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International Energy Agency

3. Urban Transport 1

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Pretoria, 15 October 2019

IEA #energyefficientworld

Training Overview

3. Urban transport 1

Scenario: Demand for mobility in your city/municipality is increasing

Question: What are the ways to increase mobility through more efficient forms of transport?

Training Overview

1. **Energy use, drivers, and impacts of transport**
   - Urban transport issues and impacts
   - A case for action in urban transport
   - Transport Concepts: Avoid, Shift, Improve

15 mins

2. **'Shift' policies**
   - Policy case studies on 'shift'
   - Strategies to shift to more sustainable modes of transport

20 mins

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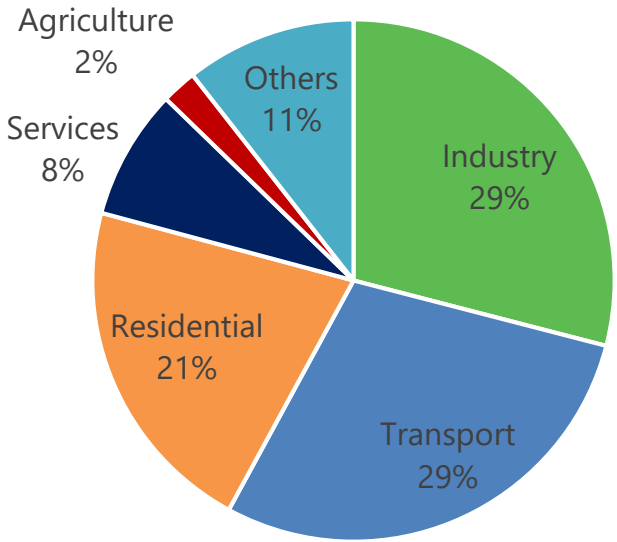
Training Overview

- From the spatial planning perspective of the previous session, we now start looking more closely at mobility in this session.
- We begin with energy use and impacts of transport.
- We then show how mode affects transport energy use, leading to the decomposition which highlights the role of “shift”, noting that the urban planning session covered the “avoid” aspect of transport energy use.
- We use the toolkit classification of “regulatory-economic-information” as a way to guide the discussion in order to (1) be consistent in using frameworks to classify policies, and (2) to aid the understanding of how and when to apply policies

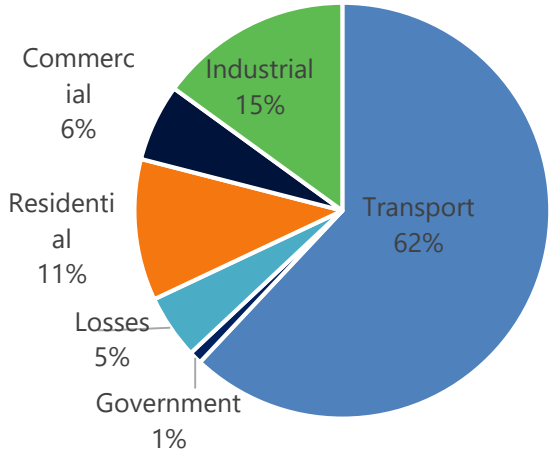
1. Energy use, drivers, and impacts

Why transport energy use?

Share of sectors in the global final energy consumption (9717 mtoe) in 2017



Average energy consumption by sector across South Africa's 8 largest metro areas (2011)



Stockholm Environment Institute (2015*) The contribution of low-carbon cities to South Africa's GHG emissions reduction goals*: https://www.sustainable.org.za/uploads/files/file122.pdf

Transport's share in energy use (29%) is almost as much as industry. In South Africa's 8 largest metro cities, transport takes about 62%

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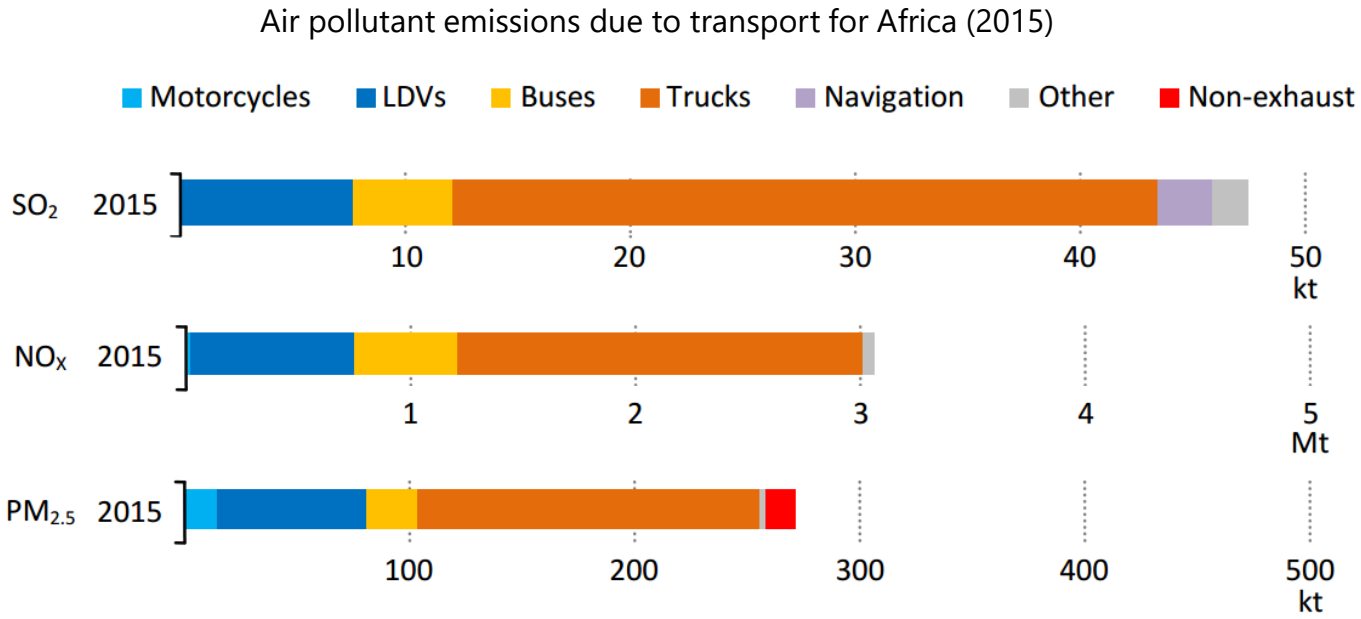
Impacts: Health costs of transport



