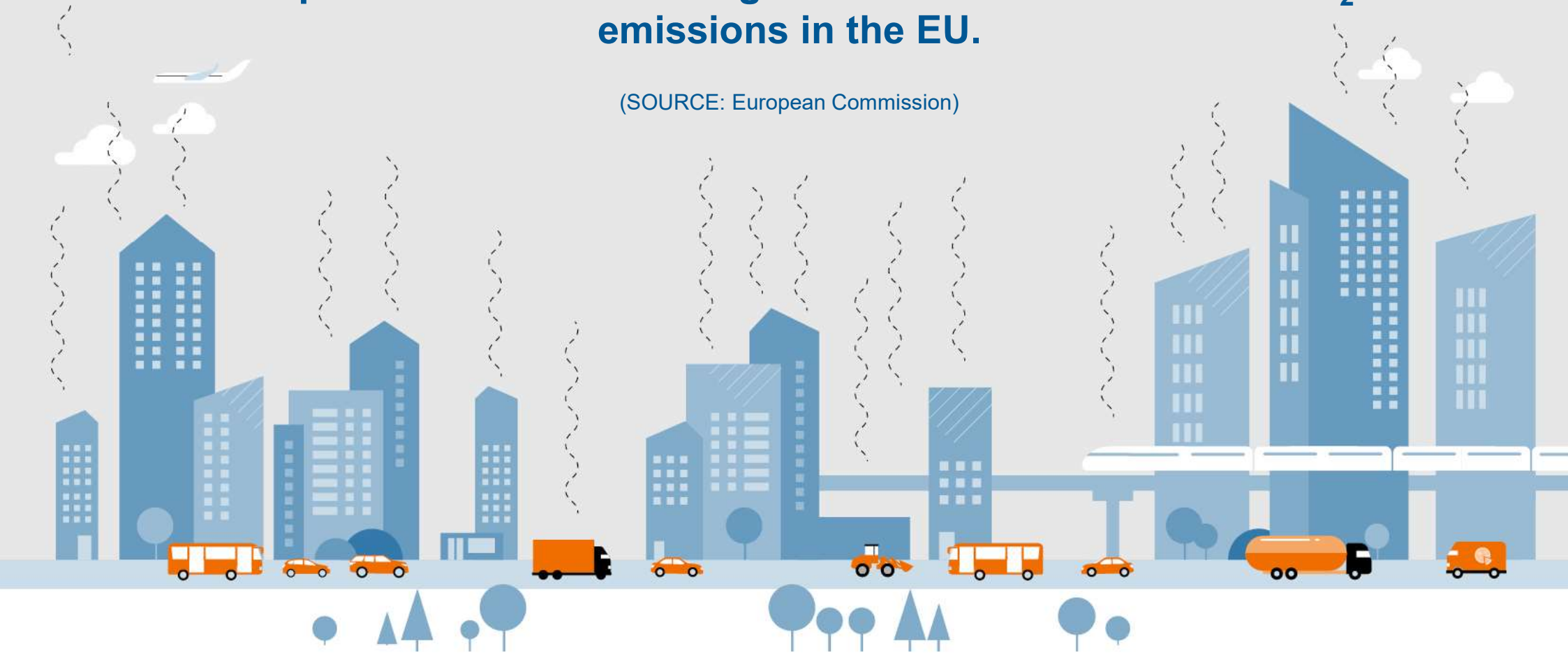


Digital piloting of city logistics: An approach to accelerate the green transition in cities

