

# Air quality and health impacts of HDVs in ASEAN countries

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# Background

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- Among transportation subsectors, on-road diesel vehicles are the leading contributor to air pollution and associated disease burdens.
- Within that group, heavy-duty vehicles are the main contributor to exhaust emissions and health effects, accounting for 86% of global on-road diesel nitrogen oxides (NO<sub>x</sub>) emissions in 2015.
- Besides the impact on air quality and public health, black carbon (BC) from diesel engine exhaust severely affects the climate as the particles produce significant near-term climate warming.

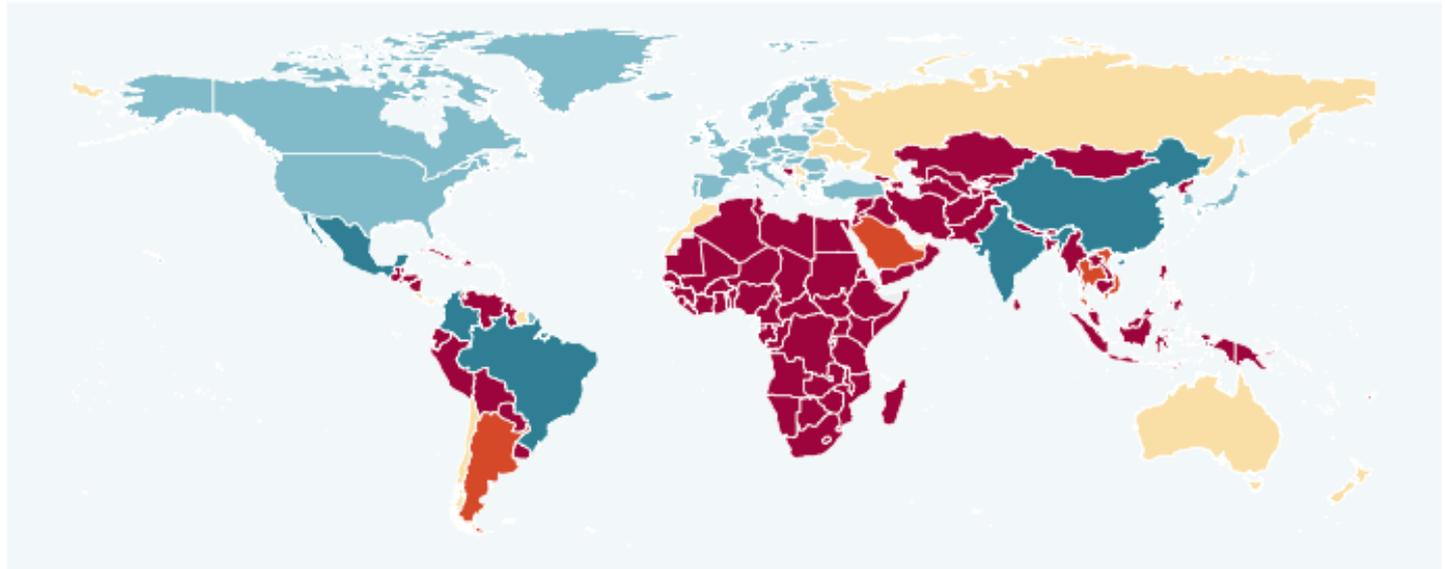
# Currently implemented HDV emission standards (Euro-equivalent)



