Newsletter

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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

Electric mobility: is it environment-friendly or not?

Newest results from the Laboratory for Energy Systems Analysis at PSI, paint a more favorable picture of electric mobility under the Swiss conditions suggesting that it is the only realistic option to reduce greenhouse gas emissions from cars decisively. Even today, electric cars are already more climate-friendly than their gasoline and diesel counterparts if charged with electricity from renewable sources.

Read more

SCCER Mobility webinar series - spring 2019

All video recordings of the talks of the spring semester 2019 are available for viewing on the ETH Video Portal! We would like to thank all the speakers, who participated and shared insights about their ongoing research so far. We look forward to welcoming you to the next round of webinars in the fall semester. Program details will follow soon!

Read more

Production of fiber reinforced plastics made easy

9T Labs, an ETH spin-off, has devised a new 3D printing method that overcomes manufacturing limitations and makes high performance plastics more accessible to new applications and industries. As Martin Eichenhofer, co-founder of 9T Labs, explains, the printing technique is "an integrated and fully automated workflow for the production of industry-grade carbon fiber composite parts."

Read more

Carbon-neutral mobility

The recently published report by the European Academies' Science Advisory Council entitled "Decarbonisation of transport: options and challenges" was presented at the Swiss Academies of Sciences in Bern on 5 April 2019. The report concludes that existing instruments and measures of European energy and transport politics are unlikely to achieve the greenhouse gas reduction targets of the Paris Agreement.

Read more

New member Management Office

Pascal Sonder joined the team of the SCCER Mobility Management Office on 15 April 2019. He is your point of contact for all financial and administrative issues. Please give him a warm welcome. We would also like to say thank you to Fiorella Meyer, who held the position previously, for all her effort and support since the beginnings of SCCER Mobility. We wish her all the best for her new professional endeavors.

Contact

More news highlights

MAS | CAS ETH "Future Transport Systems" News

Final thesis presentations

On 10 May 2019, the first class received the degree Masters of Advanced Studies (MAS) "Future Transport Systems". This marks the successful end of the first round of the program. After finishing the three Certificates of Advanced Studies in "System Aspects", "Technology Potentials" and "New Business Models", students began work on their masters' projects last fall semester. This included selecting a topic of research, documenting the process and major outcomes in a written thesis and presenting the work in a final presentation.

Read more

New MAS Program Manager

Since 1 June 2019, Kirsten Oswald took over the position of MAS Program Manager. Along with these new tasks, she will still be responsible for communication and Young Talent Development at SCCER Mobility.

Contact

CAS "Technology Potentials" – registration open until 30 June

The next CAS "Technology Potentials" will take place in the fall semester 2019 (19 September - 20 February) and deals with topics including advancements in vehicle technology, energy carriers and infrastructure, applications of spatial information and communication technologies, integrated assessment of mobility technologies as well as user-oriented innovations and applications. Registration is open until 30 June 2019. Find out more on the program website.

Upcoming events

Symposium for sustainable mobility at the Umwelt Arena Schweiz

This symposium will take place on **4 July 2019** at the Umwelt Arena Schweiz. The topic is reducing CO_2 emissions from road transport through alternative powertrain technologies including electric mobility. Christian Bach (Capacity Area A2) and Markus Friedl (Joint Activity CEDA) are invited speakers at this event. More information

Presentation SCCER White Paper: "Power to Gas" - Perspectives in Switzerland

The SCCER Joint Activity "White Paper on the Perspectives of Power-to-Product (P2X) Technology in Switzerland" has concluded. The corresponding white paper and results of the study will be presented on **8 July 2019** at ETH Zurich (HG D 7.1). More information

SCCER Mobility Annual Conference 2019 - register now!