Dr. Yancho Todorov, Senior Scientist

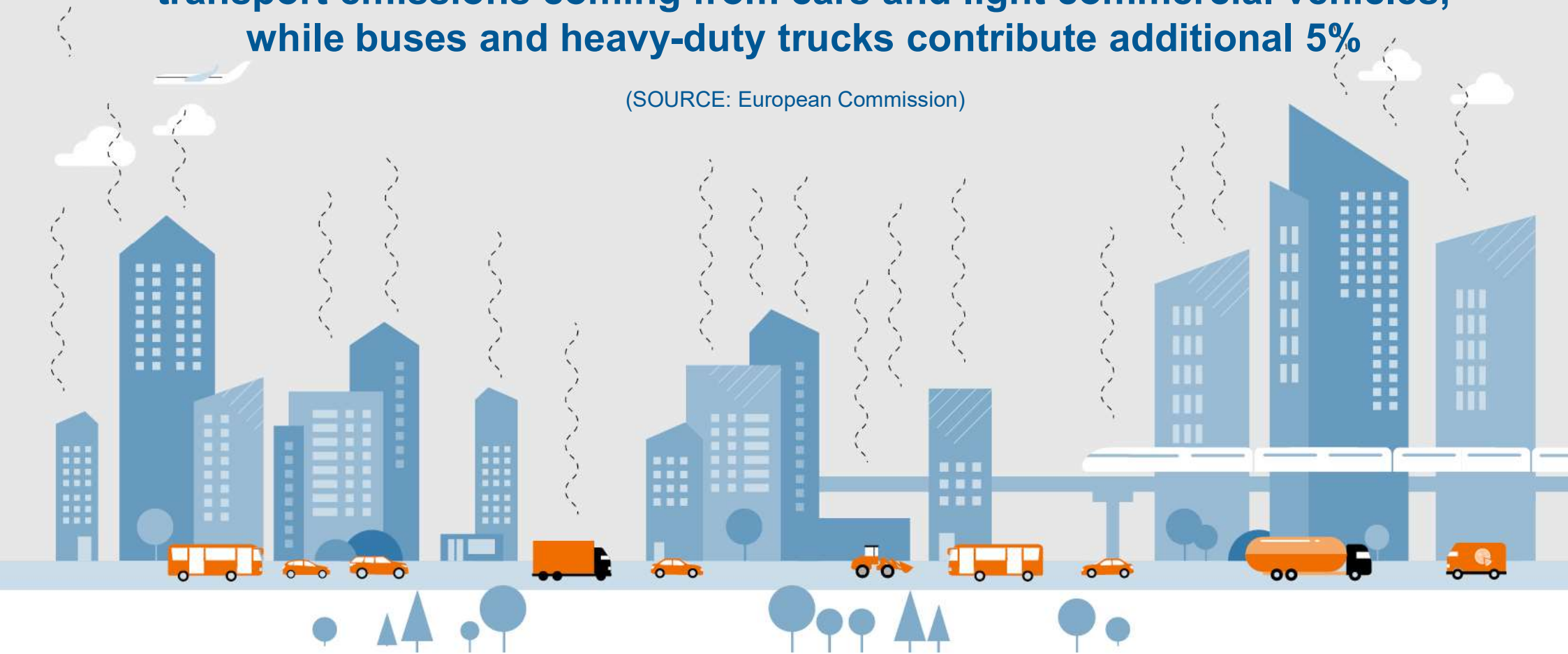
The transport sector is one of the biggest contributors to the carbon footprint in cities accounting for around 21% of the total CO₂ emissions in the EU.

(SOURCE: European Commission)



The road transport is the largest contributor with 15% of the total CO₂ transport emissions coming from cars and light commercial vehicles, while buses and heavy-duty trucks contribute additional 5%

(SOURCE: European Commission)



How to meet the ambitious targets for lower emissions and energy efficiency?

