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Make roads safe

by reducing greenhouse gas emissions from urban transport

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Key messages

- The UN Decade of Action for Road Safety (2011–20) is aiming to reduce road traffic fatalities by 50% by 2020 compared with the 2010 baseline.
- Low carbon transport offers a practical opportunity to safeguard citizens as they go about their daily lives, at the same time as reducing greenhouse gas emissions from urban transport systems.
- Cities can prevent death and injury on their roads as the reduction of greenhouse gas emissions in the urban transport sector is accompanied by a significant reduction in the number of private vehicles and improvements in infrastructure for pedestrians and cyclists.
- For example:
  - In London, congestion charging during peak hours was imposed to reduce the number of vehicles in the city center. Since enforcing the congestion charge, traffic accidents declined by 31% between 2003 and 2006 and carbon dioxide equivalent emissions dropped 16.4%.
  - Within 1 year of the implementation of a bus rapid transit system in Ahmedabad, India, greenhouse gases were reduced by 35%; by the second year fatalities related to traffic accidents were reduced by 65.7%.

Introduction

This paper shares two case studies from cities that have taken action in the transport sector to make their roads safer and have seen the benefits in reduced road fatalities and emissions. With the continued trend towards private motorization, it is estimated that by 2020 road traffic injuries will be the third largest cause of premature deaths worldwide—more than malaria, HIV, or tuberculosis.[1] City investments in low carbon transport structures such as bicycle lanes and pedestrian pathways would promote commuter safety on the roads. Increased safety due to low carbon transport would save lives, property, and money, all of which are impacted by road collisions, reducing gross national product by about 4% worldwide.[2]

As cities in low and middle income countries experience rapid urbanization and motorization, transport solutions need both

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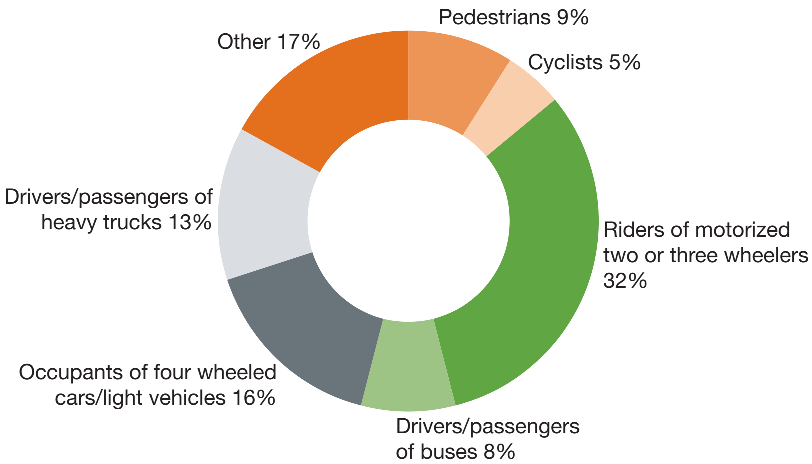
This series of short papers aims to demonstrate how low carbon transport options can support national and local development agendas efficiently.

improved facilities and more effective safety regulations.[3] Currently 92% of road crash fatalities occur in these countries despite the fact that they have only 84% of the total global population and only 53% of the world's total registered vehicle fleet.[4] Low carbon transport is a highly profitable fit to resolve the growth in both road traffic fatalities and carbon emissions caused by the growing demand for transport.[5]

Figure 1 Fatalities by road user category[6]



As the demand for motorized commuting increases in low and middle income countries, nonmotorized transport road users become especially vulnerable to road traffic accidents and require better policymaking in this sector.[7] Developing countries have a relatively high share of pedestrians and cyclists. It is clear that increasing low carbon modes of transport and converting these modes into mainstream transport would not only save carbon emissions but also safeguard citizens' health and wellbeing.

Traffic related crashes and accidents cause heavy losses to life and property, in turn creating costs to the economy. In India in 2010, for example, nearly 134,000 people were killed in traffic accidents.[8] This translates into annual economic losses from road accidents of 3% of India's gross domestic product.[9] Motorized two and three wheelers, often used as an alternative to poor public transport services in low and middle income countries, had the greatest share of casualties, with almost a third of the total number.[10]

Motorized vehicles trigger road crashes. Seventy percent of road traffic accidents involve multiple vehicles, and the number of injuries and fatalities increases with the number of motorized vehicles.[11] Therefore the most effective long term way to reduce road collisions with other vehicles is to reduce the number of motorized vehicles on the road[12] by encouraging alternative modes of transport—cycling, walking, and public transport such as buses, trains, and metros.

Cities can easily reduce the number of traffic accidents by introducing low carbon measures that aim to reduce the volume of motorized traffic. At the same time, investments in low carbon transportation will reduce greenhouse gas emissions and provide measures for adapting to climate change.

Case study
Congestion charge in London, UK

In 2003 London introduced a congestion charging scheme. This requires private car users to pay a daily fee of £11.50 (about US$19.40) once they enter a designated area in the city center between 7 am and 6 pm on weekdays.[13] The aim was to reduce the number of vehicles in central London, reducing congestion, negative environmental impacts of emissions, and the number of road traffic accidents in the city.[14]

About 30% of the total vehicles in central London are exempt from the charge—buses, taxis, two wheelers, and those belonging to disabled persons and residents. Vehicles that emit 75 g/km or less CO_2 and that meet the Euro 5 exhaust emissions standard, as well as hybrid and electric vehicles, are also exempt.[16] Altogether, the changes in traffic volume, vehicle occupancy, traffic flow, and modal share have led to a 31% decrease in injuries from road traffic accidents within the charging zone.[17] And the effect goes beyond the boundaries of the charging zone—London's inner ring road, which immediately surrounds the charging area, experienced a 28% fall in injuries compared with a citywide decrease of only 19%.[18]