The transport sector contributes a huge amount to emissions, especially NOx, reaching more than 3Mt in 2015. The Bulk of these are from trucks and LDVs which are often concentrated in urban areas

Source: World Energy Outlook 2016

Impacts: Congestion in African cities 2018

RANK BY FILTER	WORLD RANK	CITY	COUNTRY	CONGESTION LEVEL
1	17	**Cairo**	Egypt	**44%** ↓ 2%
2	90	**Cape Town**	South Africa	**31%** ↓ 1%
3	105	**Johannesburg**	South Africa	**30%** – 0%
4	182	**Pretoria**	South Africa	**25%** ↑ 1%
5	261	**East London**	South Africa	**20%** ↓ 1%
6	308	**Durban**	South Africa	**18%** ↓ 2%
7	391	**Bloemfontein**	South Africa	**12%** – 0%

Source: https://www.tomtom.com/en_gb/traffic-index/ranking/?country=EG,ZA

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Drivers of transport energy use

1. Socio-economic

- Higher population means higher transport energy consumption due to mobility needs of each person
- Higher economic activity and purchasing power means more mobility requirements

2. Physical Structure

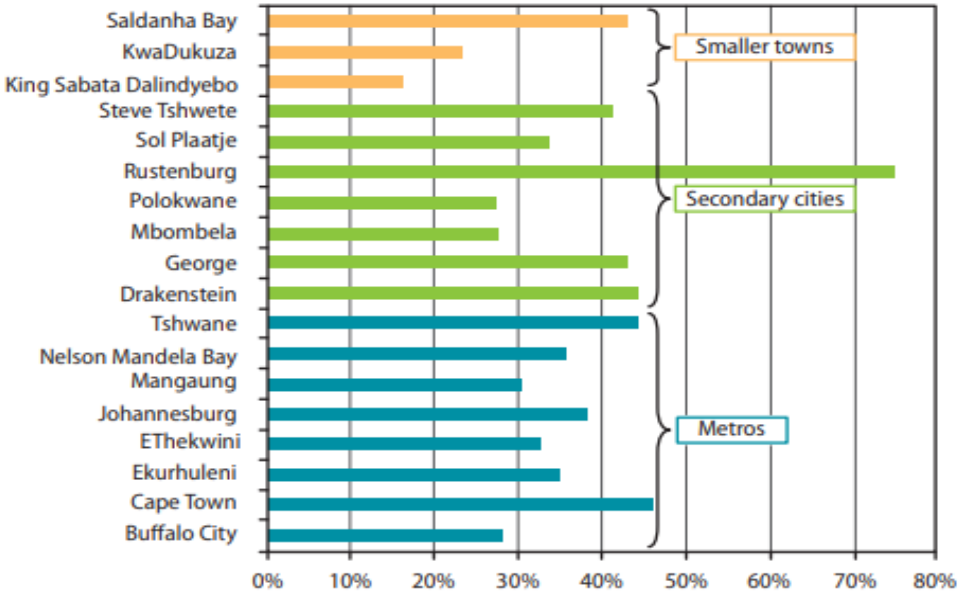
- Distance of key activity centres to residential areas increase mobility needs, greater distances requiring vehicles as opposed to walking/cycling
- In urban areas, this is the urban form and the associated urban sprawl as discussed in the earlier sessions

3. Mode of transport

- Choice of mode of transport (rail, bus, low-duty vehicle) affects the energy use for a given mobility requirement

Drivers: socio-economic

Car ownership in South African urban areas



The percentage of South African urban households that owns cars increased to 32.6% in 2013 from 22.9 % in 2003 with associated urban congestion problems

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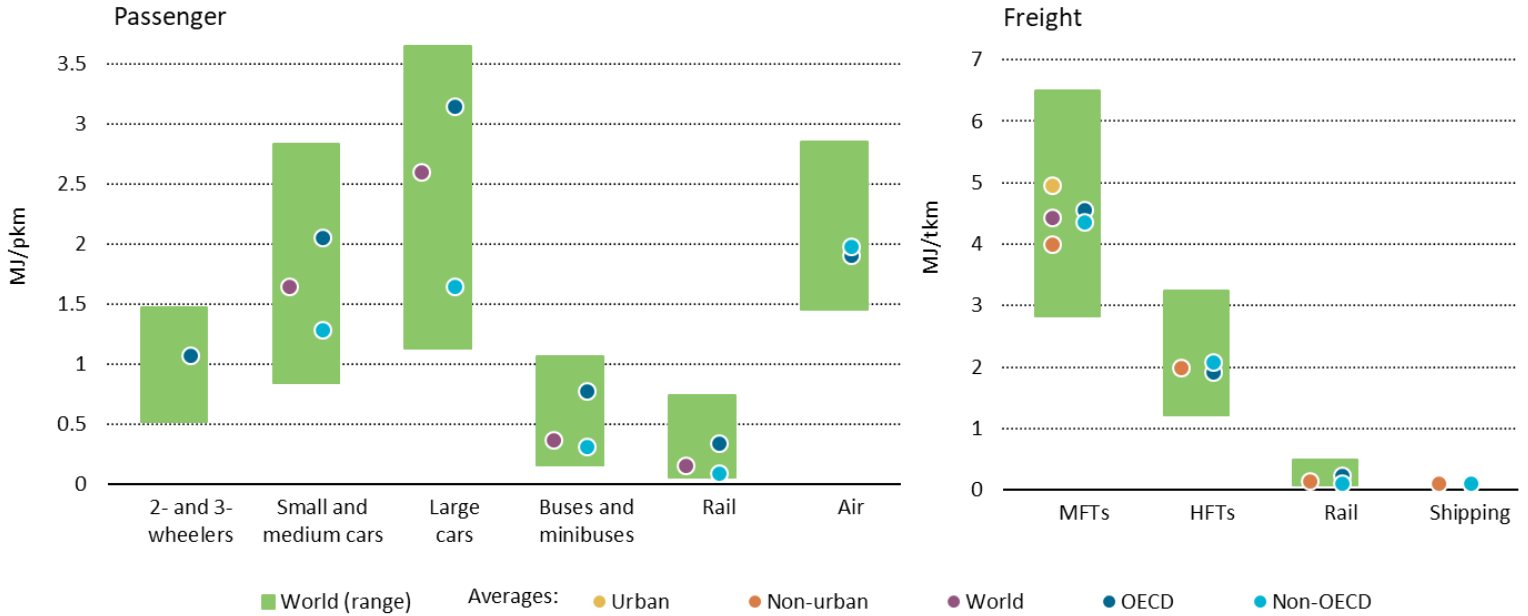
Drivers: mode of transport

