

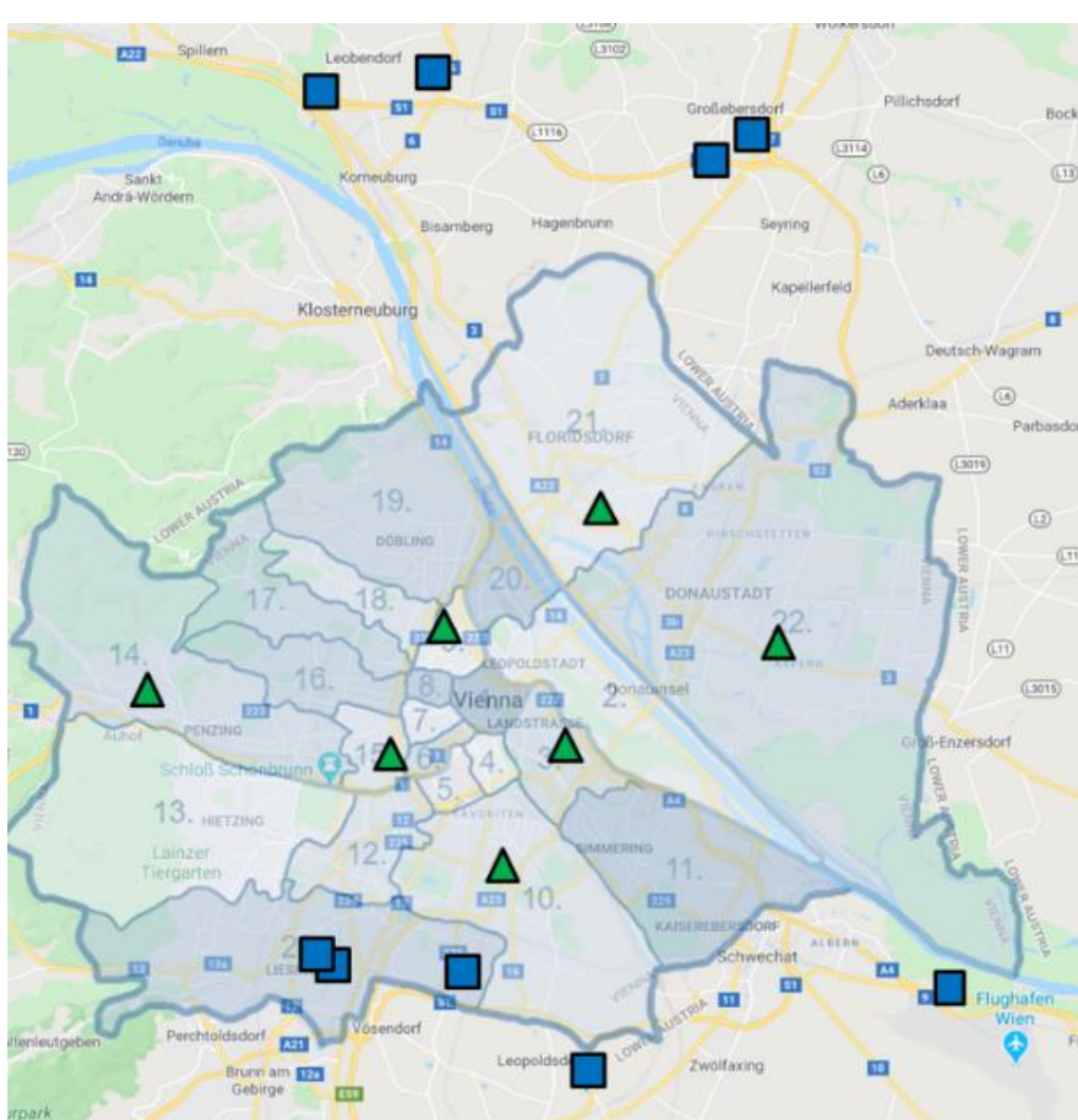


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The Impacts of Automated Urban Delivery and Consolidation

