E-Bike City

Plan B for sustainable transport?

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E-Bike City: Plan B for sustainable transport?

KW Axhausen

IVT
ETH
Zürich

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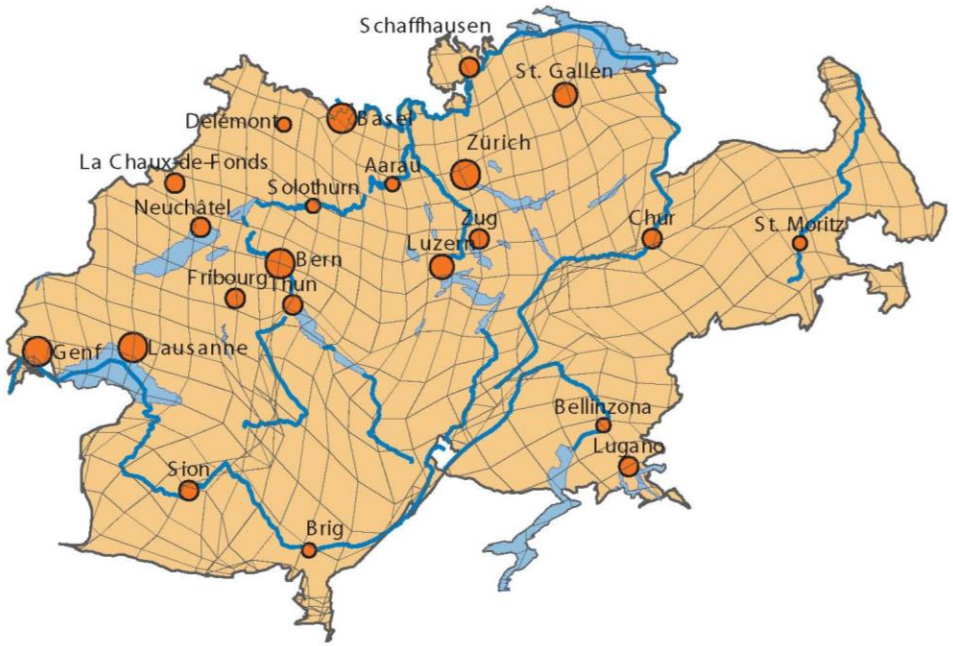
Institut für Verkehrsplanung und Transportsysteme
Institute for Transport Planning and Systems

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

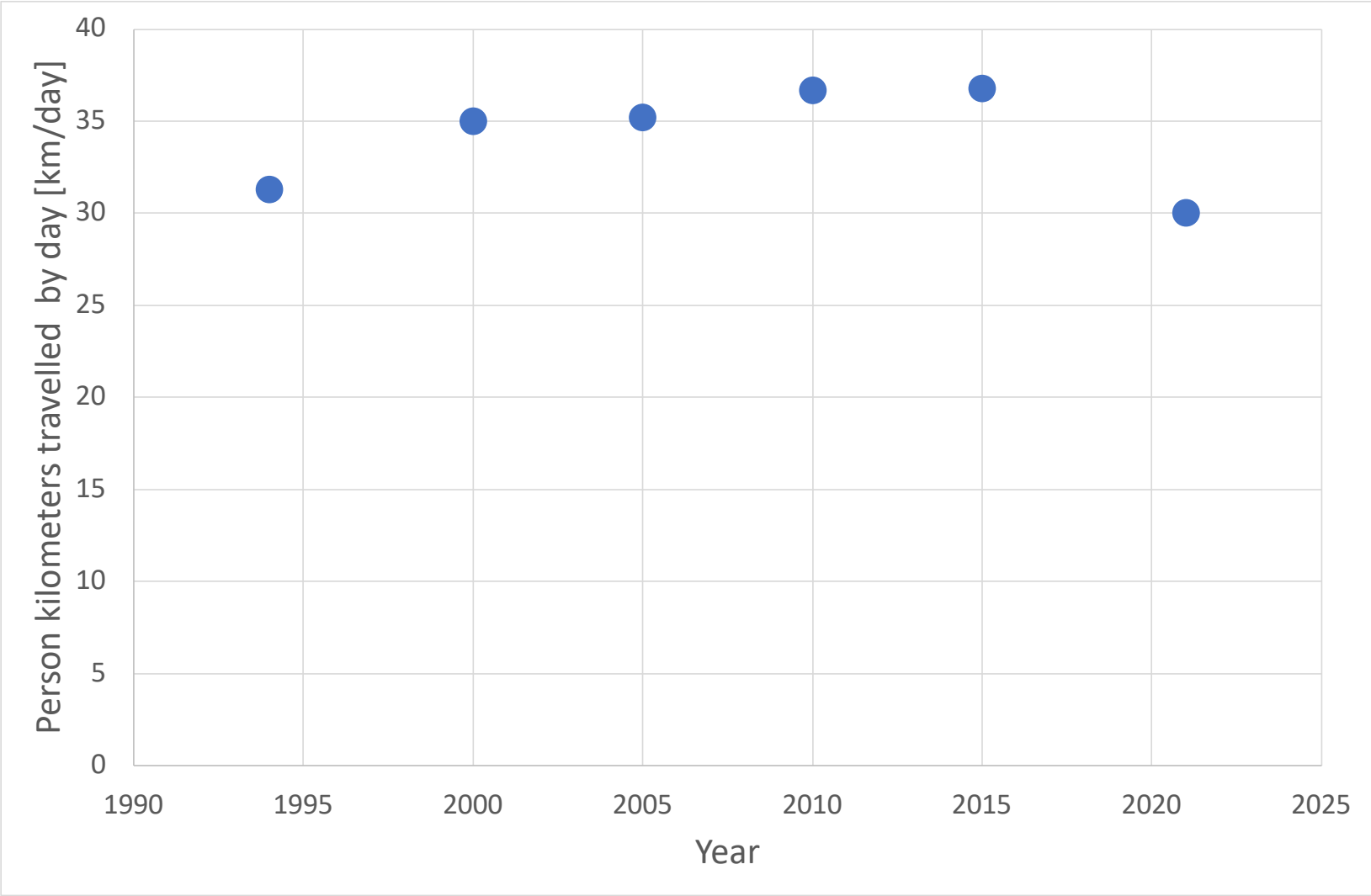
Dilemmas

Shrinking "road" – Switzerland (1950)