Transport energy intensity by mode, in MJ per passenger-kilometer (p-km) and tonne-kilometer (t-km)



The 'mode' of transport influences the energy use for similar activities, measured in passenger-km and tonne-km. Public transport such as rail and buses show higher efficiency

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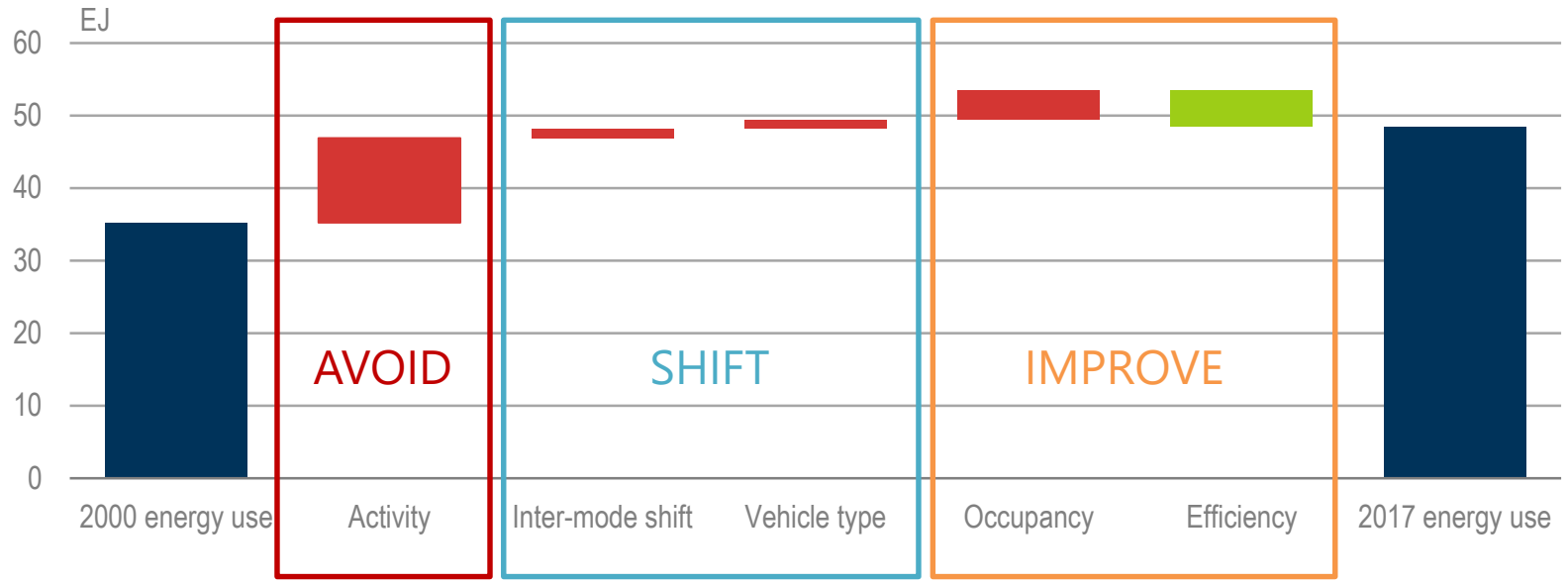
How has transport energy use evolved and what can be done?

Decomposition of passenger transport final energy use, 2000-17



Global transport activity is rising and behaviours are shifting to less efficient practices.
Strategies to address this could be classified as Avoid, Shift, and Improve

Source: Energy Efficiency 2018

2. ‘Shift’ Policies

‘Shift’ Policies

Make more efficient modes of transport…

Regulatory / Institutional

- Available to use

Economic

- Cheaper to use

Information / Capacity

- Known
- Popular
- Easy to understand

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‘Shift’ Policies: Regulatory / Institutional

Regulatory / Institutional

- Available to use

- **Provide** more sustainable public transport
  - Increase levels of mass transit
- **“Shared space”** sustainable modes (cycling, walking, pedicabs) alongside vehicle transport
- **Provide infrastructure for seamless integration** between different sustainable modes (bus, BRT, rail, cycling, walking). For example:
  - Cycle parking areas next to stations
  - Signposted route paths

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‘Shift’ Policies: Regulatory / Institutional

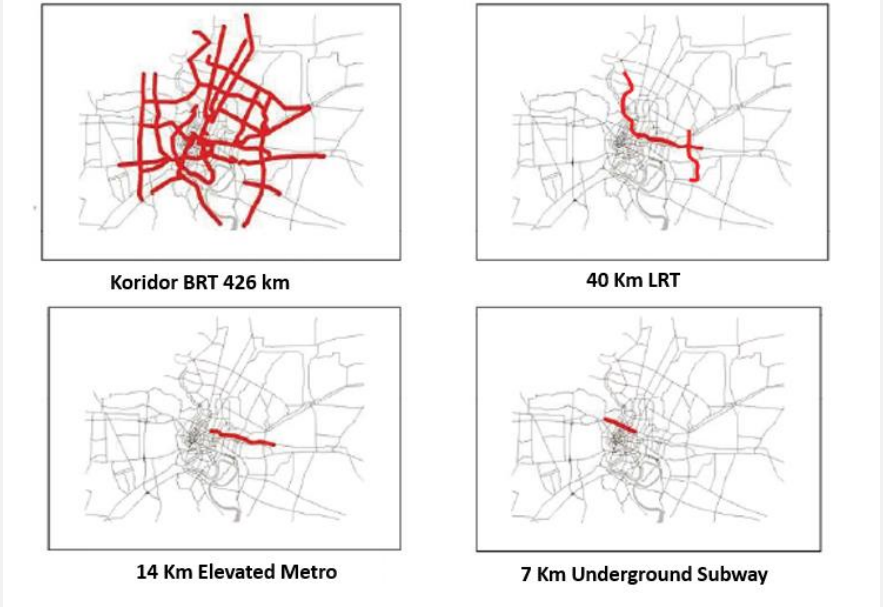
Regulatory / Institutional

- Available to use

- **Provide** more sustainable public transport.

