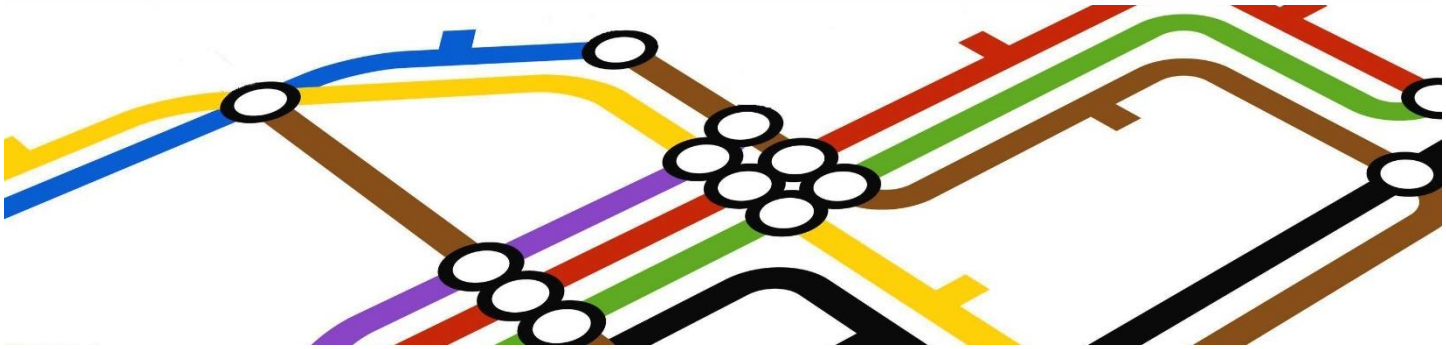
sccer mobility

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



Newsletter

No. 10 / December 2018

Dear Reader
We are pleased to present the latest SCCER Mobility news to you. This issue communicates major advances and events of our research platform. Enjoy reading!

News & Highlights

SCCER Mobility Academia-Industry Dialogue

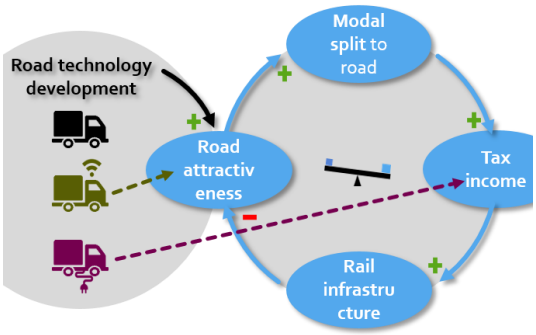
On 29 November 2018, SCCER Mobility hosted the second Academia-Industry Dialogue themed *Decarbonizing the freight sector in Switzerland*. More than 25 experts from industry, public offices and academia participated and discussed the main challenges. SCCER Mobility plans to uphold the exchange with interested stakeholders to address specific research questions.

Read more

SCCER Mobility Seminar (Webinar) Series

SCCER Mobility successfully launched an internal seminar series as a platform for young scientists to present their research. The series promotes connectivity between the different groups and locations. All talks can be streamed from anywhere or viewed later. Research scientists Dimitry Demin (BFH) and Viola Papetti (Empa) kicked-off the series with talks about their ongoing SCCER Mobility projects.

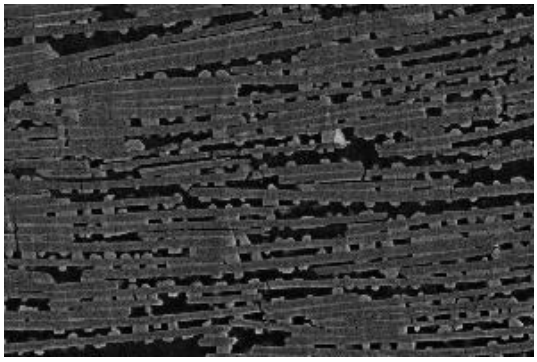
View talks



Learning Lab - SBB Cargo project funded

Congratulations to the team of the Learning Lab - Future Transport Systems! The project submitted to the ETH Mobility Initiative received funding to analyze rail freight competitiveness in the light of new developments in the road freight sector. This effort will kick-off in January 2019 in collaboration with SBB Cargo.

