Sprout

Sustainable **P**olicy **R**esp**O**nse
to **U**rban mobility **T**ransition

Urban mobility transition:

Tools for tracking change and anticipating effects of innovative mobility solutions

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The Urban Mobility Transition and its barriers

- Cities are like a living organism which is dynamically changing depending on the several **social**, **political** and **environmental** mega trends of the era
- New **mobility solutions** and **business models** pop up, affecting significantly the **urban landscape**
- The city planners should effectively manage the changes and identify the appropriate policy response by:
  - Embracing and accelerating **innovation** in urban mobility and
  - Tackling the potential **negative impacts** of these new trends

Main barriers in urban mobility planning

- New **mobility solutions** and **business models** pop up, affecting significantly the **urban landscape**
- Previously tested and implemented **policy responses** are unable to adequately address the changes in the urban mobility scene
- Cities were developing without having:
  - A clear view first on the **impact** of urban mobility innovations in cities and regions
  - The **policies impact** to the current and future urban environment and the urban stakeholders
  - The **interrelations** between the urban mobility operations, new mobility solutions and the urban policies.
- **Data-availability** is still a major shortcomings for the most cities, especially for urban **freight transport**
- Policy making at local level is *often* **reactive** rather than proactive

The H2020 SPROUT answer!

Cities play a central role in innovation dynamics.

City-led innovation means:

- preparing the right conditions for embracing innovation;
- creating networks for accelerating innovation;
- harnessing the innovation potential through the appropriate measures and policies.

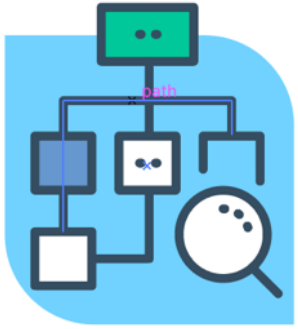
Achieve paradigm shift & use innovation for better prepare for special conditions (COVID-19)

The H2020 SPROUT approach
The city led innovation to mobility

SPROUT will provide a city-led innovative policy response that will be capable of harnessing the impacts of new mobility solutions in a way that makes them more attractive to the users and more sustainable for the society as a whole.

5 Key Objectives

Understand the transition in urban mobility



Foresee and identify the impact of the drivers of urban mobility transition

Formulate a city-led innovative policy response

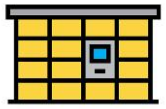
Provide tools to enhance local policy-making capacity

Navigate future policy on urban mobility

SPROUT Innovative Mobility Solutions

IoT enabled Smart Parking for Last mile deliveries:
Real-time dynamic management of unloading operations including planning and booking

Intermodal passenger & freight transportation nodes
Parking for private bicycles into intermodal nodes
Smart parcel lockers & Micro hubs in metro stations



Autonomous mobility & Cargo hitching:
Modular electric self-driving pod for mixed freight/passenger transport
Combined cargo & public transport service

Data Analytics driven traffic & mobility management
Bluetooth detectors data analysis of travel behaviour mobility patterns
Re-allocating the public sphere - balance between capacity and liveability;
Prioritizing vulnerable road users at signalized intersections.

Integrated mobility & Micro-mobility :
Creation of micromobility points

Public sphere re-allocation:
Relocating public space reducing capacity to car & increasing pedestrian and cycling zones.

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Pilots expected impacts

Kalisz:
- Delivery time reduction (20%)
- Road congestion reduction (10%)
- growth of safety (qualitative), proportion of cargo deliveries using the tested infrastructure (30%)

Valencia:
- Reduction in CO2 emissions (2%) ,
- Increase of multimodal trips linking cycling and public transport

Padua :
- Reduction in traditional fuel consumption (3%),
- Reduction of CO2 (4%) ,
- Environmental quality improvement (9%), E-mobility recharging points (+10)

Tel Aviv:
- Reduced total crossing time of pedestrians at signalized crosswalks (12%) ,
- quality of public space & road user experience (qualitative)