# Removing sulfur from the fuel supply is a crucial first step to controlling air pollution from HDVs

## Status

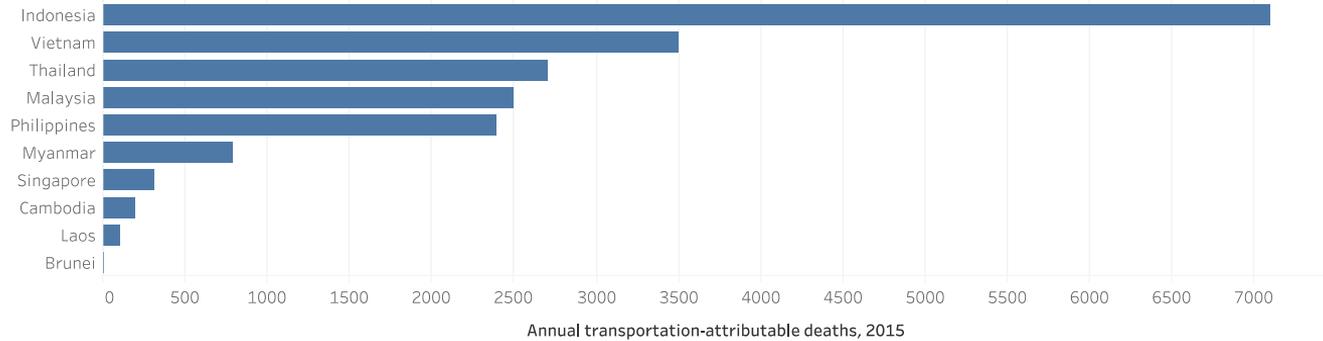
- Implemented
- Adopted
- Fuels available
- Fuels planned
- Fuels needed



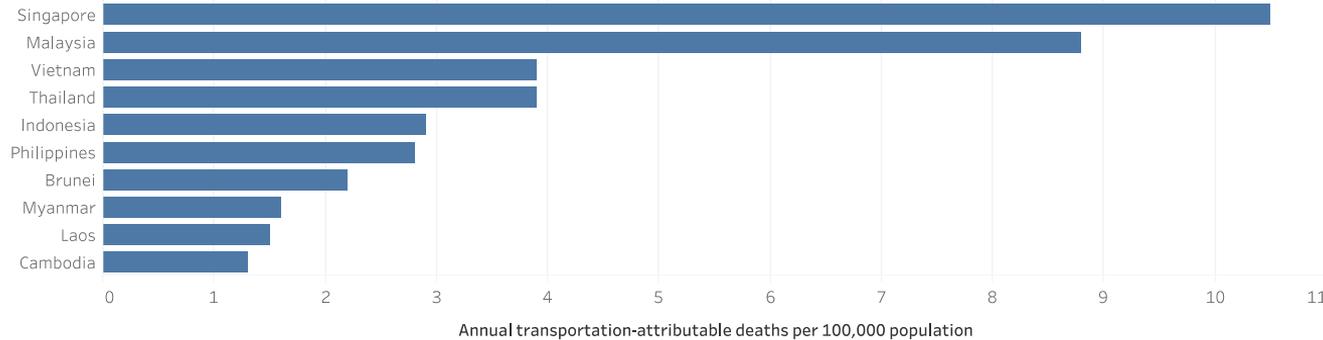
*Implementation status of soot-free heavy-duty engine standards and ultralow-sulfur diesel by country as of July 2019. Recently adopted standards will take effect between 2020 and 2023, depending on the country. Fuels available or planned means soot-free engine standards are not yet adopted. Fuels needed means fuel sulfur reductions are needed to enable implementation of soot-free engine standards.*