Read more



Nature-inspired super stiff and tough composites

Researchers from Capacity Area A3 have developed a novel material based on biological structures found in nature that are as stiff and tough as the highest performance composite materials today. The study was inspired by nacre, also known as mother of pearl, which is a natural material with remarkable fracture toughness whilst being very lightweight.

Read more

Optimizing bus routes with the e-MIP cockpit

Researchers of the Dencity program at Bern University of Applied Sciences set out to develop a tool to optimize, reroute or implement new bus routes in collaboration with the bus manufacturer HESS AG. The goal was not only to optimize land use and spatial planning in urban environments, but also to reduce energy consumption and CO_2 emissions from urban mobility.

Read more

More news highlights

MAS | CAS ETH "Future Transport Systems" News

Registration for CAS "Technology-Potentials"

Registration for the next CAS "Technology-Potentials" is open from **January to April 2019**. This course offers participants a deep insight into the current situation, as well as future developments of powertrain and automotive engineering in the context of passenger and goods transport. Further topics include spatial information and communication technologies as well as the integrated assessment of technologies and transport systems. The students will also learn about agile and user-centered innovation.

More information

Contact

Interview Prof. Dominique Foray – perspectives from an innovation economist part VI

Dominique Foray is Full Professor at EPFL and leads the Chair of Economics and Management of Innovation (CEMI). He is also responsible for the content and design of the module dealing with innovation in mobility systems in the CAS "System Aspects". To get a glimpse of how an innovation economist assesses current and future developments in the transport sector, we will be featuring excerpts from an interview with Dominique Foray.

Which measures are necessary to foster a society and economy driven by innovation and towards sustainable growth?
D.F.: Human capital, framework conditions (product market, labor market and finance), entrepreneurial culture and values are the main important issues. That is for innovation. Innovations towards sustainable growth raise other issues such as strong demand side policies in favor of green innovation (adoption subsidies, public procurement, carbon prices).

In your opinion, how will people travel in the future?
D.F.: How will the future be? This depends a lot on the path-dependent processes of transport evolution as well as the basic demographic and geographic parameters of the country considered. For example in a country like Switzerland in which the railway system is outstanding (relative to other countries) and there is no car industry based in the country, I really think that railways will continue to be the main component of the dominant mobility patterns and this will happen if transport companies provide effective responses to disruptions. In other countries – those where the railway system is poor and there is no "railway culture" – the future is likely to be very different!

More information MAS

Upcoming events

SCCER Mobility Seminar (Webinar) Series

The last SCCER Mobility seminar of this semester will take place on **20 December 2018 at 11:15**. Christian Vögtli, research scientist at Bern University of Applied Sciences, will be presenting ongoing and upcoming projects in battery systems in railway application. Please join at ETH Zurich (HG D 22) or https://zoom.us/j/558338954.Find out more here.

First publication swiss CAR report 2018/19

The swiss Center for Automotive Research (swiss CAR) will hold an event for the publication of their newest report analyzing the Swiss automotive (suppliers) industry. The event will take place on **17 January 2019** at University of Zurich (KOL-F-117). Along with Prof. Anja Schulze, who heads swiss CAR and will be presenting the report, guest speakers including Prof. Konstantinos Boulouchos (ETH Zurich, SCCER Mobility) and Christian Bach (Empa, SCCER Mobility) will give talks. More information is available here.