Case study: BRT system in Jakarta

- Analysed public transport options considering the resources of an emerging economy
- What can you build with $1 billion



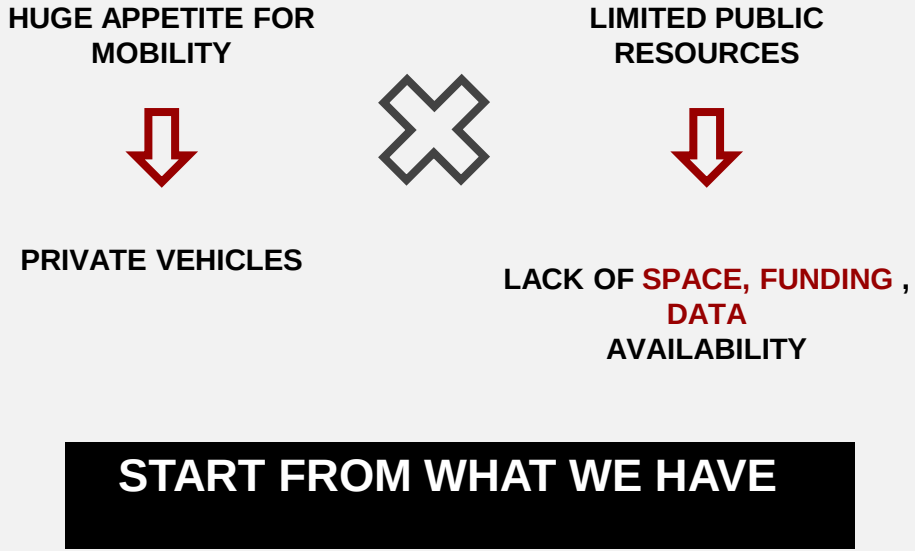
Adapted from ITDP 2018 IEA EETW Jakarta

‘Shift’ Policies: Regulatory / Institutional

Regulatory / Institutional

- Available to use

- (1/3) Analyse limitations of Jakarta



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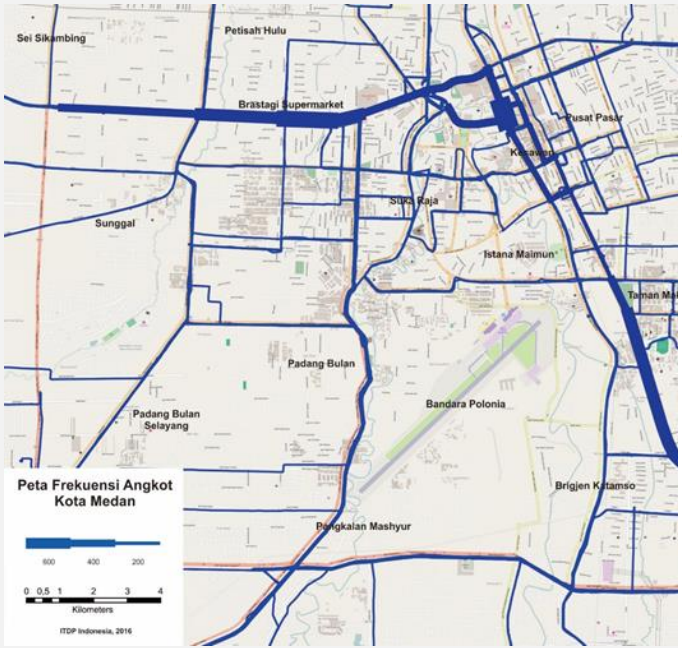
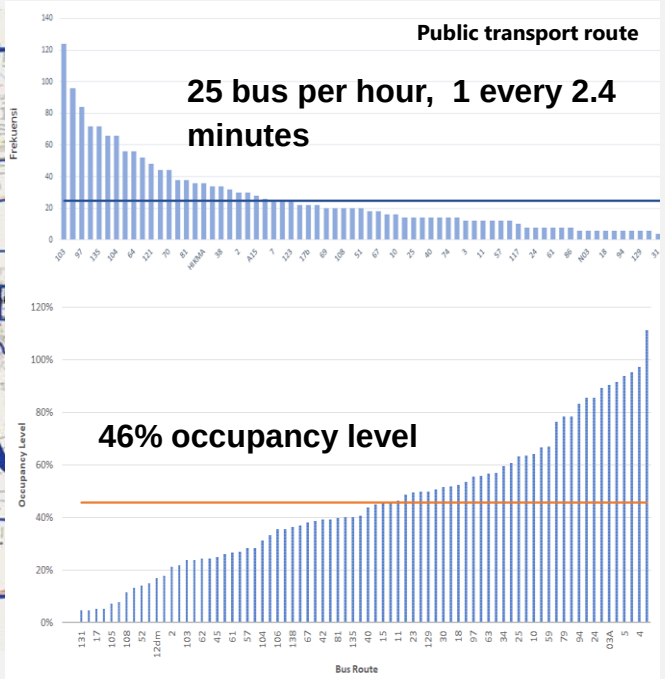
‘Shift’ Policies: Regulatory / Institutional

Regulatory / Institutional

- Available to use

- (2/3) measure based on existing frequency and occupancy





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‘Shift’ Policies: Regulatory / Institutional

