

Project "Strategic Guidance": an overview

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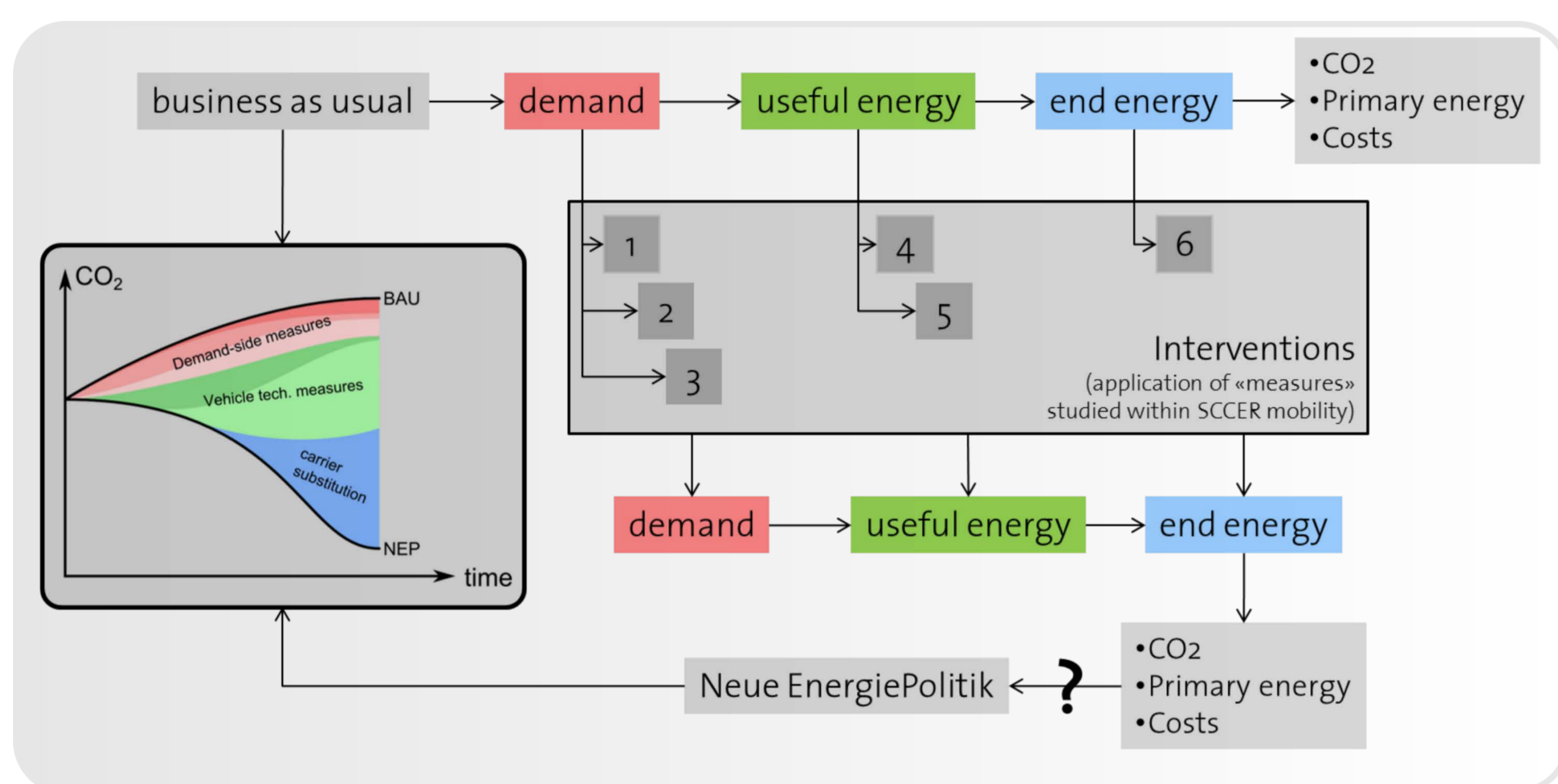
Synopsis

The goals of the strategic guidance project is the estimation of the best-case and possibly worst-case (envelope) CO2 mitigation potentials of "interventions" considered in SCCER Mobility. It's intention is to put "interventions" into their systemic context, thus "putting a figure on a tech".
An additional objective is the active contribution to the identification of promising research directions for the transformation of the mobility system towards sustainability.

INTRODUCTION

Premise: interventions → sustainability

The transformation from "Business as usual" to the "Neue Energiepolitik" can only be achieved by changes to the current transportation system – so called interventions.



