sccer mobility
Swiss Competence Center for Energy Research
Efficient Technologies and Systems for Mobility

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Strategic Guidance: Example interventions on the Swiss road-based Freight Sector

This poster shows the results of the maximum CO_2 reduction potential analysis in the Swiss road-based freight transportation sector of alternative powertrain options. Based on national surveys, daily vehicle usage profiles – in terms of payload and distance – of light and heavy duty vehicles are derived. A CO_2 emission reduction can be possible if those mobility services can be supplied with the alternative vehicle powertrain systems. Impediments are mainly range and payload capacity limitations.

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What is the Strategic Guidance Project?

The aim of the Strategic Guidance project is to identify paths to realize the transition from the status-quo to the «Neue Energiepolitik» of the Swiss government. It estimates the best-case CO_2 mitigation potentials of «interventions» considered in SCCER Mobility. Its intention is to put them into their systemic context, thus derive their maximum contribution potential.
An intervention can influence the mobility sector in different fields of measures (see Fig. 1) . The ensemble of interventions serve as input to strategic planning. The potential assessment is carried out with an energy-systemic model of the Swiss mobility sector – combining demand and supply of mobility services.

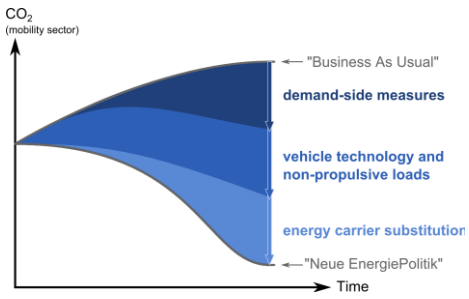


Figure 1: Fields of measures to the targets of the «Neue Energiepolitik»

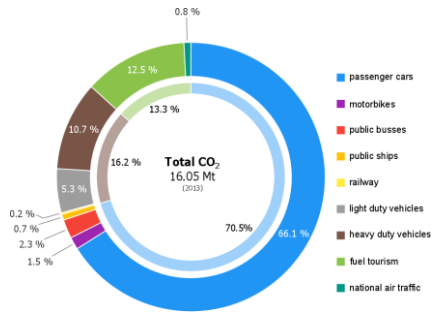


Figure 2: CO2 share of transportation sector in Switzerland [BAFU 2016]

Why consider road-based Freight Sector?

Freight – in particular road-based – is a large contributor to the CO_2 emissions from transportation (see Fig. 2) and it is assumed by federal offices to grow steadily and even faster than passenger transportation [ARE 2016]. The sector is commercially operated and consist, compared to the sum of all private cars, of a small fleet. Fewer vehicles could allow for faster impacts penetration of interventions. Cost incentive or taxation (e.g. LSVA) are functioning and yet ready tools to shape this sector.

Methodology

The demand is data driven and relies on surveys of the federal office of statistics. Relevant datasets for the road-based freight sector are «Erhebung leichte Nutzfahrzeuge (LWE)» and «Gütertransporterhebung (GTE)». The gathered information is processed and represented in daily vehicle trips with changing payload according to the good distribution (for analysis of usage patterns refer to poster «Characterization of the Usage of the Swiss Heavy Duty Trucks with the purpose of assessing the sectorial Energy Demand»). This demand is combined with a bottom-up vehicle energy demand model (for more information refer to poster «Real-world energy demand determination within the ESMOBIL-RED project»). Impacts of interventions which modify the powertrain design can thus be assessed on a systemic level. Interventions are straight forward alternations of the status-quo. There or no rebound effects covered. Costs are not included and no optimization is performed. The results represent the maximum possible CO_2 reduction potentials.

Light Duty Vehicles Interventions

Fleet

What are the light duty vehicles considered in the CO_2 share?

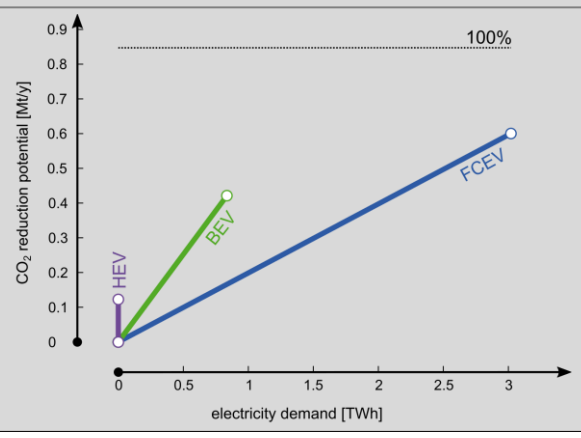
Lieferwagen
(up to 3.5 t)

Intervention

Pathway: substitute existing vehicles by 3 equally powered vehicles with alternative powertrain designs where feasible:
- HEV: hybrid electric vehicles
- BEV : battery electric vehicles
- FCEV: fuel cell electric vehicles

Impediments: Power limitation (in WLTP), Payload Capacity and Range

Results

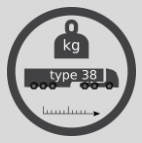


Heavy Duty Vehicles Interventions

Fleet

What are the heavy duty vehicles considered in the CO_2 share?

Lastwagen
(type 35)



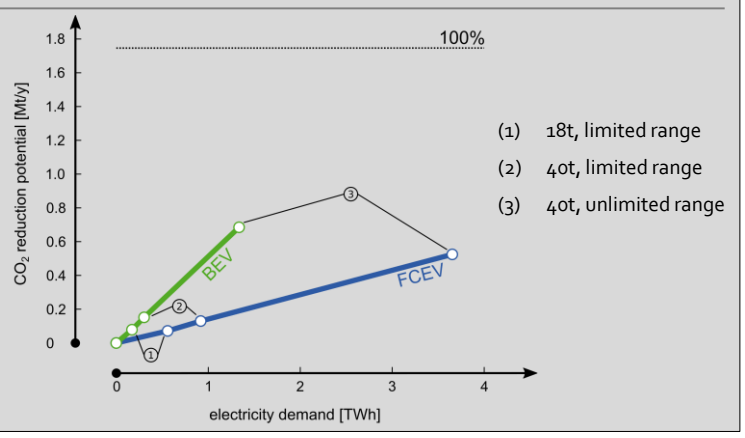
Sattelschlepper
(type 38)

Intervention

Pathway: substitute existing Lastwagen (only type 35) by 2 alternative powertrain designs where feasible:
- BEV : battery electric vehicles
- FCEV: fuel cell electric vehicles

Impediments: Power limitation (in WHVC), Payload Capacity and Range

Results



References

[BAFU 2016]: Treibhausgasemissionen der Schweiz 1990-2014
[ARE 2016]: Perspektiven des Schweizerischen Personen und Güterverkehrs bis 2040

About us

Energy Systems Group @ LAV,
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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.

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