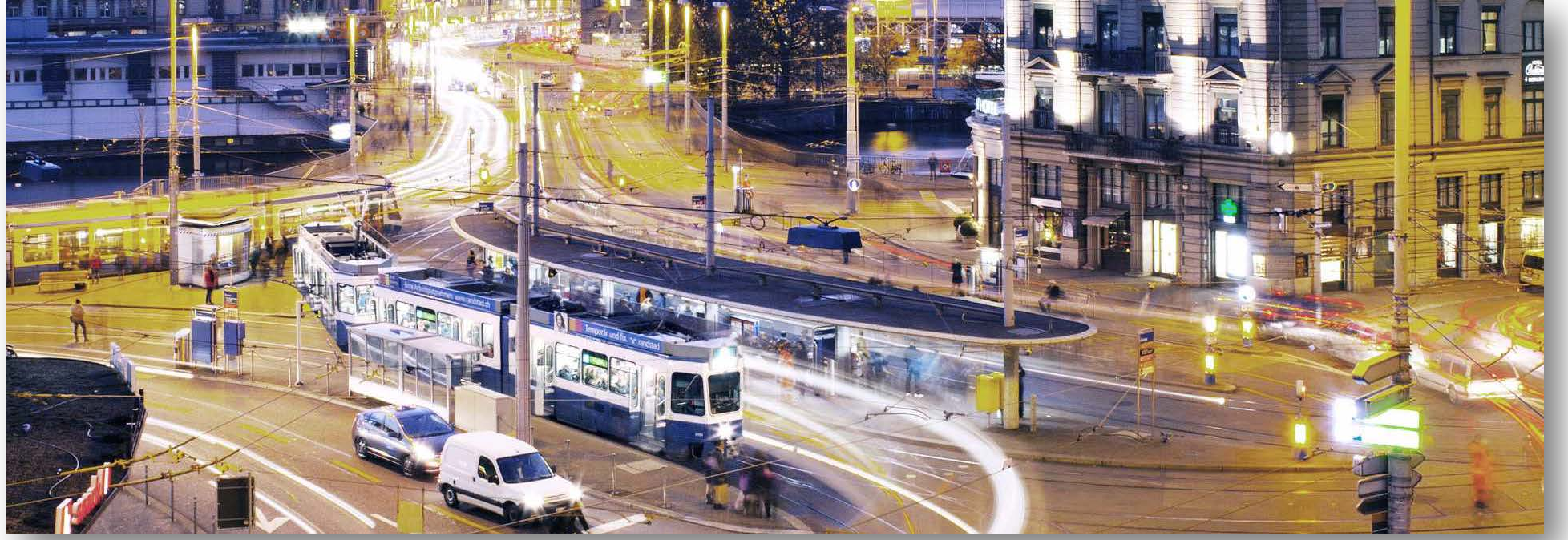

Energy Perspectives in Transportation

Kay Axhausen, ETH Zürich, NRP / SCCER

FNSNF
Swiss National Science Foundation

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Federal Department of Economic Affairs,
Education and Research EAER
Commission for Technology and Innovation CTI
Innovation Promotion Agency

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National Research Programme

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Energy Consumption and Transportation

The Current State

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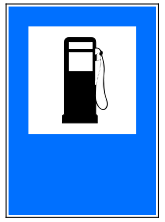
The Current State

- 80% of Swiss households own a private car
- it is driven 22 km per day
- usually 1 occupant (Avg.: 1.5).

- Private cars are used for only 1 h per day



- 26% of the total energy is consumed as fuel

The Role of Shared Mobility

Estimating the potential impact

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What is Shared Mobility?

- Transportation services that are shared among users
  - (public transportation)
  - car-sharing
  - ride-sharing
  - bike-sharing
  - Car pooling

- Variety of implementations
  - access/egress distance
  - fixed or dynamic routes
  - station-based or flexible
  - pre-booking or on-demand
  - ...

