Preliminary Results of Transport Electrification Scenarios in Nepal

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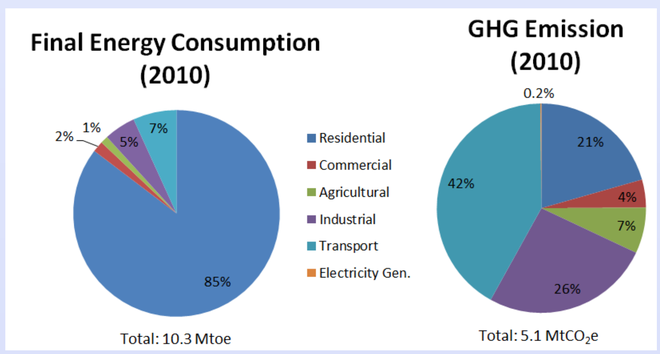
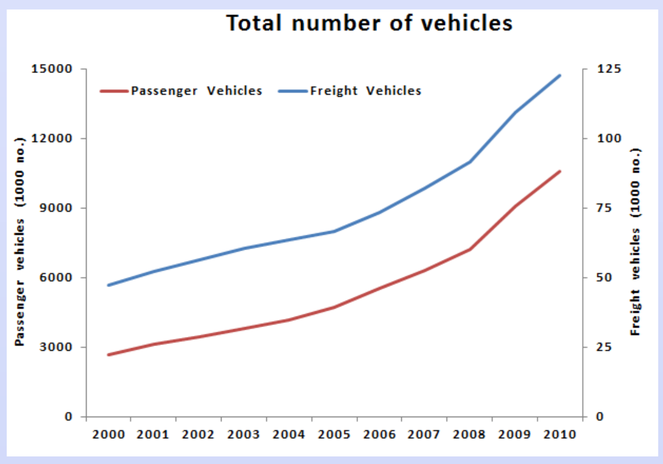
INTRODUCTION

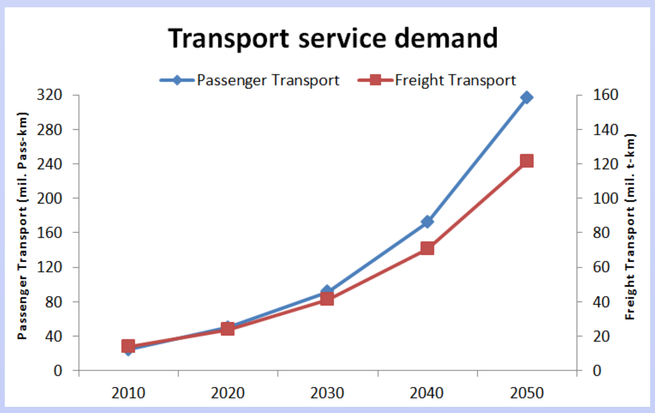
- Transport sector consumed 63.13% of the total oil imports and 15.9% of the total final commercial energy supply in 2010.
- Compound annual growth rate of total number of vehicles was 17% from 2000 tot 2010.
- Transport Sector in Nepal has the second highest share (7%) in total final energy consumption and the highest share (42%) in the total Greenhouse Gas (GHG) emission in 2010.
- Nepal has a technical hydro-electricity potential of (42000 MW) but only 652 MW was utilized in 2010.
- Transport electrification can have a vital role in low carbon development and energy security of Nepal.

