Autonomous vehicles: The next step in accessibility?

Bevorzugter Zitierstil für diesen Vortrag

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Autonomous vehicles: The next step in accessibility ?

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Expected changes and challenges

Expected changes

Autonomous vehicles:

- Management of the transition until 2025-2040
- Reorganisation of public transport by new fleet operators
- Mobilisation of all current non-car users
- Accessibility gains and related urban sprawl

Behavioural changes:

- On-line shopping growth and its delivery services (drones, delivery robots, delivery points, autonomous delivery/pick-up)
- Timing and location of work
- (Scale of formal work)

Challenges

Making the Paris 2015 real:

- Electrification of regional traffic
- Continuing growth in long distance travel/freight

Balancing work/home locations:

- ‚Optimal' built density (m^3/km^2) and human density (m^2/head)
- Balanced road use (noise, emissions, quality of stay)

CBDs with radically fewer/other retail outlets

Aging of society

Potential loss of control of traffic flow

- What can the public still do ?

Expected AV impacts

Some expected AV impacts

- New travellers in Switzerland:
  - Between 6 and 17: 2.3%
  - Between 65 and 80: 3.3%
  - Over 80: 3%

- Volume of empty trips: 18-53% of current car flows

- Additional capacity:
  - + 78% (Friedrich, 2015)
  - + 270% (Tientrakool et al., 2011)

