MATSim User Meeting 2023
Simulation-based investigation of transport policies - a case study in Gladbeck

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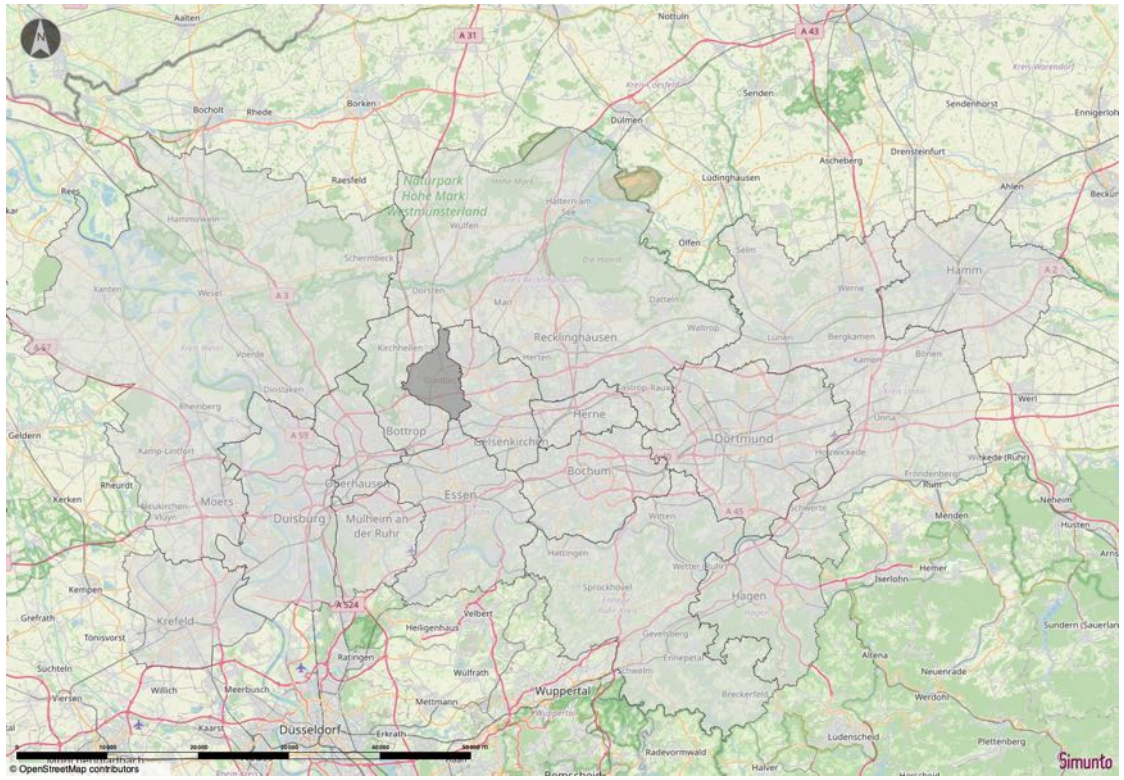
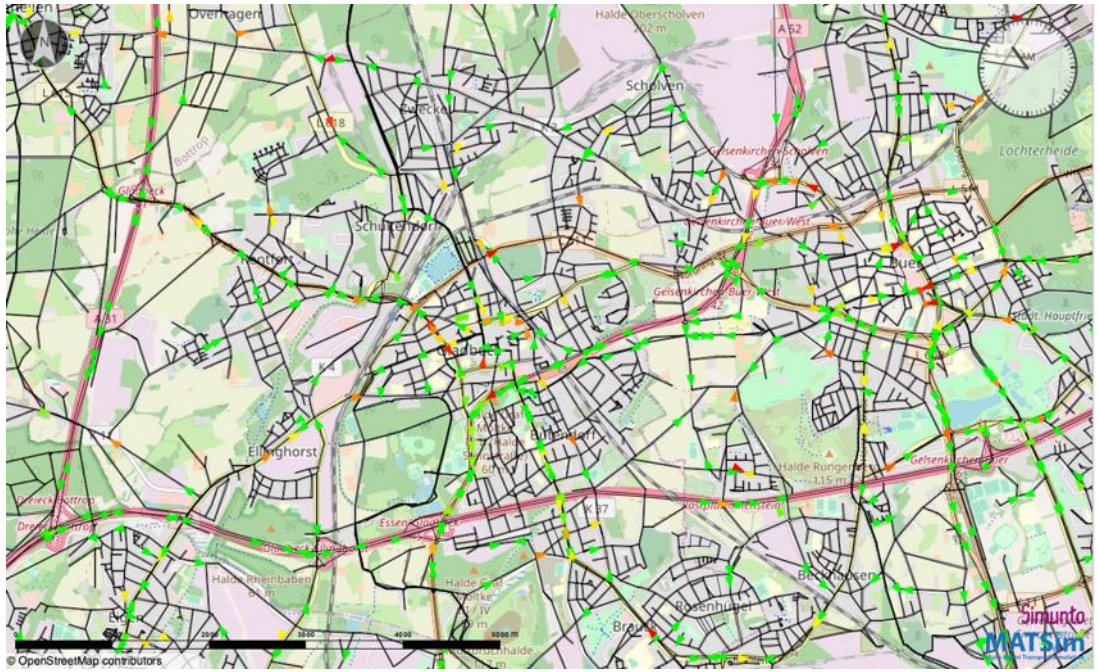
Project: Glamobi