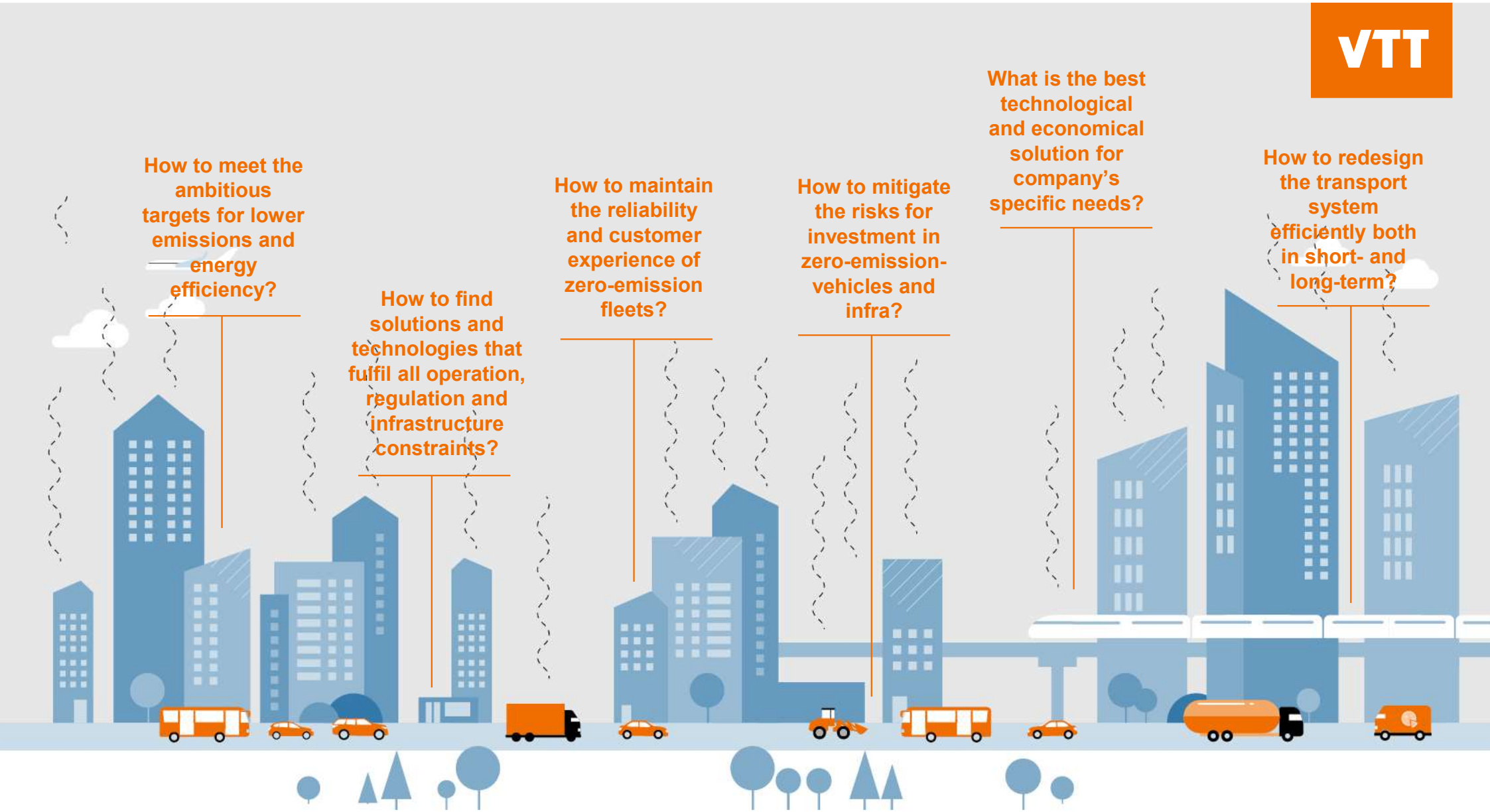
How to find solutions and technologies that fulfil all operation, regulation and infrastructure constraints?

How to maintain the reliability and customer experience of zero-emission fleets?

How to mitigate the risks for investment in zero-emission-vehicles and infra?

What is the best technological and economical solution for company's specific needs?

How to redesign the transport system efficiently both in short- and long-term?



Challenges towards zero-emission city logistics (B2C)



Limited spaces in the urban locations and high density of people, implying high logistics demand.



Scarcely populated urban and peri-urban areas (e.g., islands) with low logistics demands.



