

HUPMOBILE

Simulation in supporting mobility decision-making

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Urban mobility planning

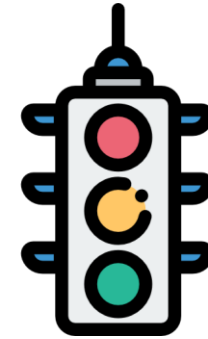
Traffic in urban area



Motorized traffic



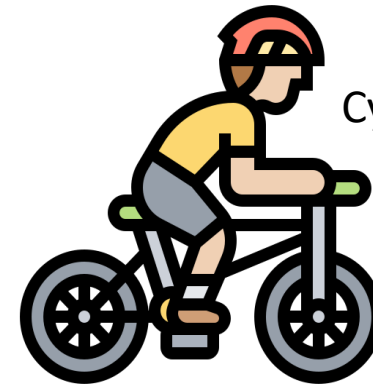
Public transport



Traffic light system

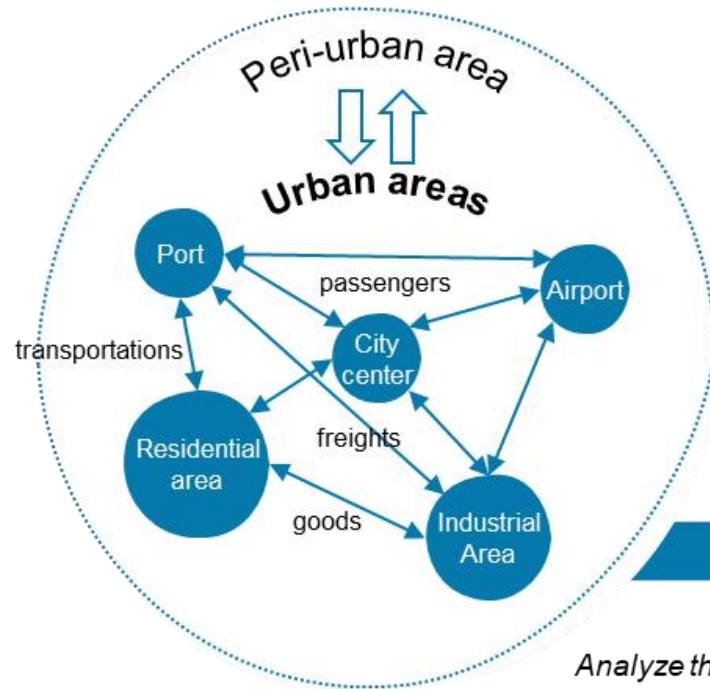


Pedestrians



Cyclists

Simulation in urban mobility planning



Analyze the inbound and outbound transport flows and their interaction

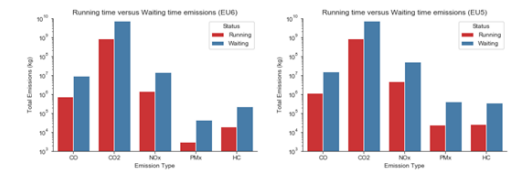


