

MPDD Chair Seminar, 24 June 2021

Mobility, its dynamics and its carbon content: the reasons for difficult governance

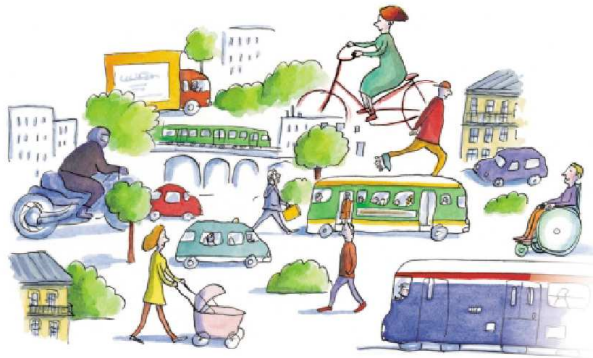


Fabien LEURENT



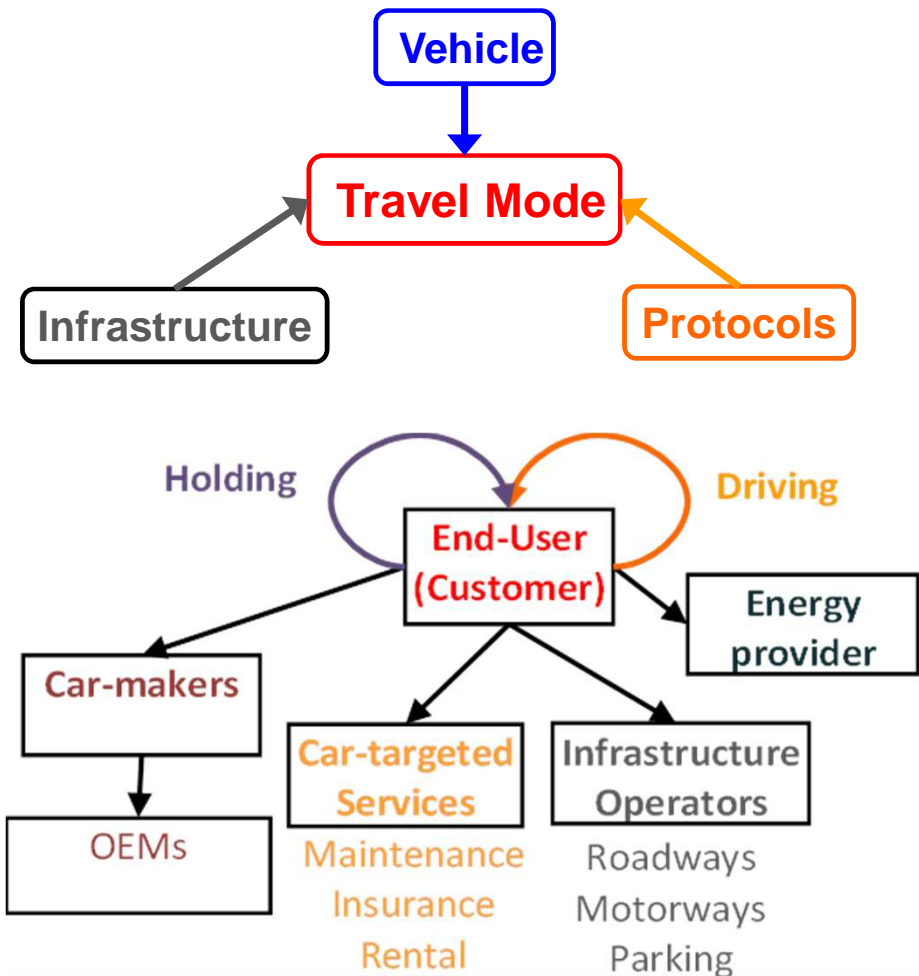
24 JUNE 2021

The Mobility World: Diversity & Complexity



- The diversity of

- Functions: passengers, freight, utilities
- People & mobility needs
- Travel situations in space
- Travel modes
- Mobility services
- Vehicle technologies
- Supply players