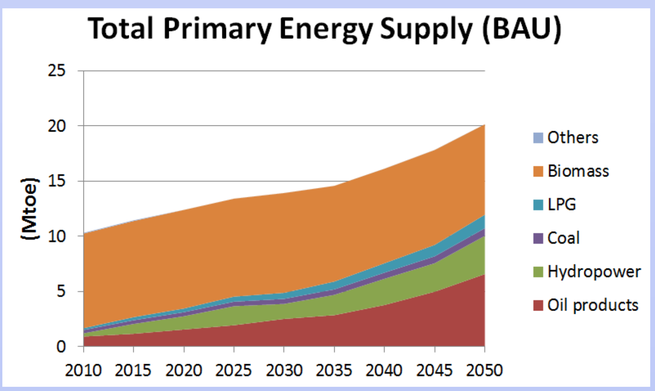


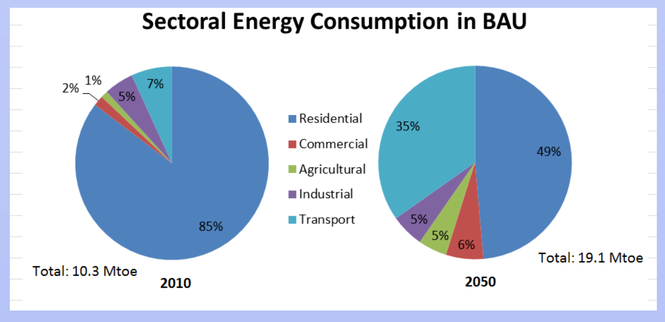


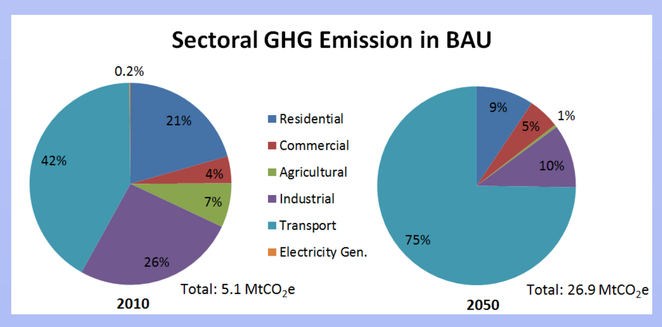
FUTURE TREND

- AIM End-use is used as an analytical tool to develop the model of Nepal.
- Transport Sector will have the second highest share (35%) in total final energy consumption in 2050 in business-as-usual (BAU) Scenario.
- Transport sector will continue to have highest share of GHG emission in 2050





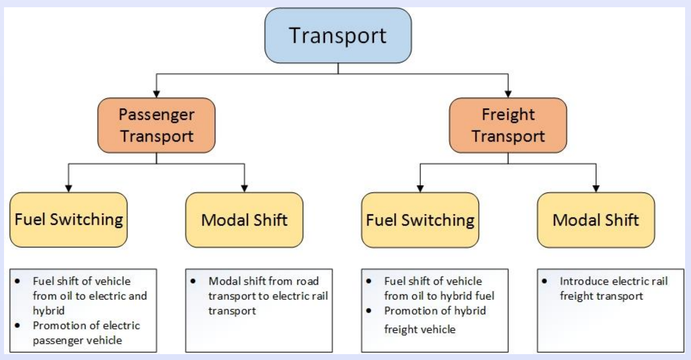




OBJECTIVES

- To analyze the effect of transport sector electrification in total primary energy consumption and GHG emissions in Nepal.