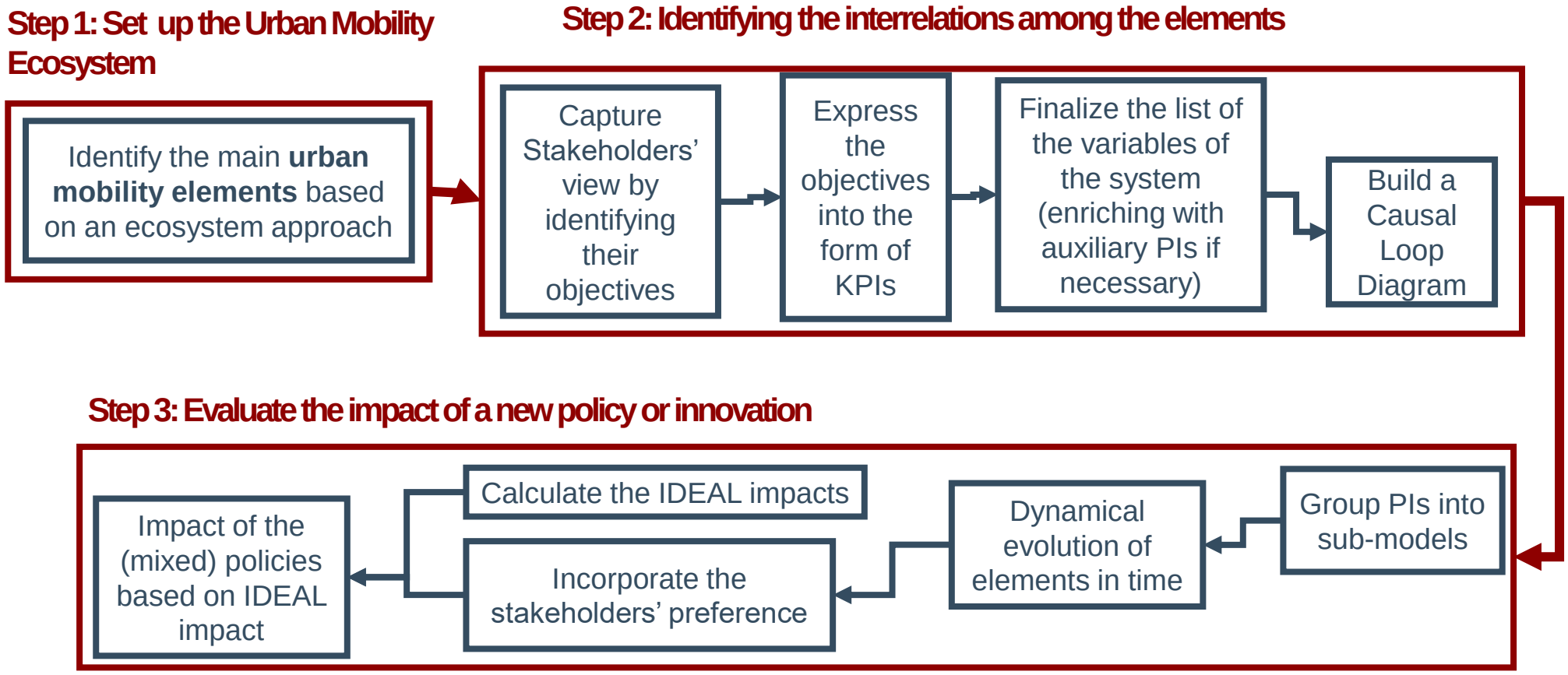
Budapest:
- Increase the modal share of shared solutions (10%)

Building an Urban Policy Model based on the system dynamics methodology for:

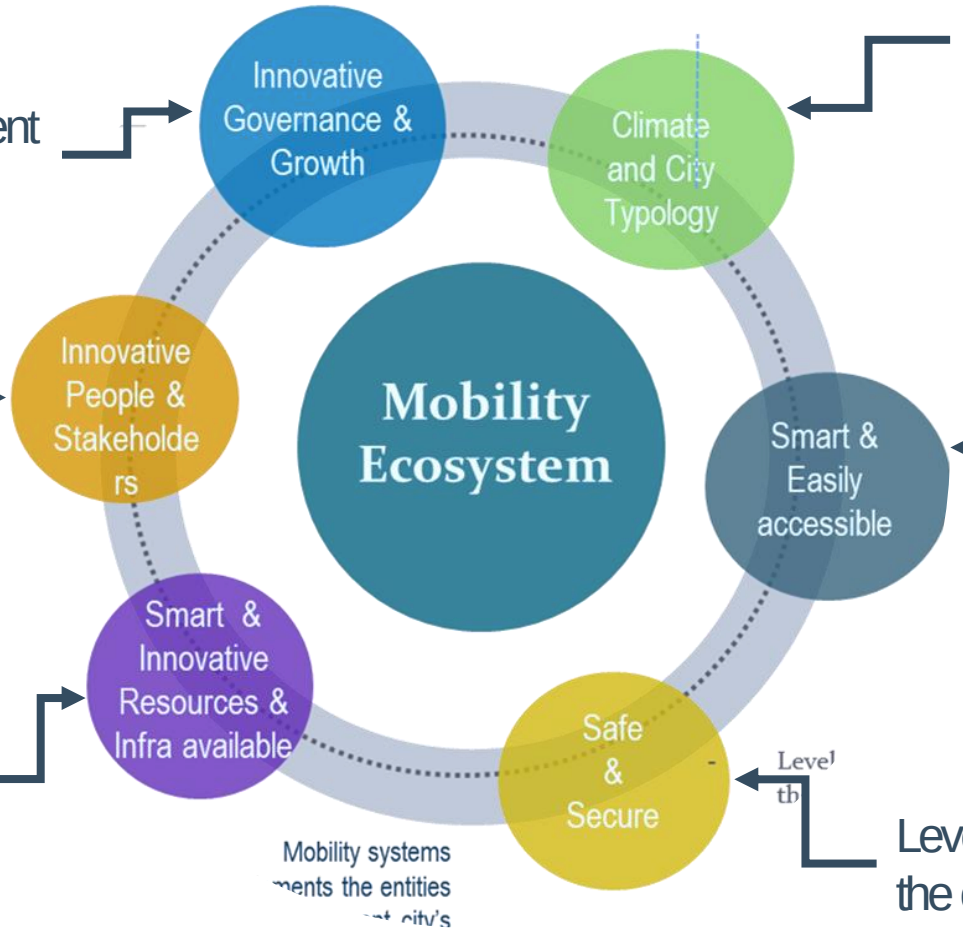
- Mapping the interaction of the various elements of an urban mobility system,
- Analyzing how an innovation or a policy response may affect the mobility system's spatio-temporal evolution and
- Defining how effective potential policies could be