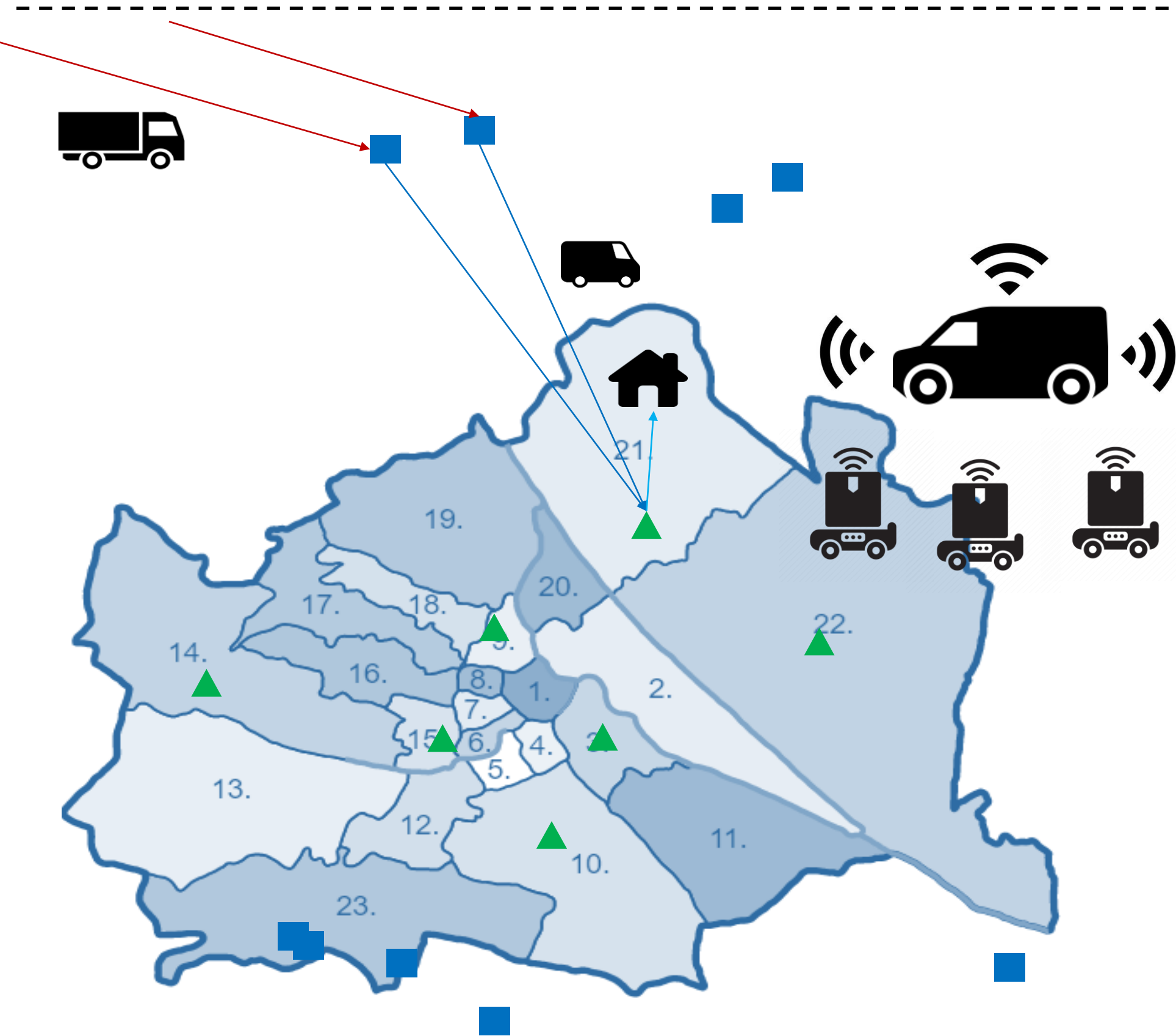
Introduction

With the introduction of CCAM, new business models and operational concepts will emerge. Automation and consolidation are expected to bring disruptive changes to the delivery system. We consider a case study for Vienna, where 272,000 parcels are delivered from 9 logistics centers and 7 potential city-hubs per day.