# Transportation-attributable deaths from ambient PM<sub>2.5</sub> and ozone

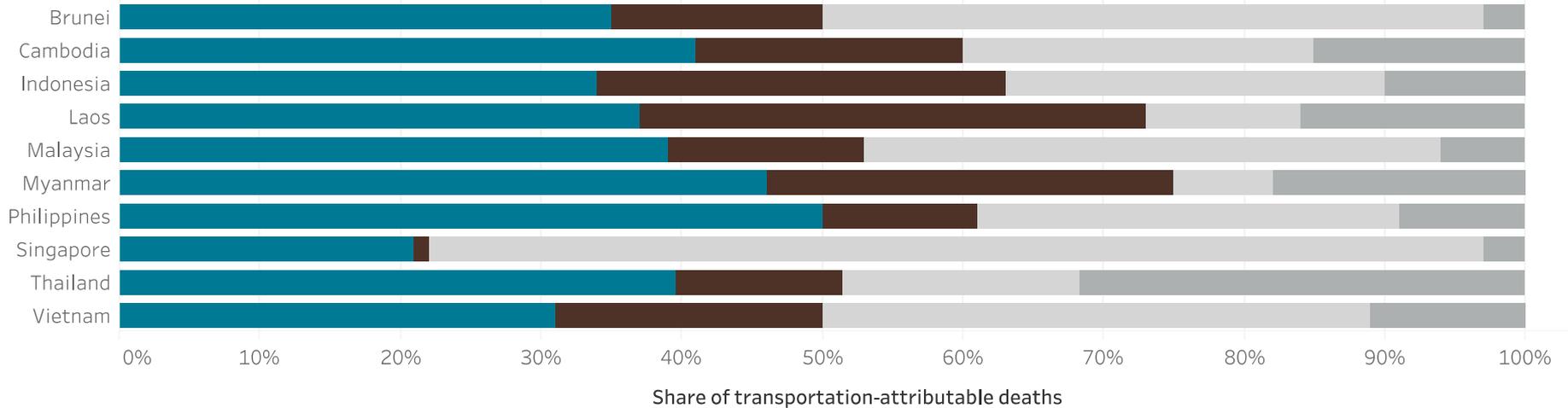
Annual PM<sub>2.5</sub> and ozone transportation-attributable deaths, 2015



Annual PM<sub>2.5</sub> and ozone transportation-attributable deaths per 100k population, 2015



# Contribution to transportation-attributable deaths by subsector

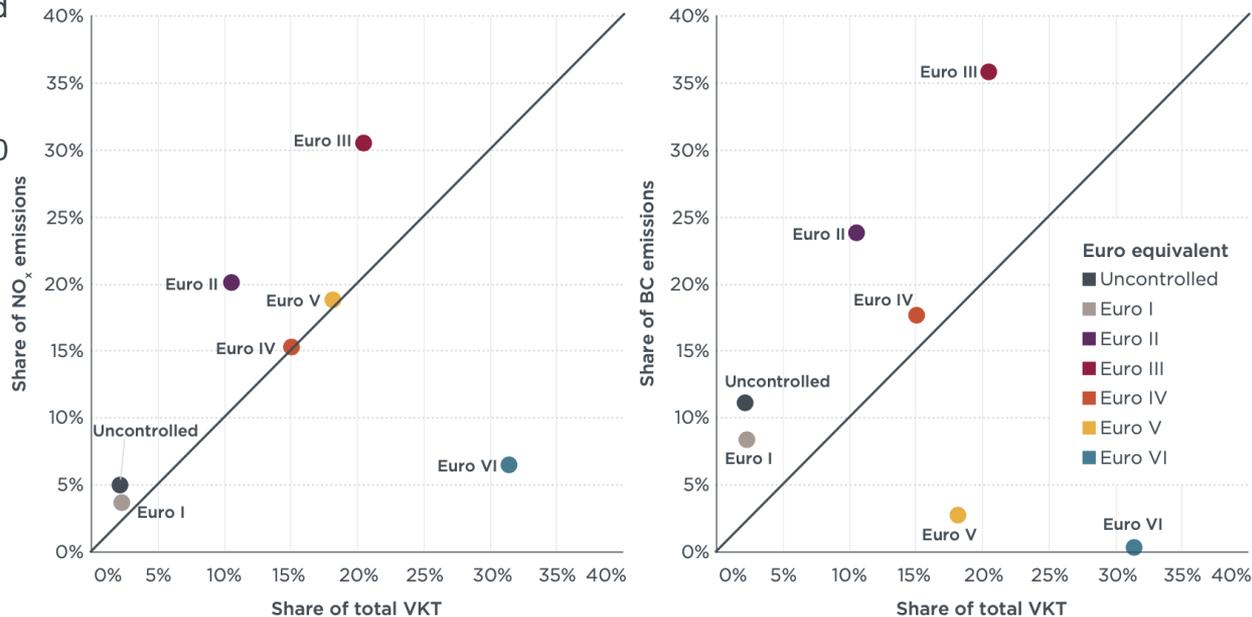


## Subsector



# Contribution of HDDVs with different standards to tailpipe NOx and BC emissions

Share of total VKT and pollutant emissions by Euro-equivalent standard in G20 economies, 2020 (G20 total)