Simulation-based multilevel optimization model



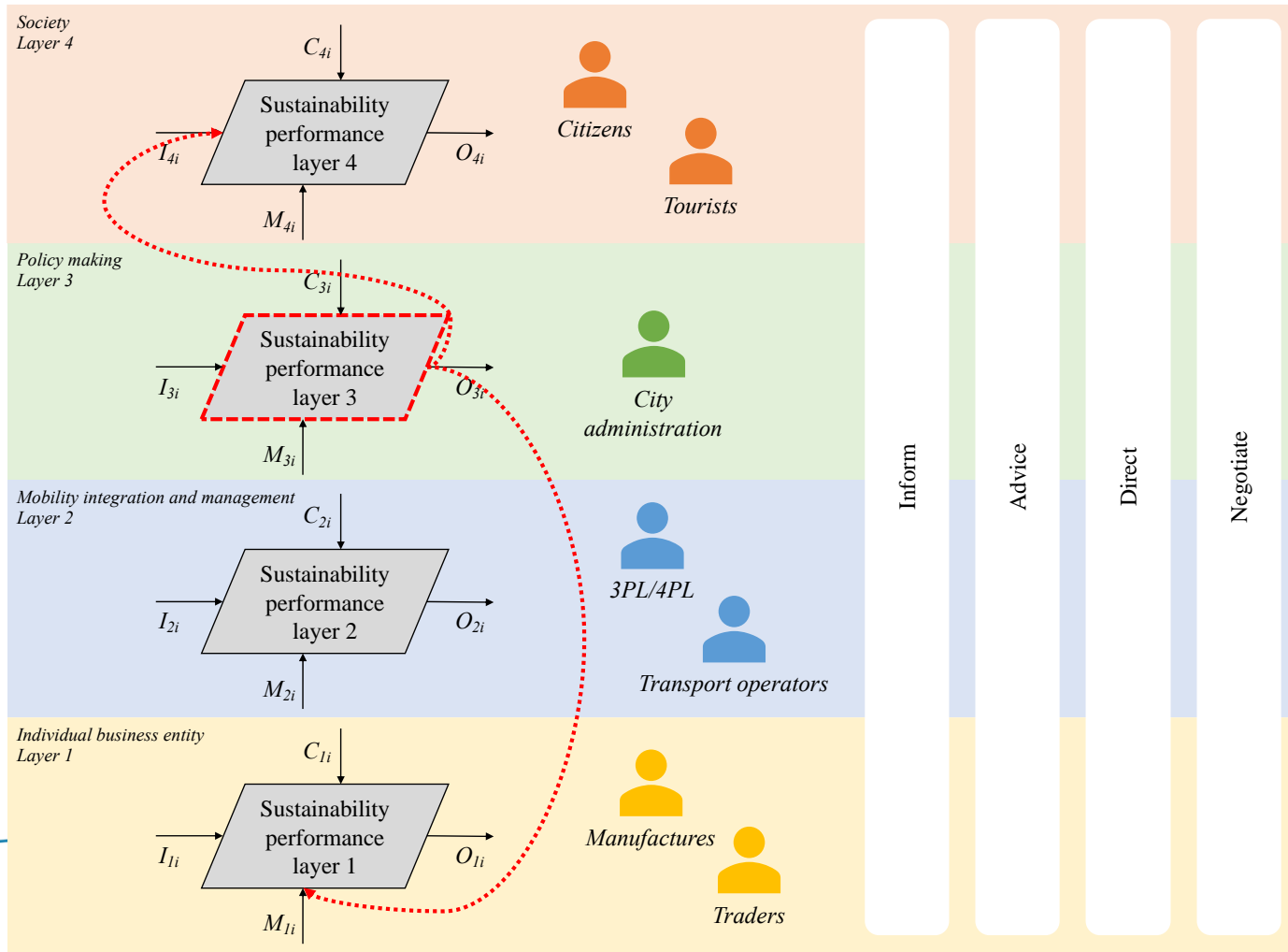
Simulation model

- Waiting time
- Fuel/Power consumption
- Noise level
- Emissions (CO₂, CO, NO_x..)



Total waiting time emissions (EURO 6 vs. EURO 5)

Decision-making framework

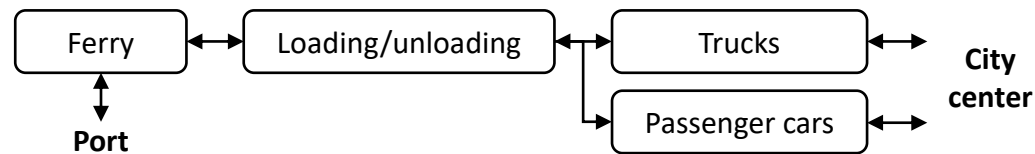


- How to overcome challenges related to decision making in urban production logistics
- Identify the factors from the recent research projects papers
- Facilitate the development of simulation models for urban production logistics

