Electric two-wheelers in the urban mobility system: sustainability and policy options

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DEUTSCHE ZUSAMMENARBEIT

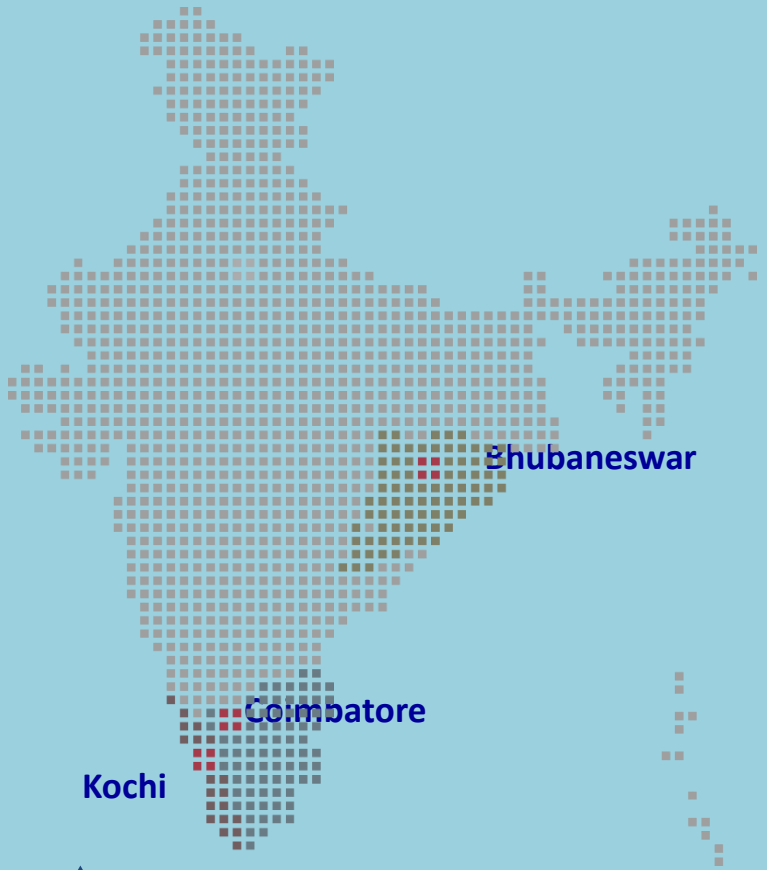
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Integrated Sustainable Urban Transport Systems for Smart Cities (SMART-SUT)

Commissioned by - German Federal Ministry for Economic Cooperation and Development (BMZ)

Lead Partner Ministry- Ministry of Housing and Urban Affairs (MoHUA), Government of India

Lead Executing Agency - Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH



The 3-year long project is jointly implemented by GIZ and the consortium comprising GFA, WRI India and Wuppertal Institute.

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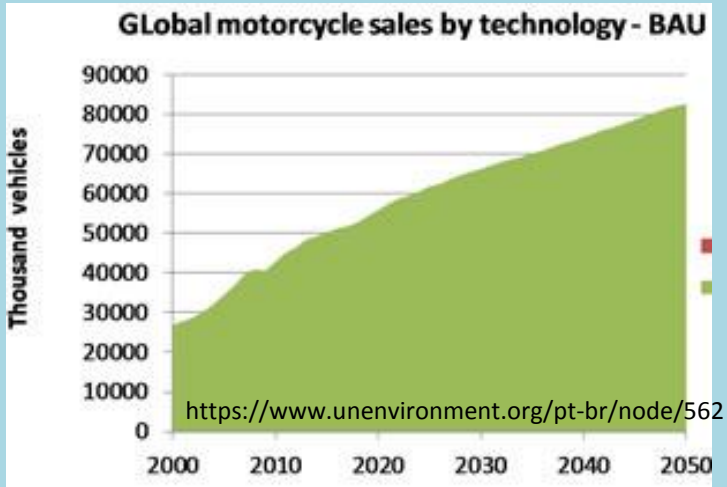
WRI INDIA

Wuppertal Institut

Two-wheelers: large and growing market

- Around 50 million powered two-wheeler sales per annum and rising
- >70% of vehicle fleet in India, Indonesia and Vietnam
- Popular due to economics, flexibility, reliability, ease of parking



Cycling: varying trends

- Zero emissions and noise, active/healthy mode
- Attention increasing in policy and media
- Rising in some cities and countries due to comprehensive policy approach
- Significant potential
- Range of barriers: limited potential for high modal share in many cities, especially for trips >5 km

Can electric two-wheelers (E2W) be the bridge?