- Car centric city, located in the Ruhr region
- Ambitious project goal:
  - Offer an inclusive mobility system
  - Reduce CO_2 emissions by 2030 by 68 % [1]
  - Reduction of motorized transport

Scenario



- Cut out of the **matsim-metropole-ruhr** scenario
  - Detailed Cycling
  - Parking cost and parameterized parking search traffic
  - Income dependent scoring
- Total 151.305 agents
- Calibrated ASCs to match the modal split [2] but currently recalibrating

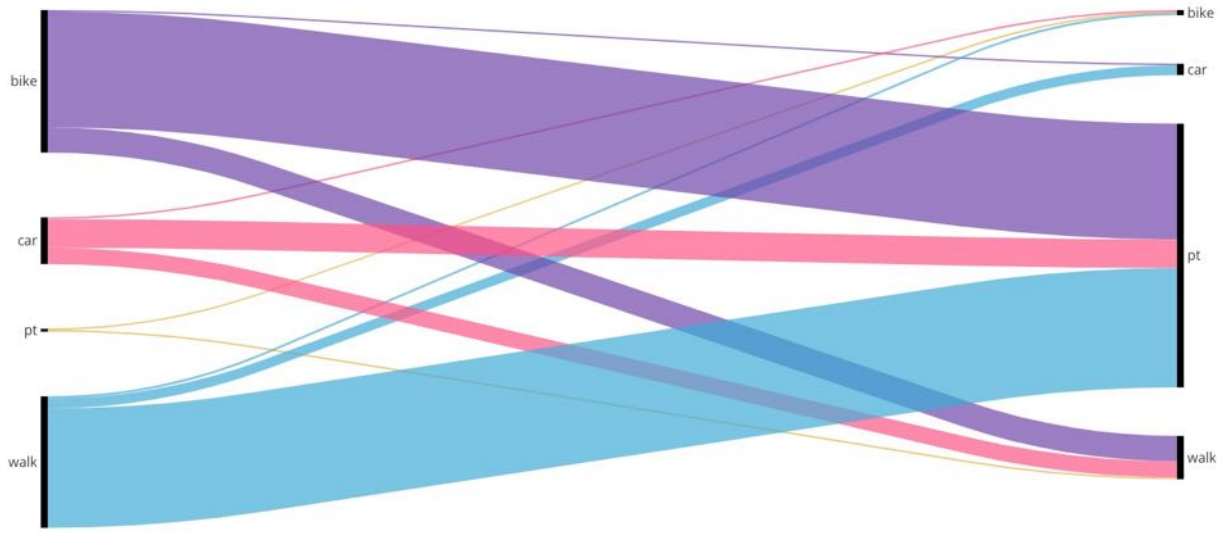
What needs to be investigated?