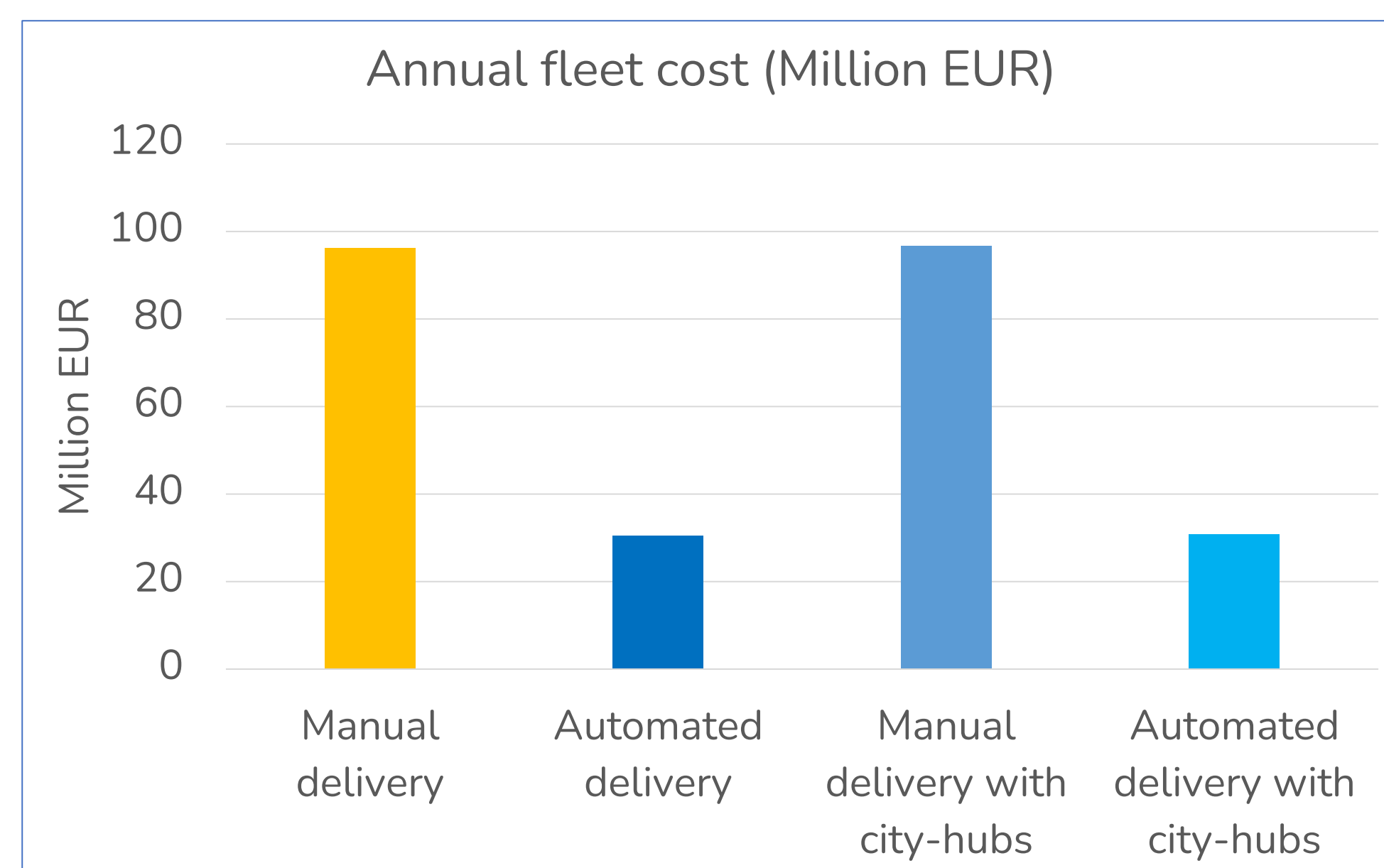
Delivery Scenarios

- **Manual delivery (status quo)**
 - baseline scenario for comparison
- **Automated delivery (Robo-van + delivery robots)**
 - Level 5 Robo-van as “mothership”
 - Small delivery robots for the last 200m
 - Delivery can be done during off peak hours and night
- **Consolidated delivery**
 - Trucks deliver parcels from logistic centers to city-hubs
 - Vans deliver parcels from city-hubs to customers