Overview

- Environmental and social issues

- Mobility as a large contributor to carbon emissions
- Attempt to increase the carbon tax on fuels in France, 2019 => the « Gilets jaunes » crisis

- Objectives

- To reveal SPECIFIC features of mobility systems
- To identify « Handles » and « Lever arms » for public action

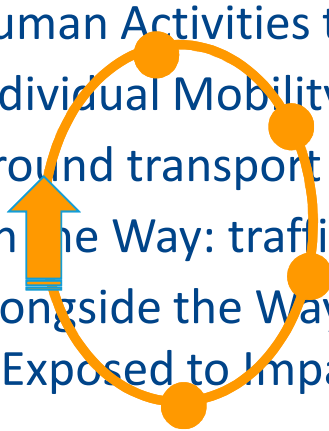
- Roadmap



SPACE

- Geographical Space

- Human Activities take place in specific slices, they are located in space
- Individual Mobility: trips from origins to destinations to perform one's activities
- Ground transport (road / rail): path along the network infrastructure
- On the Way: traffic composition and impacts
- Alongside the Way: local Population is Exposed to Impacts



Economic system effects:

- Density economies
- Agglomeration economies
- Access benefits
- Scale economies

Urbanization as a two-sided circle

Public action

Land-Use Planning

- Activity location & Amenities in space

Mobility Tools

- Vehicle types & Access rights
- Subscription to mob. services

Demand Management

- Enterprise mobility plans
- Mobility credits

Parking Management

- On-street & Off-street & In-buildings

Traffic Management Schemes

- Multimodal "Right-of-Way"

