Electrification of the transport sector: Current status

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The Urban Challenge
The risk of continuing as we go

+2.5 billions
more people
in cities (63%)

EXPECTED FOR 2050

THERE ARE CURRENTLY ABOUT 1700 MILLION VEHICLES IN THE WORLD

WHO, “Global Health Observatory data repository”, 2015
Photo: B137
AND IS EXPECTED TO INCREASE TO 3500 MILLION BY 2050

Sitty and Taft, "What will the global light-duty vehicle fleet look like through 2050?", 2016
Photo: Whitehotpix
WITH THE MAJORITY OF GROWTH OCCURRING IN DEVELOPING ECONOMIES
WHICH LEADS TO WASTED TIME

2-5% of losses in GDP due to vehicular congestion
SPACE LOSSES
7 million premature deaths in the world caused by poor air quality
THE URBAN POTENTIAL
An opportunity to do things right

80% OF GLOBAL GDP IN CITIES

$5 TRILLIONS ANNUAL NEEDS IN INVESTMENT IN INFRASTRUCTURE IN THE NEXT 20 YEARS

75% OF INFRASTRUCTURE STILL TO BE BUILT

Source: OECD Environmental Outlook 2050, World Economic Forum, Infrastructure figure Global Infrastructure Baset. Photo by Andreas/Flickr
HOW DO WE TAKE ADVANTAGE OF THIS OPPORTUNITY?
Avoid
Shift
Improve

Reduce trips
More sustainable modes
Vehicles and fuels
Avoid

Urban development and integration with transport

Shift

Non-motorized transport

Public transport

Improve

Technological improvements
Mejoras tecnológicas
Transporte público
Transporte no motorizado
Desarrollo urbano e integración con transporte

AVOID
SHIFT
IMPROVE

Better access for the most vulnerable
Less death, injuries, illnesses
Reducing energy consumption
The transport sector consumes more than half of the world's oil demand.

To achieve emissions mitigation goals and avoid increasing the global 2 °C by 2050, transport must reduce between 1.7 and 2.5 GtCO2 (10-15% of the total required).
Noise levels from road traffic that are greater than 55 dB $L_{den}$ affect an estimated 125 million people — one in four Europeans.

> 55 dB $L_{den}$

**ANNOYANCE**

- 20 000 000
  - Almost 20 million Europeans are annoyed by environmental noise.

**SLEEP DISTURBANCE**

- 8 000 000
  - At least 8 million Europeans suffer sleep disturbance due to environmental noise.

**HEALTH IMPACTS**

- 43 000
  - Noise pollution causes 43 000 hospital admissions in Europe per year.

**PREMATURE DEATHS**

- 10 000
  - Noise pollution causes hypertension and cardiovascular disease, leading to an estimated 10 000 premature deaths annually in Europe.

ELECTRIC BUSES

- Slow loading
- Fast charge
- Opportunity load

By Robert Frank

WORLD RESOURCES INSTITUTE
THERE ARE ALREADY MORE THAN 300 CITIES THAT HAVE IMPLEMENTED ELECTRIC BUSES IN THEIR PUBLIC TRANSPORT FLEETS

Source: authors
BUT THERE ARE STILL SOME BARRIERS TO THE IMPLEMENTATION OF ELECTRIC FLEETS

- Most expensive infrastructure
- Resistance to change
- Technology performance (eg battery range)
- Hiring models not suitable
WITH FINANCIAL MECHANISMS THAT ADAPT TO NEW TECHNOLOGIES

• Innovating in other ways to pay for the most expensive assets - batteries, buses, infrastructure - using leasing and rental agreements

• Reducing the cost of financing with public guarantees

• Longer concession periods to pay the assets
IN MOST REVIEWED CASES, THERE ARE GRANTS PROVIDED BY NATIONAL OR SUB-NATIONAL GOVERNMENTS

- Through public subsidies
  - CapEx
  - OpEx
  e.g. USA, London

- Tax incentives
  Corporate taxes
  Import tariffs
  VAT
STOCK OF PLUG-IN ELECTRIC AND HYBRID VEHICLES IN THE WORLD

- More than 3 million plug-in electric and hybrid vehicles
- 40% of private vehicles and 90% of buses are in China
- Shenzen, managed to transform the entire fleet to 100% electric in 6 years (16 thousand vehicles)
SHENZHEN, CHINA

World's largest electric fleet
Battery tank and replacement machine

BEIJING, CHINA