Variety of E2W

Speed up to about 25-30 kph

- Pedelec (no throttle)
- E-bike (throttle)

Speed appr. 25 – 45/50 kph

- E-scooter

Speed 45+ kph

- Electric motorcycle

sifted


Elektric.co


Bikes.eu

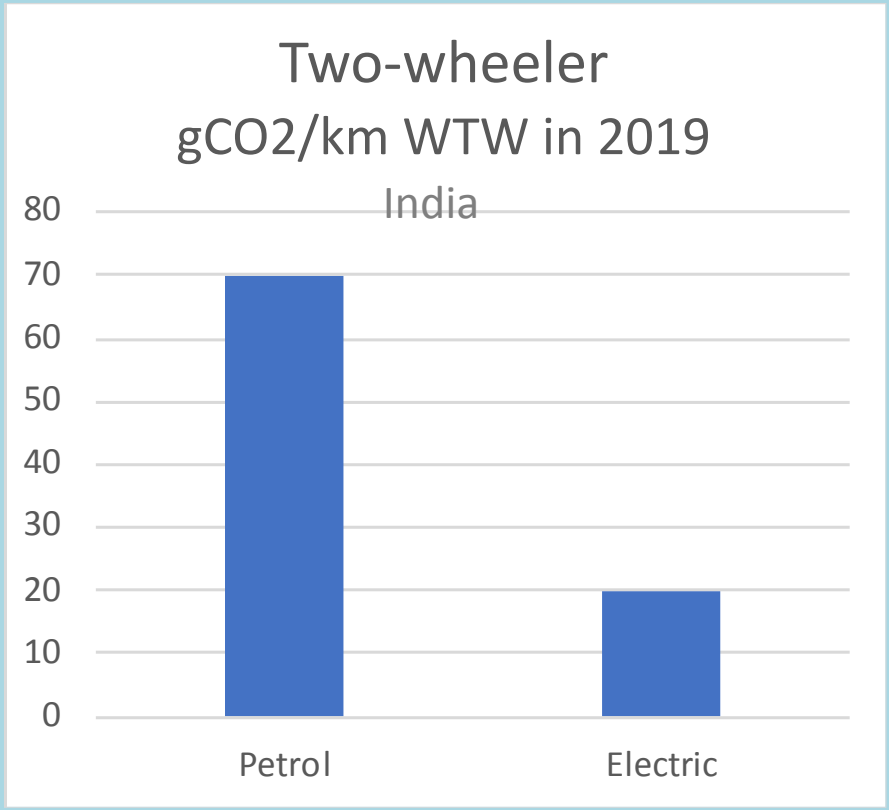

https://www.bankbazaar.com/top-10-e-bikes-india.html

Elektric.co


Gogoro

For a global below 2 degree scenario, emissions of two-wheelers need to be reduced by 95% in 2050

Global Fuel Economy Initiative



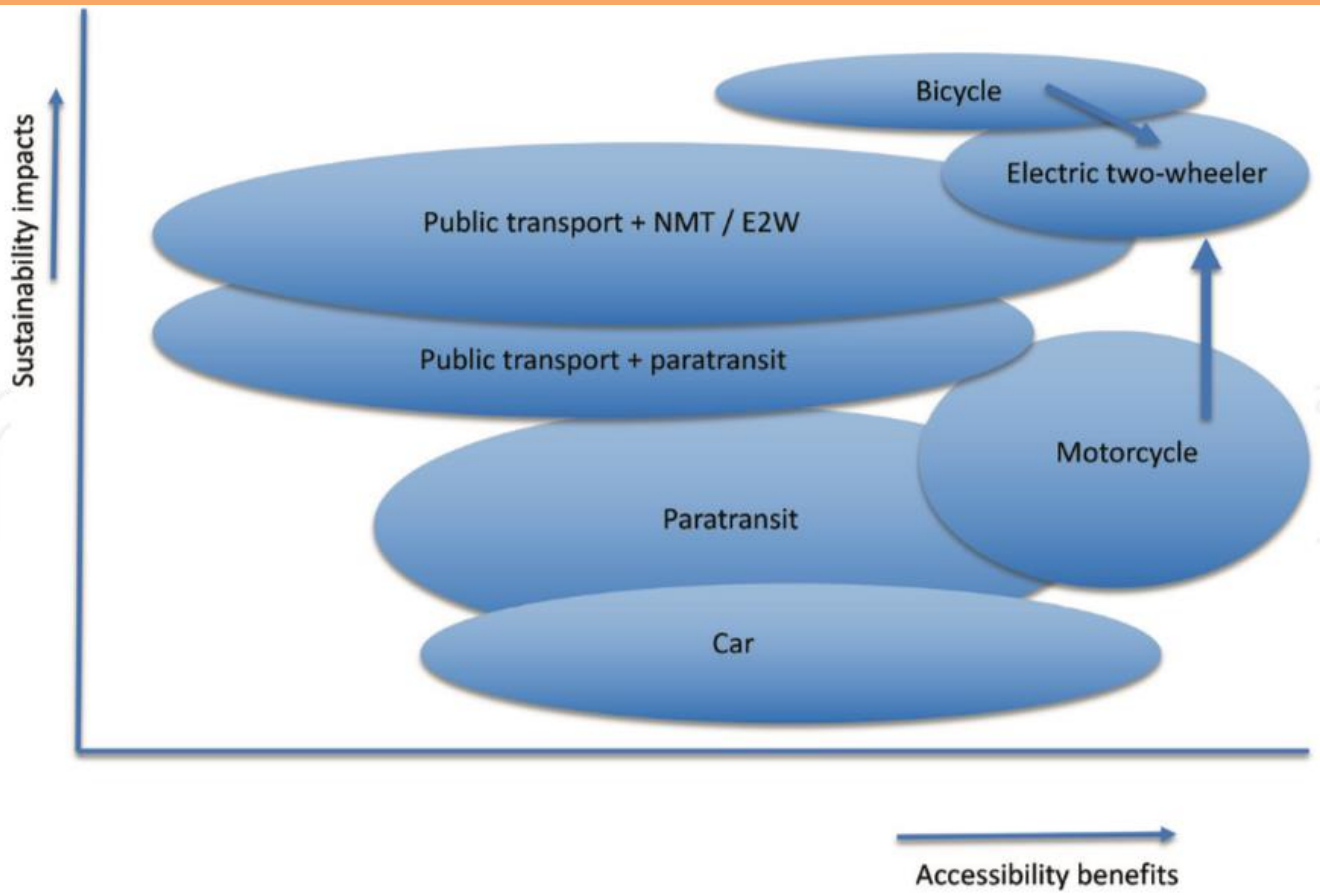
In addition to: zero street-level air pollution