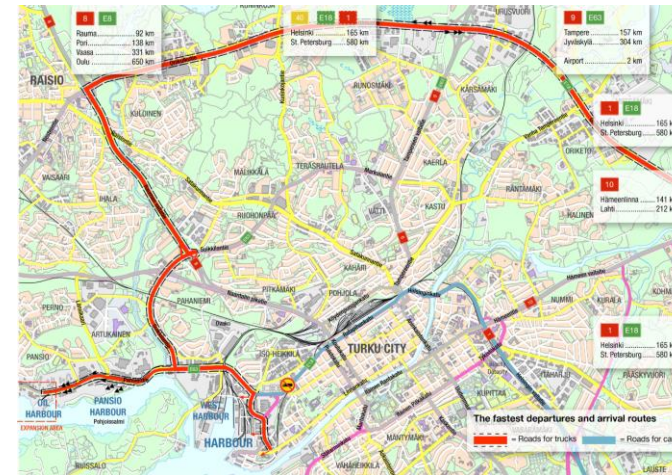
Case 1: Turku, Finland



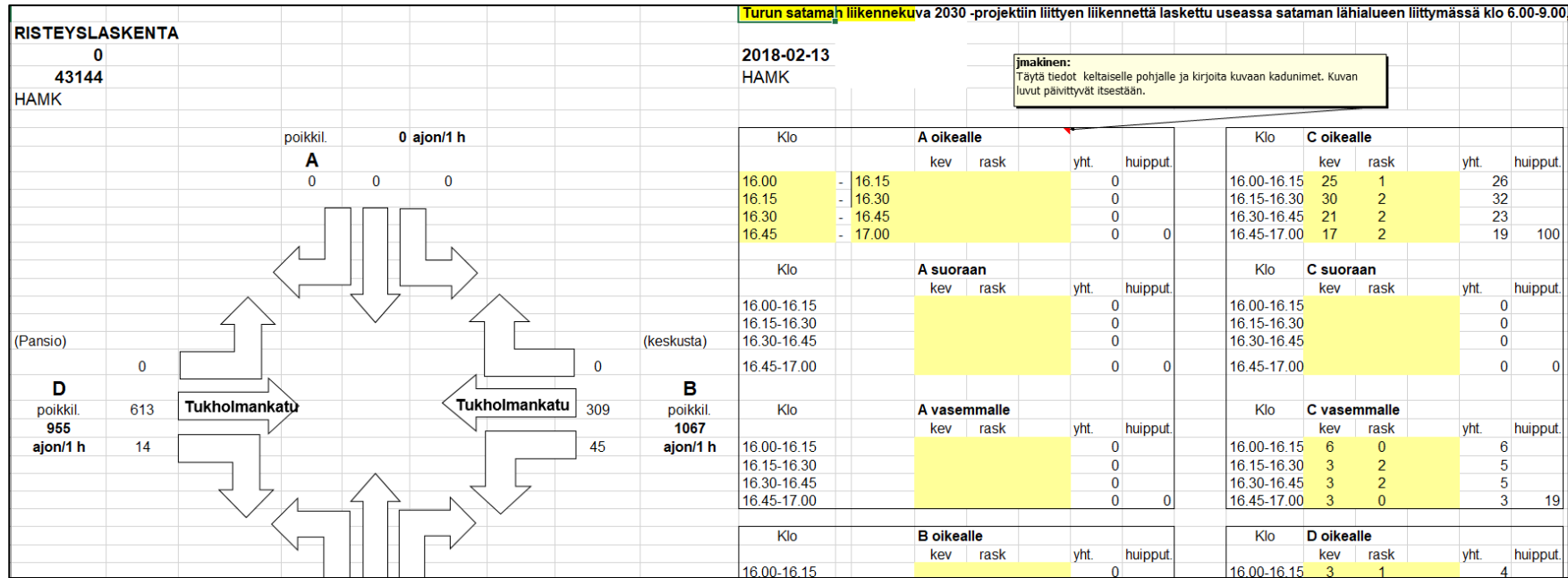
Turku city case



- **Turku city map** imported from OpenStreetMap
- **Truck and passenger car traffic** (from the ferry)
 - # of trucks cargo traffic (import/export) (from Port of Turku cargo statistics)
 - Remaining ferry capacity is assumed to be filled with passenger cars
- **Routes for truck and passenger car**