Shrinking "road" – Switzerland (2000)



Switzerland: Pkm change since the MZ 1994



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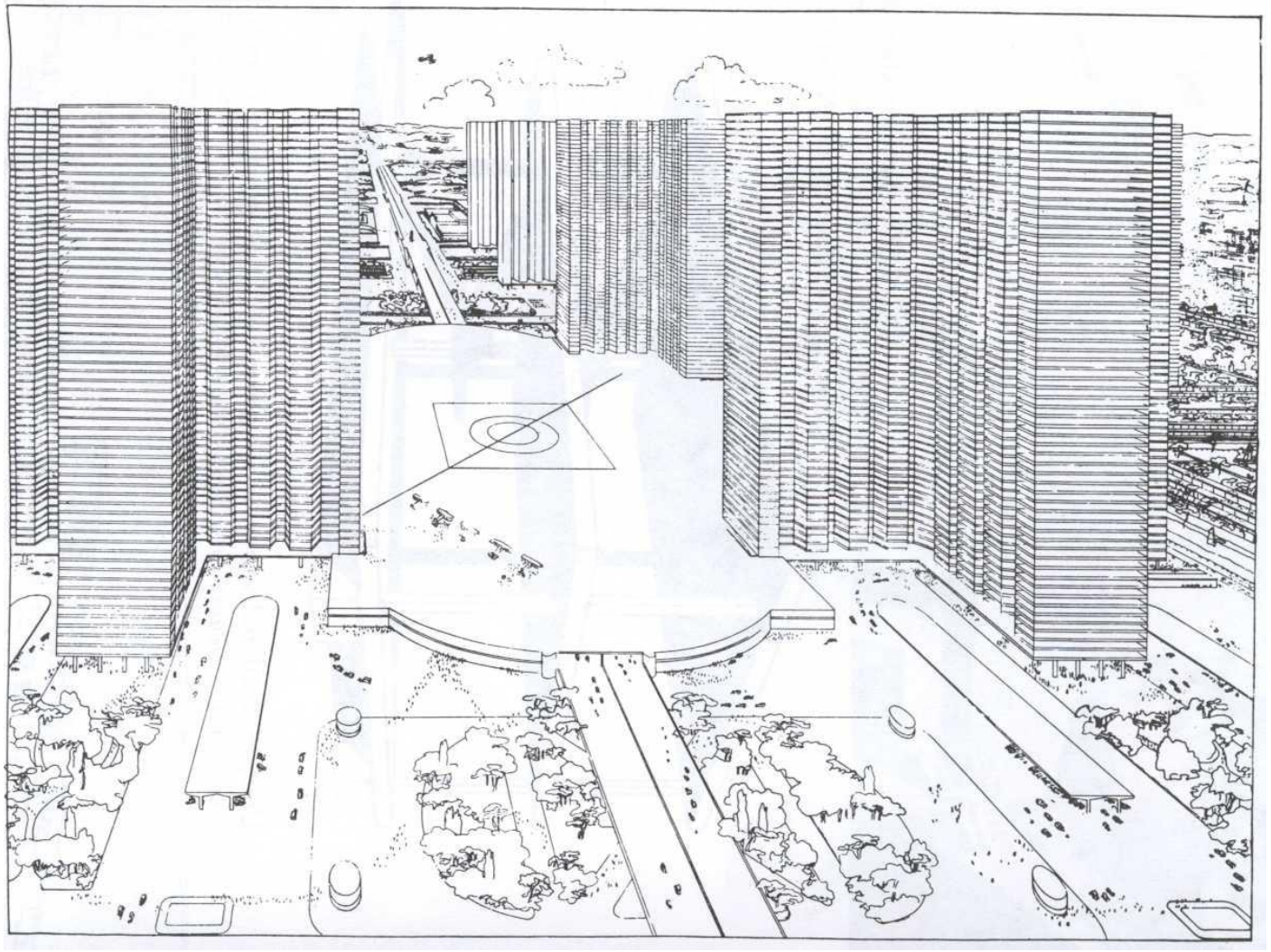
Dilemma today

- Higher accessibility improves productivity and increases social capital

- Higher accessibility (lower generalised cost and/or more people) increases
  - car ownership
  - transport demand and with it
    - GHG emissions
    - Congestion
  - encourages WFH (and lower transit use)
  - invites sprawl

What were the past visions ?