Regulatory / Institutional

- Available to use

- (3/3) proposed BRT line and execution

Adapted from ITDP 2018 IEA EETW Jakarta

‘Shift’ Policies: Regulatory / Institutional

Regulatory / Institutional

- Available to use

- **“Shared spaced”** sustainable modes (cycling, walking, pedicabs) alongside vehicle transport

Case study: New York Time Square

- Did not worsen traffic congestion
- Allowed higher activity around the area for less transport energy use
- Additional benefits of economic activity and safer streets

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‘Shift’ Policies: Regulatory / Institutional

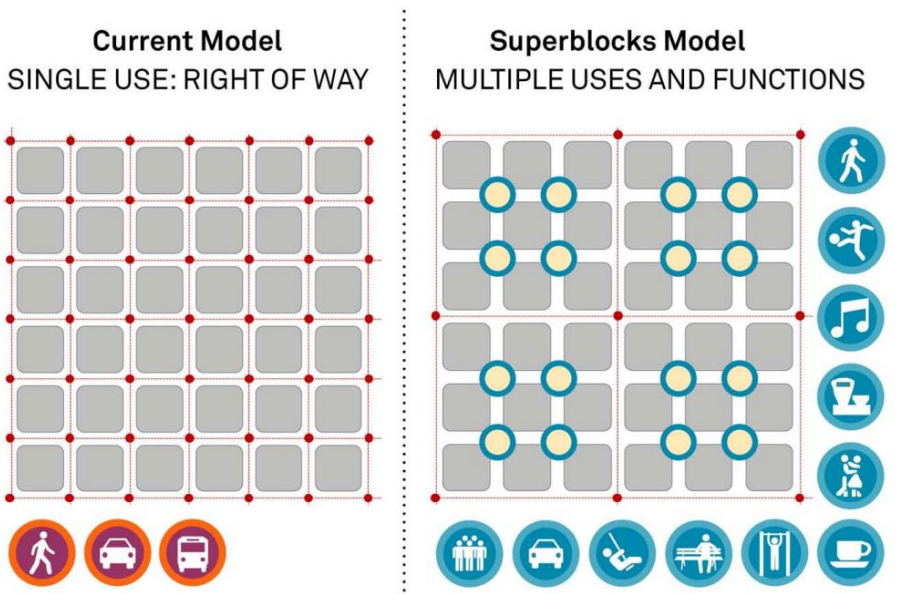
Regulatory / Institutional

- Available to use

- **“Shared space”** sustainable modes (cycling, walking, pedicabs) alongside vehicle transport

Case study: Barcelona’s super blocks

- Taking back some of the road to encourage walking and bicycles



Source: Barcelona Urban Mobility Plan

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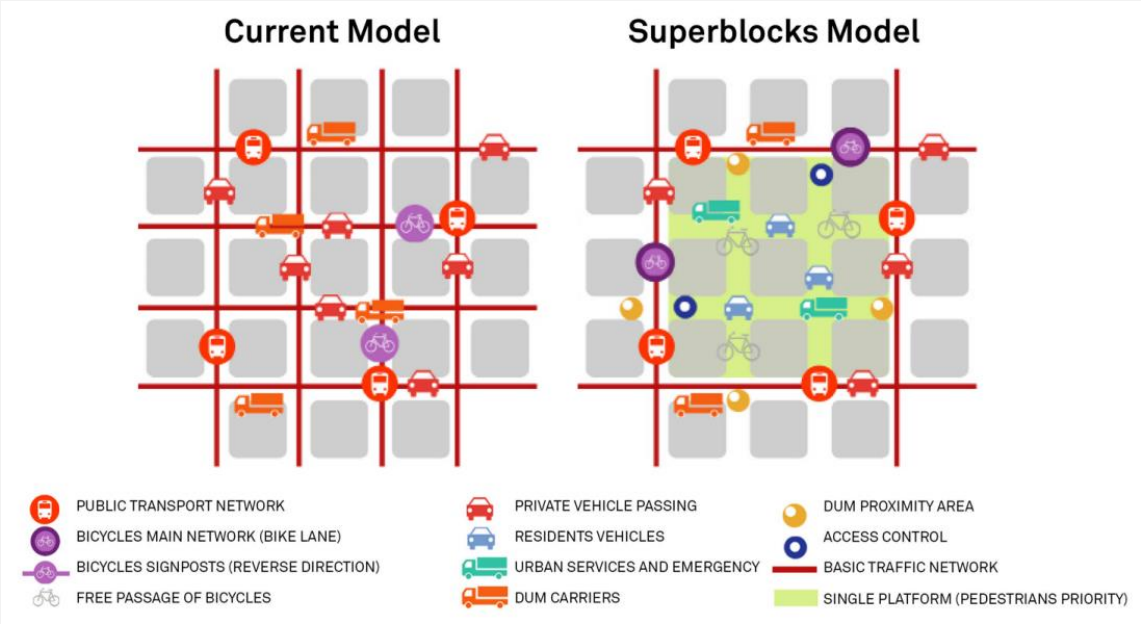
‘Shift’ Policies: Regulatory / Institutional

Regulatory / Institutional

- Available to use

- Superblocks create more space for walking and cycling and integrating it with public transport to increase sustainable transport use