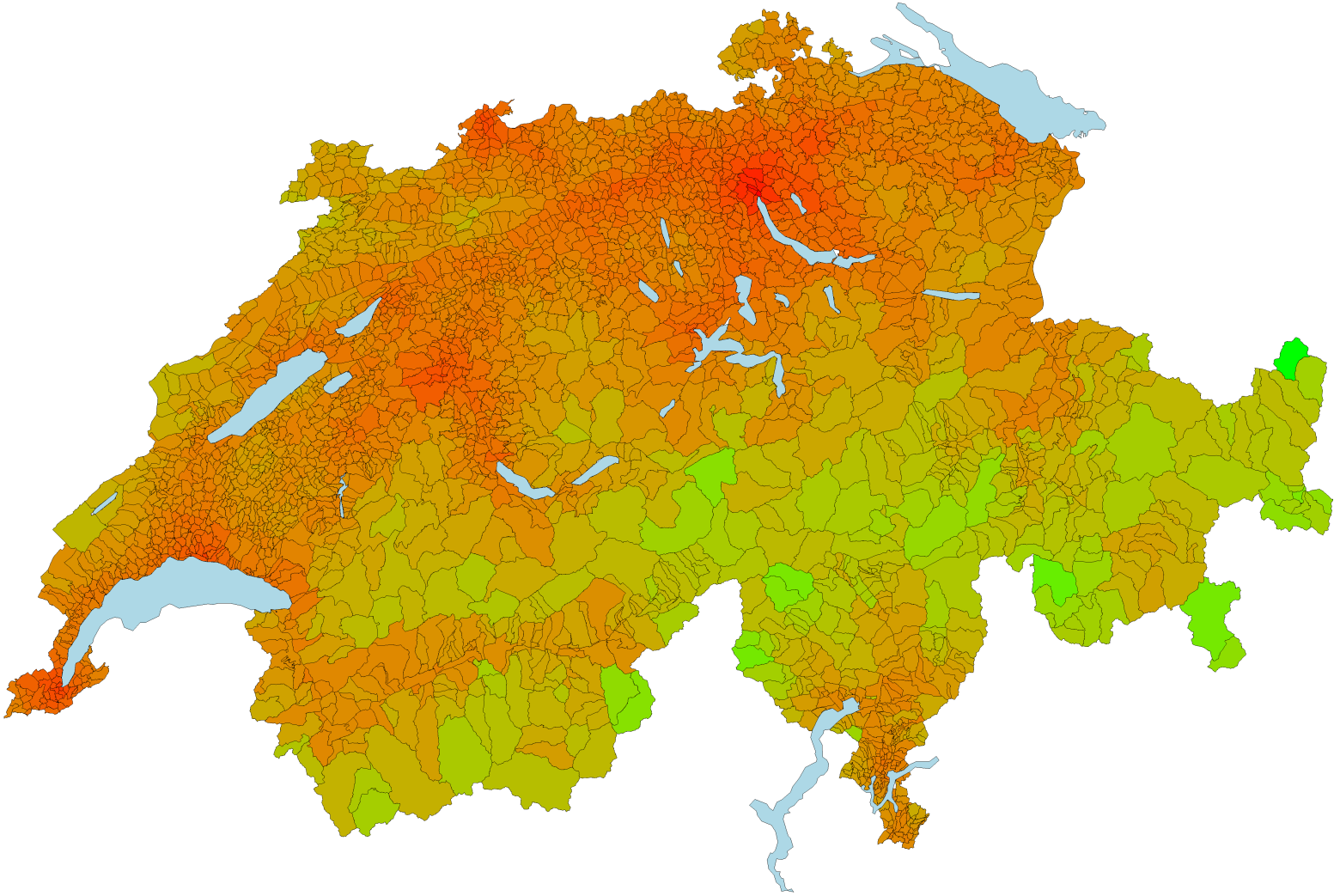
Some expected AV impacts

- Lower per km costs:
  - Shared fleets (between 10-30% of the current Swiss fleet depending on service levels (See Bösch et al., forthcoming)
  - Market power in purchasing and servicing the fleet
  - Electrified fleet
  - Vehicle pooling, say doubling of the current car occupancy (see Dubernet, Rieser-Schüssler and Axhausen, 2013)

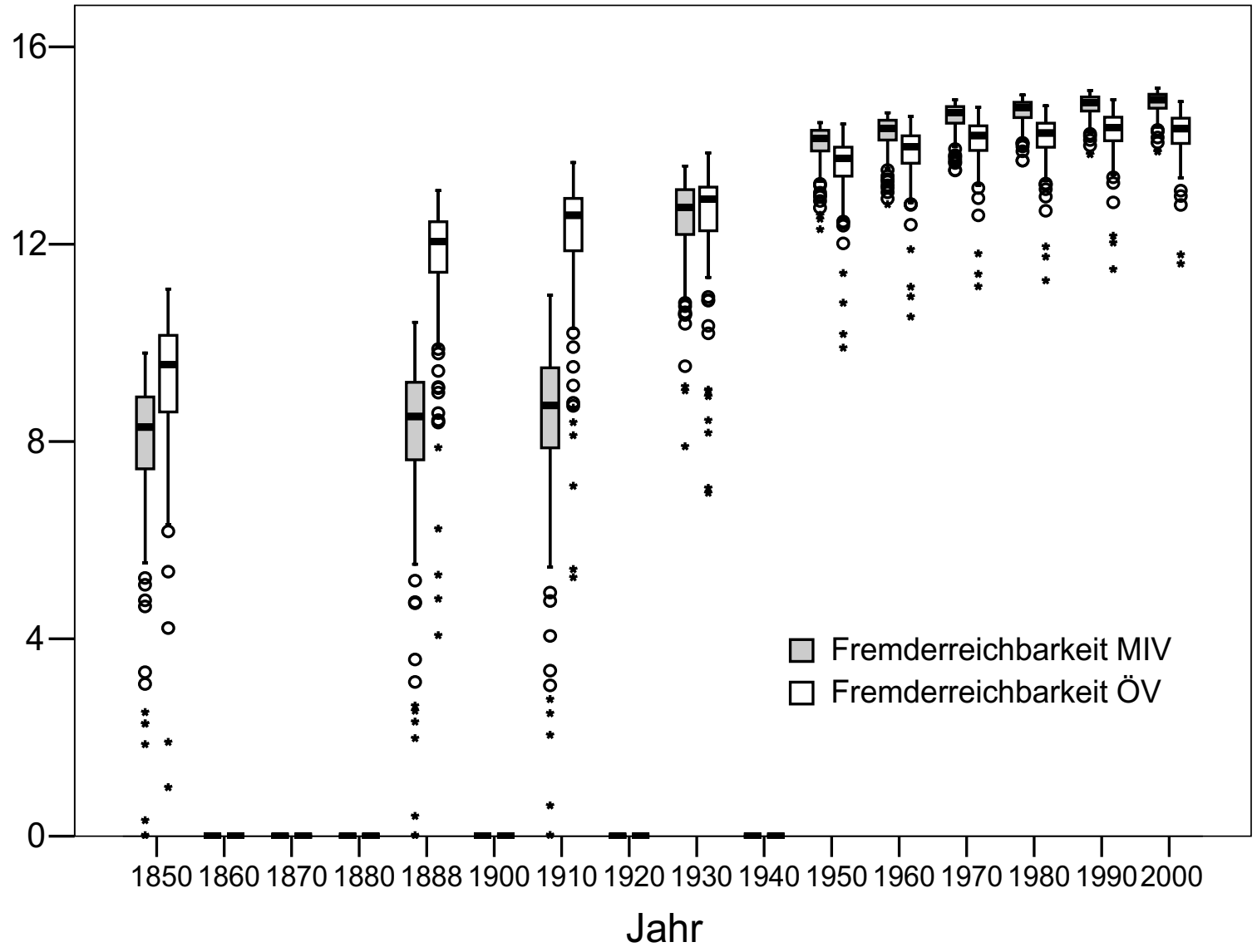
- More comfort and time usability during the ride