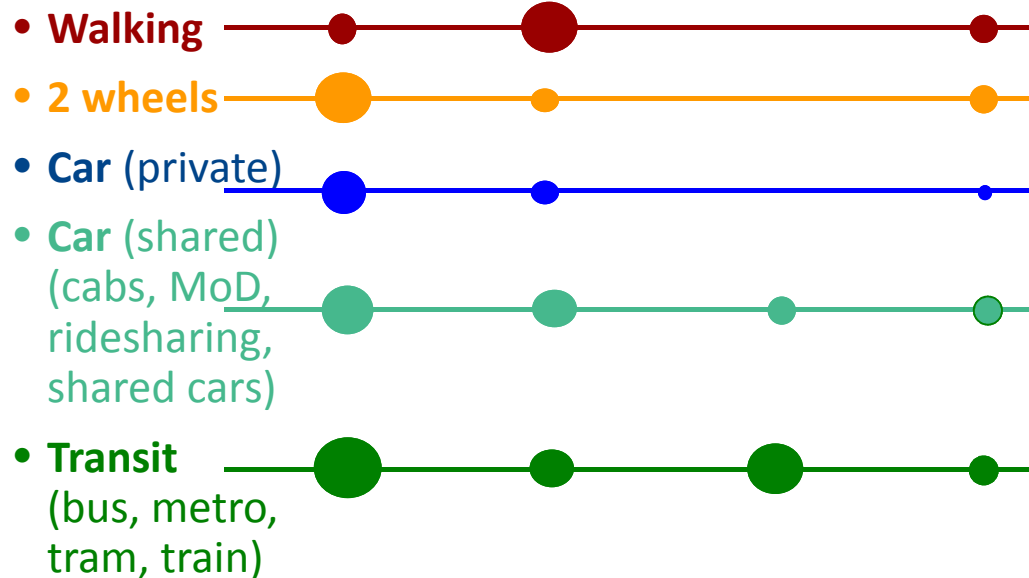
Transport Planning

- Network infrastructure
- Transit services

TIME

$$\text{Trip Time} = \text{Run} + \text{Access} + \text{Wait} + \text{Manage}$$

Travel modes

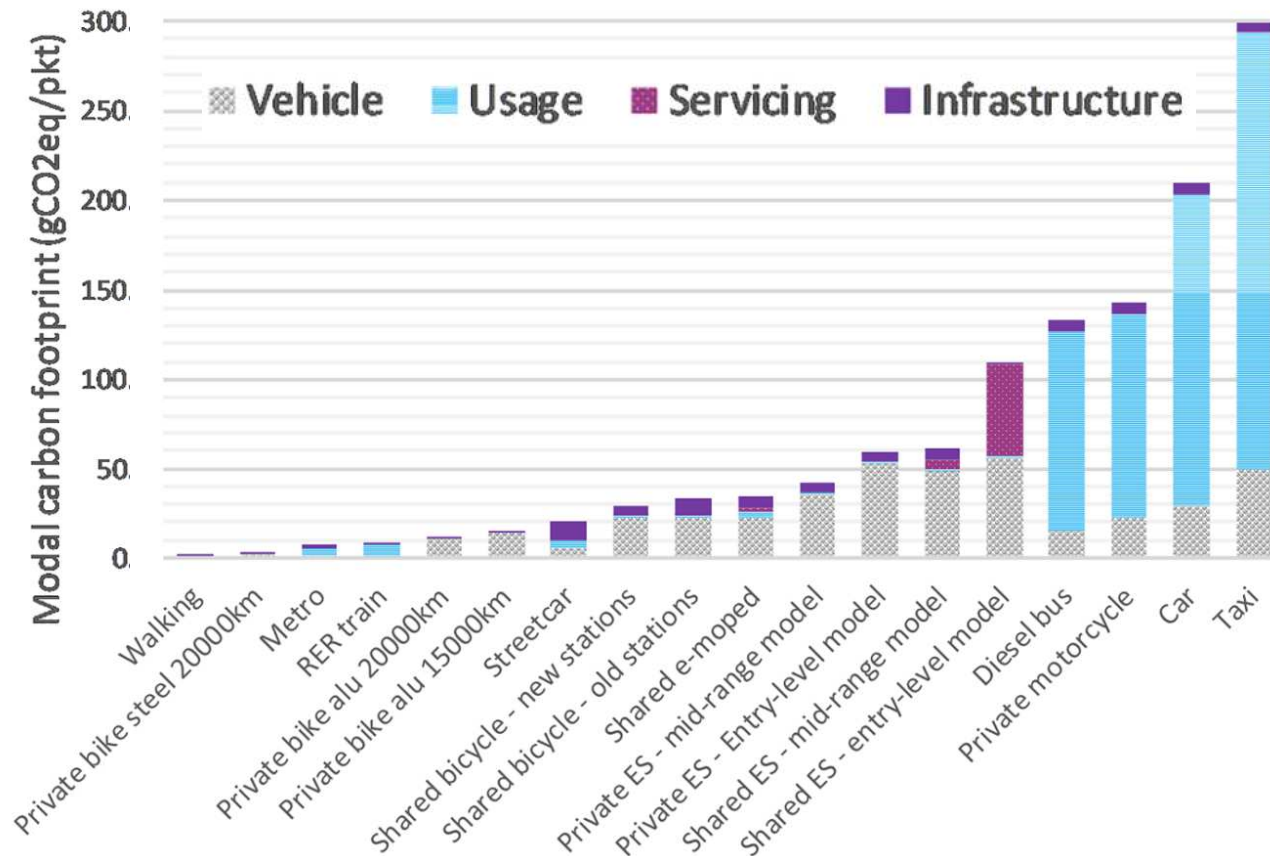


$$\text{Comfort} = \text{Motor} + \text{Seat} + \text{Driving} + \text{Track}$$

Public action

- Traffic management, “on the way”
 - **Local set-ups:** speed limits, speed bumps, sinuosity
 - **Way plans:** lane assignment, corridors
- The provision of public transport
 - **Transit modes**
 - **Shared Mobility Services**
 - **Parking facilities**
- Demand management
 - **Pricing?**
 - **Information:** modal places, times, prices
 - **Modal orientation:** w.r.t. modes, paths, times-of-day
 - **Mobility needs & Trip planning =>** shorter & less frequent trips?