More upcoming events

SCCERs

biosweet
Swiss Competence Center for Energy Research

New BAFU-funded project

SCCER BIOSWEET will participate in the BAFU-funded project "Exhaust Aftertreatment System for the lowest environmental impact, Natural Gas powered delivery vehicle, Euro 7 and beyond (EAS7+)". EMPA, PSI, SUPSI, EngiCer SA and FPT will conduct the research in collaboration. A new catalyst system for delivery vehicle natural gas engines will be developed, resulting in very low pollution. If operated with biogas, the engine would have the potential to demonstrate a zero impact vehicle. The main issue is the oxidation of unburnt methane. This will be improved by fundamental catalysis investigations, addition of specific reactants, optimized catalyst positioning along the exhaust pipeline as well as innovative 3D printed polyhedral substrates with microwave heating.

SCCER Mobility Glossary

This section intends to widen the common ground between all SCCER Mobility partners. Contributions from our members are welcome. To make suggestions for this section, please contact the Management Office.

Road freight & energy consumption: Following airfreight, transporting goods on the road is the most energy intensive freight mode per ton km and it is fueled almost exclusively by fossil energy carriers. In Switzerland CO_2 emissions from road freight account for about 18% of the emissions from the transport sector (BAFU 2018). While electrification with renewable electricity is a viable option for reducing direct emissions from cars, for heavy-duty trucks it is more challenging to achieve useful autonomy ranges using battery electric propulsion. This is primarily due to the lower energy density of batteries, so that e-trucks have a smaller range compared to conventional trucks. Furthermore, diesel trucks have the advantage of needing less time for refueling compared to current battery charging times.

Freight energy infrastructure: One possible alternative would be to recharge electric trucks during operation, e.g. using electric road systems. In this case, the truck would be continuously charged by overhead lines or by dynamic wireless charging systems integrated into the road itself. Alternatively, electricity could be converted to synthetic fuels such as hydrogen, thus allowing more energy to be carried on board. All of these solutions promise decarbonization yet they require new, expensive energy infrastructures, interfere with operations and only work towards decarbonization if a renewable energy supply can indeed be guaranteed.

Performance-related heavy vehicle charge (LSVA): The LSVA is a Swiss federal tax for heavy-duty vehicles, which is collected based on total vehicle weight, vehicle emissions and the distance traveled in Switzerland. Currently, alternative-fueled trucks are exempt from the LSVA, so that there is a break-even for investing in these technologies.

Feasibility of road freight electrification: The Energy Systems Group (ETH Zurich) active in Capacity Area B1 analyzed the feasibility of some options for massive electrification of road freight. The study builds on LSVA data from the Swiss truck fleet, which feeds into a bottom-up simulation tool developed specifically for this purpose. Results show that, currently, technological (e.g. max. battery cell density), regulatory (truck weight limitations) and infrastructure constraints (e.g. charging power) limit electrification to niche applications. Near full decarbonization would require significantly improved battery energy density (factor 5-6 compared to current state-of-the-art), higher charging power (≥200 kW), swapping batteries multiple times (4-6x per day) or combinations thereof. No matter the approach, e-trucks are generally significantly heavier than diesel trucks and thus require exemptions on their maximum permissible weight. The group is currently investigating other options like hydrogen, natural gas and plug-in hybrid electric trucks with the same methodology.

If you are interested in more details, please contact Dr. Gil Georges, leader of the Energy Systems Group.

You can also check out the corresponding paper, which was published recently.

Quiz

Which structural characteristic of nacre inspired researchers in developing a novel composite material? The first 10 people to send the correct answer to Fiorella Meyer will enter the final drawing and have a chance to win (e-mail subject: QUIZ).

Solution of the previous quiz: Energy consumption of freight trains was reduced by 12% in a Swiss case study. The winner was Dominik Bucher, ETH Zurich. Congratulations!

This information is provided by the Management Office of SCCER Mobility. Our newsletter is issued 4 times per year. If you have information that you would like to share, please contact Kirsten Oswald.

In case you do not wish to receive our newsletter in the future, please unsubscribe.

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