

10th Swiss Energy Research Conference

Energy Research – from Invention to Innovation

14–15 April 2016, KKL Lucerne



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Federal Office of Energy SFOE
Federal Energy Research Commission CORE
Commission for Technology and Innovation CTI



SWISS NATIONAL SCIENCE FOUNDATION

Programme information

Dear Sir, dear Madam

The 10th Energy Research Conference, which will be held in Lucerne on 14 and 15 April under the heading, **"From Invention to Innovation"**, will be presenting strategies, priorities and findings from the area of energy research to a broad circle of decision-makers from the private sector, research institutions, the political arena and the administration.

The initial findings from National Research Programmes "Energy Turnaround" (NRP 70) and "Managing Energy Consumption" (NRP 71) will be presented, together with details regarding the successful implementation of the eight Swiss Competence Centres for Energy Research (SCCER) resulting from the Coordinated Energy Research in Switzerland action plan. All these activities have contributed towards the evolution of a new culture of cooperation in the field of energy research in Switzerland.

In addition, those in attendance at the conference will be given an insight into the updated "Federal Energy Research Masterplan for the Period from 2017 to 2020" of the Federal Energy Research Commission (CORE), and will also be able to view a poster exhibition organised by the Swiss Federal Office of Energy (SFOE) and focusing on pioneering projects and concepts in the energy sector.

We look forward to a fascinating and diversified energy research conference in Lucerne!



W. Steinmann
SFOE Director

W. Steinlin
CTI President

H.R. Schalcher
NRP 70 President

A. Balthasar
NRP 71 President

T. Kaiser
CORE President

Programme

Thursday, 14 April 2016

1.15–1.50pm	<p>Conference opening</p> <p>Begrüssung Walter Steinmann Grusswort des Kantons Luzern Robert Küng Energieforschung des Bundes Tony Kaiser</p>
1.50–3.30pm	<p>SCCER: New dynamics in Energy Research</p> <p>Die Swiss Competence Centers for Energy Research (SCCER) – ein neues Förderkonzept Walter Steinlin Energieeffizienz in der Industrie: Wissenstransfer von der Forschung in die Praxis Beat Wellig Koordination der Forschungsinhalte im Überblick – Von Labor-Experimenten und Feldversuchen zu industriellen Demonstrationsprojekten Domenico Giardini, Larryn W. Diamond, Peter Meier Interdisziplinär und vernetzt – gemeinsam zur Energiewende Martina Hirayama, Bettina Furrer, Petr Korba SCCER als Innovationsbeschleuniger Peter Richner, Andreas Hafner SCCER – eine Erfolgsgeschichte, die weitergeht Walter Steinlin</p>
3.30–4.30pm	<p>Individual look at poster exhibition on pioneering projects and ideas in energy innovation and Break</p>
4.30–6.15pm	<p>Invention and Innovation – Integration in the value-added chain</p> <p>Wie wird Energieforschung politisch relevant? Andreas Balthasar Druckluftspeicher und ihr Beitrag zur Energiewende Andreas Haselbacher, Giw Zanganeh Débranche! Suren Erkman Alternative Stromversorgung im Spannungsfeld von Technik und Akzeptanz Christian M. Franck, Isabelle Stadelmann-Steffen Energiesparpotenziale in Haushalten von älteren Menschen Heinz Rütter, Thomas Ammann Sorptionstechnologie: Auswirkung von effizienterer Wärmenutzung auf die Energiewende Bruno Michel Forschen entlang von Wertschöpfungsketten Hans-Rudolf Schalcher</p>
Followed by from 7.15pm	<p>Apéro in the KKL Dinner in the Hotel Schweizerhof Lucerne (reservation required)</p>

Friday, 15 April 2016

8.30–10.15am	<p>New research activities and implementing results</p> <p>Einführung Frank Krysiak Energieperspektiven im Verkehr – Teilen ist Sparen Kay Axhausen Energienachfrage Schweizer Haushalte Stefanie Hille, Frank Krysiak ESI platform Serge Biollaz, Tilman Schildhauer AFEM – Analyse zukünftiger Elektrizitätsmärkte Hannes Weigt, Christian Schaffner Shaping the future Swiss electrical grids Mario Paolone Technologie und Markt – Die Rolle von Einspeisevergütungen Volker Hoffmann</p>
10.15–11.15am	<p>Individual look at poster exhibition on pioneering projects and ideas in energy innovation and Break</p>
11.15am–12.30pm	<p>Energy Research 2013–2016: a look back and expectations of the future Panel discussion with Konstantinos Boulouchos, Sophia Haussener, Peter Richner, Frédéric Varone, Andrea Vezzini, Alexander Wokaun</p> <p>Energy Research 2017–2020: a look forward and beyond Panel discussion with Beat Hotz-Hart, Tony Kaiser, Jean-Marc Piveteau, Walter Steinlin, Walter Steinmann and with the guests of the Swiss Energy Research Conference</p>
12.30pm Followed by	<p>Final address Buffet lunch (reservation required)</p>

The conference will be moderated by Andrea Leu and Tony Kaiser.