Expected AV impacts on accessibility

Switzerland: current general accessibility



Accessibility of Swiss Bezirke since 1850



Source: Axhausen wt al. (2011)

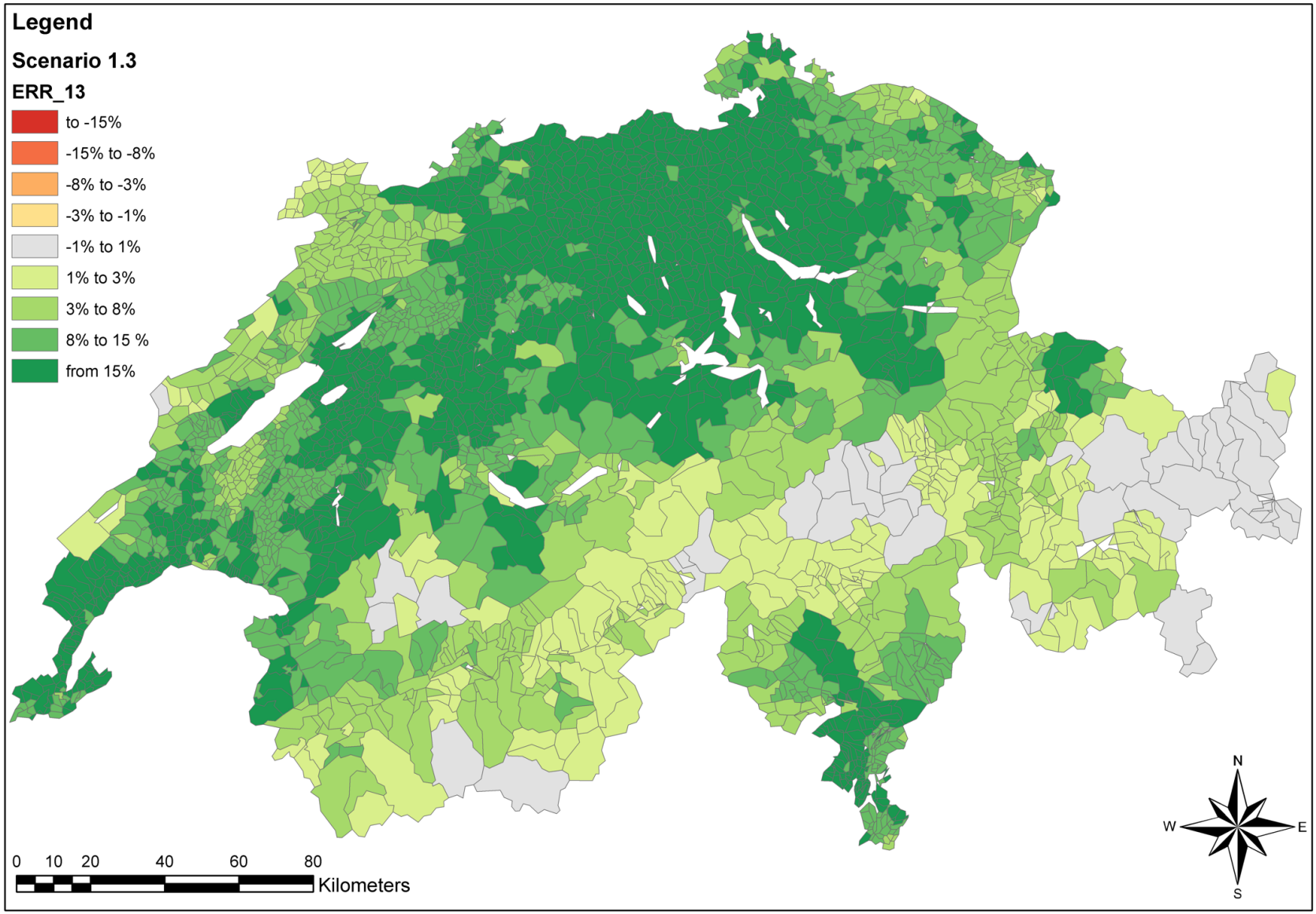
Yes, but

Demand facets	Elasticity wrt accessibility	Elasticity wrt price index
Share out-of-home	0.61	-0.06
Number of trips	0.44	-0.19
Number of trips per journey	0.24	-1.66
Time out-of-home	0.10	-0.84
Daily VMT	1.14	-1.95

