

## Delhi Metro: A Race towards Zero Emission

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**Abstract :** In December 2015, all the members of the United Nations Framework Convention on Climate Change (UNFCCC) unanimously adopted the historic Paris Agreement. As per the convention, 197 countries have followed the guidelines of the agreement and have agreed to reduce the use of fossil fuels and also reduce the carbon emission to reach net carbon neutrality by 2050 and reduce the global temperature by 2°C by the year 2100. Globally, transport accounts for 23% of the energy-related CO<sub>2</sub> that feeds global warming. Decarbonization of the transport sector is an essential step towards achieving India's nationally determined contributions and net zero emissions by 2050. Metro rail systems are playing a vital role in the decarbonization of the transport sector as they create metro cities for the "21st-century world" that could ensure "mobility, connectivity, productivity, safety and sustainability" for the populace. Metro rail was introduced in Delhi in 2002 to decarbonize Delhi-National Capital Region and to provide a sustainable mode of public transportation. Metro Rail Projects significantly contribute to pollution reduction and are thus a prerequisite for sustainable development. The Delhi Metro is the 1<sup>st</sup> metro system in the world to earn carbon credits from Clean Development Mechanism (CDM) projects registered under United Nations Framework Convention on Climate Change. A good Metro Project with reasonable network coverage attracts a modal shift from various private modes and hence fewer vehicles on the road, thus restraining the pollution at the source. The absence of Greenhouse Gas emissions from the vehicle of modal shift passengers and lower emissions due to decongested roads contribute to the reduction in Green House Gas emissions and hence overall reduction in atmospheric pollution. The reduction in emission during the horizon year 2002 to 2019 has been estimated using emission standards and deterioration factor(s) for different categories of vehicles. Presently, our results indicate that the Delhi Metro system has reduced approximately 17.3% of motorized trips by road resulting in an emission reduction significantly. Overall, Delhi Metro, with an immediate catchment area of 17% of the National Capital Territory of Delhi (NCTD), is helping today to reduce 387 tonnes of emissions per day and 141.2 ktonnes of emissions yearly. The findings indicate that the Metro rail system is driving cities towards a more livable environment.

**Keywords :** Delhi metro, GHG emission, sustainable public transport, urban transport

**Conference Title :** ICTTE 2023 : International Conference on Traffic and Transportation Engineering

**Conference Location :** Cancun, Mexico

**Conference Dates :** April 03-04, 2023