Radical dreams: Le Corbusier's City radieuse



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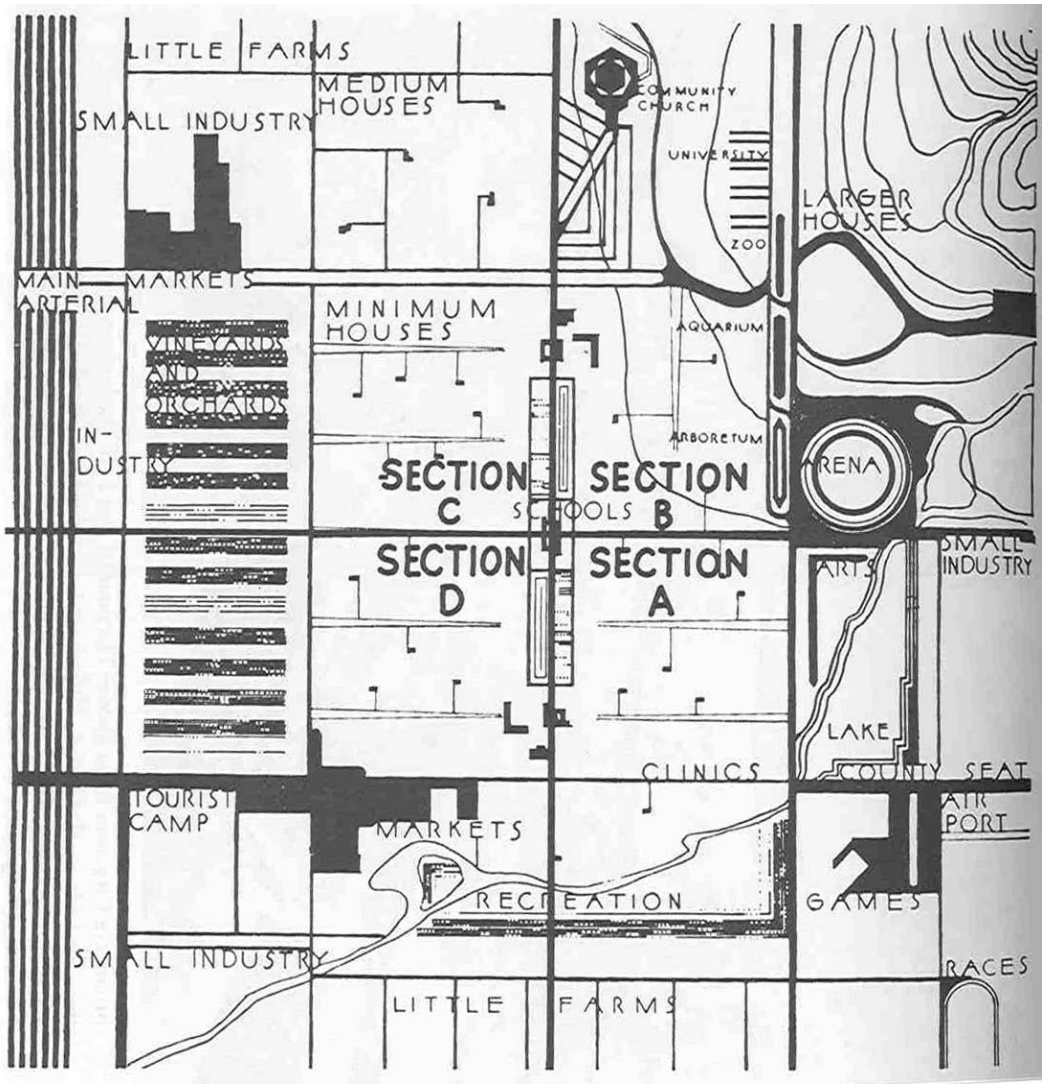
Past radical dreams: Lloyd Wright's Usonia



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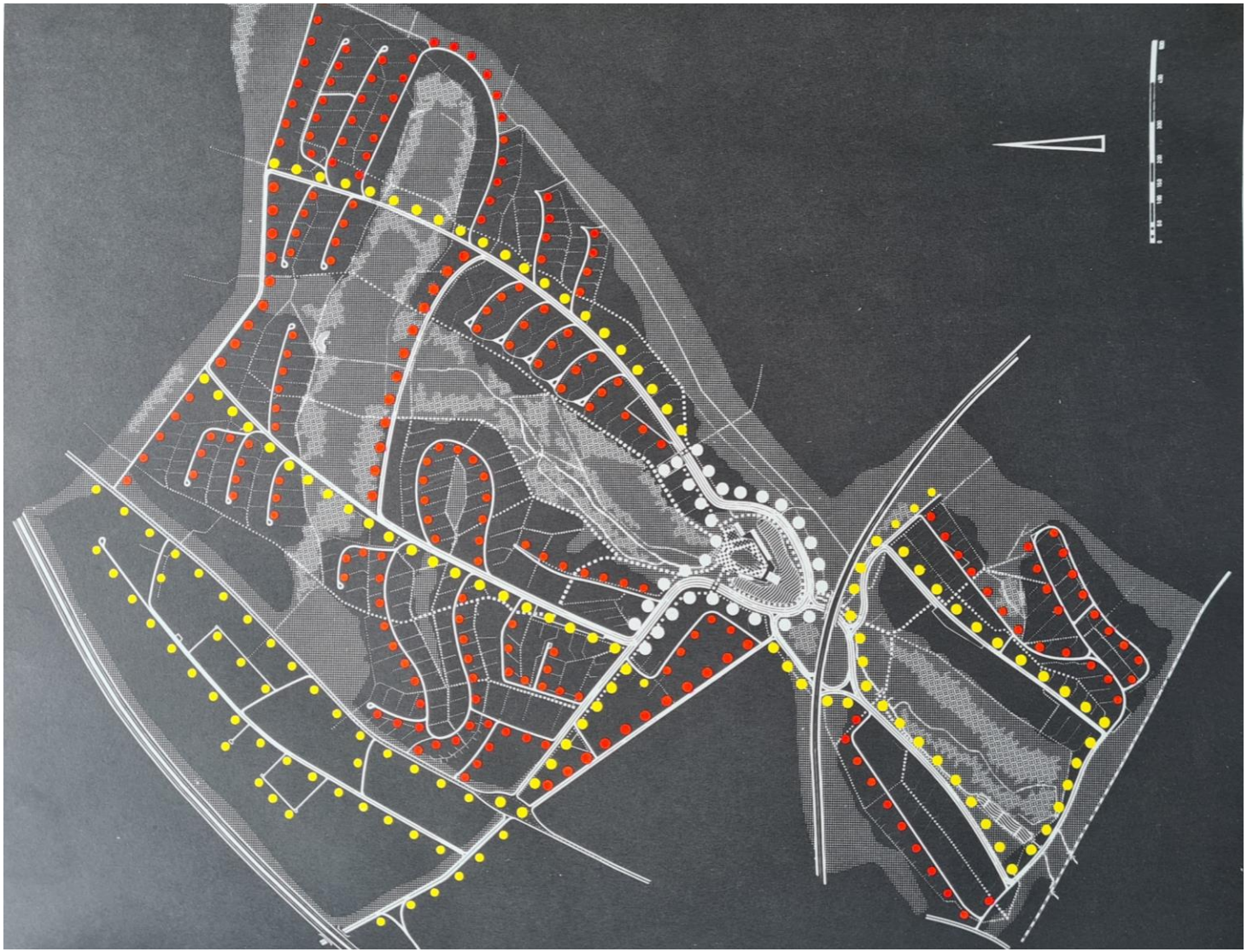
Past radical dreams, realised: «Autogerechte Stadt»