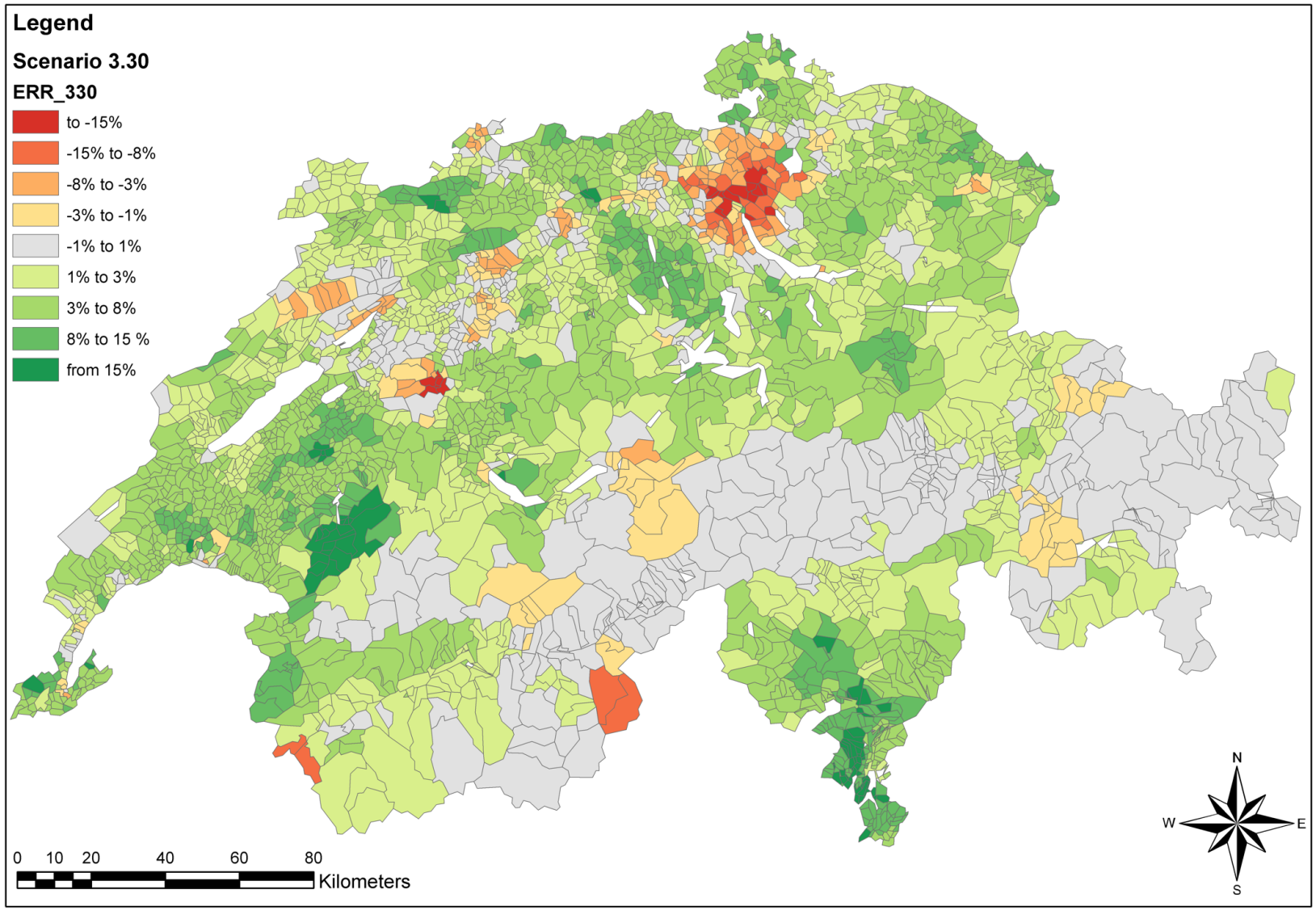
Source: Weis und Axhausen, 2013

Accessibilities after 100% AV introduction

+78% capacity, current demand with 100% private AV



+78% capacity, pooling only, 15% more + 100% of transit



Summary of the very first assumption-driven results

- The future of transit hangs in the balance
- The gains need to be translated into a new balance :
  - More street space for pedestrians and cyclists
  - More street space for pick up/delivery points
  - Rethinking urban form
- New price systems for public transport and low income residents

Questions ?

www.matsim.org

www.ivt.ethz.ch
www.futurecities.ethz.ch

www.senozon.ch

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