Potential Impact

- 1 car-sharing vehicle replaces 10 private vehicles [Millard-Ball et al., 2005]

- One third of urban car or taxi trips can potentially be merged [Song et al., 2014]

- (E)-bike-sharing as alternative to motorized urban transportation

Understanding the Impact

Car-Sharing acts as «Enabler»

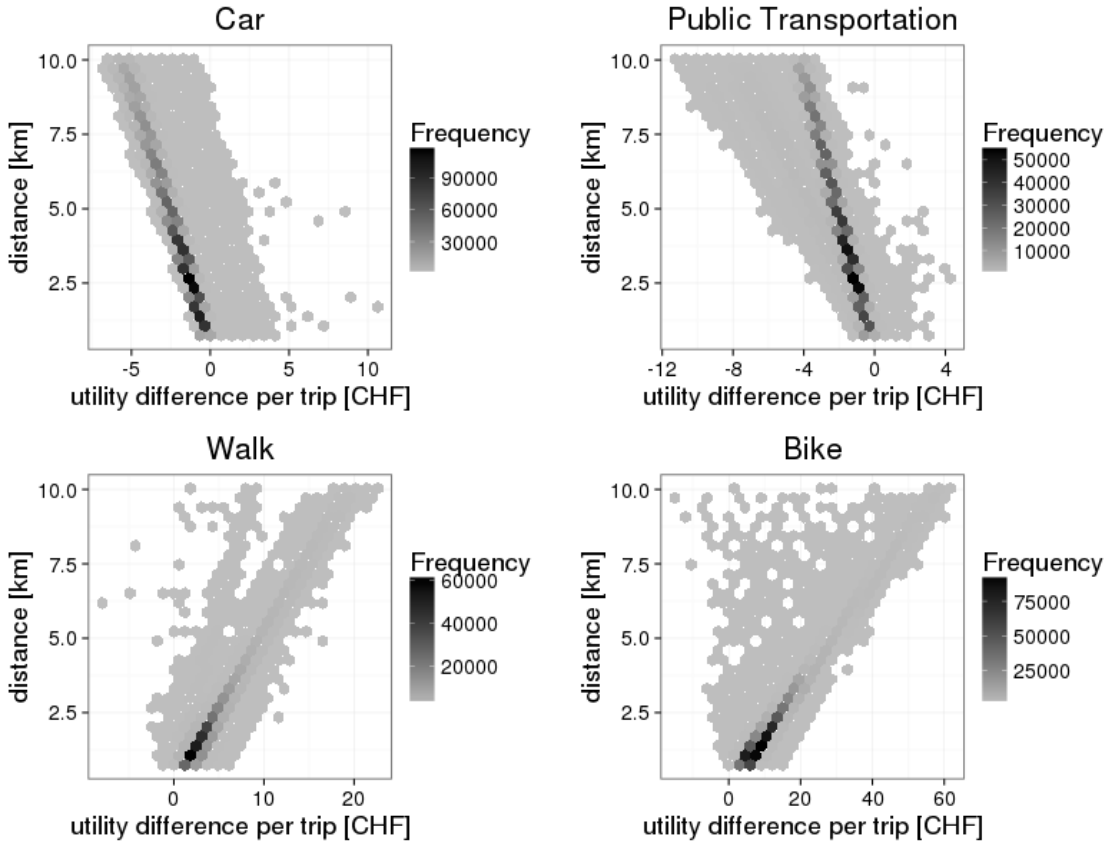
- Example:
  Having a car available on an as-needed-basis, car-sharing-members do not need to own a car. Without the sunk-costs, they may stop driving to work.

Bike-/Ride-Sharing offer direct savings

- Example:
  - Riding a bike is a highly energy- and space-efficient way of transportation.
  - Sharing a ride may save energy and space.

