

# **Planning transport infrastructure:** *perspectives, challenges and approaches*

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# 1. perspectives









#### United Nations (2018). World Urbanization Prospects: The 2018 Revision. Key Facts

- DEMOGRAPHIC GROWTH: an overall increase in the world population is expected in the coming years. However, this phenomenon follows very different trends from region to region (actually Europe will suffer a slight decline in population)
- URBANISATION: at present 55% of the World's population lives in urban areas; in 1950 the share was at 30% and today's predictions estimate an increase up to 68% by 2050
- POPULATION AGEING: in 2050 the global population aged 60 years or over will be twice as much as today's (in absolute terms)



- Electro-mobility is seen as a key component of the agenda for sustainable mobility
- By 2050, Internal Combustion Engine Vehicles (ICEVs) are expected to be banned from cities, giving way to Electric Vehicles (EVs), i.e.
   Plug-in Hybrid Electric Vehicles (PHEVs) and Battery Electric Vehicles (BEVs)
- The use of **renewable energy sources** in the electricity production mix is important towards decarbonisation of the whole cycle





**Connected Vehicles (CVs)** : vehicles equipped with advanced communication technologies that allow the exchange of information between the various elements of the transportation system

#### INNOVATIVE TECHNOLOGIES



**Digital Infrastructure** : monitoring traffic condition , exchanging information among users and service providers, increasing road safety and enhancing driving comfort



#### INNOVATIVE TECHNOLOGIES



Electrification

Automation

Digital Infrastructure (e.g. Smart road)





- Public Transport
  Shared Mobility
  AMoD
  EV
  CV
  CV
  AV
  CAV
  E-CAV
- Smart Roads
- Digital Infrastructure

### EXAMPLE: E-CAVs deployment - factors of uncertainty



Coppola & Esztergar-Kiss (2019) "Autonomous vehicles and future mobility". Elsevier

# 2. challenges



## To better plan investment

- Improve transportation system adaptability
- To anticipate the impacts of technological disruptions

## To stop the growth of transport CO2 emissions

- Avoid un-necessary demand
- improve transport efficiency

# **Challenges for planners**

How to take the right decisions about investment for the future?

How to drive the change towards sustainability?

What planning instruments ?



# 3. Assesment tools



## Integral assessment: the three spheres of sustainability



### **Energy transition**

- Electro-mobility is seen as a key component of the agenda for sustainable mobility: by 2050, Internal Combustion Engine Vehicles (ICEVs) are expected to be banned from cities, giving way to Electric Vehicles (EVs)
- insufficient advances in **Air and Sea transport**
- electricity or hydrogen zero-carbon footprint will require zero-carbon generation of electricity and hydrogen power



### Strong growth in freight transport

Freight volumes may triple between 2015 and 2050

- modal share of Sea may further increase from current 70% to future 74%
- growth rate of Air is expected higher <sup>2</sup> than others mode

Co2 emissions are projected to growth by 225% by 2050 Projected freight traffic by mode, 2030-50



Source: ITF Outlook 2019

### TRANSPORT AND LAND-USE

- Territorial Impact Assessment (TIA)
- Transit Oriented Development (TOD)
- Accessibility Planning



Is there a problem of mobility? or: Is there a problem of accesibility?



• Jobs Productivity and Labor Force participation

effects arising from markets enlargement

### Competitiveness

effects arising from markets competition, which may be positive but also negative, the weaker may succumb

### • Transport Equity Assessment

methods with the potential to shape transport decision-making processes, thus allowing for the adoption of more equitable transport solutions

✓ Efficientarism vs. sufficientarism

### • Liability issues

in the era of the digital revolution and self-learning systems, human-machine interaction raises new ethical questions:

- ✓ Principles and priorities
- ✓ Data storage, protection and sovereignty

# CONCLUSIONS

### • Vision

In the long term, a widespread adoption of **new technologies** (e.g. E-CAV) will enable Innovative Mobility Solutions (e.g. vehicle sharing, AMoD, ...) and **new roles** for transport planners/operators/...

### • Uncertainty

Policies must be **anticipatory** despite uncertainty of the future , in order to get greatest benefits in terms of environmental, social and economic sustainability



## CONCLUSIONS



#### • Holistic

**Integral assessment tool** for the simulation of future scenarios is key to support correct investment decision and to design and implement mobility policies driving change towards **sustainability** 

### Participatory

New form of **planning approaches** (including bottom-up exploration of policies) could represent an opportunity for more effective planning processes and mobility solutions



# Thanks for attention!

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