- Modeling policy cases:
  - Free public transport
  - Introducing a city-wide speed limit of 30 km/h
  - Cycling courses for refugees
  - Improvements to the cycling infrastructure
  - Temporary closing of streets in front of schools
  - Climate Coin

Speed Limit

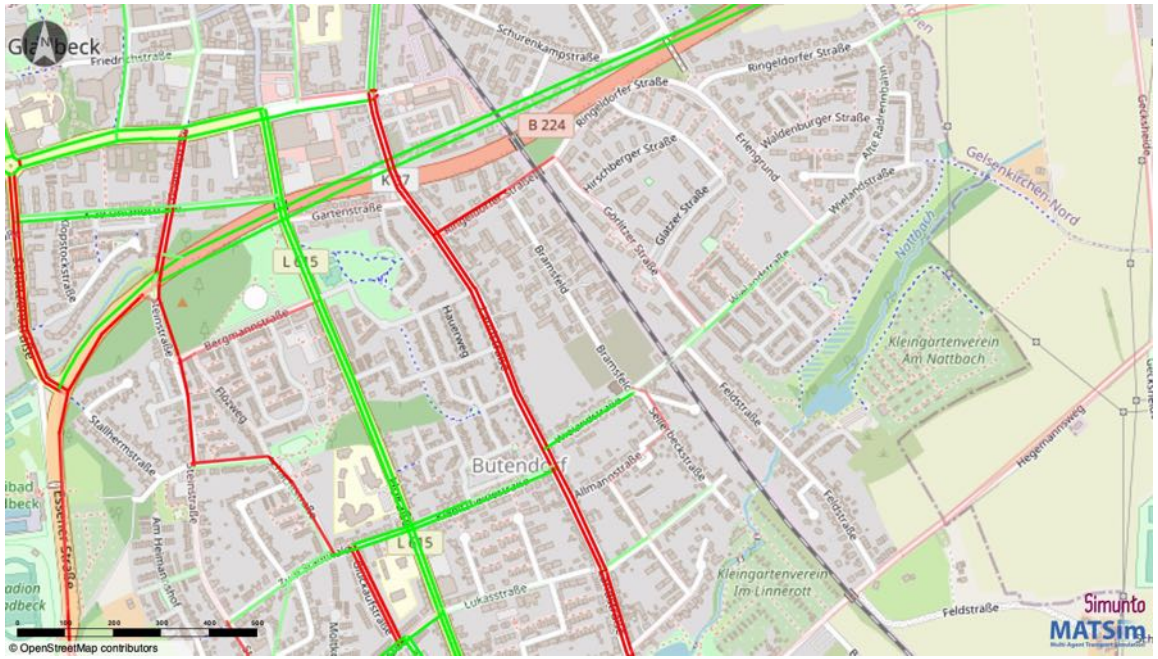
- Multiply free speed by 0.6 on every link within Gladbeck (not motorways)
- Fewer car trips but rise in CO_2 emissions
- Average and total car trip distance increased;
- Average car speed reduced by a factor of 0.22 inside the city

