

Climate and health benefits of policies to address emissions from heavy-duty vehicles: South Africa

BACKGROUND

Among transportation subsectors, on-road diesel vehicles are the leading contributor to air pollution and associated disease burdens. In addition to the impact of emissions on air quality and public health, black carbon from diesel engine exhaust severely affects the climate as the particles produce significant near-term climate warming. A new ICCT paper quantifies the health and climate benefits of key policies for reducing air pollutant emissions from heavy-duty vehicles (HDVs) in the G20 economies. Building off this research, the benefits for South Africa were analyzed under five scenarios:

- » **Adopted:** Policies adopted by December 2020.
- » **Expanded world-class:** In addition to adopted policies, we assume that South Africa 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 equivalents and next-generation standards 16 years after they are applied to new vehicles. Pre-Euro VI-equivalent vehicles are assumed to be gradually replaced over this time period.
- » **Next-generation standards:** Building upon the **expanded world-class** scenario, South Africa would implement next-generation emission standards in 2030, with 90% reduction in NO_x 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 would meet Euro VI equivalents and next-generation standards 16 years after they are applied to new vehicles.

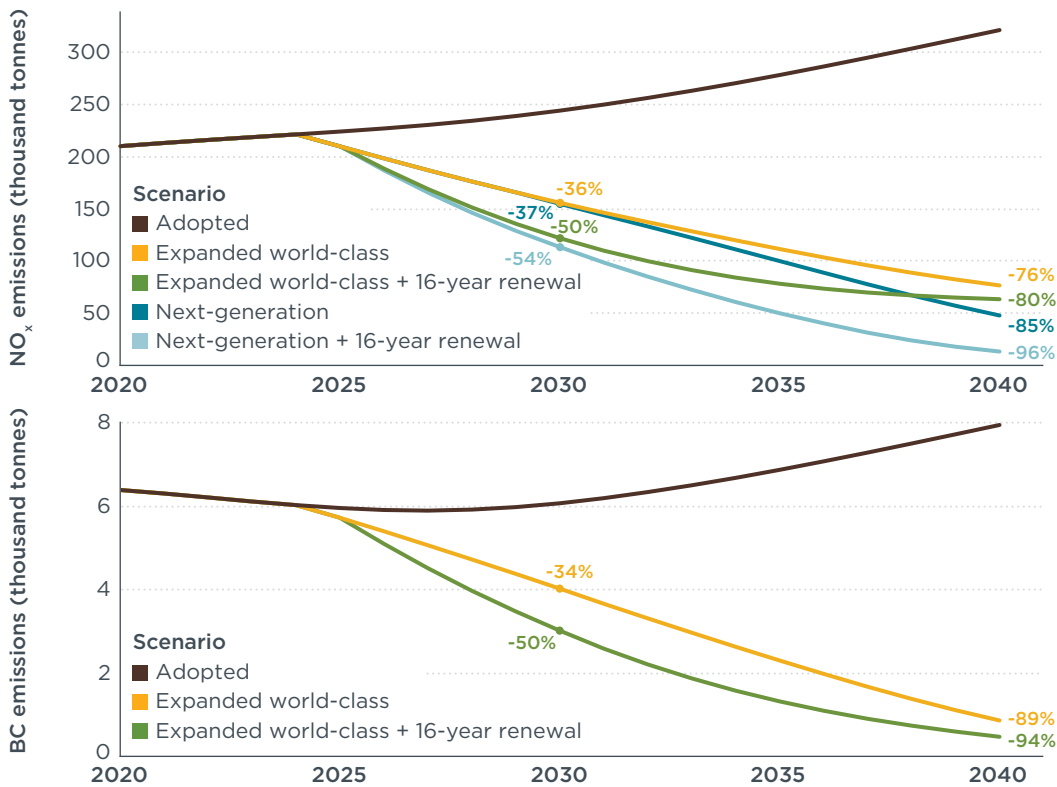


Figure 1. Diesel HDV exhaust NO_x and black carbon emissions from 2020 to 2040 in South Africa. Data labels show the percent change in emissions compared with adopted policies in 2030 and 2040.

KEY FINDINGS

- » Avoided HDV exhaust NO_x emissions in 2040 compared with adopted policies are projected to be 240 thousand tonnes (76% reduction) in the expanded world-class scenario, 260 thousand tonnes (80% reduction) in the expanded world-class plus 16-year renewal scenario, 270 thousand tonnes (85% reduction) in the next-generation standards scenario, and 310 thousand tonnes (96% reduction) in the next-generation plus 16-year renewal scenario.
- » Avoided diesel HDV exhaust BC emissions in 2040 compared with adopted policies are projected to be 7.1 thousand tonnes (89% reduction) in the expanded world-class scenario, and 7.5 thousand tonnes (94% reduction) in the expanded world-class plus 16-year renewal scenario.
- » Cumulative avoided diesel HDV exhaust NO_x emissions from 2020 to 2050 compared with adopted policies are projected to be 5,100 thousand tonnes in expanded world-class scenario, 5,500 thousand tonnes in expanded world-class plus 16-year renewal scenario, 5,700 thousand tonnes in next-generation standards scenario, and 6,400 thousand tonnes in next-generation plus 16-year renewal scenario.
- » Cumulative avoided diesel HDV exhaust black carbon emissions from 2020 to 2050 compared with adopted policies are projected to be 144 thousand tonnes in the expanded world-class scenario, and 157 thousand tonnes in the expanded world-class plus 16-year renewal scenario.
- » Cumulative mitigation potential (GWP20) for diesel HDV exhaust black carbon, CH₄ and N₂O emissions from 2020 to 2040 compared with adopted policies is projected to be 211 million tonnes CO₂e in the expanded world-class plus 16-year renewal scenario, accounting for 8% of the total mitigation potential among G20 economies.