The 2019 edition of the SCCER Mobility Annual Conference will take place on **6 September 2019** at ETH Zurich. This year we would like to focus on international and European transport perspectives, research highlights from the Capacity Areas and specific Joint Activities as well as technology and socioeconomic measures supporting decarbonization efforts. As in previous years, there will be a poster session and Best Poster Award. More information

More upcoming events

SCCERs

SCCER-FURIES White Paper

SCCER-FURIES recently published its first white paper entitled "Direct current technologies for Switzerland's electricity transmission and distribution". This document has been developed by the partners of the SCCER-FURIES' work package 3 based on work undertaken in the frame of the competence center. Download your copy here and enjoy reading!

SCCER CREST Annual Conference 2019

The theme of the SCCER CREST Annual Conference is "Breaking Boundaries - Linking Sectors? Challenges for the Energy Transition". It will take place on **19 September 2019** in Sierre. All details and information, as well as the program will be published here.

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.

Natural gas, which is essentially methane (CH_4), is considered an alternative fuel to gasoline or diesel and it is the cleanest burning hydrocarbon, releasing less pollutants and carbon dioxide (CO_2). This is because natural gas has a very homogenous composition and many contaminants are already eliminated at the source. Not only the direct pollutants are low, but also the indirect ones, as the exhaust gas has a low-reactive composition and therefore a lower potential to form ozone and secondary aerosols compared to gasoline and diesel exhaust. Furthermore, due to its chemical composition (with a 4:1 hydrogen to carbon ratio compared to less than 2:1 for gasoline) natural gas has a theoretical CO_2 emission reduction of about 25% per unit energy.

Vehicles running on methane either use **compressed natural gas** (CNG) stored onboard in gas cylinders at 200 bar or **liquefied natural gas** (LNG) stored in insulated tanks at -160°C. CNG and LNG have high knock resistances (resistance to self-ignition or burning in an uncontrolled way during compression), which allows designing engines with high specific power and improved efficiency. However, CH_4 is harder to ignite due to the way the carbon atoms are bonded. Though the technology of CNG and LNG engines lagged behind in the past, today they are on a comparative technological level as gasoline and diesel engines.

Yet the **full efficiency potential** of gas engines is not exploited, as converted gasoline/diesel engines are typically used in road transport applications and these are not optimally designed to use natural gas. For passenger cars, gasoline engines are usually converted to run on natural gas with similar efficiencies and thus 20-25% lower CO_2 emissions (see first paragraph). For trucks and buses, diesel engines are modified and powered either by spark ignited pure natural gas or a mixture of natural gas and diesel, where the former is the primary fuel and the latter is used only for ignition. Due to the Otto-cycled combustion process, actual spark ignited CNG engines of trucks and buses show a reduced efficiency by 10-20 % compared to diesel and therefore only 5-15% reduced CO_2 emissions. The so-called dual-fuel CNG engines with natural gas-diesel mixture achieve similar efficiencies as conventional diesel engines (~45%).

Within SCCER Mobility, the Automotive Powertrains Technologies Laboratory headed by Christian Bach at Empa and part of Capacity Area A2 investigates natural gas as a transport fuel. This in cooperation with the Aerothermochemistry and Combustion Systems Laboratory (Konstantinos Boulouchos) and the Institute for Dynamic Systems and Control (Christopher Onder) at ETH Zurich as well as partners from automotive industry. The focus is on new combustion processes with improved efficiency using new ignition, supercharging technologies and advanced gas-exchange concepts. The target is to achieve an engine efficiency of 50%. The consortium also studies the use of renewable biogenic and synthetic CH_4 instead of fossil natural gas and optimizes combustion processes of blended CH_4 fuels with high hydrogen content.

Quiz

Who founded 9T Labs, an ETH spin-off specializing in 3D printing? The first 10 people to send the correct answer to Pascal Sonder will enter the final drawing and have a chance to win (e-mail subject: QUIZ).

Solution of the previous quiz: Car manufacturers in the EU will have to lower emissions of new vehicles by 37.5% within the next decade. The winner was Jana Plananska, University of St. Gallen. Congratulations!

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

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