Source: Barcelona Urban Mobility Plan

‘Shift’ Policies : Economic

Economic

- Cheaper to use

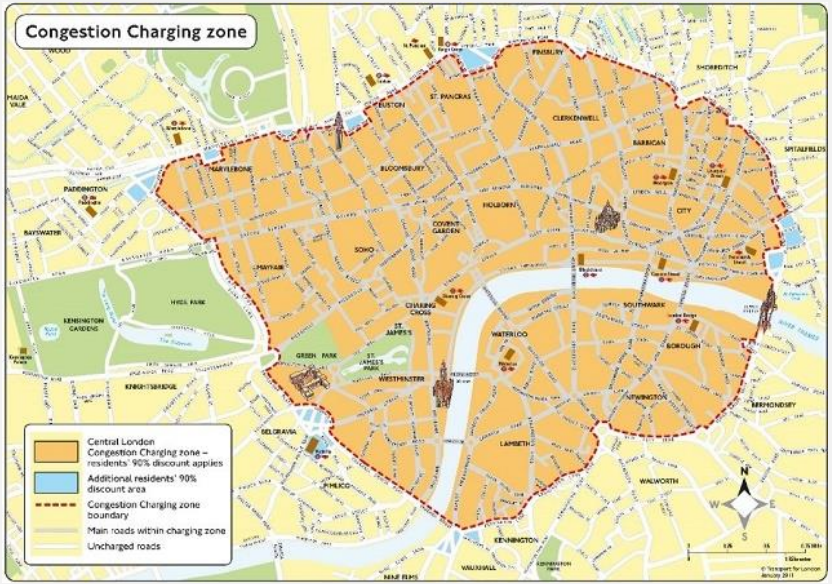
- **Congestion pricing**
- **Road pricing** to reflect environmental cost of road use
- **Parking charges –** higher costs reduce car modal share
- **Taxes** on private vehicle use, or **subsidies** for public transport investment

‘Shift’ Policies : Economic

Economic

- Cheaper to use

- **Congestion pricing.** Case Study: London



Impacts:

Traffic levels ↓**20%** (75,000 vehicles)

Congestion reduction in zone during charging hours: ↓**30%**

Pedal cycle trips across London: ↑**83%**

NOx ↓**13%**

PM 10 ↓**15%**

Source: https://www.c40.org/case_studies/londons-congestion-charge-cuts-co2-emissions-by-16

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‘Shift’ Policies : Economic

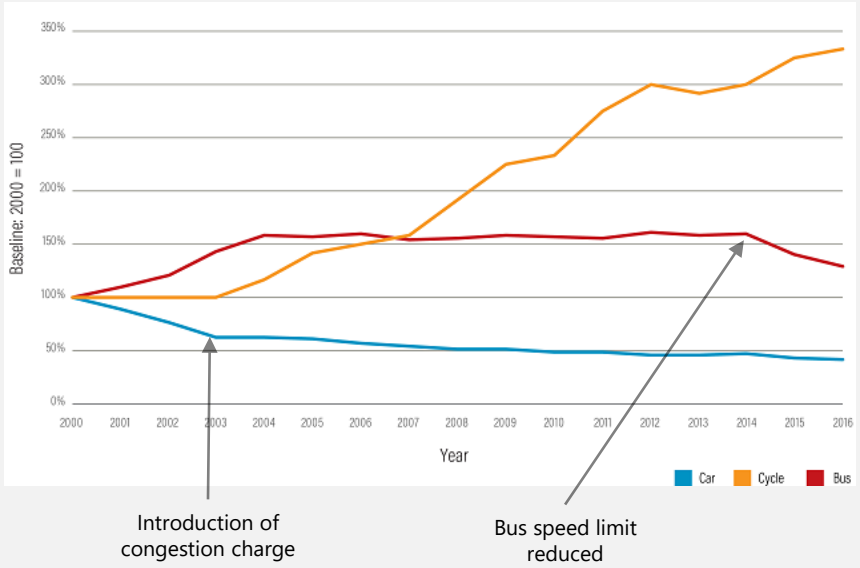
Economic

- Cheaper to use

- **Congestion pricing.** Case Study: London

- What worked:
  - Centralised institutional structure and **strong political will**
  - Extensive **public communication and consultation**
  - Improved public **transport and fare integration**

Change in Surface Transport Shares, London 2000-2016



Source: http://thecityfix.com/blog/toward-car-free-cities-3-reasons-londons-congestion-charge-working-shiyong-qiu-thet-hein-tun-dario-hidalgo/

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‘Shift’ Policies : Economic

Economic

- Cheaper to use

- **Road pricing.** Case Study: Singapore ERP

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‘Shift’ Policies : Economic

Economic

- Cheaper to use

- **Road pricing.** Case Study: Singapore ERP

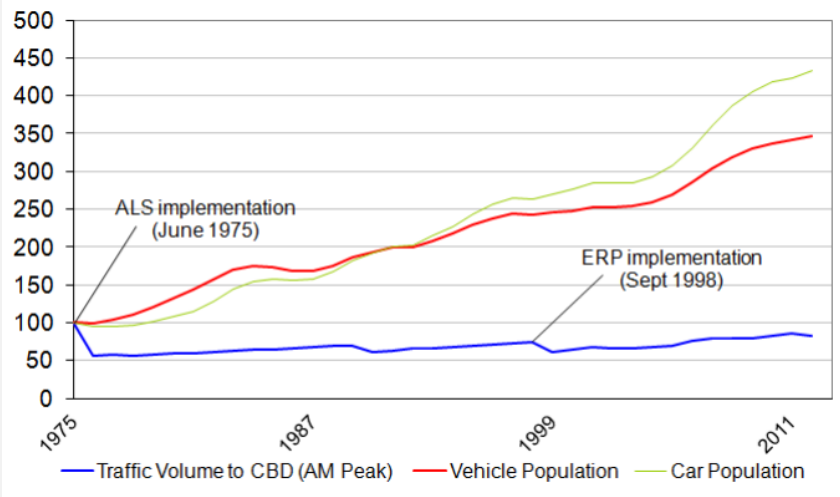
- The Electronic Road Pricing (ERP) Scheme has been a key policy tool in reducing and keeping low sharp peak traffic volumes

Impacts:

Area Licensing Scheme (ALS): ↓ **29%**
ERP: ↓ **7%**

CO2

↓ **2,010 ktonnes**



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‘Shift’ Policies : Information

Information / Capacity

- Known
- Popular
- Easy to understand

- **Promote** sustainable urban transport (SUT) and build it as a superior brand to private car use
- **Nudge** behaviour towards SUT
- **Provide easy accessible information** on SUT to integrate informal transport services