Source: Reichow (1963), p. 24

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Past radical dreams, realised: Motorways

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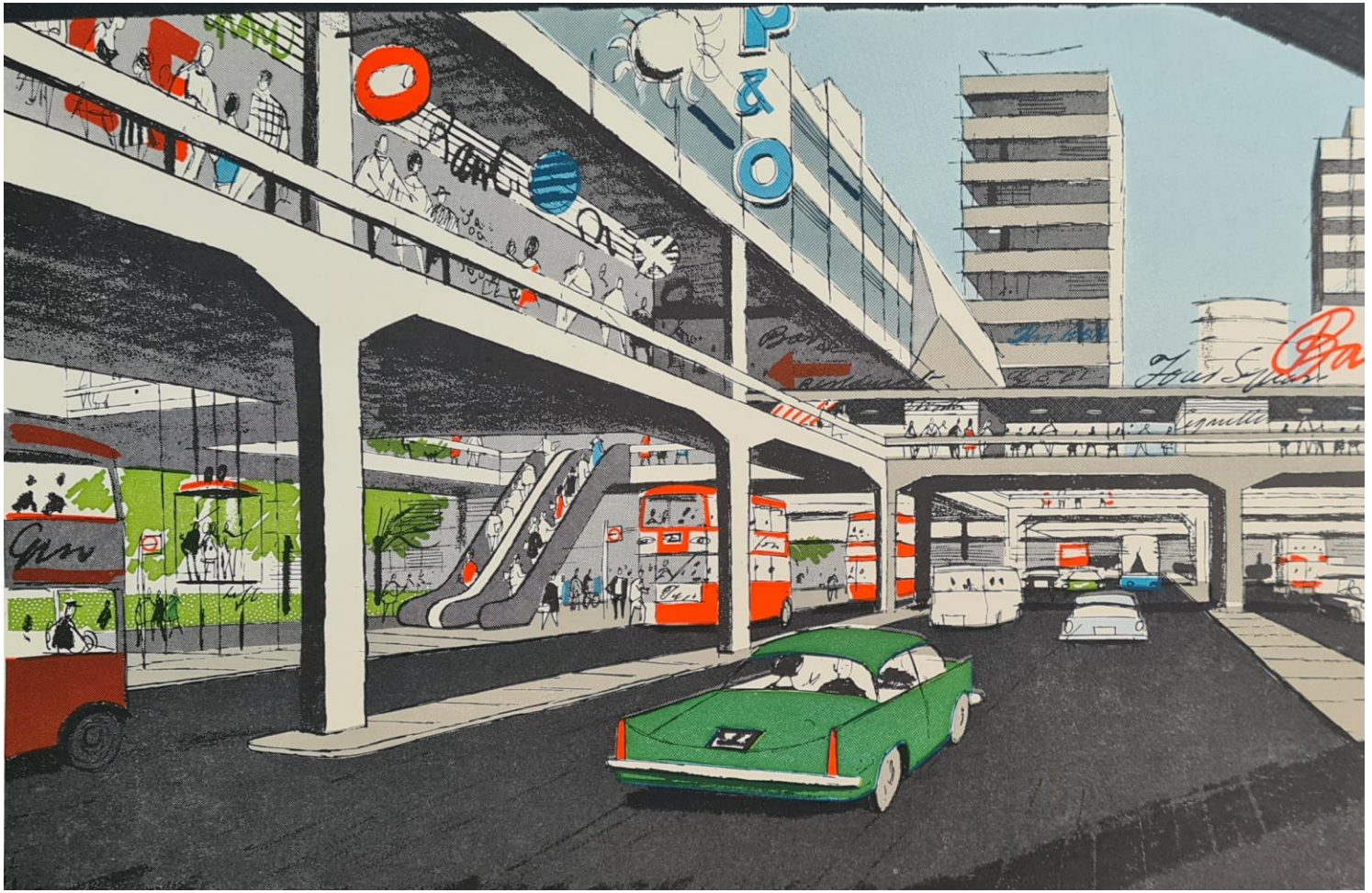
Past radical dreams: Buchanan's two-level central London



Source: Buchanan Report (1963)

