EXPLORING THE GREEN GROWTH & TRANSPORT NEXUS IN INDIA

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Overview

Green growth is integral to foster socio-economic development along with environment sustainability in developing countries. The architecture of the transport system that delivers mobility and accessibility has implications on the national green growth goals. It has vital bearing on energy security, air quality in the cities, public health and the emissions of carbon dioxide (CO_2) which is a major contributor to global climate change. Immediate actions are required to facilitate the transition towards green transport to avoid endemic infrastructural and behavioural lock-ins. Researchers have emphasized the co-benefits (e.g. air pollution related mortality, decrease in road traffic accidents, energy security) of aligning national development and global climate policies during the economic transformation (IPCC, 2007; Ribeiro& De Abreu, 2008; Dubash& Bradley, 2005; Kejun et.al, 2006; Shukla, 2007; La Rovereet.al., 2006).

Therefore there is a need to synergize climate change policies and development strategies to choose "win-win" solutions especially in case of transport sector. We analyze energy, technology and policy transitions in the Indian transport sector for "climate centric" and "green transport" scenarios,as well as estimate the magnitude of co-benefits that can be realized under alternate scenarios.

Methods

We use the integrated modelling framework to understand energy, technology transitions up to the year 2030 for India.The Asia–PacificIntegrated Assessment Model (AIM)/Enduse model is used to assess the impact of various mitigation strategies on transport sector energy consumption and CO_2 emissions. End-use model uses a logistic regression approach to estimate the future sectoral shares and transport demand.The Greenhouse Gases and Air Pollution Interactions and Synergies (GAINS) modelling approach is used to estimate health benefits of reduced air pollution.

The "green transport" scenario envisages decoupling of transport demand and economic growth. Both supply and demand side strategies like reducing the travel need by increasing the penetration of ICT technologies, reducing average travel distance by changing land use pattern, switching to cleaner fuels (biofuels, CNG), improving the efficiency of conventional technologies and increasing investment to expand the public transportation network are considered to facilitate the transitioning towards green transport in India. The "climate centric" scenario, assumes a stringent policy state which includes enforcement of carbon tax and strict restrictions on carbon emissions thereby providing an impetus for earlier adoption of advanced technologies.

Results

CO_2 emissions reduce by 15.6 MtCO2eq (3.7% decline) in climate centric scenario compared to baseline scenario in 2030 In the green transport scenario CO2 emissions are reduced by 23 MtCO2eq in 2020 and 87 MtCO2eq (20.7% decline) in 2030 compared to baseline scenario. The contribution of efficiency improvement strategy is 6.5%, demand reduction 11% and shift to clean fuel is 4% to the overall reduction of emissions in the green transport scenario In the climate centric case, the energy demand reduces by 10 Mtoe (7.6% decline) by 2030 whereas in green transport scenario it reduces by 7.14 Mtoe in 2020 and 27.136 (20.8% decline) Mtoe in 2030 compared to baseline case. The co-benefits like improvement in air quality by reduction in NOx and SOx emissions and reduction in the number of deaths in case of climate centric (~9000 deaths or 1.6% decrease) or green growth (~12000 deaths or 2.2% decrease) scenario can be realized.

Conclusions

Our results show the different trade-offs and benefits of choosing between "climate centric" versus "green growth" policy portfolios. Whereas, carbon emission reduces in the climate centric scenario it requires huge investments for R&D and infrastrature to support penetration of advanced technologies. On the other side, green growth policies lead

to higher health related and local air quality co-benefits while simultaneously reducing the carbon emissions from transport sector. From a policy perspective, pursuing green growth strategies in the transport sector is crucial for sustainble development in India.

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