A 3-Step-Methodology

A tool that can be incorporated in a city's SUMP process



1 Set up the Urban Mobility Ecosystem



Integrated planning current political framework

Geophysical and environmental conditions of a city

The behaviour of the People, Smart, Entrepreneurship

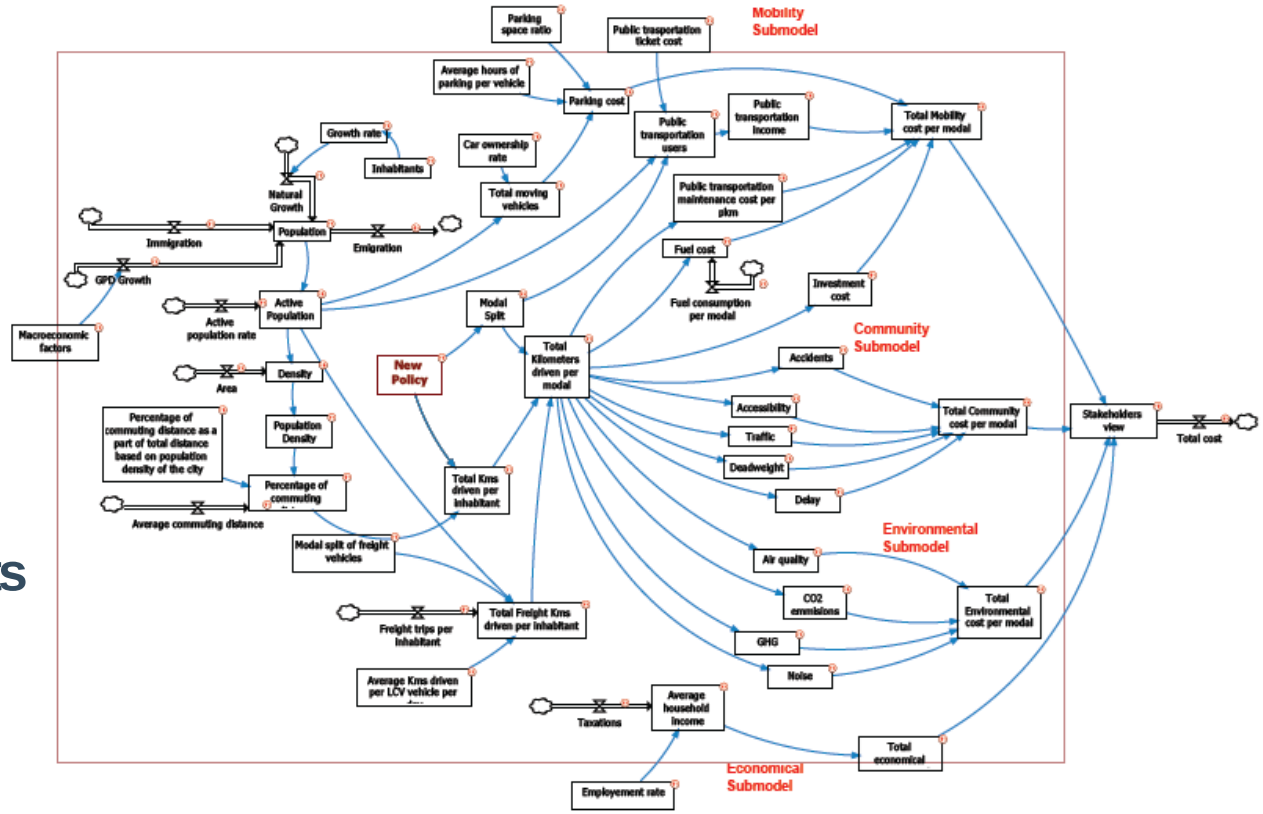
Level of accessibility of New Mobility & Transportation Services

Availability of smart resources, physical and digital infrastructure

Level of security & safety of the current mobility services

2 Identifying the main variables of the system
Build the urban mobility system

- Identify stakeholders' objectives based on participatory approaches
- Expressing the objectives in PIs for each SPROUT city
- **Alignment of** the PIs with the UM ecosystem & **SUMI**
- **Finalize** the list of PIs (key variables, auxiliary)
- Build the **Causal loop diagram** that describes the **interrelations** of the **main variables/mobility elements** of a mobility system



3 Evaluate the impact of a new policy
Minimum parameters needed

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Minimum parameters needed

- The major input of data is the:
  - ***Kilometers driven*** in city for freight and passenger transportation
  - ***Modal Split*** of the vehicles in the city
- Parameters affect ***Passenger kilometers driven***
  - Active population
  - Average commuting distance for the city Passenger kms per day
- Parameters affect ***Freight kilometers driven***
  - Freight trips per inhabitant
  - Average freight urban kilometers driven per LCV

Cost functions of the interrelations

- Different costs per km identified in literature, regarding climate, accidents, etc.
- Based on estimated kms driven, the different costs of the city are calculated