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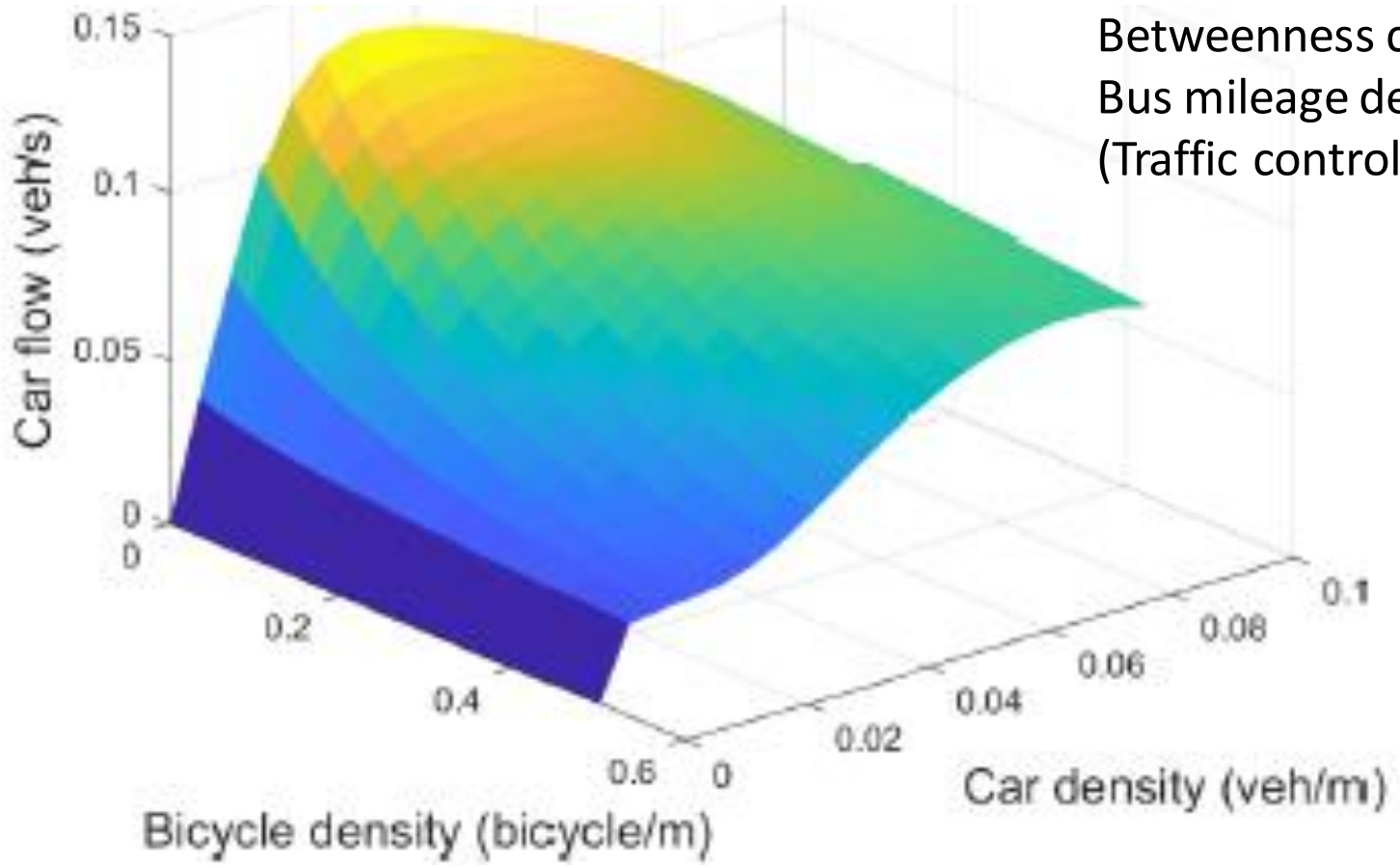
Can we escape? Nearly fixed urban network capacity =

Junction density,
Lane miles density
Betweenness centrality,
Bus mileage density
(Traffic control)



Source: Loder,, Ambühl, Menendez, Axhausen, 2015

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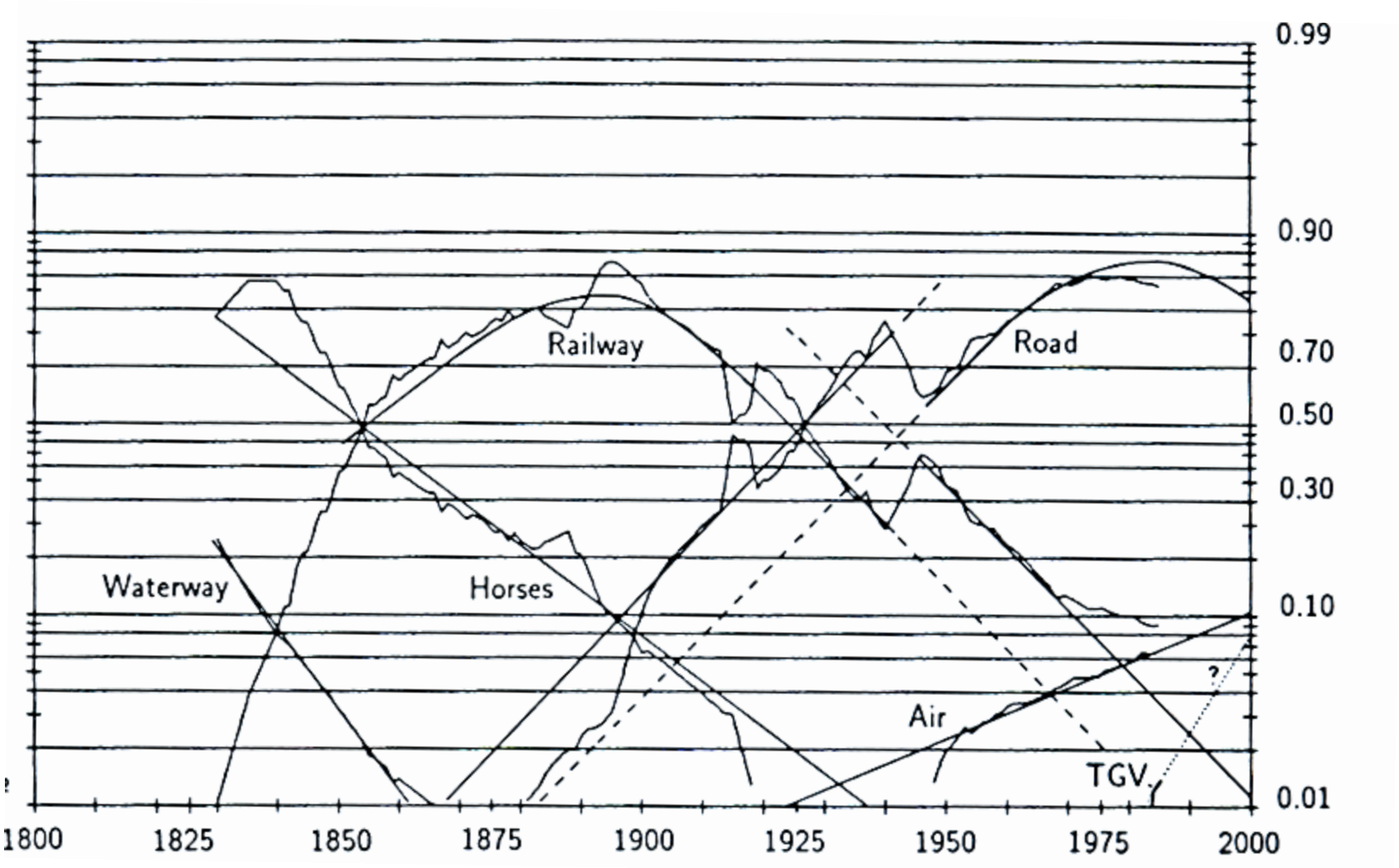
Ways out ?