Location of the refueling infrastructure and warehouses/depots



Various types of vehicle technologies on the market

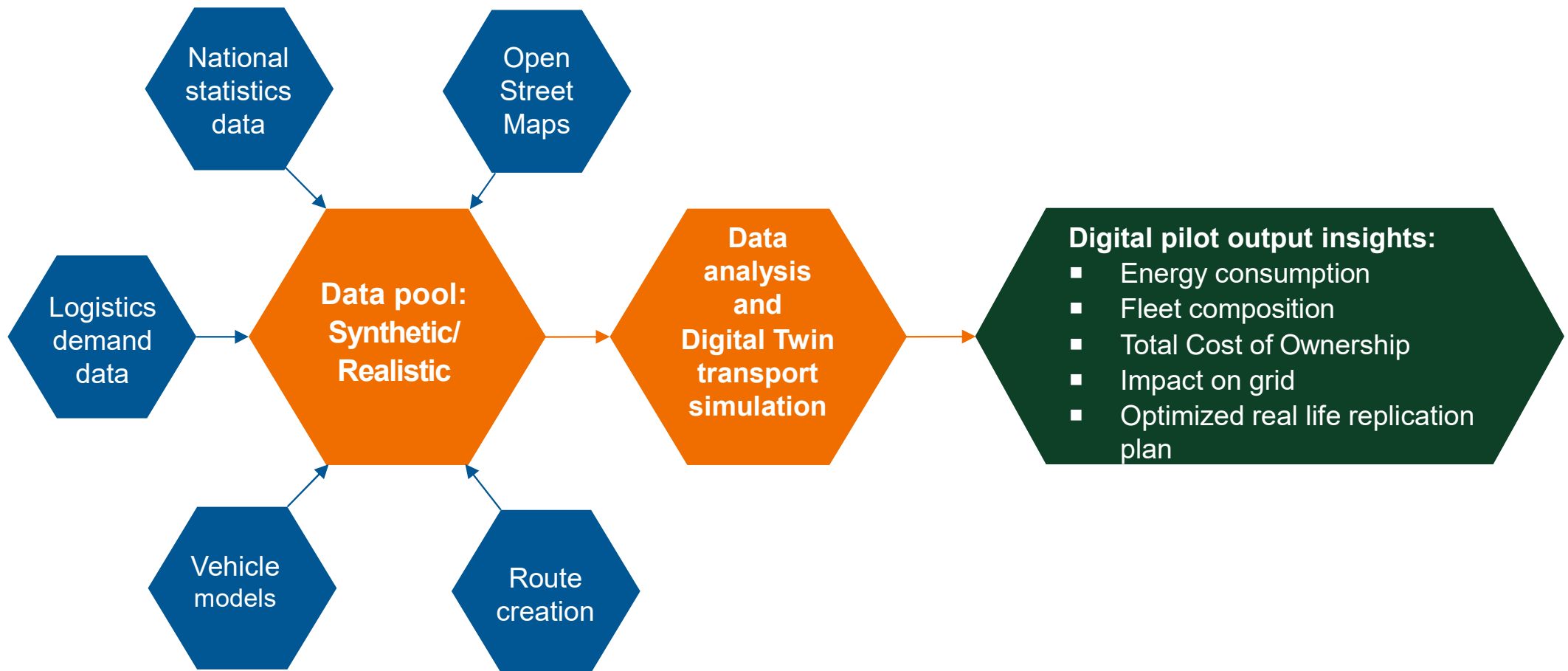


New prospective vehicle technologies in short- and mid term outlook

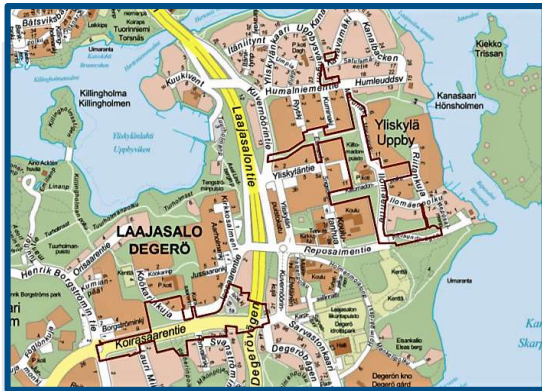
How to re-design and procure a zero-emission vehicle fleet that fits its purpose?



Digital piloting framework



Digital piloting – proof of concept



Finland: Laajasalo, Helsinki

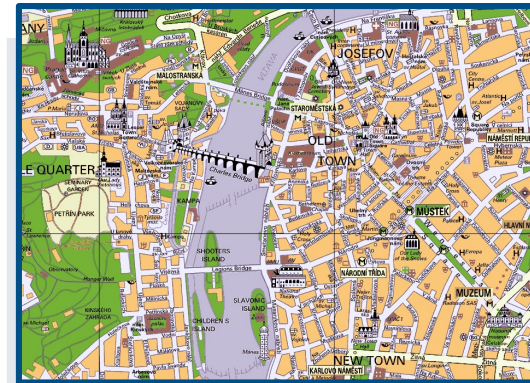
Suburban setting
Low density residential

Depot located in Herttoniemi

Modeled cases:

- Electric vans
- Drones
- Delivery robots

Logistics demand and operational insights data supplied by Posti



Czechia: Prague, District No. 6

Urban setting
High density residential, public, government

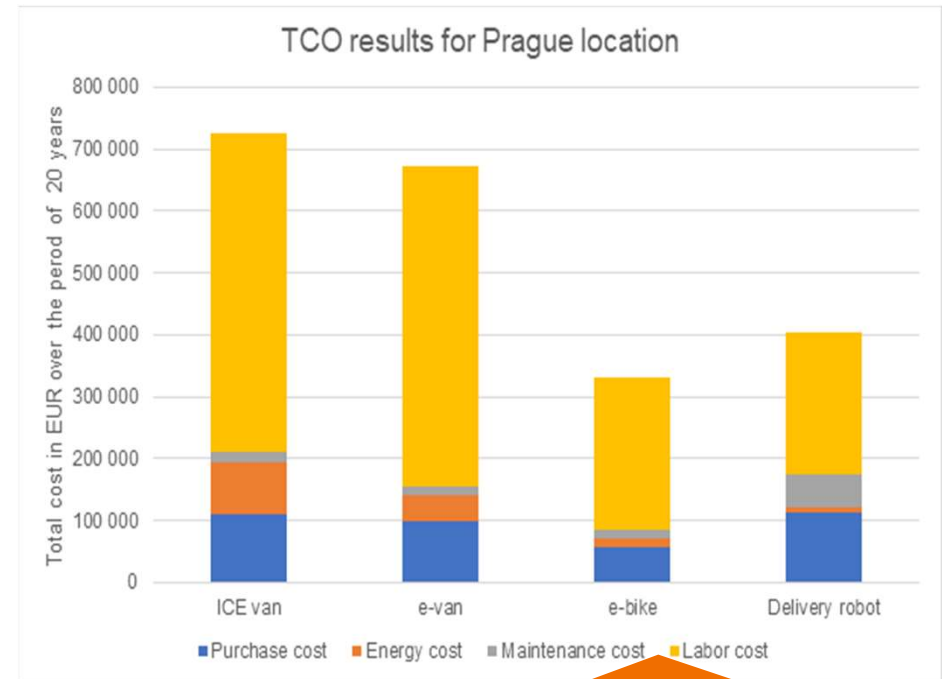
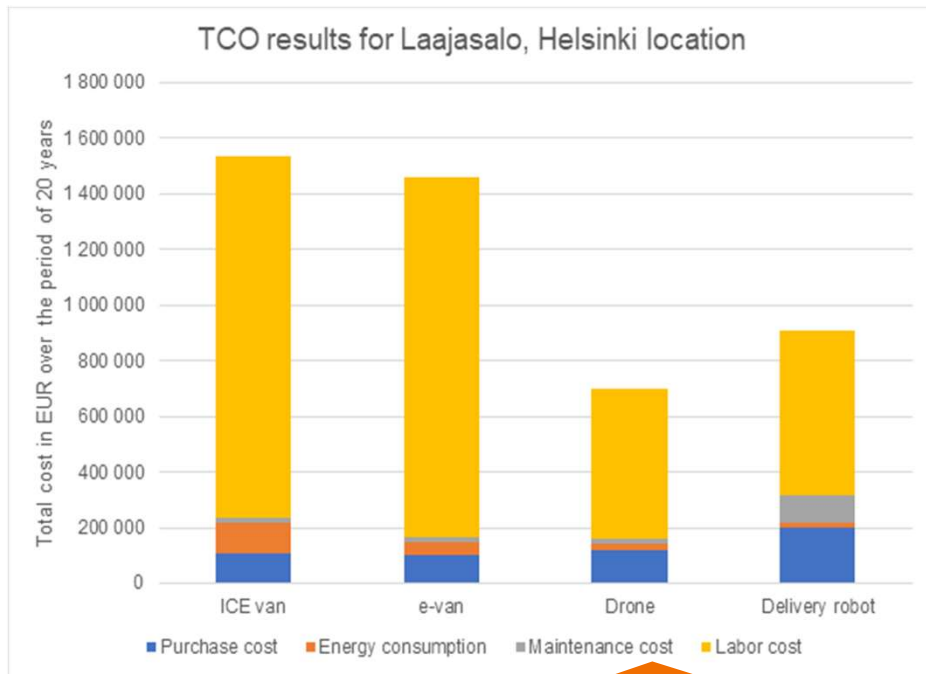
Depot located 11 km west of the area

Modeled cases:

- Electric vans
- Delivery robots
- Cargo e-bikes

Logistics demand and operational insights data supplied by UPS, Liftago, complemented by national statistics and synthetic data

Piloting outcomes – Laajasalo/Prague



Based on Finnish Post data

- Daily trip length and energy need
- ICE van: 139 km, 15,9 liters of diesel (~159 kWh)
- e-van: 139 km, 49 kWh (saving 10,5 t of CO2 annually)
- robot (+ 1 e-van): 467 km, 16 kWh
- drone (+ 1 e-van) : 468 km, 21 kWh