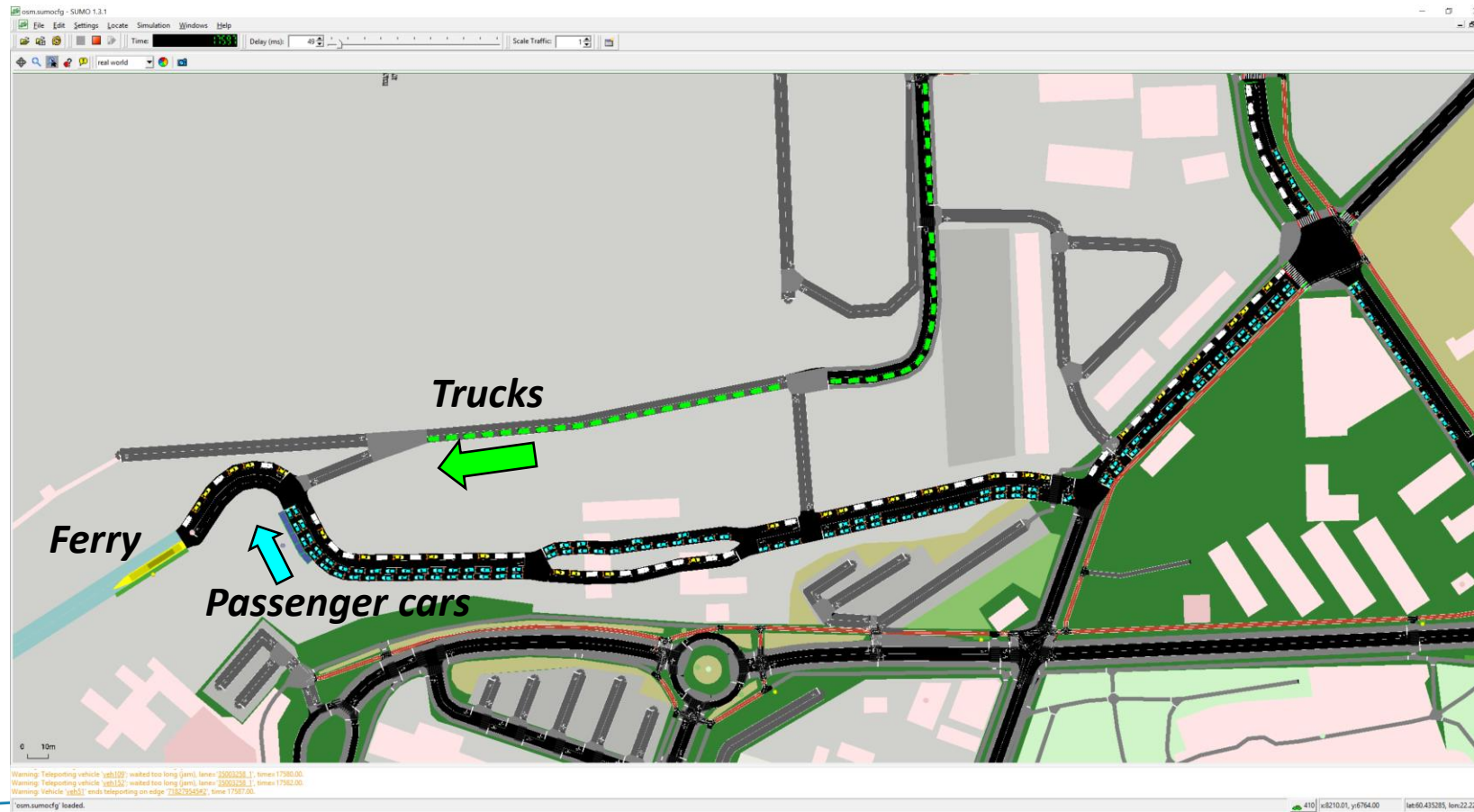


Case 1: Turku, Finland



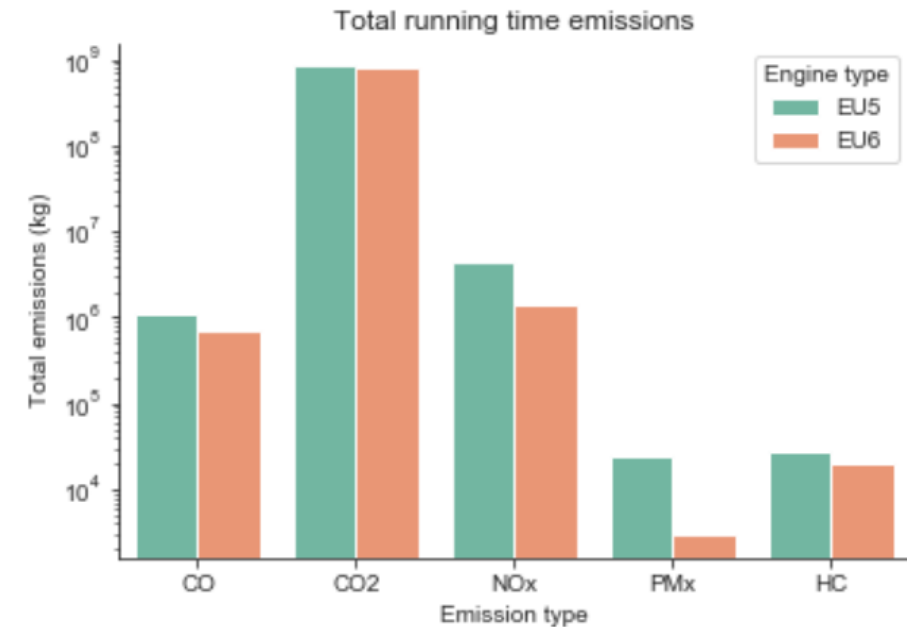
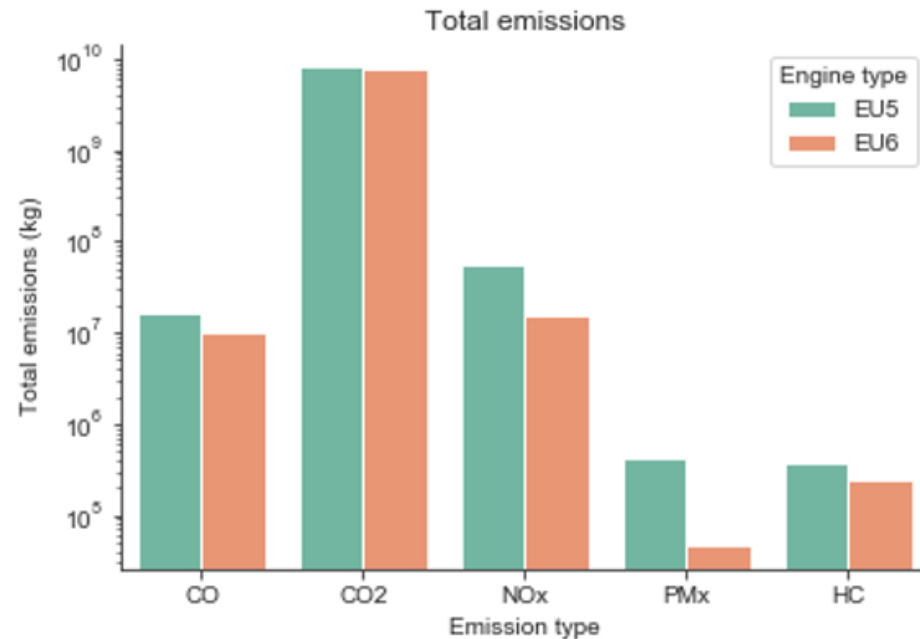
Traffic flow data

