SCCER CREST
Swiss Competence Centers for Energy Research
Competence Center for Research in Energy, Society and Transition

sccer mobility

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Joint Activity Mobility
The Evolution of Mobility: A Socio-Economic Analysis

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Mission of the JA: Bridging the research fields from both SCCERs

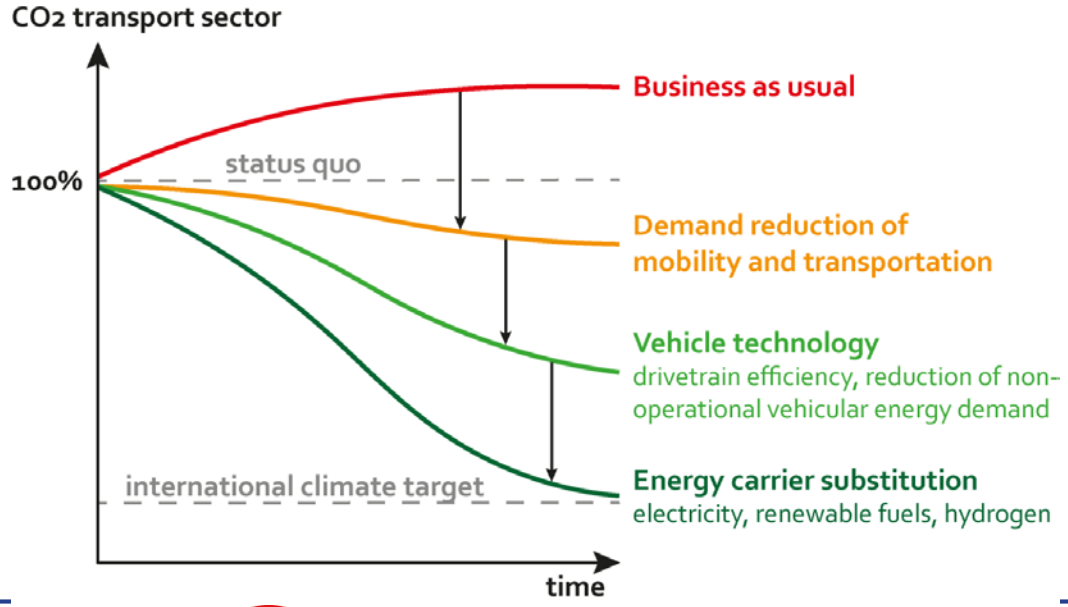
- **Research fields**
  - B1: Design, Demonstration and Dissemination of Systems for Sustainable Mobility
  - B2: Integrated Assessment of Mobility Systems
- **Work packages**
  - WP 2: Change of Behavior
  - WP 3: Energy Policy, Markets and Regulation

Mission of the JA

Joining the forces of the SCCERs Mobility & CREST.