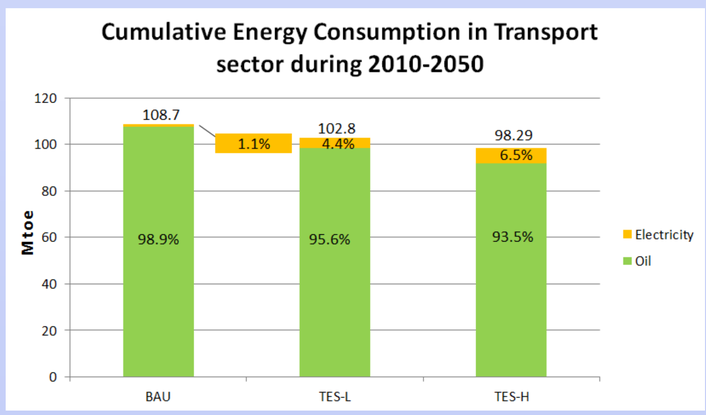
SCENARIOS DESCRIPTION

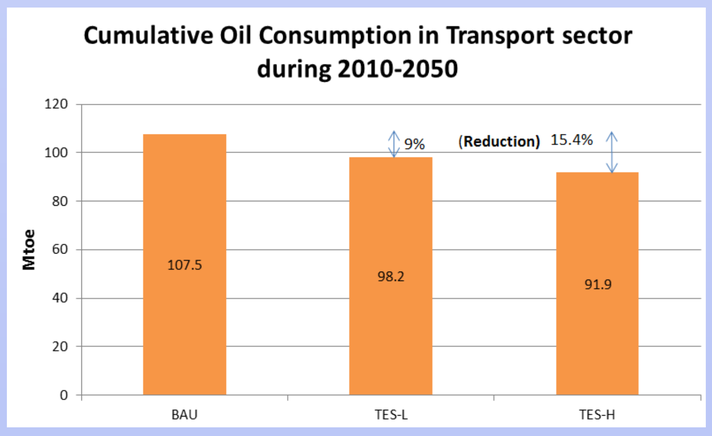


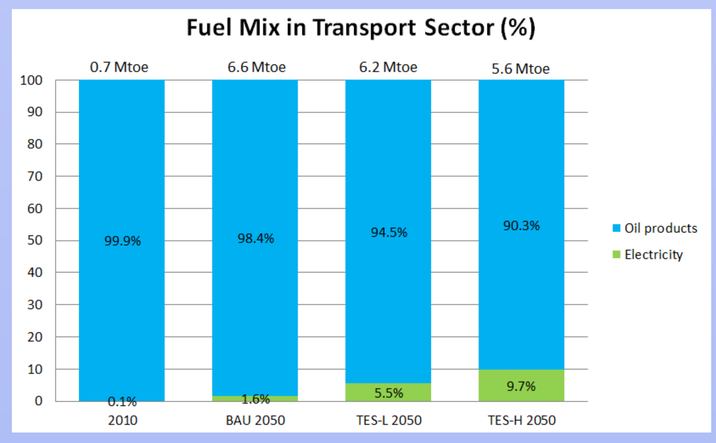
- Two scenarios are compared with the BAU scenario in this study:
  1. Transport Electrification Scenario – Low (TES-L)
  2. Transport Electrification Scenario – High (TES-H)
- **Description of TES-L:**
  - 10 % penetration of electric and hybrid vehicles in road transport and 5% modal shift from road to electric rail transport in 2025
  - increment of electric rail transport from 5% to 10% in 2050
- **Description of TES-H:**
  - 10 % penetration of electric vehicles in road transport and 5% modal shift from road to electric rail transport in 2025
  - increment of electric vehicles in road transport to 20% and increment in electric rail transport from 5% to 10% in 2050

RESULTS AND DISCUSSION

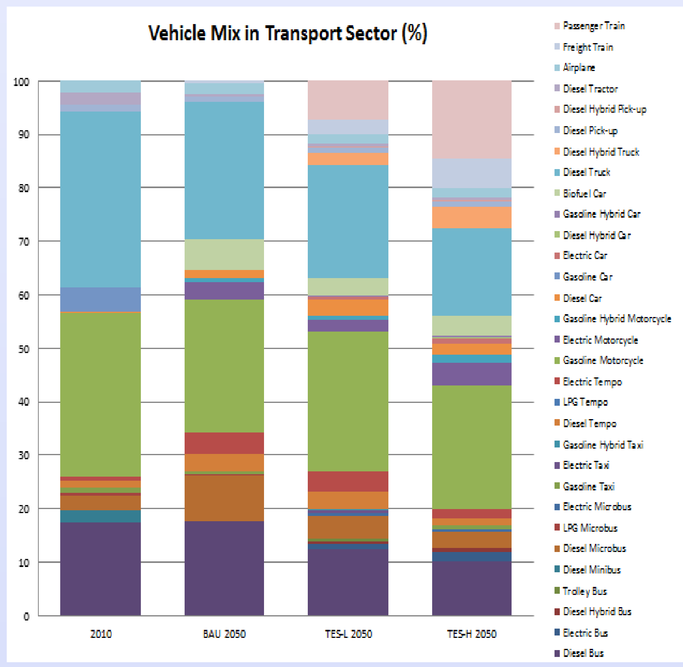
- Penetration of electric and hybrid vehicles along with modal shift decreases the total final energy consumption in transport sector.
- Share of oil products in the total final energy consumption in transport sector decreased from 98.4% in BAU scenario in 2050 to 94.5% and 90.3% in TES-L and TES-H respectively.
- Consumption of oil decreased by 10.8% and 22% in 2050 in TES-L and TES-H scenario.