The talks will be given in the language of the title; a simultaneous translation service is available.

SCCER: fresh momentum in the field of energy research

In 2013, Parliament voted in favour of expanding the existing capacities in seven areas of energy research and their networking via competence centres (Swiss Competence Centres for Energy Research, SCCER). The eight competence centres form the framework for longer-term cooperation between researchers from a variety of fields and academic institutions.

After a period of two years of development and one year of operation, the SCCER have already surpassed the declared expansion objectives. Not only have they created new jobs at all levels, they also (and more importantly) form the basis for fresh momentum in the field of energy research in two different ways: firstly, the integration of expertise from a broad range of specialised fields is resulting in comprehensive solutions to numerous energy-related issues, and secondly, innovation cultures from the various types of academic institutions are being brought together within the competence centres, where they supplement and stimulate one another.

1. Swiss Competence Centres for Energy Research (SCCER): a new promotion concept

» *Walter Steinlin, President of CTI; President of the SCCER Steering Committee*

The future energy system needs research-based solutions that are economically scaleable and meet with broad social acceptance. With the creation of the eight competence centres, a new promotion concept has been implemented that supplements the existing programmes and addresses all the associated challenges.

2. Energy efficiency in industry: knowledge transfer from research into practice

» *Professor Dr. Beat Wellig, director of the Thermal Energy Systems and Process Technologies Competence Centre at the University of Lucerne; head of Work Package 1 at SCCER EIP*

The objective of SCCER EIP is to reduce energy consumption in Switzerland's industrial sector through the development of innovations, and thus to strengthen the sector's competitive capacity. Alongside intensive research and development activities, the training and further education of specialised personnel from engineering bureaus and industrial companies is of central importance for meeting the objectives of Switzerland's proposed new energy policy, "Energy Strategy 2050". The further education campaign at the University of Lucerne is providing specialised personnel with information regarding the fundamentals and application of the latest findings relating to the pinch method for the reduction of energy demand in industry. It is also offering online training methods such as video tutorials to supplement the education and coaching programmes.

3. Overview of the coordination of research content: from laboratory experiments and field tests through to industrial demonstration projects

» *Professor Dr. Domenico Giardini, Professor of Seismology and Geodynamics at the Federal Institute of Technology, Zurich; head of SCCER SoE*

» *Professor Dr. Laryn W. Diamond, Director of the Institute of Geological Sciences at the University of Bern; head of SCCER-SoE Task 1.1: Resource Exploration and Characterisation*

» *Dr. Peter Meier, CEO of Geo-Energy Suisse AG; business partner of SCCER SoE; member of the Board of SCCER SoE*

The SCCER programme is a unique component of the national research system and is a good example of relevance and value-added with a national and international dimension. Each SCCER has become a centre of focus for energy-related issues of national interest, and each one collects data relating to the relevant programmes at the national and international levels, thus forming a network of an entirely new dimension based on the strengths of the various partners (Federal Institutes of Technology, universities, colleges of technology, etc.) and the quality of Switzerland's research environment. A good example of this is the preparation of technology road maps for our future energy system, in cooperation with the industry and involved federal offices.

4. Interdisciplinary and networked: working together towards the energy turnaround

» *Professor Dr. Martina Hirayama, Director of the School of Engineering at the Zurich University of Applied Sciences; vice-president of the CTI; member of the SCCER Steering Committee*

» *Professor Dr. Bettina Furrer, director of the Institute for Sustainable Development, School of Engineering, Zurich University of Applied Sciences; deputy head of SCCER CREST*

» *Professor Dr. Petra Korba, lecturer and head of the Electrical Energy Technology and Smart Grids group, School of Engineering, Zurich University of Applied Sciences; leader of Work Package 2, SCCER FURIES*

The development of cooperation between different types of academic institutions is a central element in the "Coordinated Energy Research Switzerland" action plan. In this way, with the incorporation of the private economy the entire spectrum of the innovation chain can be encompassed, from basic and applied research through to introduction onto the market. Within the competence centres, networked and interdisciplinary research teams are able to join forces in the search for viable solutions for the "energy turnaround", and to secure the relevant transfer of knowledge and technologies. The interaction between different research cultures calls for innovation and creates significant value-added. At the same time, the creation of new research groups and professorships enhances the fundamental potential and forms the basis for long-term success.

5. Competence centres as drivers of innovation

» *Dr. Peter Richner, Deputy of Director Empa, Head of Swiss Competence Center Future Energy Efficient Buildings and Districts SCCER FEED&D*

» *Dr. Andreas Hafner, Senior Innovation Manager, Academic Partnership Developer, BASF; business partner of SCCER EIP*

Researchers from academic institutions are working closely together with industry partners in all competence centres with the aim of developing new solutions for achieving the objectives of "Energy Strategy 2050". But their cooperation is not restricted to project-related activities. It also encompasses intensive medium to long term strategic agreements between research institutions and industry. This results in the creation of a new standard of cooperation that extends from essential aspects of network building and informal exchanges of ideas through to the achievement of ambitious objectives. In the medium term this gives rise to a fresh innovation dynamic, thanks to which new solutions can be introduced onto the market and Switzerland's position as an industrial centre can be strengthened.