Triple dividends[15]—in London's charging zone:

- *traffic accidents down 31% between 2003 and 2006*
- *toxic pollutants (e.g. mono-nitrogen oxides) down 13.4%*
- *particulate matter (PM_{10}) down 15.5%*
- *carbon dioxide equivalent emissions down 16.4%*

In the first year following the introduction of the charging scheme, the decline in traffic volume and increased efficiency of traffic flow translated into a reduction in toxic pollutants within the charging zone—mono-nitrogen oxides by 13.4%; particulate matter (PM_{10}) by 15.5%; and carbon dioxide equivalent (CO_2eq) emission by 16.4%.[19]

Despite its limited scope, the measure has had a significant influence on the traffic volume in London. It has led directly to higher occupancy rates in vehicles[20]—while the total number of trips by individuals increased by 13% between 2001 and 2011, the number of private motorized trips decreased by 13% in the same period. Even on roads surrounding the charging zone, traffic volumes decreased by an average 5% during weekday charging hours compared with the precharging baseline in 2002.[21] As a result, congestion in 2004 and 2005 in charging zones during charging hours was reduced by 26% and 22%, respectively, compared with precharging.[22]

Photo credit: Mariordo59

The shift from private motorized vehicles saw an increase of trips made by bicycle (66.6%) and public transport (50.8%) from 2001 to 2011,[23] in addition to reduction in traffic levels by 10.2% from 2003 to 2013.[24] This development was achieved partly by introducing the charging scheme for central London, and also through promoting nonmotorized transport and public transport with an extension of the existing cycle lane network, bus subsidies, and expanded bus services. The reduction in traffic volume and congestion made bus services more reliable, with excess waiting time within and around the charging zone dropping by 30% in the first year after introducing the charging zone compared with network-wide reductions of 20%.[25] Although there is still some way to go in achieving consistently high air quality in London, the evidence presented demonstrates significant improvements since the congestion charge was introduced. London also continues to work towards ensuring safer streets for cyclists and pedestrians, for example through recent additional investment in dedicated cycle lanes.

Case study
Janmarg bus rapid transit system in Ahmedabad, India

As the seventh largest urban agglomeration in India and the country's third most polluted city in 2005, Ahmedabad had been experiencing rising vehicle emissions as well as increasing traffic accidents on its roads. Projections for the city estimate that Ahmedabad's population will increase from 5.4 million inhabitants in 2001 to 13.2 million by 2041.[26] This rapid population growth is accompanied by massive motorization for travel, with an annual growth rate of 9.2% between 2002 and 2009, and an increasing sprawl of urban settlements.[27] As a result of these developments, an annual increase in fatal traffic accidents by approximately 3,000% is projected, assuming a business as usual scenario.[28] However, an EMBARQ study projects that these alarming numbers can be mitigated: Ahmedabad's bus rapid transit (BRT) could prevent 77% of road deaths by 2040, coupled with annual greenhouse gas reduction by 10 million tons of CO_2eq—an 84% reduction from the baseline.[29]

Photo credit: Meena Kadri

An important component of this low carbon development is the Janmarg[30] BRT system, opened in 2009, which carries over 140,000 passengers per day.[31] Ahmedabad's traditional public bus system, operating since 1945, experienced a steady decline in passengers, resulting in a downward spiral of decreasing revenues, a reduced bus fleet, and an erosion of service quality.[32] Today the Janmarg BRT system offers an affordable, time efficient, low carbon transport option for daily journeys. About 60% of its passengers use the service to travel to and from work, 13% for social travel, and 10% for travel to educational institutions.[33]

Due to the high quality of the BRT system, 13% of Janmarg's new passengers decided to shift from shared vehicles (rickshaws and taxis) and 12% of its passengers switched from their private motorized vehicles.[34] With an increase in operational speed, a decrease in mixed traffic congestion, and savings in fuel consumption due to better technology and efficiency of buses,[35] the BRT system reduced greenhouse gas emissions by 15% in its first year of operation.[36] With the expansion of its network and bus fleet, Janmarg is projected to achieve annual savings of 40.7 million tons of CO_2eq by 2035 compared with the business as usual scenario.[37] This is a saving equivalent to about one third of the city's total CO_2eq emissions.

Ahmedabad's bus rapid transit system is projected to prevent 77% of road deaths by 2040, coupled with annual greenhouse gas emission savings of 10 million tons of CO_2eq—an 84% reduction from the baseline.

Small but strategic changes in the public transport sector through the BRT system have increased the sector's safety performance—level boarding for safer access to buses, closed stations with designated entry and exit points, and more gradual, safer road turns for vehicles at intersections.[38] A survey carried out by CEPT University 2 months after initiation of the system revealed that 79% of passengers questioned felt safe when crossing the road, and 96% thought that the buses were driven safely.[39]

Additional safety measures—separate bicycle lanes, pedestrian crossings, and an adjusted street lighting design—accompany the BRT system, making it safe not only for passengers, but also for other road users.[40] By transforming the bus based public transport system in Ahmedabad into a low carbon system, Janmarg was able to significantly reduce the number of road traffic accidents along its corridors. By 2011 the number of fatalities related to traffic accidents had reduced by 65.7% and overall accidents had declined by 13%.[41]

Conclusion

Reducing greenhouse gas emissions in the urban transport sector makes roads safer for users and prevents injuries and deaths in traffic accidents. Urban solutions that prioritize low carbon transport translate into an increase in road safety across the board for all road users in the area where climate friendly measures are implemented. Surrounding areas also benefit from the spillover effects of reduced traffic volumes. When transforming the urban transport sector into a low carbon system, cities are simultaneously transformed into safer and more livable homes for people.

Notes

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