Use Cases

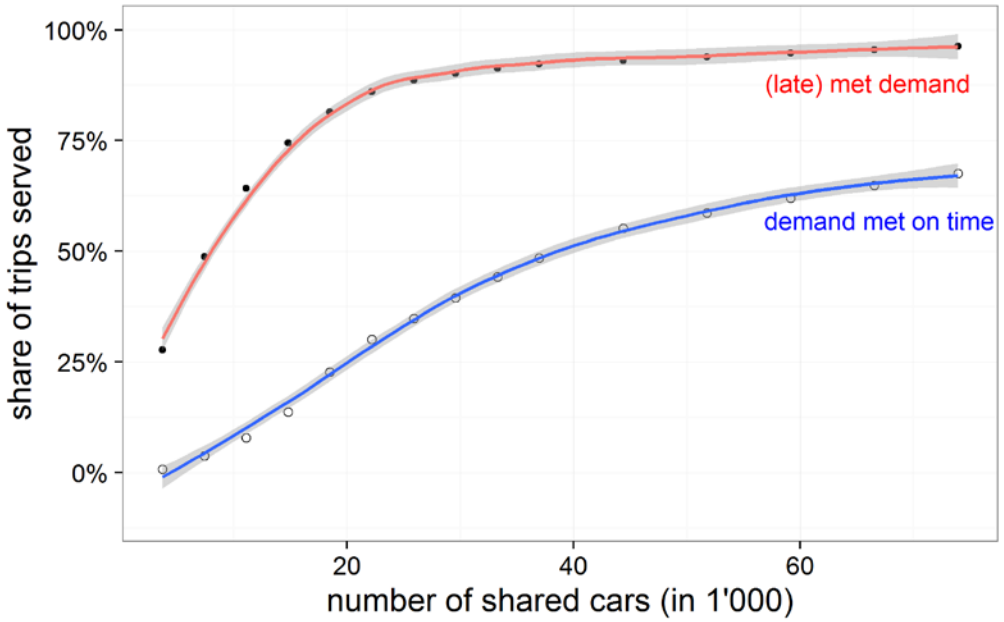
Shared E-Bikes



- Idea: Look at trips within the canton of Zurich. What if the mode had been changed to E-Bike?
- Result: Shared E-Bikes are
  - much more convenient than walk or bike.
  - a possible substitute for short car and public transportation trips.

Use Cases

Shared Cars



- Idea: Look at all car trips within the canton of Zurich. What if they had been served by shared vehicles?

- Result:
  - if shared, only 25% of today's vehicles could serve today's demand
  - Sharing rides allows even further savings

Policy Measures

Free-at-the-point-of-use infrastructure (roads, parking, ...) creates excess usage.

- Pricing and other measures can help to move towards a system optimum.

- Possible measures are:
  - limiting parking supply
  - limiting private vehicle ownership
  - (dynamic) pricing on parking
  - (dynamic) road pricing
  - express lanes for certain vehicles
  - ...

Mobility Visions

Possible development paths

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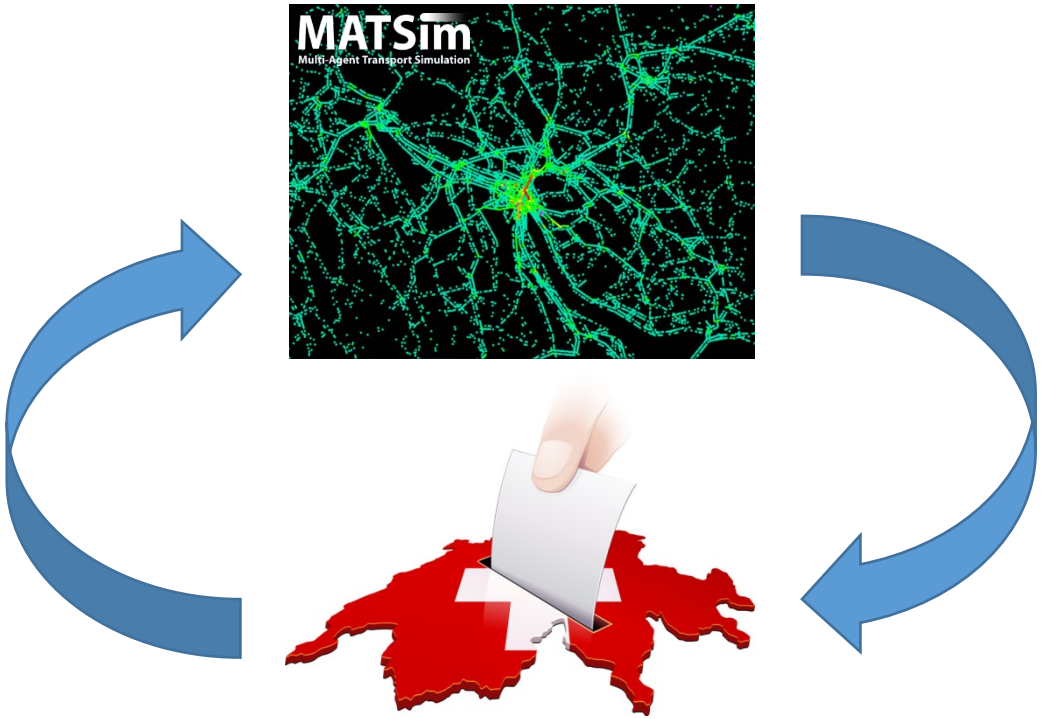
NFP71-Project: Sharing is Saving



Generate scenarios with different combinations of services and policies

Test the impact on energy consumption and public acceptance using agent-based modelling and a stated-preference survey

Provide visions and tools for a new and shared mobility system

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Outlook

Shared Mobility ...

- allows a more efficient use of energy and transportation infrastructure.
- supports transit-oriented lifestyles.
- may become even more important with the introduction of autonomous vehicles.

Questions ?

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www.matsim.org