Case 1: Turku, Finland



Simulation model in SUMO

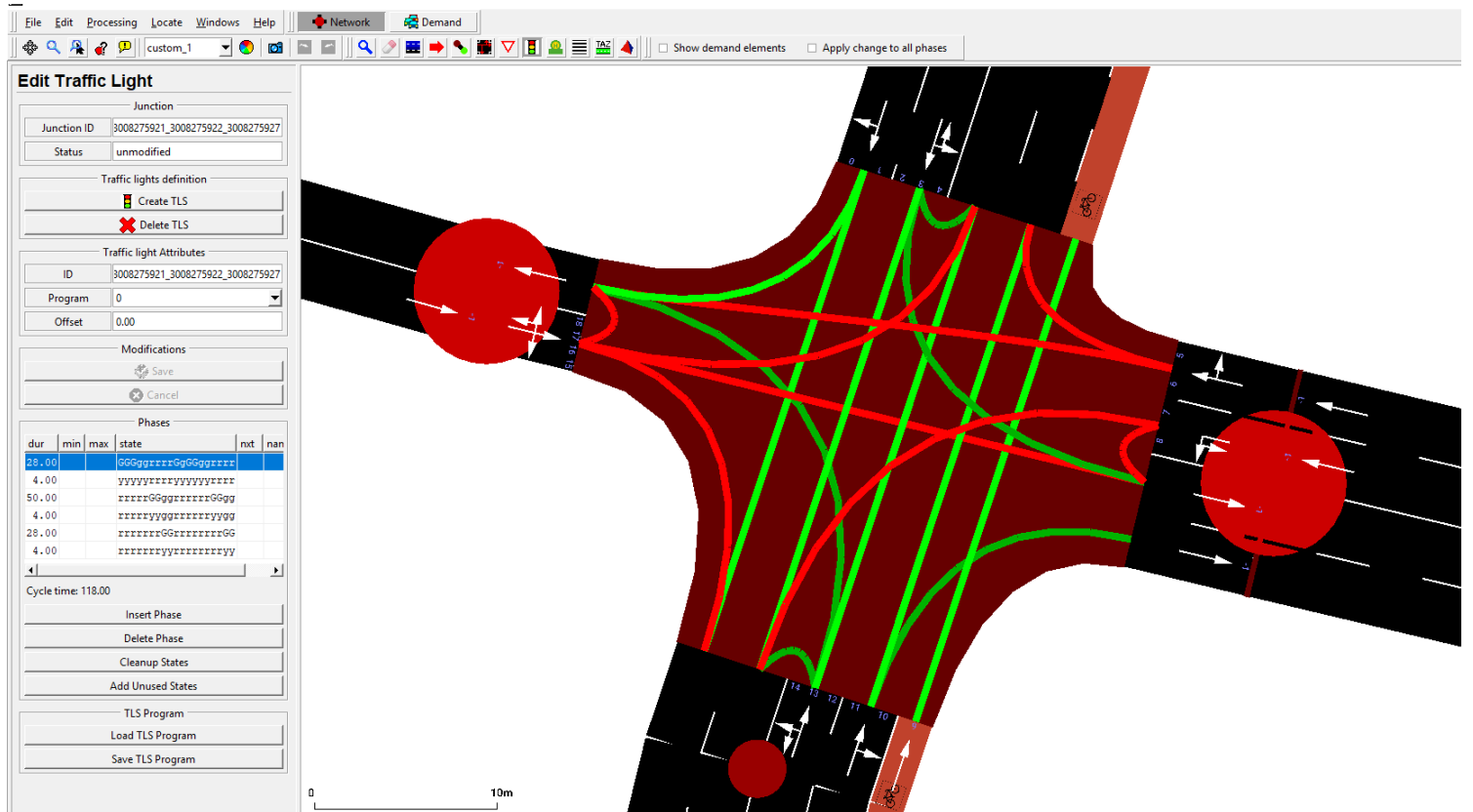
Case 1: Turku, Finland



Simulation results - total amount of emissions

Case 2: Hamburg, Germany

- Traffic light simulation



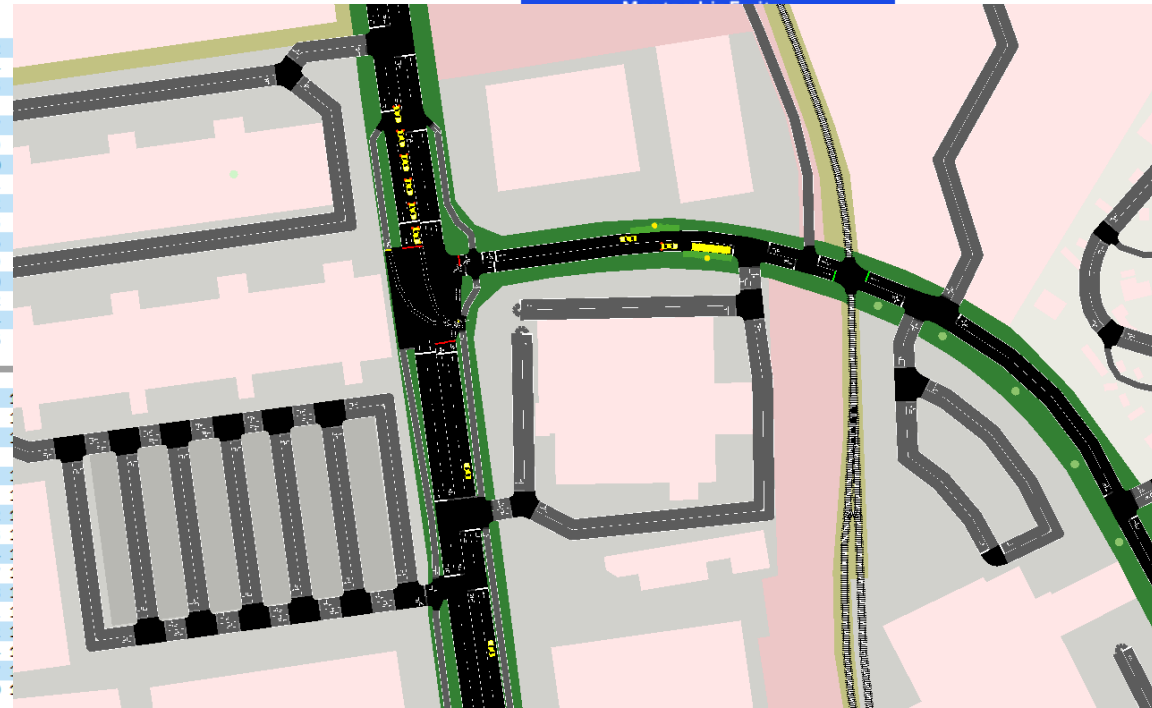
Case 2: Hamburg, Germany



Stellingen – Winsbergring – Diebsteich – Holstenstraße

♦ S-Stellingen.....ab	522	542	600	620	632
♦ Lederstraße.....	524	544	602	622	634
♦ Am Volkspark.....	525	545	603	623	635
♦ Arenen.....					
♦ Schnackenburgallee (Mitte)....	527	547	605	625	637
♦ BAB-Auffahrt Volkspark.....	529	549	607	627	639
♦ Winsberg (Nord).....	530	550	608	628	640
♦ Winsberg (West).....	531	551	609	629	641
♦ Winsberg (Süd).....	532	552	610	630	642
♦ Rondenbarg.....	535	555	613	633	645
♦ Marlowring.....	536	556	614	634	646
♦ Ruhrstraße.....	538	558	617	637	649
♦ S-Diebsteich (Westseite).....	539	559	618	638	650
♦ S-Diebsteich (Ostseite).....	541	601	620	640	652
♦ Kaltenkircher Platz.....	543	603	622	642	654
♦ S-Holstenstraße.....an	544	604	624	644	656