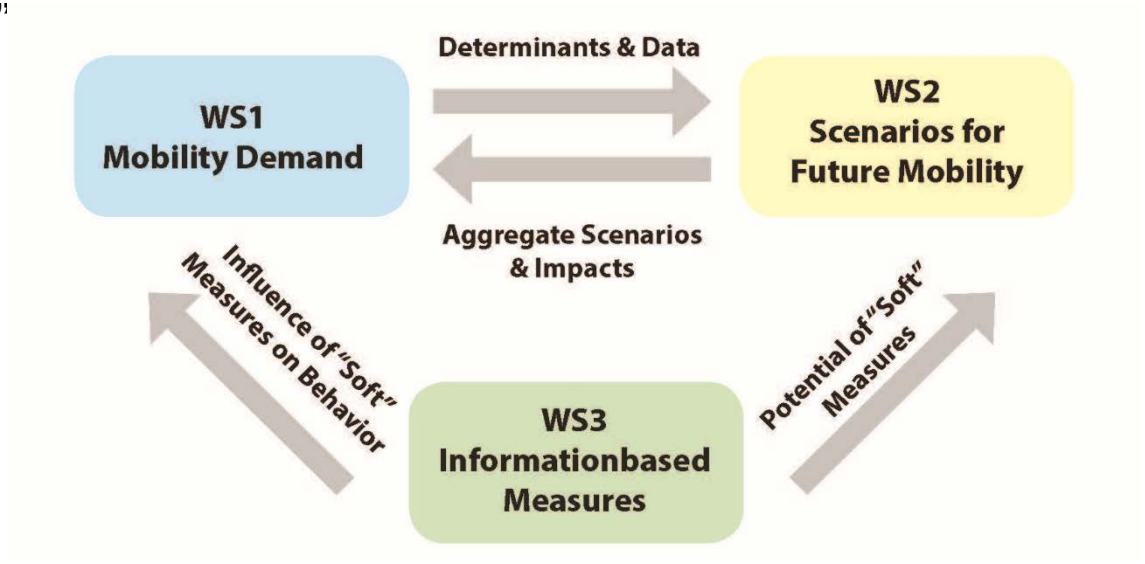
To achieve adoption / realization of demand reduction and the energy carrier substitution.

The key is to have the technologies **and** make them used by the people.



Mission and Organization of the JA Mobility

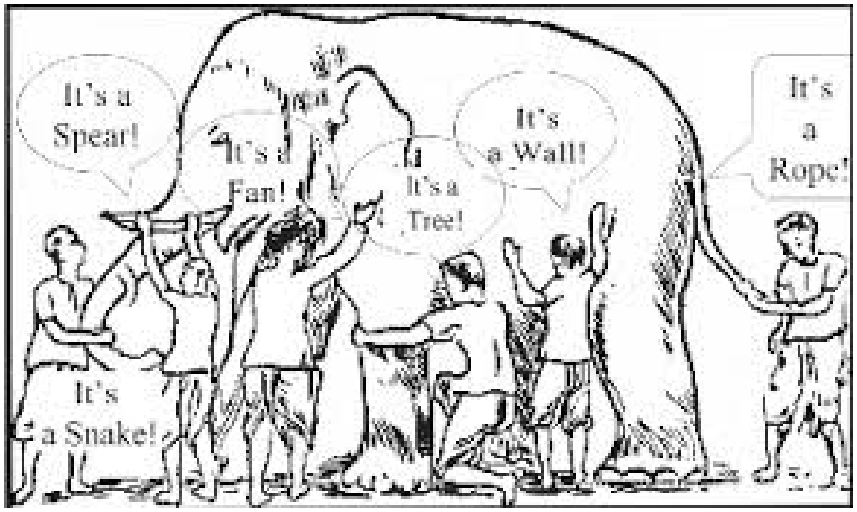
1. Developing approaches to reduce mobility-related household energy demand,
2. Developing coherent scenarios for a future Swiss mobility system
3. Using field experiment to test the impact of programs that use “soft measures”