History: Modal split in France (all distance bands)



Source: Grübler (1998) S.209

Which visions are we discussing?

A managed/co-ordinated one

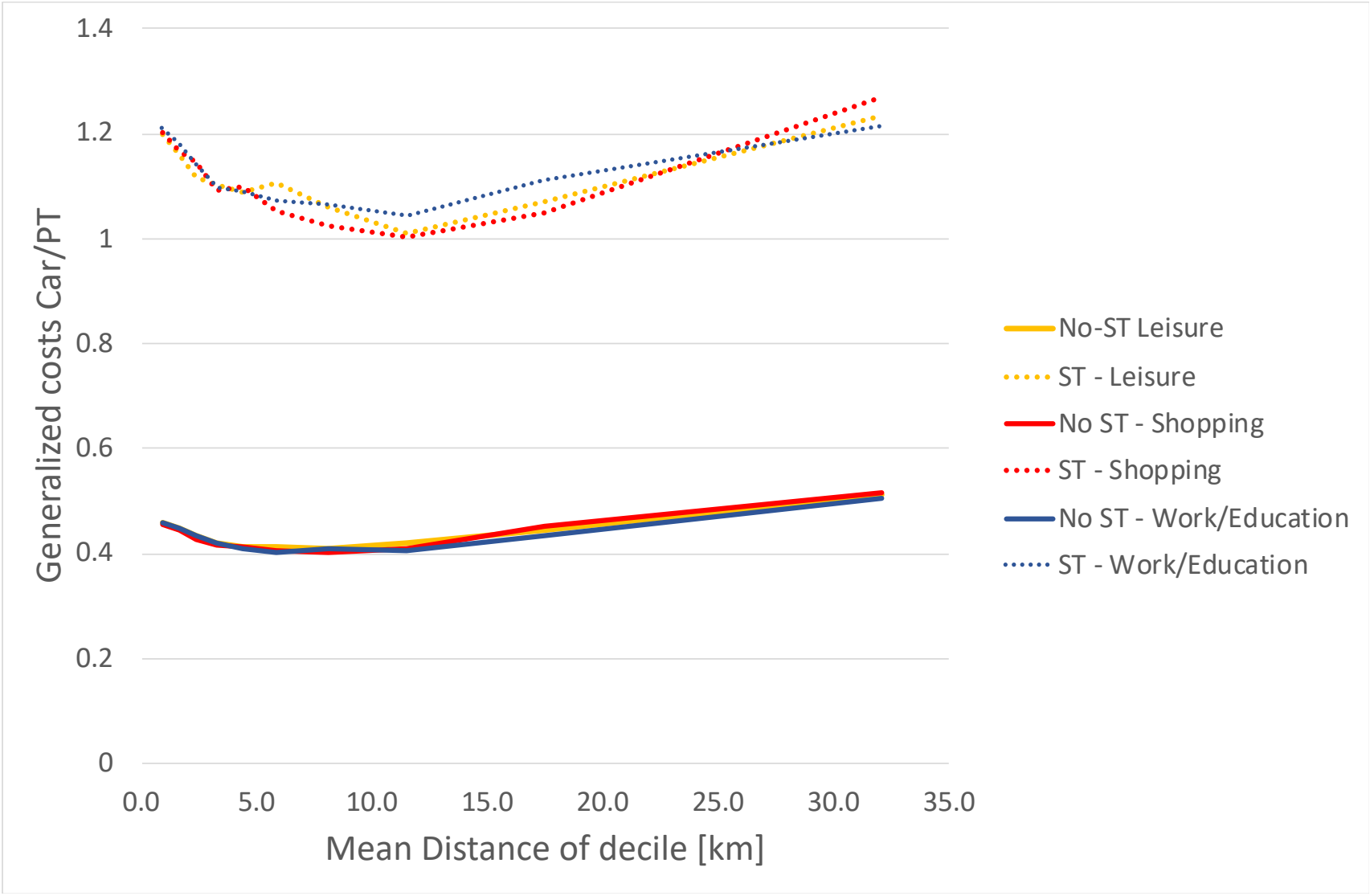
A managed/co-ordinated one: Pricing

- *Mobility pricing*
  - Two-part tariffs for infrastructure
    - Option fee
    - Pay-as-you-go for usage
  - Congestion pricing
  - (Demand responsive) parking pricing
  - GHG (CO_2) pricing
  - Local emissions pricing

A managed/co-ordinated one: Public transport

- MaaS improved shared mobility with
  - Demand responsive pricing
  - On-demand services