♦ S-Stellingen.....ab	1534	1551			
♦ Lederstraße.....	1536	1553			
♦ Am Volkspark.....	1537	1554			
♦ Arenen.....		1557			
♦ Schnackenburgallee (Mitte)....	1539	1559			
♦ BAB-Auffahrt Volkspark.....	1541	1601			
♦ Winsberg (Nord).....	1532	1542	1552	1602	1612
♦ Winsberg (West).....	1533	1543	1553	1603	1613
♦ Winsberg (Süd).....	1534	1544	1554	1604	1614
♦ Rondenbarg.....	1537	1547	1557	1607	1617
♦ Marlowring.....	1538	1548	1558	1608	1618
♦ Ruhrstraße.....	1541	1551	1601	1611	1621
♦ S-Diebsteich (Westseite).....	1542	1552	1602	1612	1622
♦ S-Diebsteich (Ostseite).....	1544	1554	1604	1614	1624
♦ Kaltenkircher Platz.....	1547	1557	1607	1617	1627
♦ S-Holstenstraße.....an	1550	1600	1610	1620	1630

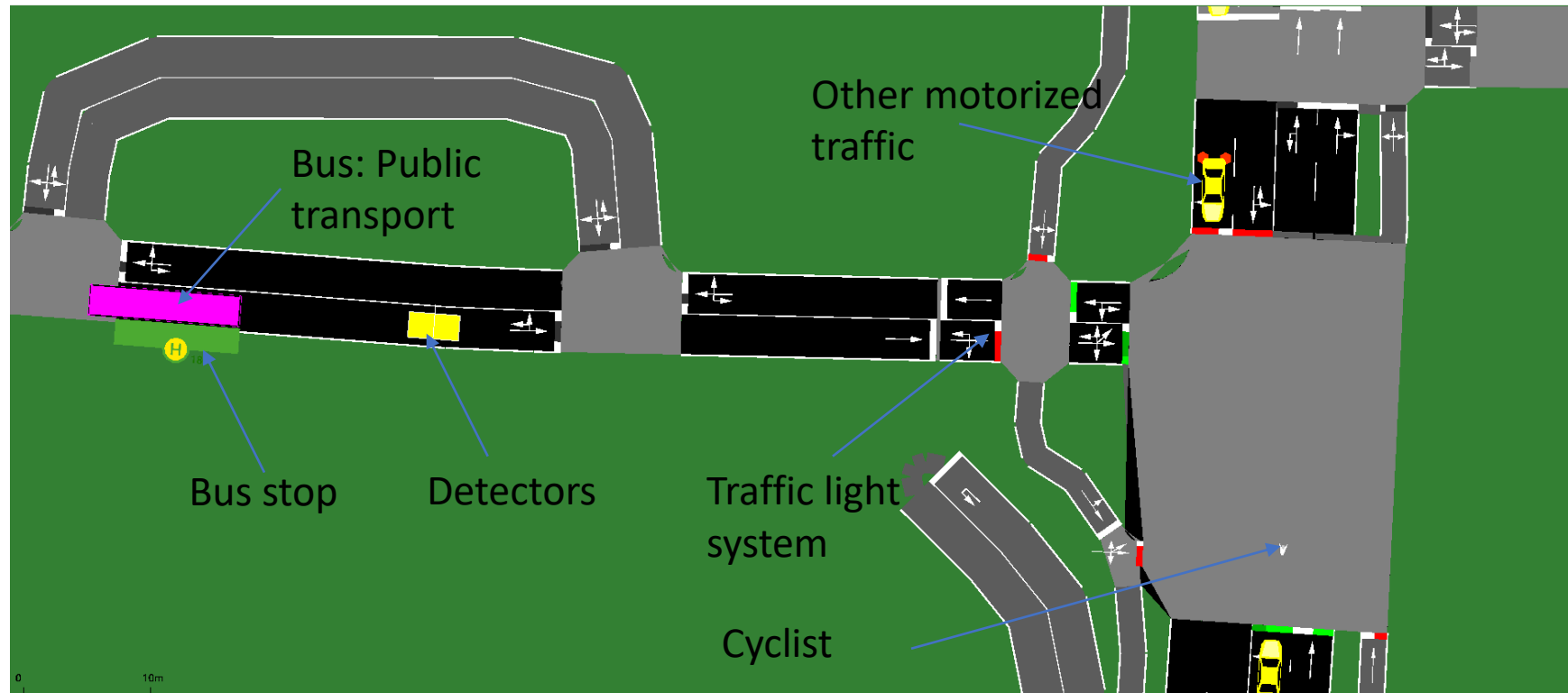


Public transport schedule as an input

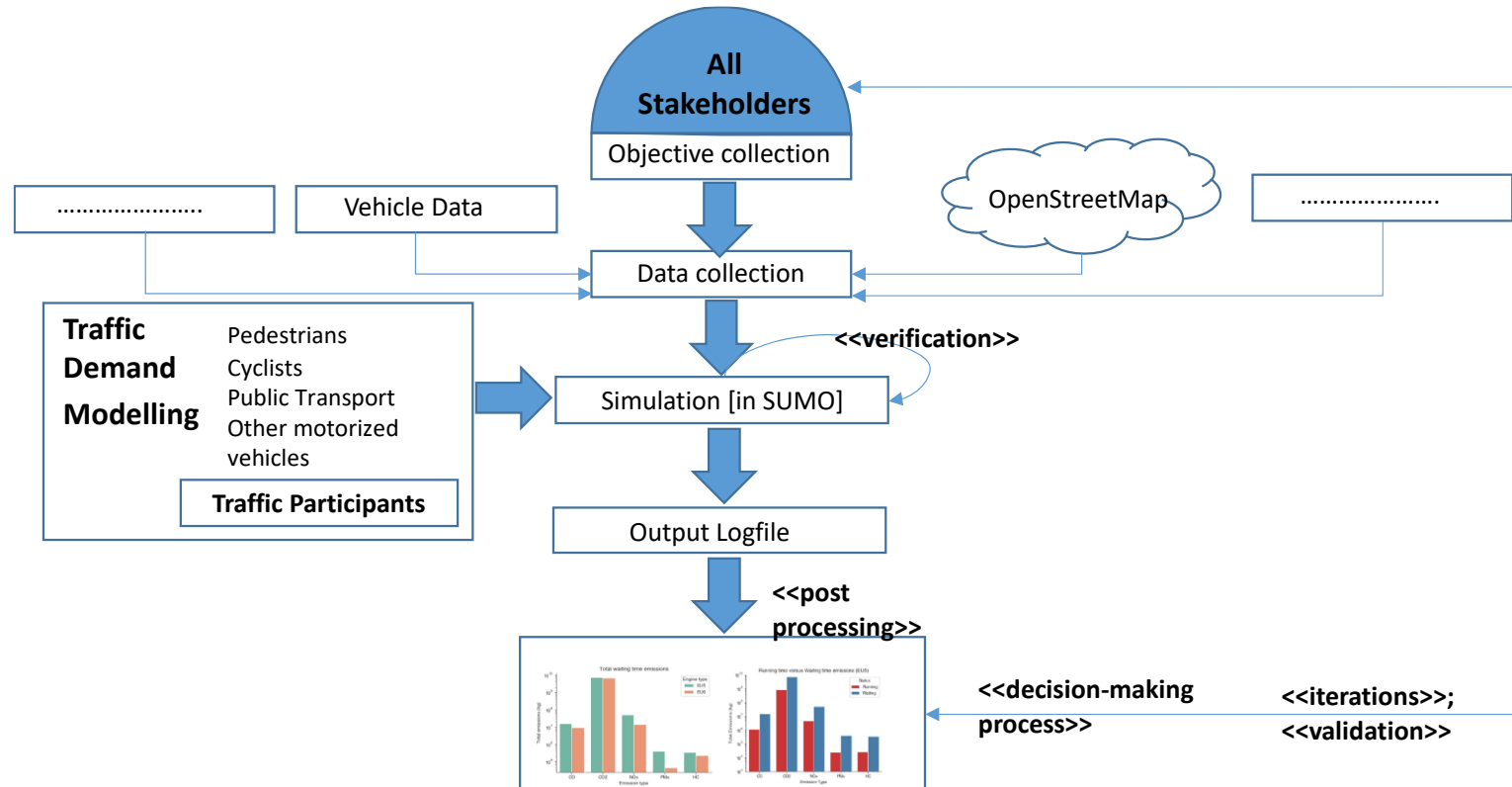


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Case 2: Hamburg, Germany



Simulation model building process





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