	Car	Motorbike	Bus	Coach	Bike	e-Bike	e-Scooter	LCV*	HGV*
Climate (€/pkm)	1.18	0.89	0.47	0.44	0.00	0.00	0.00	3.98	0.53
Climate (€/vkm)	1.90	0.94	8.83	8.66	0.00	0.00	0.00	2.75	6.48
GHG (€/pkm)	0.38	0.51	0.17	0.15	0.00	0.16	0.16	1.15	0.20
GHG (€/vkm)	0.62	0.53	3.12	2.85	0.00	0.16	0.16	0.79	2.50
Air pollution (€/pkm)	0.71	1.12	0.76	0.73	0.00	0.00	0.00	4.68	3.24
Air pollution (€/vkm)	1.14	1.17	14.19	14.34	0.00	0.00	0.00	0.76	9.38
Noise (€/pkm)	0.60	9.00	0.40	0.20	0.00	0.00	1.00	1.60	1.20
Noise (€/vkm)	0.90	9.40	8.00	4.70	0.00	0.00	1.00	1.10	4.00
Accident (€/pkm)	4.50	12.70	1.00	1.00	10.60	10.60	10.60	6.00	4.10
Accident (€/vkm)	7.20	13.30	18.90	18.90	10.60	10.60	10.60	1.30	15.50
Delay (€/pkm)	11.00	0.00	1.80	1.80	0.00	0.00	0.00	39.60	2.50
Delay (€/vkm)	17.70	0.00	35.50	35.50	0.00	0.00	0.00	27.40	34.10
Deadweight (€/pkm)	1.90	0.00	0.30	0.30	0.00	0.00	0.00	6.80	0.40
Deadweight (€/vkm)	3.10	0.00	6.10	6.10	0.00	0.00	0.00	4.70	6.00

* In freight transport, €/pkm is measured in €/tkm

Major sources of costs

CE Delft, INFRAS & Fraunhofer ISI, (2011). External costs of transport in Europe, Delft: CE Delft.
Commision, E. (2019). Handbook on the external costs of transport version 2019. D. G. f. M. a. Transport. Brussels.
Gössling, S. & Choi, A. S. (2015). Transport transitions in Copenhagen: Comparing the cost of cars and bicycles. Ecological Economics (113),106–113.

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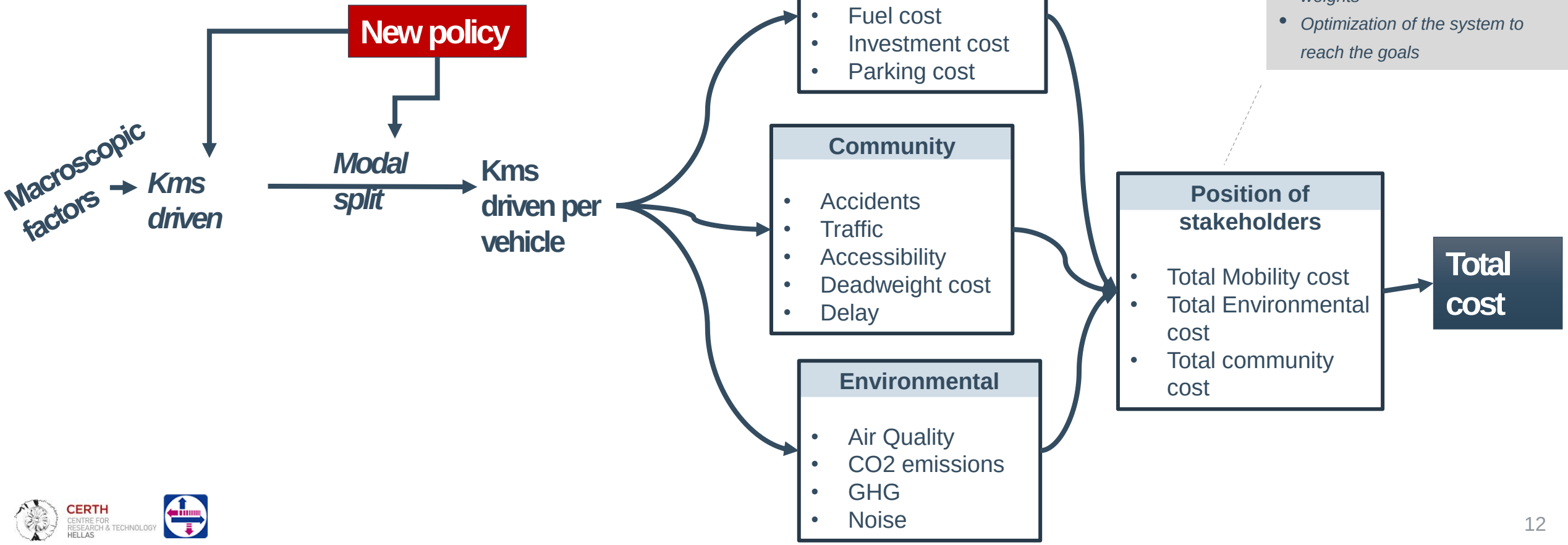
3 Evaluate the impact of a new policy
The layout of the model