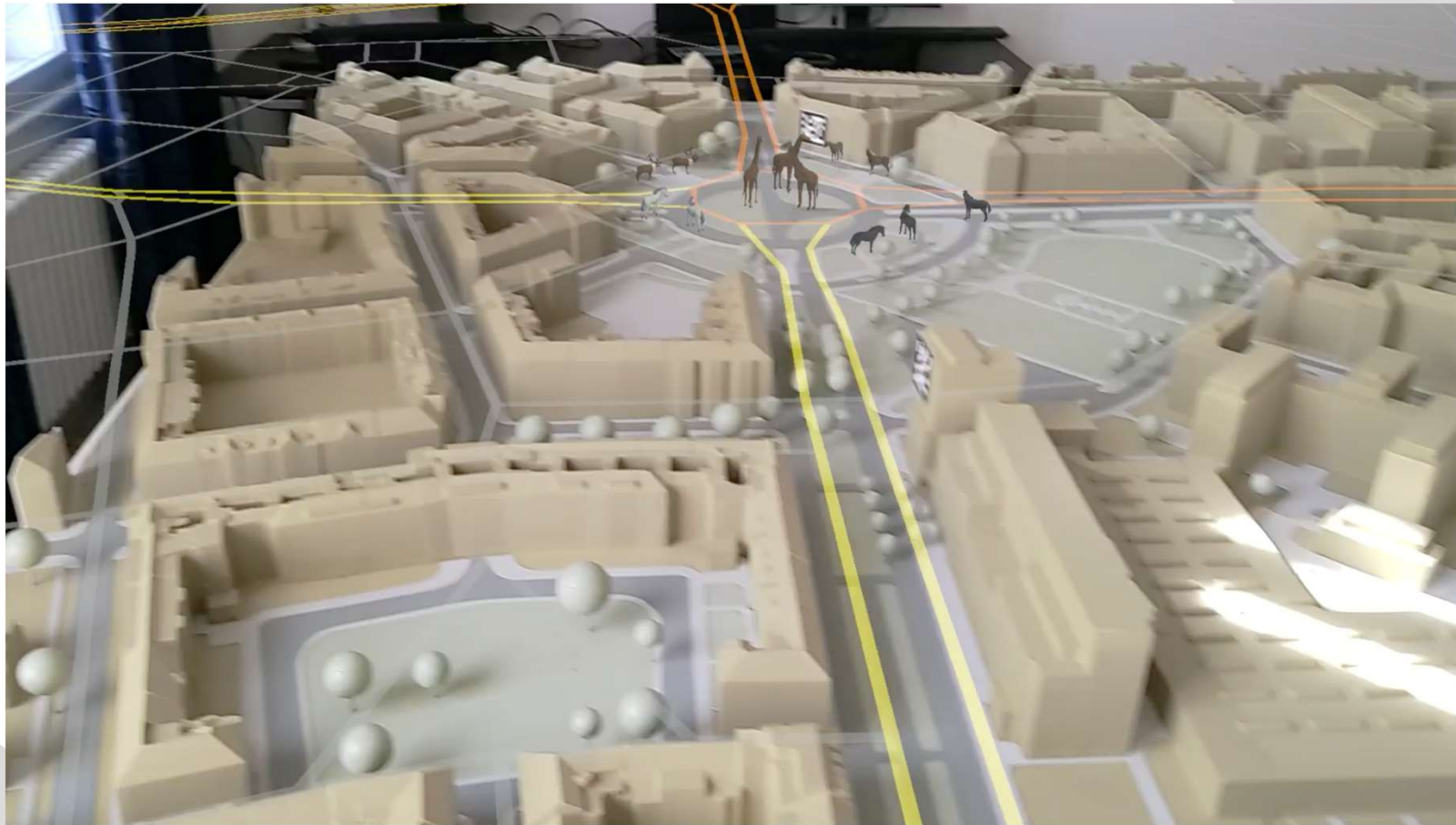
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Based on synthetic data, DHL and Liftago data

- Daily trip length and energy need
- ICE van: 113 km, 12,9 liters of diesel (~129 kWh)
- e-van: 113 km, 39 kWh (saving 8,5 t of CO2 annually)
- bicycle (+1 e-van): 36 km, 12 kWh
- robot (+1 e-van): 143 km, 10 kWh

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Augmented Reality visualization



Digital piloting brings new business opportunities for logistics companies

Low Risk

Risk free evaluation of multiple zero-emission transition scenarios.

Decision Support

Techno-economical comparison of various potential solutions to support the decision-making in procurement of low carbon fleets.



No need of physical pilots

Save from expensive physical pilots, acquiring of vehicles and building test infrastructure to gain experience.

Faster transition plan

Plan the transition in less time and speed up the acquisition of zero-emission vehicles to comply with the current policies.

Clean city environment

Accelerated decarbonization of the cities and urban locations.

bey⁰nd

the obvious

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