefited from the ETS as of 31 Dec 2014. The ETS will be enhanced to encourage take-up rates. The details will be announced at MEWR's Committee of Supply.

¹ <http://www.who.int/mediacentre/news/releases/2014/air-pollution/en/>

Tighter Industrial Emissions Standards

3 In Singapore, emissions from industries are one of the key contributing sources of air pollution. Singapore currently does not meet the 2020 air quality targets for particulate matter (PM) and sulphur dioxide (SO₂) which can cause respiratory and cardiovascular problems. NEA plans to tighten industrial emissions standards to further safeguard our air quality and improve it over time. More information will be released later in the month.

Tightening of Emissions Standards for New Diesel Vehicles and Petrol Vehicles

4 In 2013, MEWR announced that new and more comprehensive fuel quality regulations will be implemented from 2017 onwards. In 2014, MEWR announced that Euro VI emissions standards for new petrol and diesel vehicles will be implemented in 1 Sep 2017 and 1 Jan 2018 respectively to reduce emissions from new vehicles. These new regulations will help to further reduce pollutants such as ground-level ozone and fine particulate emissions from vehicular emissions, and improve our ambient air quality.

Issued on: 11 March 2015

Health Impacts of Criteria Pollutants

Pollutant	General Health Effects
PM2.5	PM2.5 can cause serious health effects at relatively low concentrations. Long term exposure to PM2.5 can cause decreased lung function, development of chronic bronchitis, stroke and premature death while short term exposure can cause a range of effects, including decreased lung function, increased respiratory symptoms and heart attacks.
PM10	PM10 can cause respiratory impairment and aggravate existing respiratory and cardiovascular disease. Individuals with heart or lung disease as well as the elderly and children are most sensitive to the effects of PM10.
SO₂	SO ₂ can cause respiratory impairment and aggravate existing respiratory and cardiovascular disease. Individuals with heart or lung disease as well as the elderly and children are most sensitive to the effects of SO ₂ .
NO₂	NO ₂ increases the risk of respiratory infection and impairs lung functions in asthmatics.
CO	Carbon monoxide deprives body tissues of oxygen and causes nausea and impairs vigilance.
Ozone	Excessive ozone in the air can impair respiratory functions.

Singapore Ambient Air Quality Targets

Pollutant	Singapore's Performance for 2014	Singapore Targets by 2020	Long Term Targets
Sulphur Dioxide (SO₂)	24-hour mean: 83µg/m ³ (Highest 24-hour mean) Annual mean: 12µg/m ³	24-hour mean: 50µg/m ³ (WHO Interim Target) Annual mean: 15µg/m ³ (Sustainable Singapore Blueprint target)	24-hour mean: 20 µg/m ³ (WHO Final)
Particulate Matter (PM_{2.5})	Annual mean: 18µg/m ³ 24-hour mean: 51µg/m ³	Annual mean: 12µg/m ³ (Sustainable Singapore Blueprint target) 24-hour mean: 37.5 µg/m ³ (WHO Interim Target)	Annual mean: 10µg/m ³ 24-hour mean: 25µg/m ³ (WHO Final)
Particulate Matter (PM₁₀)	Annual mean: 30µg/m ³ 24-hour mean: 75 µg/m ³	Annual mean: 20µg/m ³ 24-hour mean: 50µg/m ³ (WHO Final)	
Ozone	8-hour mean: 135µg/m ³ (Highest 8-hour mean)	8-hour mean: 100µg/m ³ (WHO Final)	
Nitrogen Dioxide (NO₂)	Annual mean: 24µg/m ³ 1-hour mean: 121µg/m ³	Annual mean: 40µg/m ³ 1-hour mean: 200µg/m ³ (WHO Final)	
Carbon Monoxide (CO)	8-hour mean: 1.8mg/m ³ 1-hour mean: 2.7mg/m ³	8-hour mean: 10mg/m ³ 1-hour mean: 30mg/m ³ (WHO Final)	

Emissions Standards for Diesel Commercial Vehicles

Table C-1: Emissions Standards for Diesel Passenger Cars and Light Commercial Vehicles i.e. Light Goods Vehicles of Category N₁, reference mass Class I

Emissions Standard	Limit Value (g/km, #/km – PN only)					
	Carbon Monoxide (CO)	Hydrocarbons (HC)	Nitrogen Oxides (NO _x)	HC+NO _x	Particulate Matter (PM)	Particle Number (PN) ²
Euro I	2.72	-	-	0.97	0.14	-
Euro II	1.0	-	-	0.7	0.08	-
Euro III	0.64	-	0.50	0.56	0.05	-
Euro IV	0.5	-	0.25	0.3	0.025	-
Euro V	0.5	-	0.18	0.23	0.005	-
Euro VI	0.5	-	0.08	0.17	0.005	6.0x10 ¹¹

Table C-2: Emissions Standards for Heavy-Duty Diesel Engines i.e. Diesel Heavy Goods Vehicles and Buses

Emissions Standard	Limit Value (g/kWh, #/kWh – PN only)				
	Carbon Monoxide (CO)	Hydrocarbons (HC)	Nitrogen Oxides (NO _x)	Particulate Matter (PM)	Particle Number (PN)
Euro I	4.5	1.1	8.0	0.612 (≤85 kW) 0.36 (>85 kW)	-
Euro II	4.0	1.1	7.0	0.15	-
Euro III	2.1	0.66	5.0	0.10	-
Euro IV	1.5	0.46	3.5	0.02	-
Euro V	1.5	0.46	2.0	0.02	-
Euro VI	1.5	0.13	0.4	0.01	6.0x10 ¹¹

Note: Before the Euro I standards were introduced, diesel vehicles were required to comply with the “Pre-Euro” UN/ECE R24.03 emissions standard which did not specify emission limits.

² A limit on PN was introduced in the Euro VI emissions standard to address the issue of nanoparticles emitted that are so fine and light, controlling the mass of the particulate matter alone will not suffice.

Details on the ETS

<p style="text-align: center;">2013</p>	<ul style="list-style-type: none"> • The ETS was implemented on 24 April 2013 to encourage the early replacement of old Category 'C' (Cat C) diesel vehicles with models that comply with at least Euro V diesel standards or their equivalent. • Under the scheme, owners who deregistered their Cat C diesel vehicles registered before 1 January 2001 (predominantly the Pre-Euro and Euro I models) could register for a replacement Cat C vehicle by paying a discounted Prevailing Quota Premium (PQP), without the need to bid for a Cat C Certificate of Entitlement (COE). • Owners were allowed to transfer the unused period of the COE of the existing vehicle to the replacement vehicle. • Bonus COE period for the replacement vehicle which is proportional to the existing vehicle's remaining 20-year lifespan was provided. The bonus COE incentive was set at 10% for existing vehicles with a Maximum Laden Weight (MLW) of $\leq 3,500\text{kg}$, and 30% for existing vehicles with MLW of $> 3,500\text{kg}$. • The scheme was to run for 2 years till 23 April 2015.
<p style="text-align: center;">2014</p>	<ul style="list-style-type: none"> • The ETS was enhanced. • The bonus COE incentive was increased from 10% to 20% for vehicles with a MLW of $\leq 3,500\text{kg}$, and from 30% to 100% existing vehicles with MLW of $> 3,500\text{kg}$. • Minimum payment of 10% of the PQP was introduced. • The ETS was extended by 1 year to end-April 2016.
<p style="text-align: center;">2015</p>	<ul style="list-style-type: none"> • The ETS is further enhanced (Details to be released at MEWR's Committee of Supply).