A managed/co-ordinated one? Comparison of MOBIS GC



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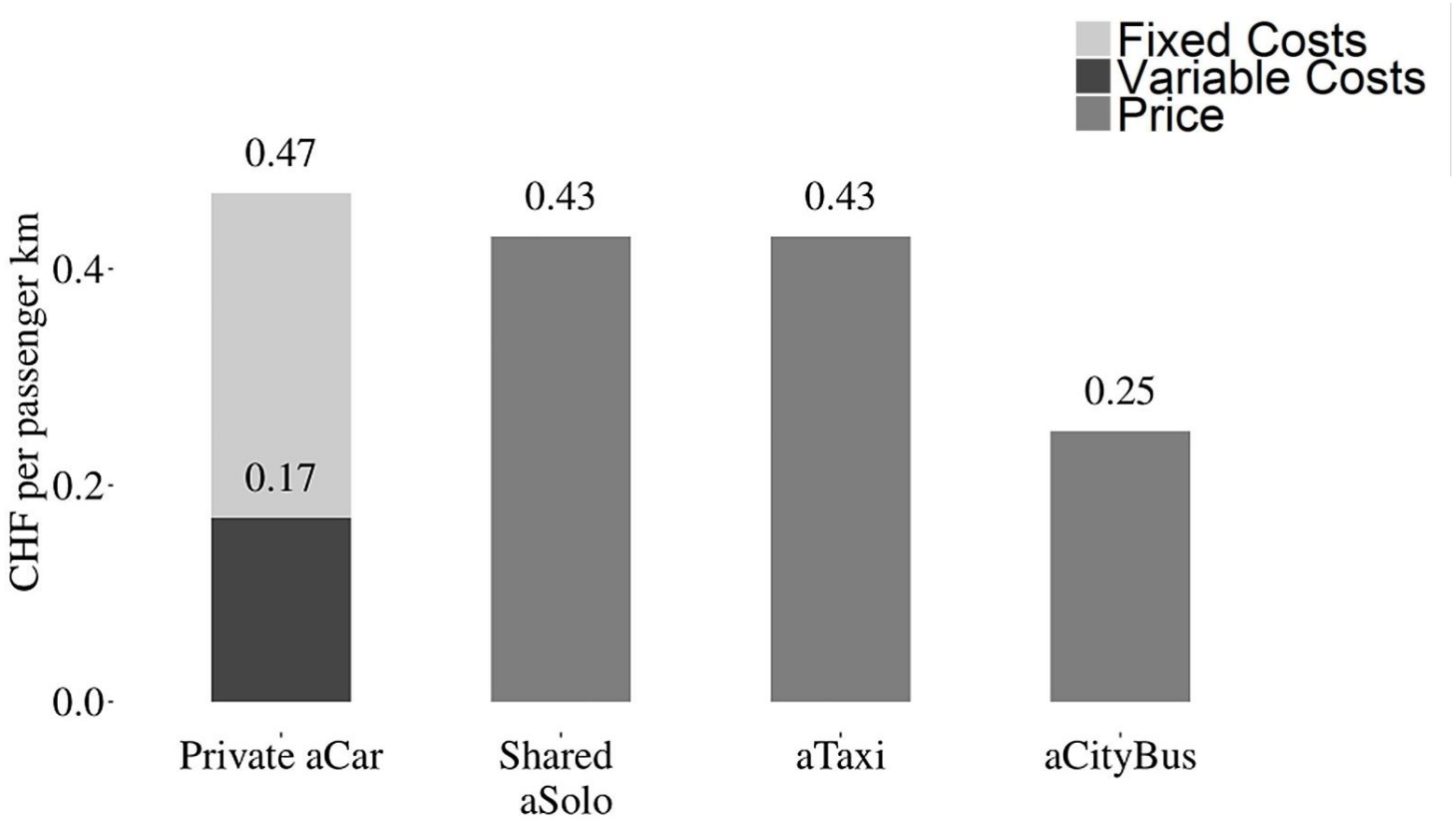
An automated one? First robust cost estimates

Structure of the pkm full costs for today's usage levels



Source: Bösch, Becker, Becker and Axhausen (2017)

An electrical autonomous one,

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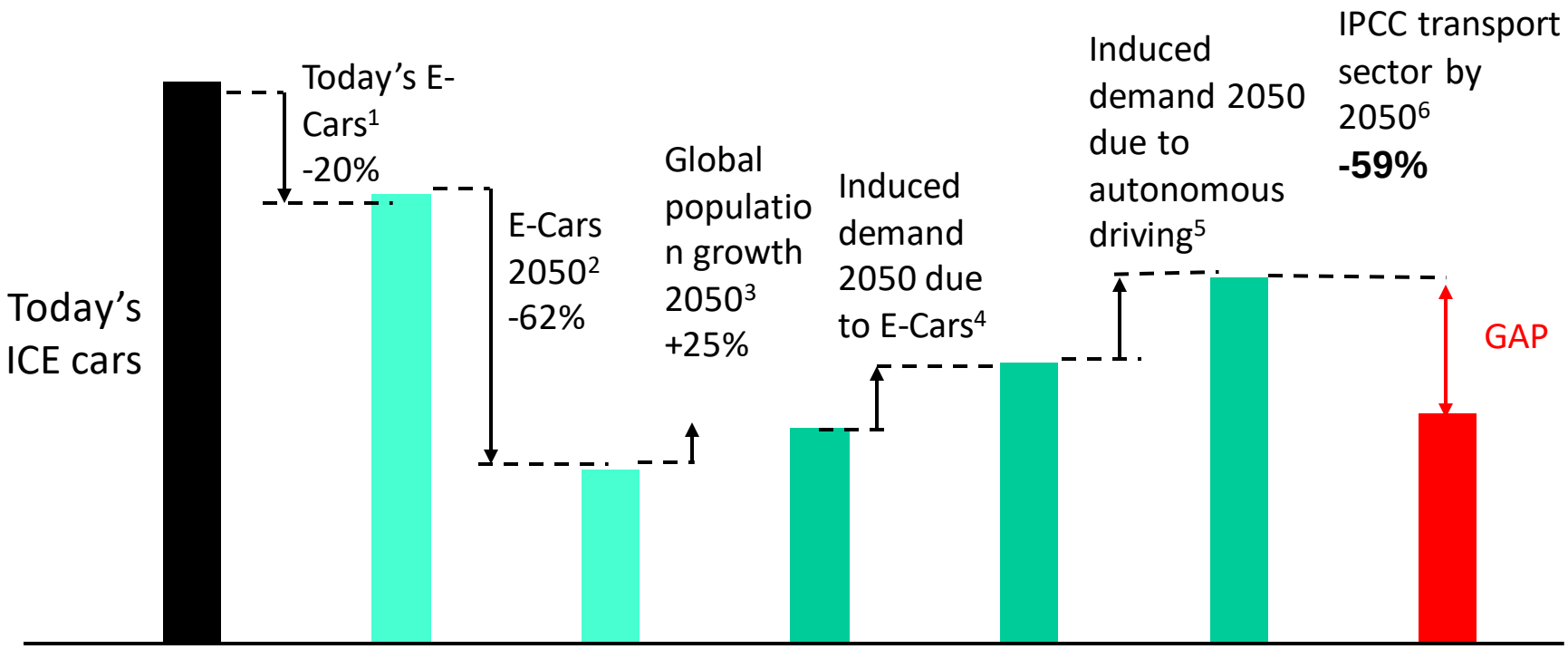
An electrical autonomous one,



Source: Livingston (2022)

Note: These are optimistic estimates of how many CO2 emissions can be avoided through technology.