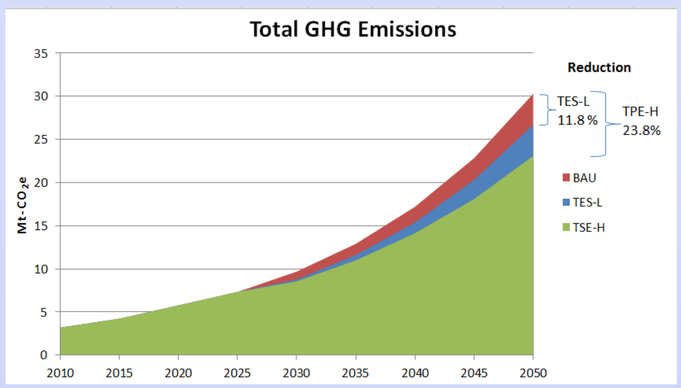


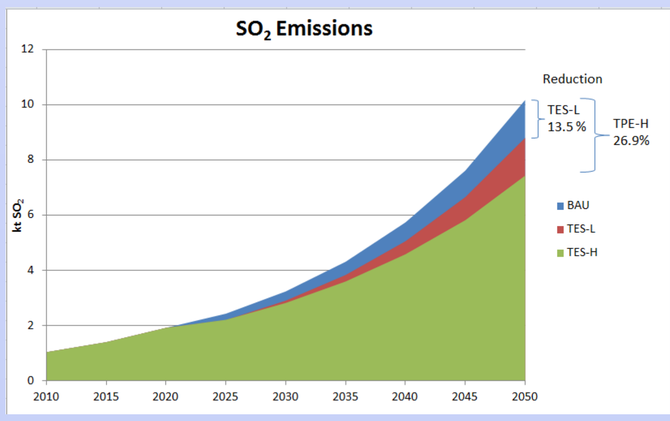


- Cumulative energy consumption in transport decreased by 5.9 millions toe and 10.3 millions toe in TES-L and TES-H scenario.
- Gasoline motorcycle has the highest passenger service share in all the scenarios.



- GHG emission decreased by 11.8% and 23.8% from BAU scenario in TES-L and TES-H scenario.
- SO_2 emission decreased by 13.5% and 26.9% from BAU scenario in TES-L and TES-H scenario.





Scenario	Total cumulative capital cost in 2025-2050 (millions USD)
BAU	68,396
TES-L	97,659
TES-H	123,786

REFERNCES

- Dhakal S (2006) Urban transportation and the Environment in Kathmandu Valley, Nepal . Institute for Global Studies, Hayama.
- Kainuma, M., Matsuoka Y., Morita T. (2003) Climate Policy Assessment- Asia-Pacific Integrated Modeling, Tokyo, Japan.
- NEA (2011) Nepal Electricity Authority Fiscal Year 2010/2011- A year in Review. Kathmandu
- Shakya S.R., Kumar S, Shrestha R.M. (2011) Co-benefits of a carbon tax in Nepal. Mitigation Adaptation Strategy Global Change.
- Shrestha, R.M., Rajbhandari, S., 2010. Energy and environmental implications of carbon emission reduction targets: case of Kathmandu Valley, Nepal. Energy Policy 38 (9), 4818–4827.
- WECS (2010) Energy Synopsis Report 2010. GoN, Kathmandu.