

Preliminary Analysis of Transport Sector Electrification Scenarios in Nepal

Bijay Bahadur Pradhan
Asian Institute of Technology and Management
Nepal

Summary

The overall objective of this research is to analyze the effect of transport electrification in the total primary energy consumption and GHG emissions of Nepal during 2010-2050. Transport sector has the 2nd highest share on total primary energy consumption and highest share on imported oil products. It is the highest GHG emission sector. Since Nepal has a huge potential of hydroelectricity, this study is done to analyze the effect of transport sector electrification in the overall energy consumption. AIM/End-use is used as an analytical tool for this study.

Two scenarios has been compared and compared with the business-as-usual (BAU) scenario. The two scenarios considered are:

1. Transport Electrification Scenario – Low (TES-L)
 - 10 % penetration of electric 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
2. Transport Electrification Scenario – High (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 20 % in electric rail transport from 5% to 10% in 2050

Findings of the study:

1. Penetration of electric and hybrid vehicles along with modal shift decreases the total final energy consumption in transport sector.
2. Cumulative energy consumption in transport decreased by 5.9 million toe and 10.3 million toe in TES-L and TES-H scenario.
3. Share of oil products in the total final energy consumption in transport sector decreased from 98% in BAU scenario in 2050 to 94% and 90% in TES-L and TES-H respectively.
4. Consumption of oil decreased by 10.8% and 22% in 2050 in TES-L and TES-H scenario from the BAU case.
5. GHG emission decreased by 11.8% and 23.8% from BAU scenario in TES-L and TES-H scenario.
6. SO₂ emission decreased by 13.5% and 26.9% from BAU scenario in TES-L and TES-H scenario.