Carbon Content



Carbon footprint comparison of different transportation modes in Paris per pkt (De Bortoli, 2021)

COST

Trip Cost = User Resource Cost

Vehicle Ownership Costs

- Vehicle purchase
- Insurance
- Maintenance

Vehicle Availability cost & Operating costs, including energy consumption

Tariffs = paying for the "right-of-way"

- Transit fees
- Parking fees
- Roadway tolls

Passage price

Parking price

Marginal Trip Cost?

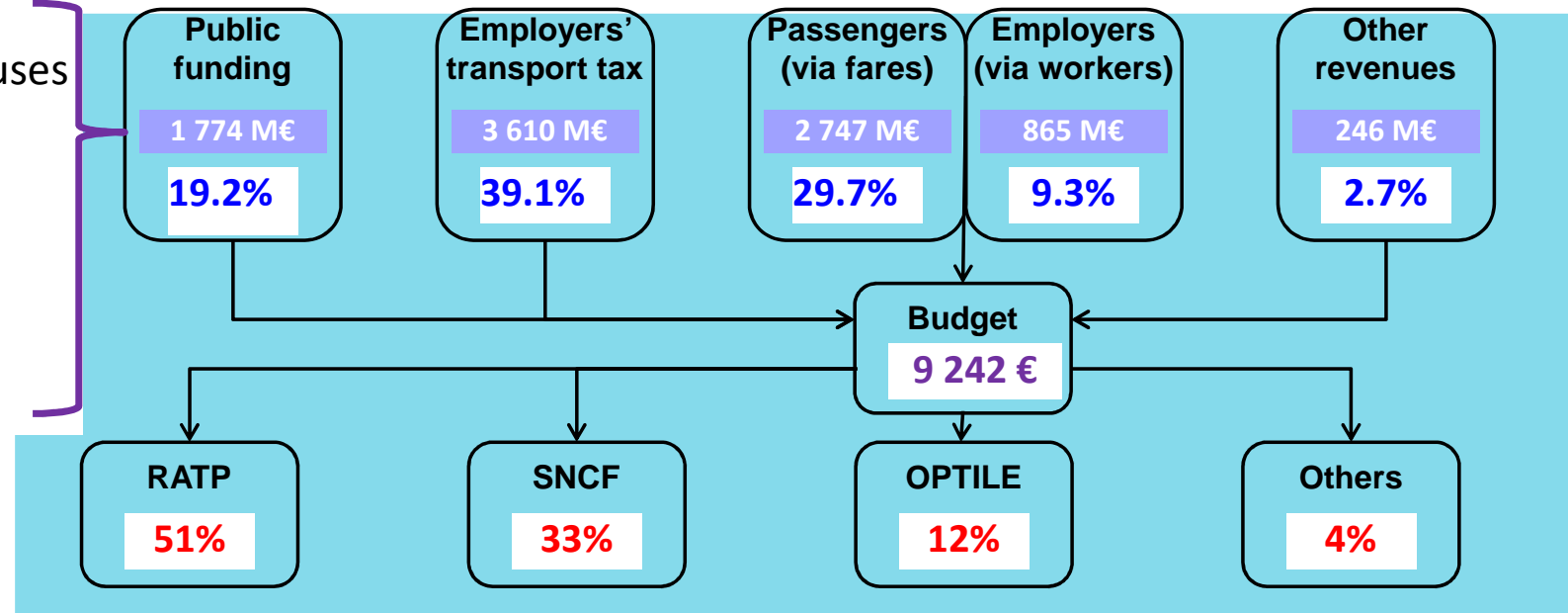
Full Logistical Cost

Public action

- **Labor regulation**
 - Driving time of employees?
 - Latent times spent "at rest"?
 - Home-to-work travel?
 - **Car as a resource** / part of wage policy?
- **Usage and ownership rights**
 - Vignette?
 - **Mobility credits?**
- **Public purse**
 - To subsidize public transport services
 - **Social fares**