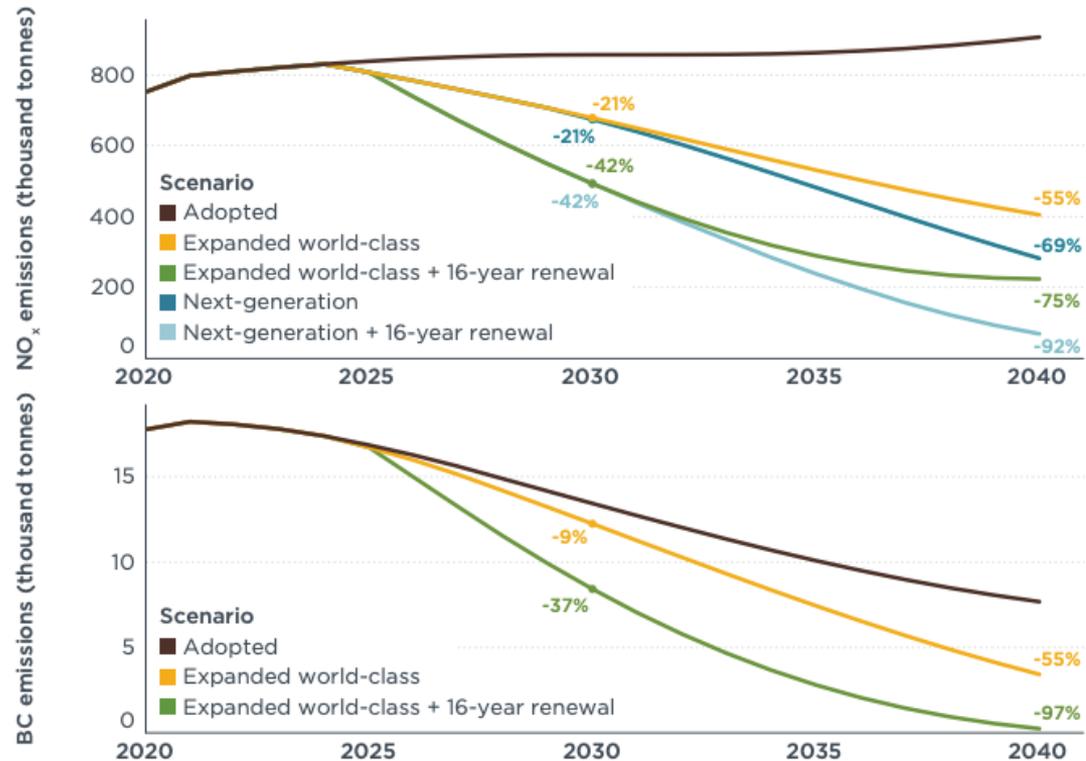
Points that fall above the diagonal line indicate that vehicles of this standard have an outsized impact on emissions relative to their vehicle activity.

# Study of G20 economies: Policy scenarios

- **Adopted:** Policies adopted by December 2020, including Euro IV-equivalent standards by 2022.
- **Expanded world-class:** In addition to adopted policies, we assume Indonesia will implement Euro VI-equivalent standards in 2025.
- **Expanded world-class and 16-year accelerated fleet renewal:** Accelerated fleet renewal policies are added to the **expanded world-class** scenario, resulting in 100% of in-use HDVs meeting Euro VI-equivalent and next-generation standards 16 years after they are applied to new vehicles.
- **Next-generation standards:** Building upon the **expanded world-class** scenarios, Indonesia will implement next-generation standards in 2030, with 90% reduction in NOx emissions rate from Euro VI-equivalent levels.
- **Next-generation and 16-year accelerated fleet renewal:** Building upon the **next-generation** scenario, 100% of in-use HDVs meet Euro VI-equivalent and next-generation standards 16 years after they are applied to new vehicles.