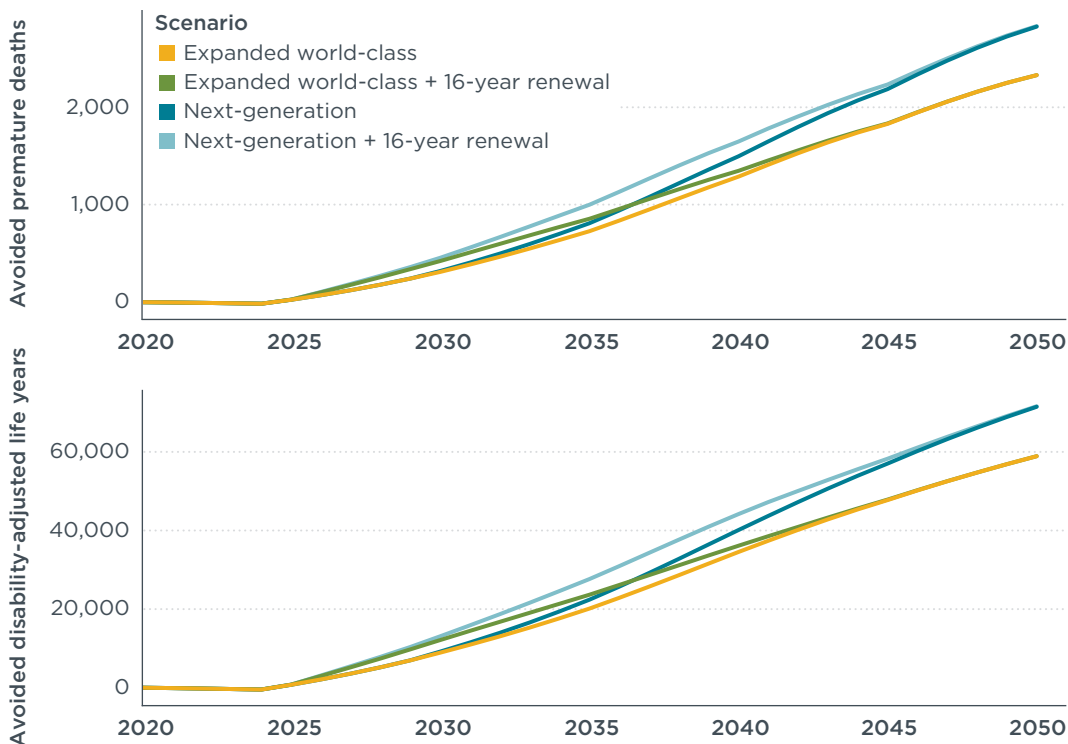


Figure 2. Avoided PM_{2.5} and ozone deaths and disability-adjusted life years attributable to diesel HDV emissions compared with adopted policies, 2020-2050.

- » Cumulative avoided PM_{2.5} and ozone premature death attributable to diesel HDV emissions from 2020 to 2050 compared with adopted policies are projected to be 27,900 in the expanded world-class scenario, 29,500 in the expanded world-class plus 16-year renewal scenario, 32,700 in the next-generation standards scenario, and 35,400 in the next-generation plus 16-year renewal scenario.
- » Cumulative avoided PM_{2.5} and ozone disability-adjusted life years attributable to diesel HDV emissions from 2020 to 2050 compared with adopted policies are projected to be 733,000 in the expanded world-class scenario, 777,000 in the expanded world-class plus 16-year renewal scenario, 857,000 in the next-generation standards scenario, and 932,000 in the next-generation plus 16-year renewal scenario.
- » The valuation of cumulative avoided health damages (in 2020 U.S. dollars, 3% social discount rate) from PM_{2.5} and ozone mortality attributable to diesel HDV emissions from 2020 to 2050 compared with adopted policies are projected to be \$23 billion in the expanded world-class scenario, \$24 billion in the expanded world-class plus 16-year renewal scenario, \$27 billion in the next-generation standards scenario, and \$29 billion in the next-generation plus 16-year renewal scenario.

PUBLICATION DETAILS

Title: Air quality and health impacts of heavy-duty vehicles in G20 economies

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Download: <https://theicct.org/publications/g20-hdv-impacts-jul2021>

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