Well-to-wheel emissions (fuel production + combustion)

Source: TEEMP model, applied to Indian vehicles and driving conditions

Grid emission factor: 820 gCO_2/kWh + 10% losses

Sustainability of travel modes



E2W:
Reducing barriers that (potential) cyclists face

Improving sustainability profile of motorised two-wheelers

Source: Bakker (2018) Electric two-wheelers, Sustainable Mobility, and the City

Figure 4. Indicative qualitative assessment of sustainability impacts and accessibility benefits of urban transport modes for trips 2–10 km, on a person-km basis. Accessibility covers travel time including parking and reliability. Sustainability aspects here include equity, road and parking space efficiency, air pollution, CO_2 emissions and fuel consumption, noise and physical activity (see **Table 1**). Larger ovals indicate larger spread in accessibility/sustainability benefits depending on local conditions. All vehicles except E2W are powered by internal combustion engines.

But a large-scale shift won't happen without policy

Bans

Phasing out PTW

Behaviour change

Policy options

Incentives

Support fleets

Road infrastructure

Banning petrol PTW

- Since 1996, Chinese cities have been banning motorcycles, city-wide or in certain areas
- (unintended) result: 200 million+ ebikes, mode share 15-25% in some cities
- Amsterdam air quality policy: only E2W from 2025

Phasing out petrol PTW

- Netherlands climate change agreement:
  - Only zero-emission moped sales by 2025
  - Aiming for only zero-emission scooter sales by 2030
- Taiwan action plan on air pollution: ban sales of non-electric motorcycles by 2035
- Sri Lanka: phase out by 2040
- Proposal in India
- Many countries have announced plans to phase out diesel and petrol vehicles (but unclear if includes two-wheelers)

Incentives

- Many governments providing subsidies, e.g.:
  - Taiwan: 25% subsidy for e-scooter
  - Paris: subsidy up to EUR 500 for e-bike
  - Austria: subsidy up to EUR 500 for e-cargobike
  - Oslo: 25% subsidy for e-cargobikes
  - Scotland: interest-free loan
  - India: FAME II subsidy of INR 10,000 per kWh
- Nepal: reduced vehicle tax, road improvement tax, waived annual tax

Safe + convenient road infrastructure

- Speed reduction, separation of modes in Netherlands
- Japan: with little bicycle infra but safe streets, a shift to ebikes from motorcycles and bicycles is taking place
- Advanced stop boxes in Taiwan
- Micromobility network for small vehicles 10-30 kph

Moped (left) and e-bike (right) on bicycle lane

Behaviour change programme

- Adoption barriers: range anxiety, new technology, unfamiliar with two-wheelers
- Behaviour change campaigns, potentially in combination with incentives and trial option to experience the new mobility option
- Potential higher during important event in life
- Scotland e-bike Grant Fund includes options for free test rides

Support fleets

Enable and support E2W for logistics and scooter sharing

- Delivery vehicles
- Two-wheeler taxis
- E-bike sharing systems at transit stations

https://postandpar...de/en/news/deutsche-post-rolls-out-its-1000-streetscooter-e-bike/

https://www.berlin.de/aktuelles/4788805-958090-emio-heisst-nun-emmy.html

Conclusions

- Local and global rationale to promote electric two-wheelers
  - Accessibility and liveability
  - Climate change
- Different types of E2W can cater to different user groups and may vary by region
- A combination of policies will be required, including limiting alternatives