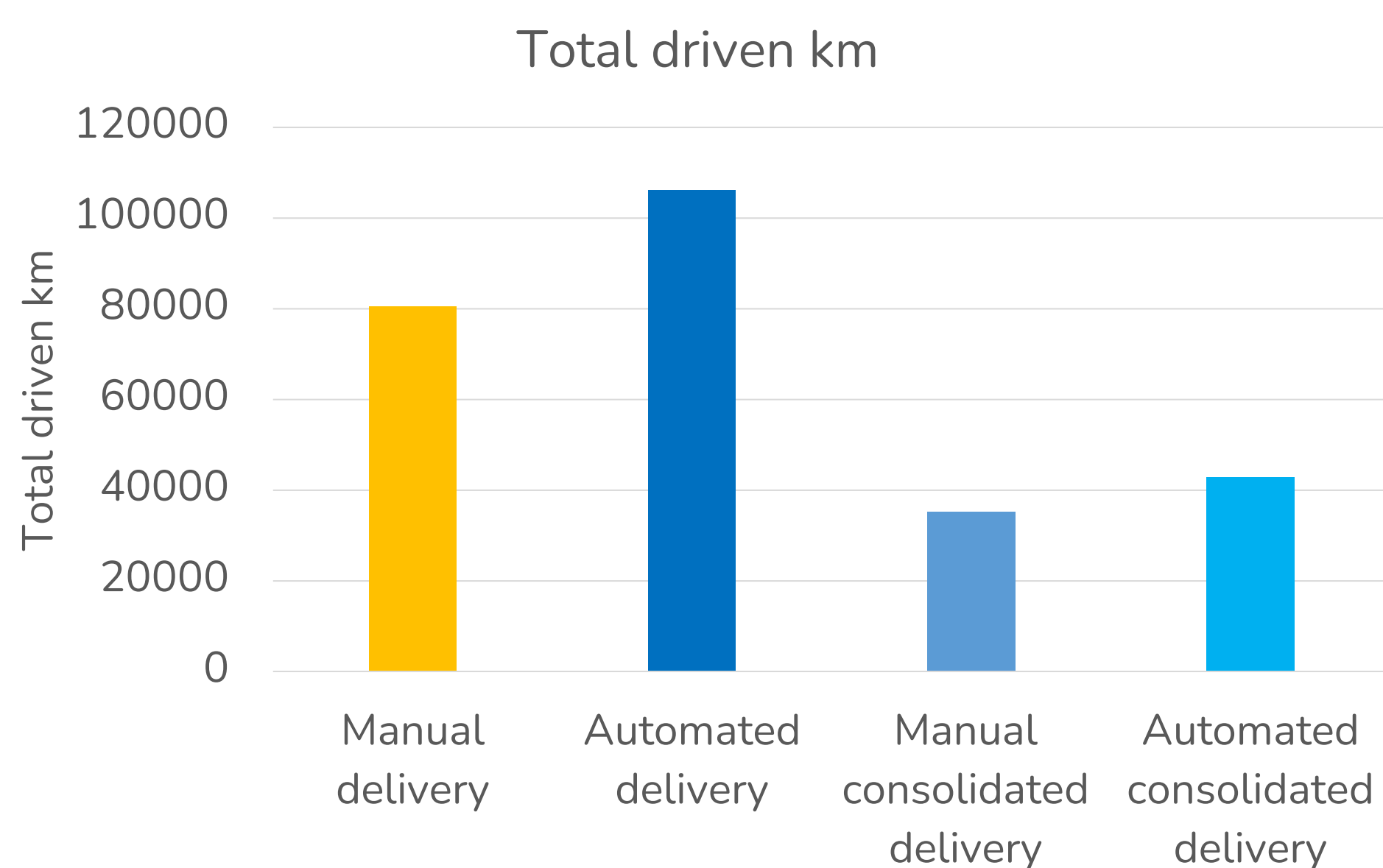
Impacts: Costs

- Higher vehicle acquisition / depreciation costs
- Additional costs for delivery robots
- Cheaper insurance and upkeep
- No driver costs but costs for monitoring personnel
- Less vehicles required for the same delivery capacity



Impacts: Freight Mileage

- Mileage increases due to lower capacities of robo-vans
- Delivery mileage reduces with consolidation
- Automated delivery can operate in three shifts (two during the day and one at night)
→ Less overlap with traffic during peak hours



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