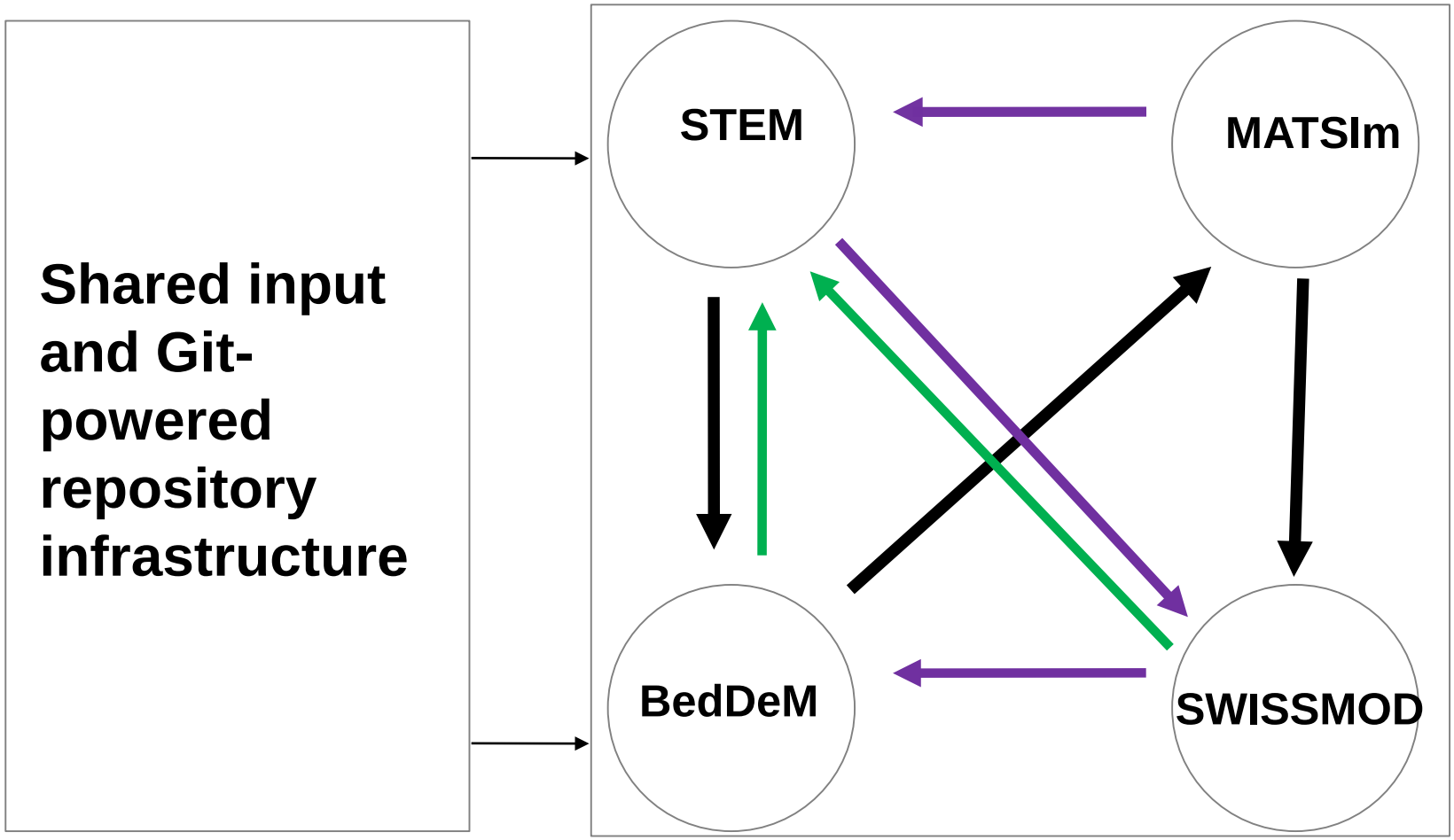
An example of zooming-in WS 2

Different models have different perspectives, but obviously address parts of the same problem!

So if we can couple / link them we can getter view of the overall



Involved Models and Linking



What we can analyze

While often we had 1-2 variables, and 3-5 Scenarios, we systematically want to analyze what influences mobility:

Mobility is complex + Future development is complex…

We now have a complex apparatus, and a systematic view on a complex space to investigate