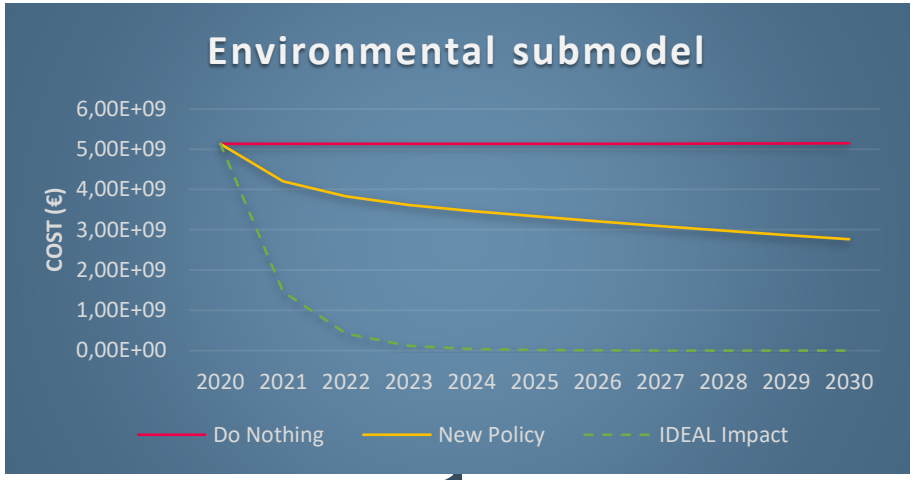
- *Incorporate the position of the different stakeholders in relation to the submodels & assign weights*
- *Optimization of the system to reach the goals*

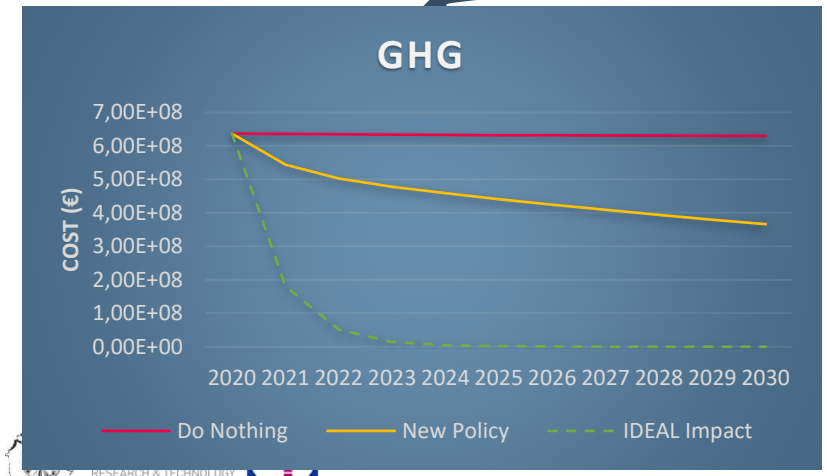
Indicative results
Environmental submodel