Public funding of Transit system in Paris-IDF

- 1 231 from syndicated bodies
- 128 from State for school buses
- 152 from Region for social action
- 207 from Districts for social action
- 56 compensate for non-profitable services



- Mode automobile

- 15 G€/an de dépenses privées dont 20% d'énergie
- *Et dépenses des opérateurs de réseaux*

- Surplus de la mobilité pour les usagers

- 50-60 G€ / an de coût généralisé

- Dommage environnemental

- 5 G€ / an

Pouvoirs publics et Mobilité (France début 2019, pré-LOM)

Collectivité	« Compétences »
Commune	Voirie : aménagement et occupation Stationnement : organisation, exploitation, tarifs
Intercommunalité	Par délégations des communes membres
Métropole	<i>Entre Interco et département</i>
Autorité organisatrice de mobilité	Organisation des transports collectifs Intermodalité, parcs-relais
Département	Réseau routier. <i>Transport scolaire</i> , transport de PMR
Région	Transport ferroviaire. Subventionnement
Etat français	Réseaux nationaux routiers et ferrés Droit du transport : réglementation, régulation, incitations
Union européenne	Transport international. Normes environnementales
Droit international	Transport international. Standards (ex. aérien)

Conclusion: Integration

- Outlook

- **Diversity** in several respects
- User is involved **on the way**: so are impacts and dwellers
- User spends **time**, and Time is money
- Coming to **costs**:
Who gets value?
Who makes decisions?

- Complexity

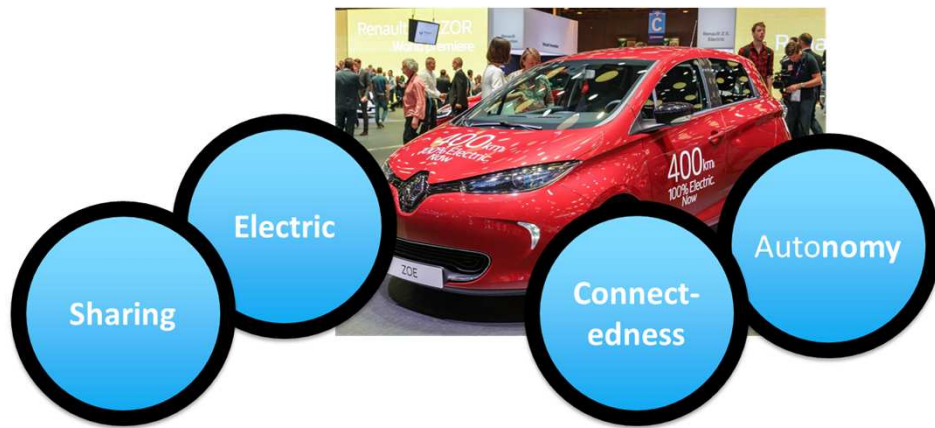
- **Spatial intricacy**
- « Urbanization circles »
- Time and comfort
- Technical complexity: modal techniques
- Cost structure
- Travel demand is derived from Activity demand

- Supervision: multi-layered

- **Travel demand**
 - Information. Orientation. Pricing
 - Labor regulation?
 - **Mobility tools**
 - Vehicle types. Access rights
 - Public transport services and the related subscription
 - **Traffic management**
 - Way management, local set-ups
 - Traffic control. Parking control
 - **Spatial setting**
 - Network planning
 - Land-use planning
 - **Energy provision**
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- ```
graph TD; A[Travel demand] --> B[Network planning]; A --> C[Land-use planning]; B --> D[Energy provision]; C --> D;
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# Discussion

