

#### Future of Electric Vehicles in Road Passenger Mobility of India

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## Future of Electric Vehicles in Road Passenger Mobility of India

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## **Presentation Agenda**

#### 1. Low Carbon National Transport Modeling Assessment

- Model System
- Scenarios Architecture
- 2. National Passenger Transport Demand
- 3. Electric Vehicle (EV) Scenarios
- 4. Conclusions

## Soft-Linked Integrated Model System



## **Transport Scenarios Architecture**



# National Passenger Transport Demand in Scenarios

## **Passenger Demand Estimation**



## Passenger Transport Demand



## Mode Share of Passenger Transport



# **Electric Vehicle Scenarios**

## Electric Vehicles (EV) Scenarios



Future socio economic development along the conventional path: mirrors resource intensive path of developed countries Governments recognize multiple co-benefits of EVs (urban air quality; energy security etc.) and push their penetration

Global 2<sup>o</sup>C climate stabilization target leads to high carbon price; this lowers carbon content of generated electricity

## Scenarios Description: EV & EV\_LCS

#### Electric Vehicle Scenario (EV): Assumptions

- **Domestic policy supports**: Direct capital subsidy, improved charging infrastructure, dedicated lanes, incentives for R&D in power train, batteries and smart grid technologies, quotas for EVs in urban public & goods transport
- **Battery costs** comes down to half of current costs in next 10-15 years: driven by advancements in battery technologies, improvements in battery capacities, declining component costs, and economies of scale in production
- Improved batteries with higher energy density will also help reduce weight of batteries: further pushing down EVs costs
- Limited range per charge put constraints on penetration of cheaper EVs for urban transportation

#### Electric Vehicle plus 2<sup>o</sup>C Scenario (EV\_LCS): Assumptions

- Global 450 ppmv CO<sub>2</sub> equivalent concentration stabilization target
- Carbon Price rise: from US\$ 14/tonne CO2 in 2020 to US\$ 200/tonne CO2 in 2045 (based on outputs from Lucas et. al., 2013)

## EV Share in Personal Motorised Transport



## **Electricity Demand and Supply**



### **Energy Demand : Transport**





### PM 2.5 Emissions



## CO<sub>2</sub> Emissions



## Conclusions

- Early penetration of EV in India would come through 2-wheelers; this would create infrastructures that would facilitate larger vehicles.
- Low carbon transport transition shall deliver Air Quality and Energy Security co-benefits
- Electric Vehicles (EV) by themselves do not contribute to CO<sub>2</sub> mitigation; they may even increase emissions
- Under global 2<sup>o</sup>C stabilization policy, in India, EV contribute sizable mitigation however emissions would be much higher than in 2010

## **Thank You**

#### Low Carbon Transport Project Website :

www.unep.org/transport/lowcarbon