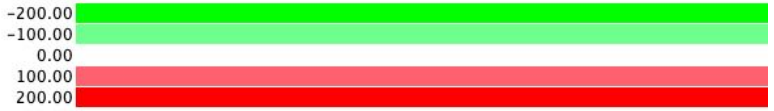
Free Public Transport



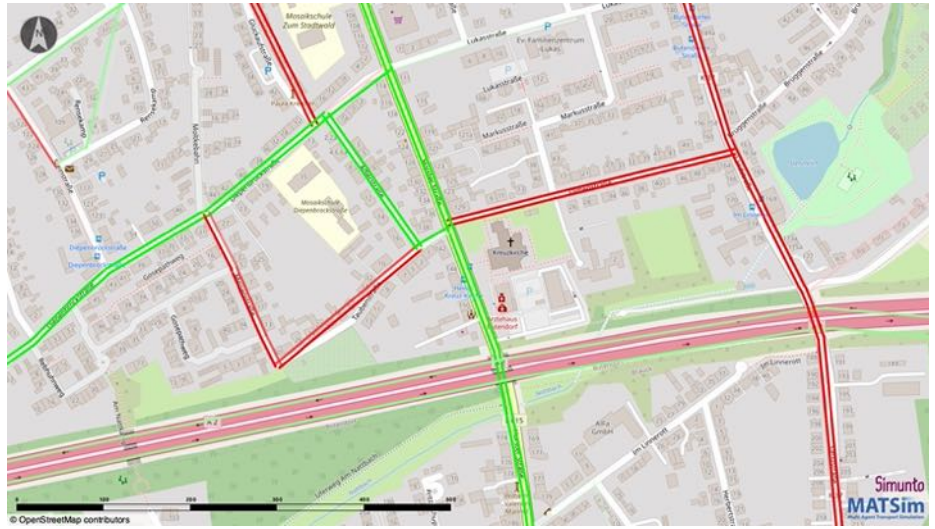
- Setting the cost of the public transport to zero
- More trips with public transport but at the cost of walk and bike
- Especially more short trips with public transport
- Agents with a lower income tend to use the public transport

Temporary closing of school streets

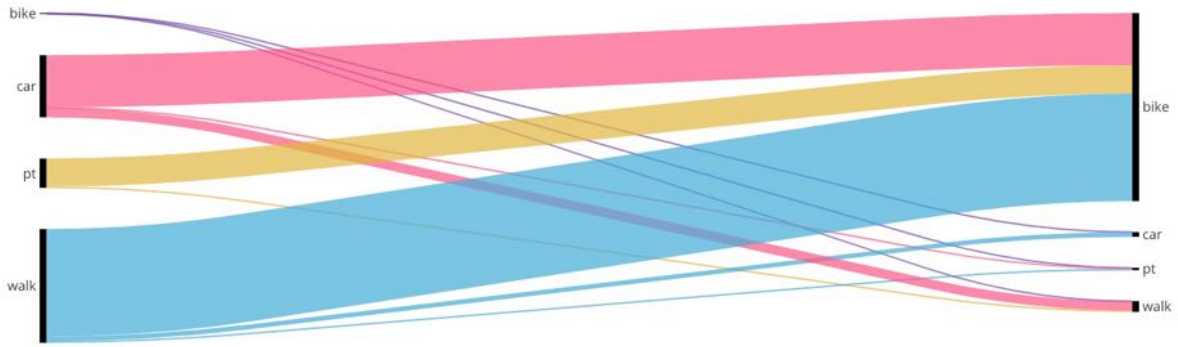




- Utilizing network change events to set capacity and free speed close to zero
- Congestion on one alternative link

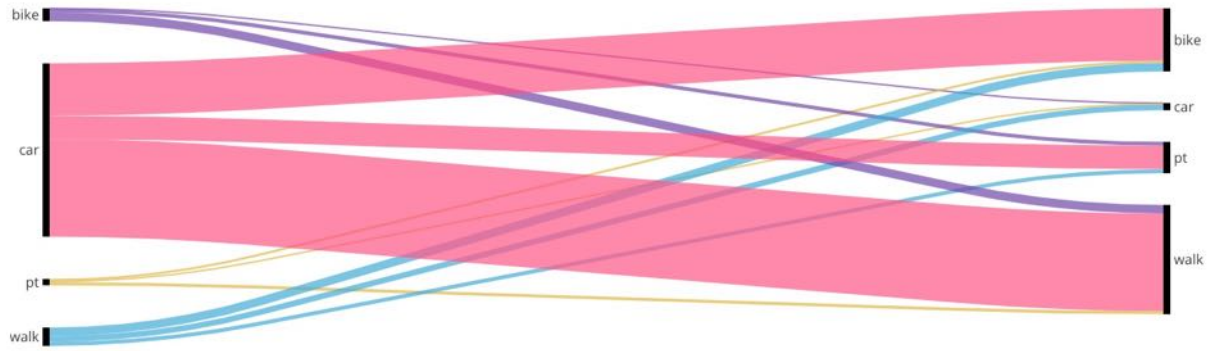


Cycling improvements



- Surface improvements → all surfaces are modelled as asphalt:
  - Only small changes as most links are already asphalt
- Faster cyclists → Doubling cycling speeds to 25 km/h in Gladbeck:
  - Biggest increase in cycling at the cost of walk and public transport