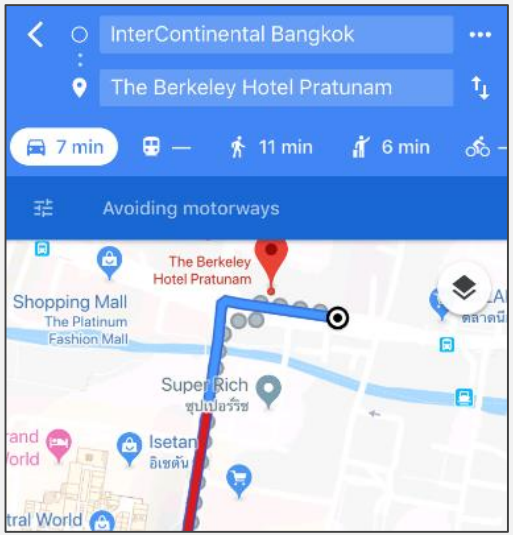
‘Shift’ Policies : Information

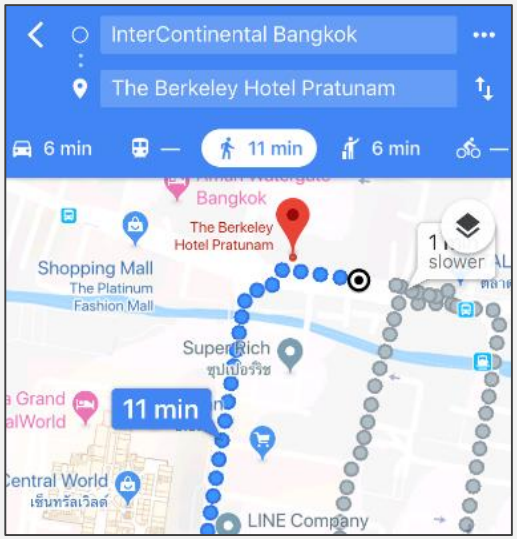
Information / Capacity

- Known
- Popular
- Easy to understand

- **Nudge** behaviour towards SUT

Making walking option the default





‘Shift’ Policies : Information

Information / Capacity

- Known
- Popular
- Easy to understand

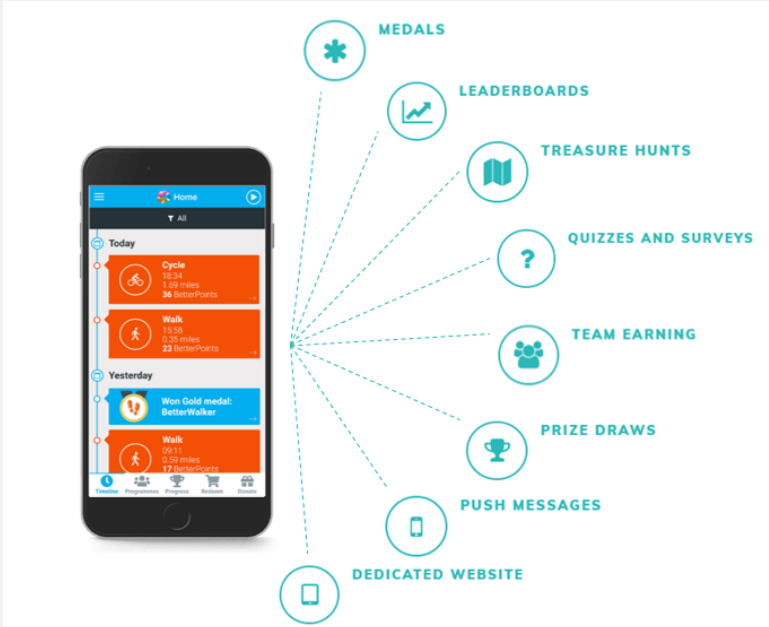
- **Nudge** behaviour towards SUT. Ex: Gamification for behaviour change

Case Study: Digitalisation for behaviour change: BetterPoint technology

- deliver incentivised behavioural change programmes through a smartphone app

Impacts of shift to sustainable transit (over 6 months):

- Bologna, Italy:
  711 tonnes CO2 emissions saved
- Sutton Council, UK:
  7.25 tonnes CO2 emissions saved



Source: Adapted from betterpoints website

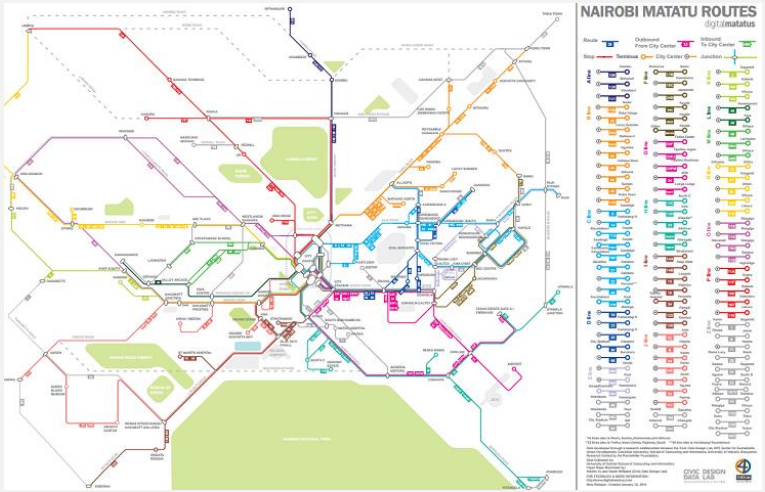
‘Shift’ Policies : Information

Information / Capacity

- Known
- Popular
- Easy to understand

- **Provide easy accessible information** on SUT to integrate informal transport services

Streamlined routes – mapping the informal system
- smartphones and GPS to document routes and translate data into info for traffic Apps



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‘Shift’ Policies : Information

Information / Capacity

- Known
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- **Provide easy accessible information** on SUT to integrate informal transport services

“**Apping**” – where informal transport options can be hailed with an app

- request EZGo tuk tuks via PassApp in Cambodia

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‘Shift’ Policies : Information

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- Known
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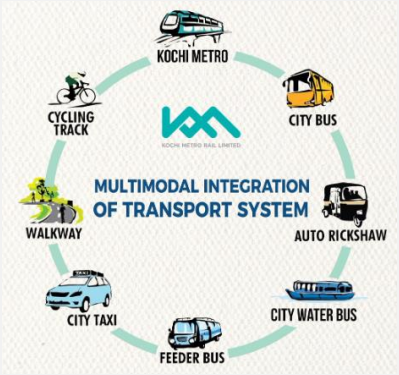
- **Provide easy accessible information** on SUT to integrate informal transport services