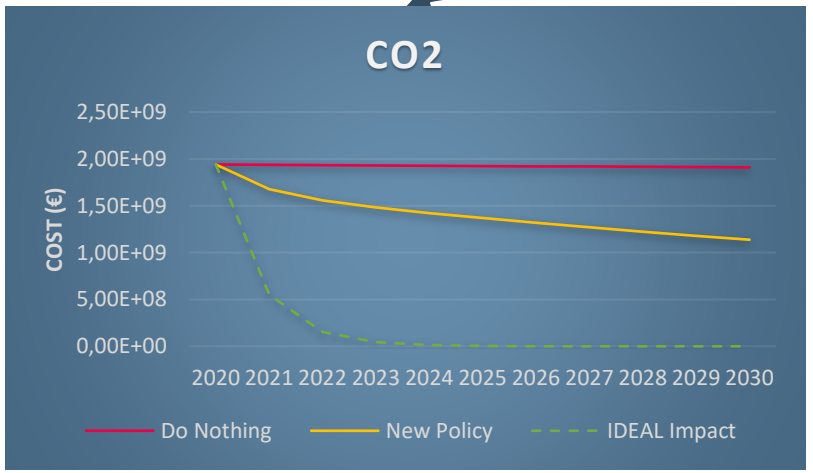
Vehicle	Modal Split at 2020	Do Nothing at 2030	New Policy at 2030	Green Deal Goals at 2030
Car	37%	32.4%	24%	*IDEAL Impact: Climate Neutral cities*
eCar	3%	2.6%	3%	
PT	17%	18.6%	0%	
ePT	1%	0.6%	27%	
Cycling	17%	18.3%	18%	
Walking	18%	19.4%	20%	
Other	8%	8.3%	8%	
	100%	100%	100%	

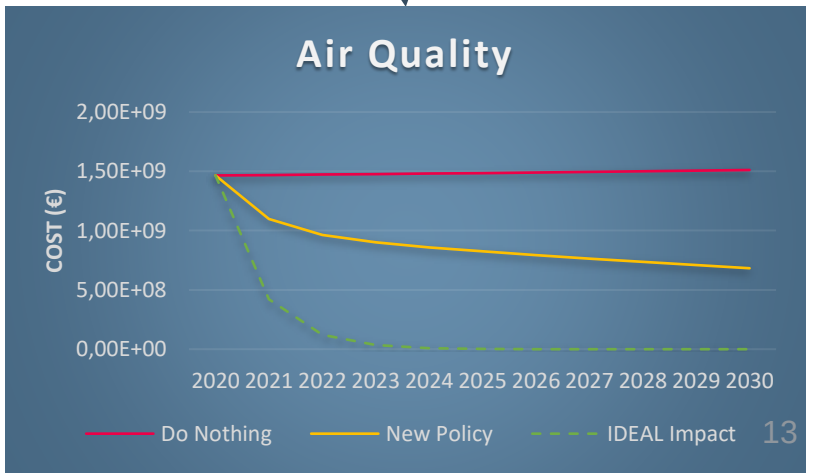
New policy:

Replacement of **PT vehicles** with **electric Pods**









Conclusion

- **This Urban policy model can be incorporated in the cities' SUMP process and facilitate the scenario building methodology and anticipating the effects of the measures chosen**
- Although urban mobility transition is not reflected in a homogeneous way across cities, **commonalities can be identified on the requirements** and **needs of the urban mobility stakeholders involved**
- A **Return On Data including an explicit information governance approach is needed for driving the cities** to continue providing the vital information required for monitoring and responding to the continuous urban mobility transition.
- **Evidence-based urban mobility planning is needed for preparing the appropriate conditions and embracing innovation**

Thank you for your attention