Fields of intervention

The translation of the SCCER Mobility research portfolio to the Swiss transportation system occurs by interventions, which introduce a modification to the system. The detailed description of the mobility sector allows for a broad range of interventions, with the purpose to cover and include all SCCER activities.

demand	MOBILITY GENERATION why? A → B Purpose of travel. e.g. commute to work, buy groceries, etc.
	MOBILITY ALLOCATION which? A → B Origin - Destination pair
	MOBILITY DISTRIBUTION how? A → B 1) Means of transportation (public, private motorized or non-motorized) 2) transportation mode (road, rail, water, air)
useful energy	ROUTE CHOICE A → B Actual path between origin and destination
	VEHICLE TYPE CHOICE Only relates to specifications w/o powertrain. Basically selection of market segment, e.g for cars: sedan, station wagon, SUV, etc.
	DRIVING BEHAVIOR v(t) Only relevant for motorized vehicle. The individual "driving style", meaning aggressivity, braking and acceleration pattern, etc.
	NON-PROPULSIVE LOAD Mainly heating, ventilation and air conditioning
end energy	POWERTRAIN TECHNOLOGY Setup, components and operation strategy
	FUEL CHOICE Type of fuel (incl. its production process)

About us

Energy Systems Group @ LAV,
Aerothermochemistry and Comb. Syst. Lab.
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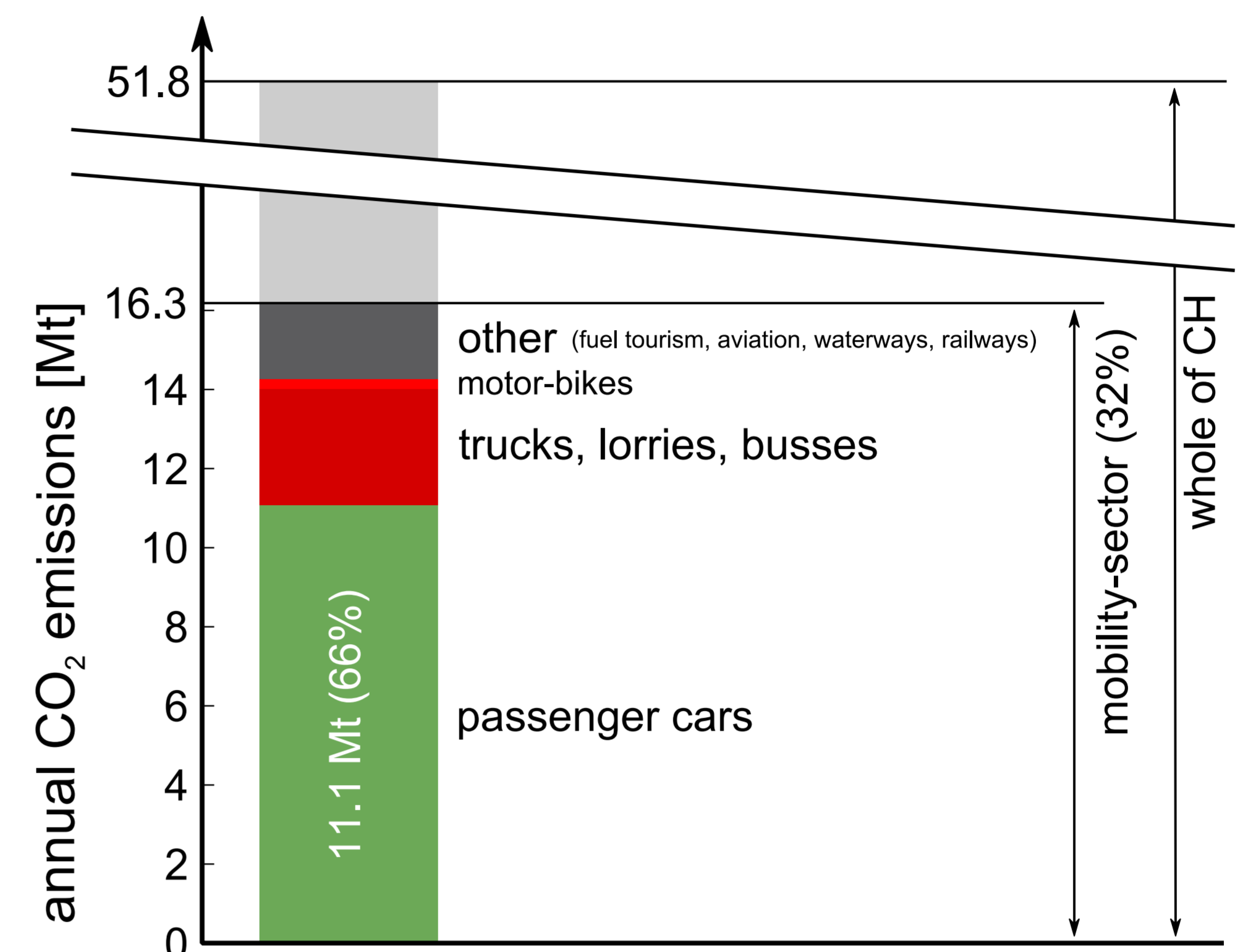


LAV's energy systems group specializes in the technology assessment of energy conversion technologies and the analysis of interconnected energy ecosystems, including mobile systems and their supporting infrastructure(s). Further activities revolve around stationary power generation, in particular decentralized, biogenic CHP plants.