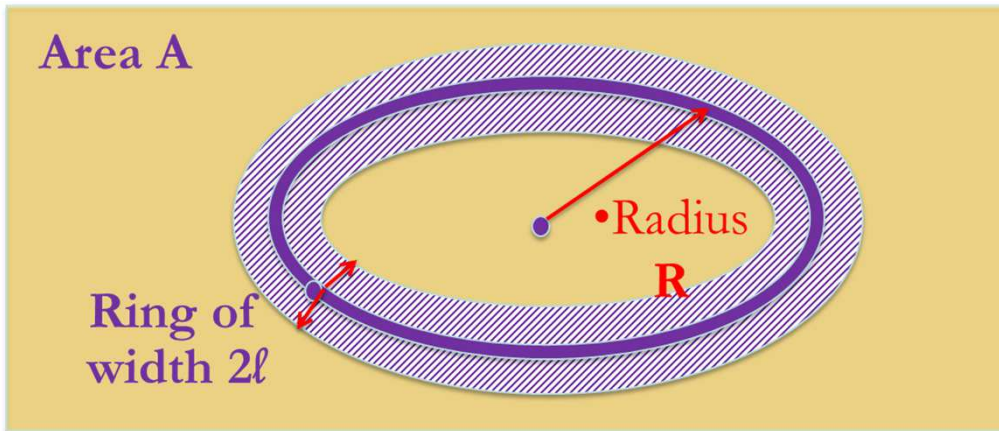
## The 4-wheels of progress?



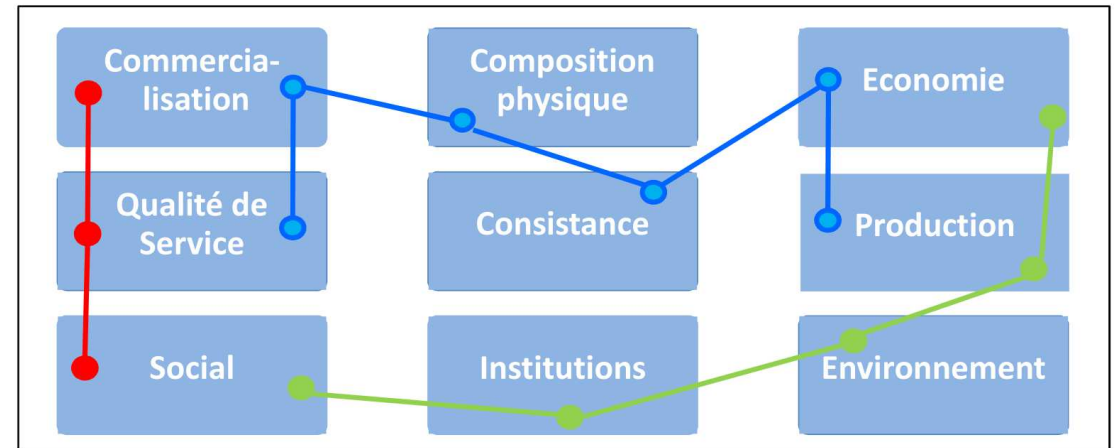
- **Going electric**
  - **Ideal** for personal mobility using small vehicles, e.g. e-scooters. Then charging is easy and environmental footprint is low
- **Connectivity**
  - **All good**, especially for mobility & retail. **Platform**-based services enable for **Pricing** as well as for **Dispatching & Sharing**
- **Shared services**
  - **Premium** looks viable (Uber & co)
  - Shared 2-wheels in urban dense areas
- **Autonomous driving?**
  - Automation already achieved: commercial relation, metro driving
  - In relation to Labor regulation?

# Towards Low-Cost SMS?

## Ring Shape for SMS



## Systemic Matrix for SMS



### Courroie de transmission

- Et de distribution

### Noria

- Fréquence de desserte
- Répartition de la charge

### Circuit

- Cycle des véhicules
- Circuit couvre largement l'espace

### Canalisation

- Protège Contenu ET l'extérieur