Case Study: Kochi India
- Integration of different transport services, both formal and informal



Source http://urbanmobilityindia.in/Upload/Conference/d3957046-bcb5-4778-bbf7-947d8f0a8d8b.pdf

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‘Shift’ Policies : Information

Information / Capacity

- Known
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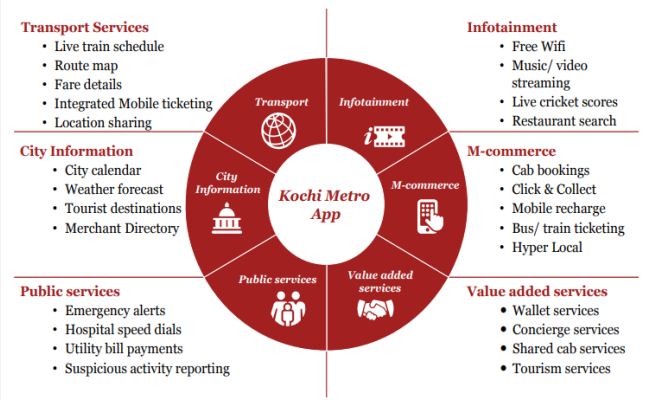
- **Provide easy accessible information** on SUT to integrate informal transport services

Case Study: Kochi India

- Included services such as e-payment in order to further increase comfort and usability
- App then allows easier nudging towards sustainable urban transport means



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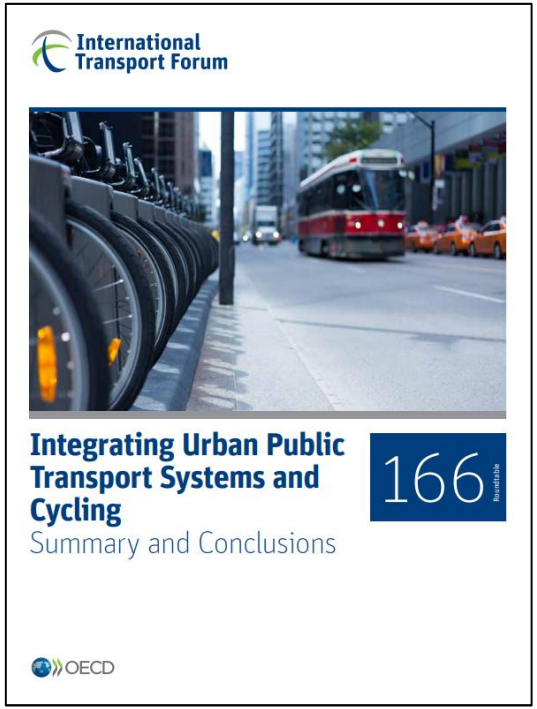
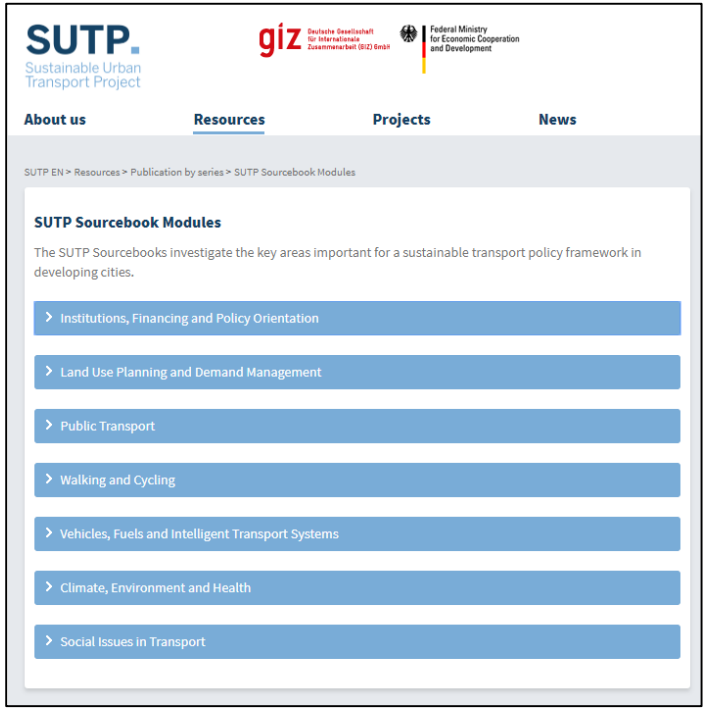
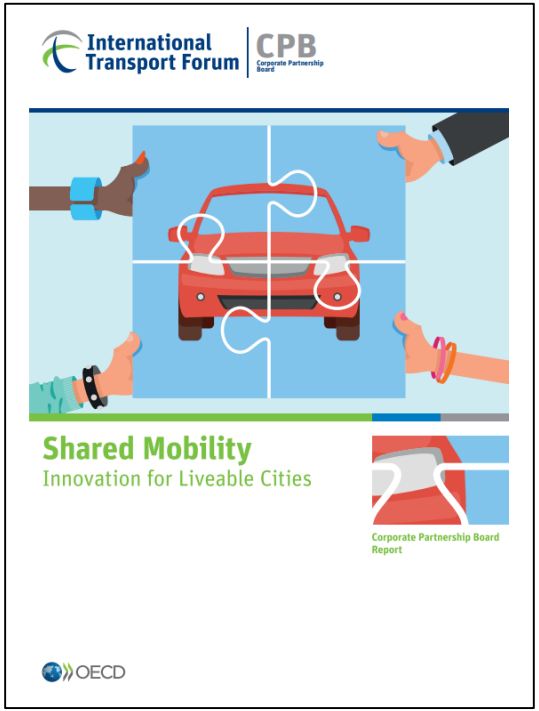


https://www.itf-oecd.org/sites/default/files/docs/integrating-urban-public-transport-systems-cycling-roundtable-summary_0.pdf



https://www.sutp.org/en/resources/publications-by-topic/sutp-sourcebook-modules.html



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