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A car free/reduced one,

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A car free/reduced one,

- a 15 min city ?
- a net-zero CO_2 city ?
- an e-Bike city ?

An e-bike city?

The idea of an e-bike city

- e-bike/transit are the core modes
- 50% of road space for slow vehicles (e-bike, bike etc.)
- Integration with shared services for large demands and demand variations
- Maintaining of current accessibility levels (for all)

The idea of an e-bike city: Birchstrasse, Zürich

Source: Ballo, 2023

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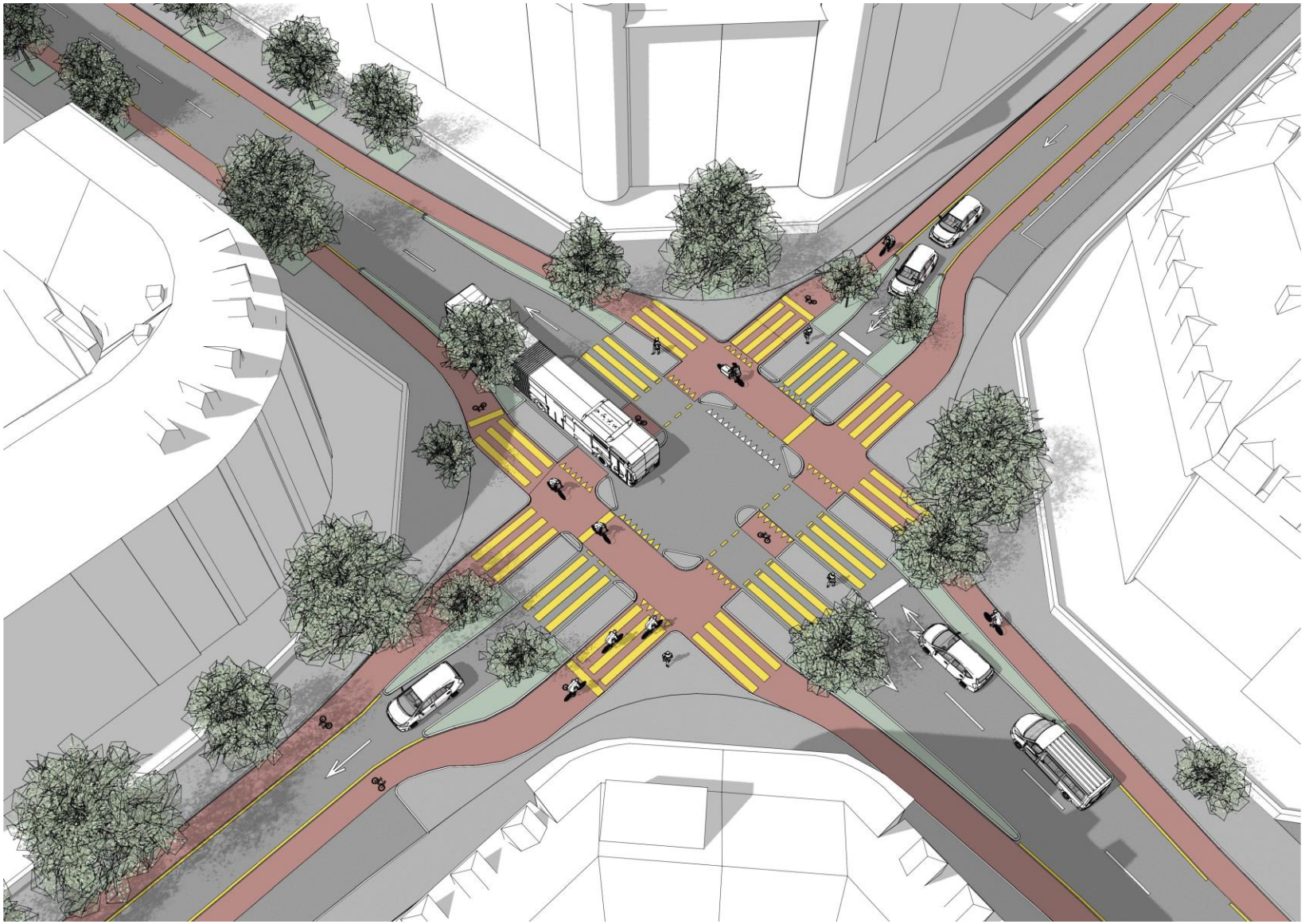
The idea of an e-bike city: Birchplatz, Zürich



Source: Ballo, 2023

Short term loosers & winners

- Future generations
- Current and future cyclists and micro-mobility
- Current and future pedestrians
- (Urban public transport users – fewer stops, more services & lines)
- Urban residents (and property owners)

- Mobility impaired

- (Poor) suburban in-commuters
- Urban car dependents
- (Urban consumers)

Research programme

- Activity scheduling/adjustment
- Cost benefit analysis
- Future retail
- Future of work
- Future of delivery services
- Future social networks
- Optimal mix of scheduled and on-demand transit
- Integration of suburbia/exurbia

- Services for the mobility impaired

Questions?

- www.ivt.ethz.ch
- ebikecity.ethz.ch
- ebis.ethz.ch/en