Cycling improvements



- Bicycle ctreets → residential streets are closed for car traffic:
  - Agents still using the transport mode car must walk to the nearest car link
- Cycle paths → every link in Gladbeck receives a separate cycling path

Climate Coin

[3]

These are the CO2 savings that are stored in our Climate Coin app:

Running = 176 g/km CO2 saving
Cycling = 176 g/km CO2 saving
Public transport = 76 g/km CO2 saving
Long-distance trains = 95 g/km CO2 saving

[4]

- Agents receive a monetary reward for cycling, walking and using public transport
- Reward is calculated using the travelled distance per mode

Discussion

policy	bike	car	pt	walk
free public transport	-4,8	-1,6	9,1	-2,6
closed school streets	0,5	-1,6	0,6	0,5
cycling streets	1,8	-4,8	1,0	2,1
cycle paths	0,7	-0,6	0,0	-0,1
faster cyclist	11,0	-3,6	-1,7	-5,7
climate coin 1EUR	0,7	-1,6	-0,3	1,2
climate coin 5EUR	4,7	-7,4	-0,9	3,6
climate coin 10EUR	10,8	-14,3	-0,9	3,6
speed limit	0,7	-1,7	0,5	0,6
smooth surface	0,2	-0,6	0,2	0,2

Table 1: Modal Shift all figures in [%]

policy	CO_2	NO_x	PM
free public transport	-2,5	-2,4	-2,3
closed school streets	-1,7	-1,7	-1,6
cycling streets	-12,5	-13,1	-12,9
cycle paths	-0,2	-0,4	-0,3
climate coin 1EUR	-1,2	-1,2	-1,2
climate coin 5EUR	-10,2	-10,2	-10,0
climate coin 10EUR	-24,3	-24,2	-24,0
faster cyclist	-4,8	-4,8	-4,6
speed limit	3,5	1,6	2,4
smooth surface	-0,7	-1,0	-1,0

Table 2: Changes in air pollution all figures in [%]

- No policy alone is sufficient
- Combining them to a strategy
- To what extent can electric vehicles help to achieve the goals Gladbeck set?
- Modeling of the remaining policy cases

Discussion

[5]

- Difficult to implement anything in reality
- Cycling courses for refuges → no effect
- Bursche Straße one new cycling path → very negative poll results
- Free public transport ticket → fewer trips with public transport

Future challenges

[6]

Any questions?

References

- [1] Gertec GmbH Ingenieurgesellschaft. (2022, January). Stadt Gladbeck Fortschreibung des Kli-
  maschutzkonzeptes (Tech. Rep.). Gertec GmbH Ingenieurgesellschaft and Stadt Gladbeck. (Retrieved
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- [2] infas, DLR, & IVT. (2019). Mobilität in Deutschland 2017 – Ergebnisbericht (Tech. Rep.). Retrieved
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- [4] changers (2023, September). How do CO2 savings become climate coins? (Retrieved from: https://klima-taler.com/co2-savings-become-climate-coins/)
- [5] nexus Institut (2023, September). GlaMoBi – Gladbecker Mobilität für Alle. Innerstädtische und interkommunale Neuorientierung urbaner Personenverkehre. (Retrieved from: https://www.zukunft-nachhaltige-mobilitaet.de/gladbecker-mobilitaet-fuer-alle-glamobi-innerstaedtische-und-interkommunale-neuorientierung-urbaner-personen-und-lieferverkehre/)
- [6] BUND Region Hannover. Die "Wander"-Bäume ziehen los! (Retrieved from: https://bund-region-hannover.de/service/meldungen/detail/news/die-wander-baeume-ziehen-los/)