

# Electric, LNG and Fuel cell vehicles

## Passenger vehicles

### Level 1

This level assumes penetration of electric vehicles to be limited, possibly due to lack of focused policy initiatives, reaching 28% for 2 wheelers, 45% for 3 wheelers and 40% for taxis, and 50% for buses and 30% for cars, reaching complete electrification at least in metro cities.

### Level 2

Level 2 envisages that focused policy decisions by the government could incentivize and promote electric vehicles, thereby increasing the penetration to 58% for electric cars and 43% for 2 wheelers, 65% for 3-wheelers, 58% for taxis and 74% for buses in road-based transport in 2050. LNG fueled buses are assumed to reach 0.05% penetration in 2030, but later give way to electric buses.

Electric two wheelers have made a debut in Tamil Nadu, and with supportive policies, electric vehicles are expected to form significant share in the transport mix in all categories of vehicles. Electrification in railways is currently ~48% and is expected to increase rapidly. Electric vehicles can be a transformative change in the transport sector. The RMI-NITI Aayog report on electric vehicles provides different transformative scenarios for penetration of electric vehicles. Further, with development of smart cities, electric vehicles penetration could increase significantly. The 4 levels assume different rates of penetration of electric vehicles, level 4 being the one where all new vehicles are electric by 2030. LNG fueled buses are also emerging as a cleaner and operationally cheaper mode of transport, and these are assumed to make an appearance in Tamil Nadu from 2022-23 onwards at increasing penetration rates from Level 1 to 4.

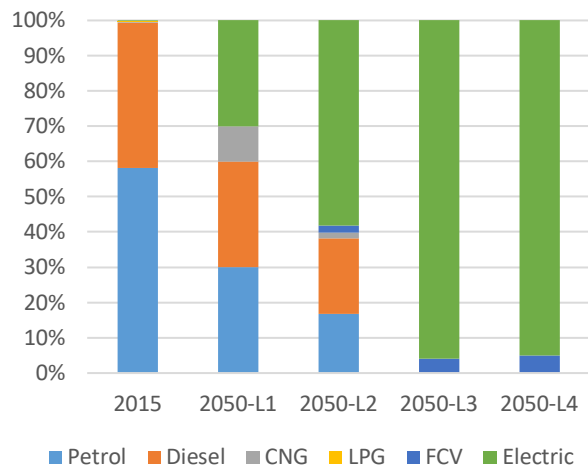
### Level 3

Level 3 assumes further electric vehicle push, increasing penetration of electric cars to 96%, 2-wheelers to 56% in 2050, complete electrification of taxis by 2050, with 4% of cars on fuel cell engines in 2050. LNG fueled buses are assumed to reach 0.1% penetration in 2030, but later give way to electric buses.

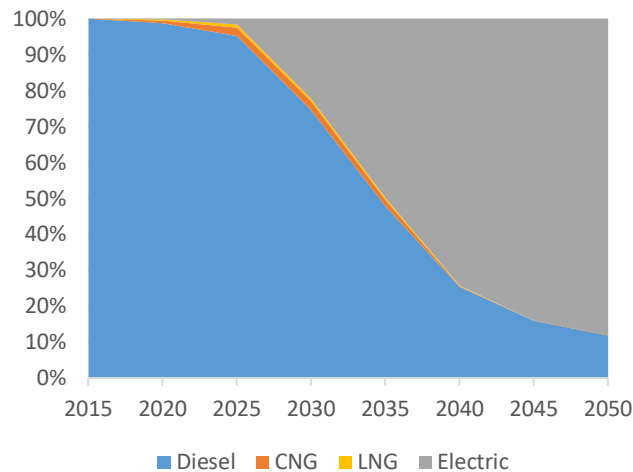
### Level 4

Level 4 assumes that transformative policy program could achieve 95% electrification of buses, 100% of taxis and 3 wheelers in 2050, 95% of cars and 66% two wheelers by 2050, the remaining mainly on fuel cells and CNG. LNG fueled buses are assumed to reach 0.7% penetration in 2030, but later give way to electric buses.

Fuel Mix in Cars



Fuel Mix in buses (Level 4)



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## Freight vehicles

### Level 1

This level assumes no penetration of electric vehicles or LNG possibly due to lack of focused policy initiatives. 100% of HCV and LCV are diesel in 2050.

### Level 2

Level 2 envisages that focused policy decisions by the government could incentivize and promote electric vehicles, thereby increasing the penetration to 2.9% in electric HCV and 0.7% in LCV. LNG fueled trucks are assumed to reach 1.1% penetration in 2035, but later give way to electric HCVs.

Though all freight transport vehicles currently run on diesel, electric and LNG fueled vehicle are the future. Tesla's electric Semi has shown the world that an electric truck can be a reality, though its commercial acceptance is likely to be a long way off in India. Several electric LCVs have also been launched by different manufacturers, and their penetration can be pushed by stricter emission standards or government mandates to convert to electric, so as to curb the increasing problem of pollution, especially in metropolitan cities like Chennai. The 4 levels assume different rates of penetration of electric vehicles. LNG fueled trucks are also emerging as a cleaner and operationally cheaper mode of freight transport, and these are assumed to make an appearance in Tamil Nadu from 2022-23 onwards at increasing penetration rates from Level 1 to 4. LNG is viable only for long-haul transport, so penetration of LNG is assumed only for HCVs.

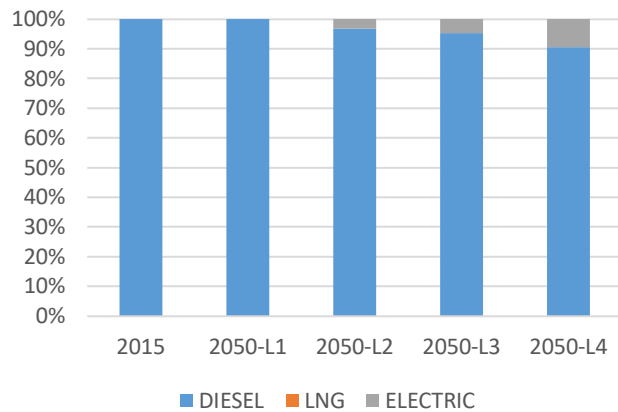
### Level 3

Level 3 assumes further electric vehicle push, increasing penetration of electric HCV to 4.3% and 1.1% in LCV. LNG fueled trucks are assumed to reach 2.3% penetration in 2035, but later give way to electric HCVs.

### Level 4

Level 4 assumes that transformative policy program and could achieve penetration of 8.8% of electric HCVs and 2.2% electric LCVs. LNG fueled trucks are assumed to reach 4.5% penetration in 2035, but later give way to electric HCVs.

Fuel Mix in HCV (2050)



Fuel Mix in HCV (Level 4)