HIGHLIGHTS

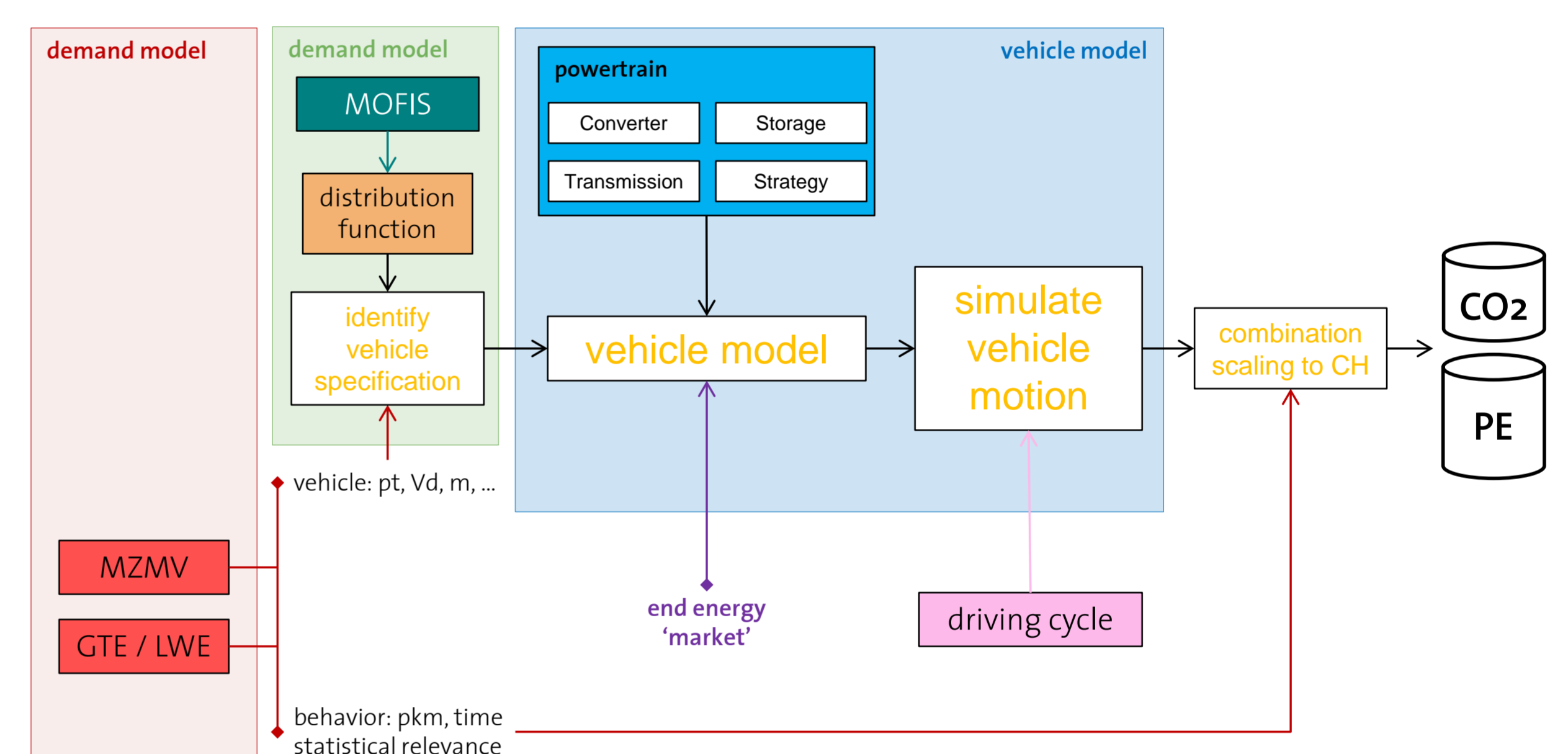
CO2 emissions of mobility sector

Roughly two thirds of the CO2 emissions in the mobility sector are caused by private motorized vehicles, representing a large potential for CO2 reduction measures.