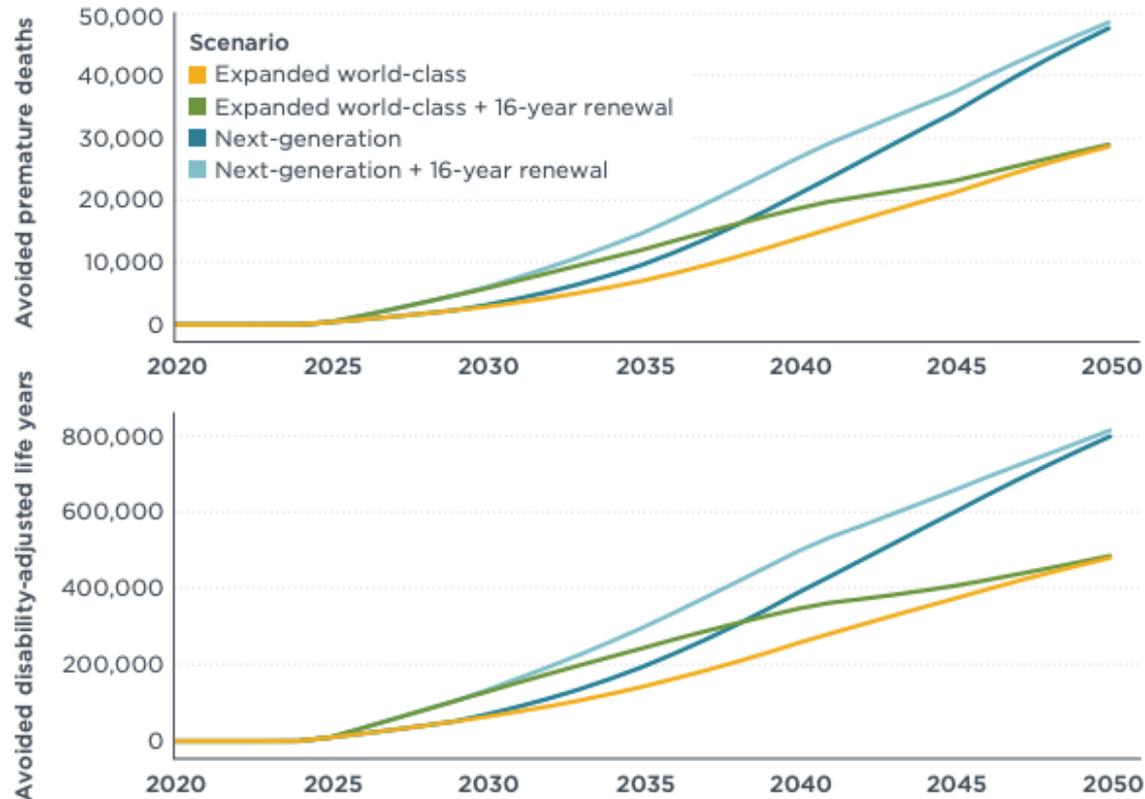
# Implementing Euro IV and progressing to Euro VI are key steps to reducing air pollution from HDVs

Diesel HDV exhaust NO<sub>x</sub> and black carbon from 2020 to 2040 in Indonesia. Data labels show the percent change in emissions compared with adopted policies in 2030 and 2040.



# Improving HDV emission control programs would generate large health benefits in Indonesia

Avoided PM<sub>2.5</sub> and ozone deaths attributable to diesel HDV emissions and years of life lost compared with adopted policies, 2020–2050



# Policy implications

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- Removing sulfur content from the fuel supply is a crucial first step to reduce HDV pollution.
- ASEAN countries that have not yet adopted HDV Euro VI-equivalent standards should consider these a priority to implement in the 2023–2025 timeframe.
- Countries that have or will soon implement HDV Euro VI-equivalent standards could accelerate these benefits with fleet renewal; however fleet renewal is not a substitute for Euro VI or next-generation standards, which are key to greatly reducing HDV emissions.
- Countries should also encourage adoption of zero-emission vehicles, starting with cost-effective segments like buses, 2- & 3-wheelers, taxis / TNCs, and urban delivery vehicles.
- Countries that allow import of used vehicles should ensure used vehicles are as clean as new vehicles, which is important to realize the full benefits of new vehicle standards in protecting public health.

Questions?  
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