Sector/Type		Dimension Name	Sub-category	Modelled internally (I) or external dimension (E)?	Modelling impact	Source	Ranges	Degree of impact (high/medium/ low - Workshop?)	Remarks
Socio-economic dynamics	1	population development		E	STEM; BedDeM; MATSim	SCCER JASM			
	2	economic growth		E	STEM	SCCER JASM			
	3	spatial distribution of economic growth		E	MATSim	ARE (4 scenarios)			
	4	spatial distribution of population dynamics		E	MATSim	ARE (4 scenarios) + ZHAW densification project			
	5	spatial distribution of non-working destinations (e.g. leisure/tourism, shopping)		E	MATSim	ARE (4 scenarios)			
	6	energy price (at producer level and at household level)	Electricity	E (in scenarios with high EV penetration and consumption, it might become endogenous)	STEM; SWISSIMOD; utilized at household level by BedDeM	SCCER JASM			
	7		Gas	E	STEM; utilized at household level by BedDeM	IEA or other international sources			
	8		Diesel	E	STEM; utilized at household level by BedDeM	IEA or other international sources			
	9		Petrol	E	STEM; utilized at household level by BedDeM	IEA or other international sources			
	10		Hydrogen	E	STEM; utilized at household level by BedDeM	yet to be determined			
	11	Household size		E	Utilized by MATSim to generate clusters for STEM in a link that was not actually utilized in Wave 0	SCCER JASM			
	12	Car ownership rate (in the population)		I	STEM generates optimal stock of cars; population is externally given				Personal cars per thousand capita
	13	Cars per household		I	BedDeM pre-processing allocates fleet of vehicles to households				
	14	Household income		E	BedDeM preprocessing the data to generate a total budget for mobility, exhausted which the people need to skip trips	?? SCCER JASM (using GDP as a proxy or BFE data for the past and growth proportional to GDP)			
	15	new lifestyle patterns	Impact of on-line shopping and home delivery (e.g. in zero-carbon modes)	E	Reduction on travel demand for shopping purposes, reflected in a lighter schedule in BedDeM (but potentially also as check - feedback to STEM)	?? WS1			this can be translated into different mobility demand configurations (absolute demand / modal shiftetc.) and might serve as scearrio/variation;
	16		Home-office/ co-working spaces	E	Reduction on travel demand for work purposes, reflected in a lighter schedule in BedDeM (but potentially also as check - feedback to STEM)	?? WS1			
	17		Flexible work forms / part time	E	Changes in the frequency of trips, possibly of their length, thus the schedule in BedDeM	?? WS1			
	18		Aging population	E	Increase in leisure travel demand by elderly	?? WS1			
	19		Higher unemployment and underemployment (a	E	Reduction on travel demand for work purposes, reflected in a lighter schedule in BedDeM (but potentially also as check - feedback to STEM)				
	20		Climate change awareness	E	Reduction on overall high-carbon travel demand, shift towards low-carbon alternatives. This would require either to include this aspect in optimization procedure (or in CO2 constraints) in STEM or a sensitivity to the issue in BeDeM choice				
	21		Openness to new technologies (through marketing/ word of mouth, etc.)	E	Impact on modal/ vehicle technological shift				
	22	Modal shift		I	BedDeM	?? WS1			Needed as a separate variable or can it be expressed through the car vs bus/tram/… mobility demand? Maybe we need both as the latter can be expressed as a function of the first.
	23	Subscription to Mobility as a service (MaaS)		E	BedDeM				
	24	Supply and demand for pooling services (where the vehicle is supplied by a household, not a company)		E	BedDeM				
	25	Cars annual mileage		E (with stock decisions being taken in expectation of a certain mileage)					
	26	Cars occupancy rate (persons per vehicle)		E					
	27	Effects of autonomous driving	Penetration of private automated cars	E	Increase in overall car travel demand	ASTRA			This can be further expanded into various sub-aspects (impact of empty rides, rides of people with no licence - kids, elderly) or kept compressed, covering all these things.
	28		Penetration of automated taxis	E	Increase in overall car travel demand AND/OR increase in public transport through greater flexibility on last mile				This can be further expanded into various sub-aspects (impact of empty rides, rides of people with no licence - kids, elderly) or kept compressed, covering all these things.
	29	Evolution of public transport (quality, supply, etc.)		E	BedDeM; MASim				
									Urban vs. Rural areas (perhaps with intermediary