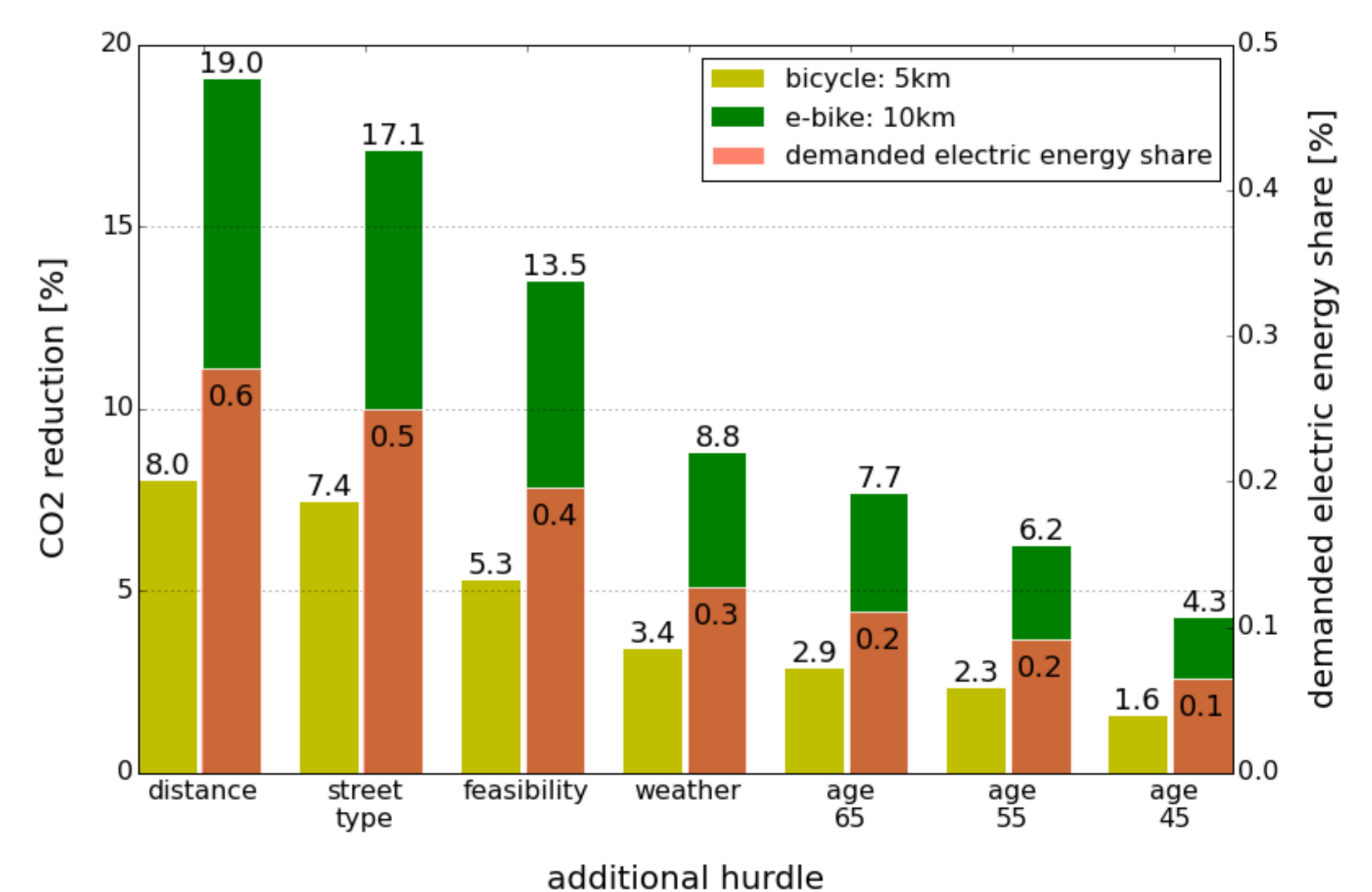
Model layout

The entire Swiss transportation system, meaning passenger and freight transportation, defines the scope of the strategic guidance project. Statistical data serve as input to include travelling behavior of Swiss citizens, routes of goods and composition of the Swiss vehicle fleet. Technical models of individual powertrain components and a link to the "end energy market" complete the description of the mobility sector.



Example intervention: bicycle promotion

Shifting short stages from passenger cars to bicycles significantly affects the CO2 emissions of the total Swiss transportation sector. The inclusion of additional hurdles for the bicycle acceptance reduces the reduction potential in CO2. Considering e-bikes which offer the opportunity of substituting even longer stages, the maximum reduction potential is enlarged. The resulting demand in electric energy is of minor impact.



[data: BFS/ARE – Mikrozensus Mobilität und Verkehr / own calculations]

OUTLOOK

- Joint project with EMPA-ICEL → real-world energy demand of (alternatively propelled) passenger cars, incl. HVAC
- Extension to freight transportation
- Extension to other transportation modes (rail, water)