6. Competence centres: an ongoing success story

» *Walter Steinlin, President of CTI; President of the SCCER Steering Committee*

The successful development of the eight Swiss Competence Centres for Energy Research has significantly enhanced Switzerland's expertise in the field of energy research thanks to the highly professional activities of numerous specialists. In a second period of promotional activity, the aim will be to focus on innovation in the declared areas of priority and promote it in close cooperation with the involved industries.

Invention and innovation: integration into the value chain

The two National Research Programmes, NRP 70 (“Energy Turnaround”) and NRP 71 (“Management of Energy Consumption”) initiated by the Swiss National Science Foundation (SNSF) are focusing on the development and successful implementation of new processes via various levels of the value chain, while taking account of Switzerland’s social, geographic, economic and ecological framework. They are accomplishing this through the integral observation of scientific and technological, as well as socioeconomic and regulatory, aspects of the process leading to the targeted “energy turnaround”.

How can energy research be rendered politically relevant?

» *Professor Dr. Andreas Balthasar, President of NRP 71 Steering Committee; Department of Political Science at the University of Lucerne*

Restructuring our energy system is a necessity – and is already becoming a reality. Professor Dr. Andreas Balthasar, President of NRP 71 Steering Committee, explains which findings our policy makers need to obtain from energy research so that innovative technologies and processes can achieve the targeted effect in practical application.

The selected projects to be presented at the Energy Research Conference by researchers and their partners offer an insight into the broad spectrum covered by NRP 70 and NRP 71.

Electricity storage via air compression and its contribution to the energy turnaround

» *Dr. Andreas Haselbacher, NRP 70 research project leader; Mechanical and Process Engineering, Federal Institute of Technology, Zurich*

» *Dr. Giw Zanganeh, Industry partner of NRP 70; Airlight Energy Manufacturing SA, Biasca*

Dr. Andreas Haselbacher and Dr. Giw Zanganeh outline the potential and technology, as well as the ecological and economic impacts, of combined heat storage at a magnitude of industrial relevance through the use of innovative materials.

Pull the plug!

» *Professor Dr. Suren Erkman, NRP 71 research project leader; Institute of Geosciences and the Environment, University of Lausanne*

In theory, it would be possible to reduce the consumption of electricity in private households by up to 30 percent. But how can people’s awareness of the importance of more efficient electricity use be raised and translated into their everyday behaviour? Professor Suren Erkman and his research team are closely examining this question and calling on consumers to “pull the plug”.

Alternative electricity supply and the problem of gaining acceptance of new technologies

» *Professor Dr. Christian M. Franck, NRP 70 research project leader; High Voltage Laboratory, Federal Institute of Technology, Zurich*

» *Professor Dr. Isabelle Stadelmann-Steffen, NRP 71 research project leader; Institute of Political Science, University of Bern*

Even the most innovative technologies cannot achieve a breakthrough unless they receive broad-based acceptance. Professors Stadelmann-Steffen and Franck jointly outline what this means for the modernisation of the electricity transmission network and which strategies are the most suitable for securing widespread acceptance of new technologies such as hybrid AC/DC systems.

Energy reduction potentials of elderly people’s households

» *Dr. Heinz Rütter, NRP 71 research project leader; Rütter Soceco AG, Rüslikon*

» *Thomas Ammann, NRP 71 partner; Swiss Homeowners Association, Zurich*

With the ageing of the baby boomer generation, the lifestyles of senior citizens are becoming increasingly relevant in terms of energy consumption. Dr. Heinz Rütter and Thomas Ammann describe the efficiency and sufficiency potentials that exist within this population group, and which strategies are suitable for positively influencing the attitudes and behaviour of elderly people with respect to energy consumption at home.

Sorption technology: impacts of more efficient heat utilisation on the energy turnaround

» *Dr. Bruno Michel, NRP 70 research project leader; IBM Research Laboratory, Zurich*

Waste heat from industrial processes, and heat produced from cogeneration plants and through the use of renewable energy, can substitute the electricity and fossil fuels currently being used for heating and cooling buildings. Dr. Bruno Michel describes the technology that is decisive for a thermally driven sorption heat pump.

Research along the value chain

» *Professor em. Hans-Rudolf Schalcher, President of NRP 70 Steering Committee*

Professor em. Dr. Hans-Rudolf Schalcher explains the motivation and requirements associated with energy research that is oriented on value chains: along the scientific value chain from research and development through to rollout, and at the same time along the economic value chain from material, design and product through to the practical application of a new technology.

New research activities and implementation of findings

In this section, interdisciplinary cooperation and collaboration between academic institutions (Federal Institutes of Technology, universities and colleges of technology) in various areas of research will be described that have been particularly strengthened by the Action Plan and the National Research Programmes. Cooperation between research and industry on the one hand, and socioeconomic/sociopsychological and technical disciplines on the other, will facilitate the rapid implementation of the findings.

1. Introduction

» Professor Dr. Frank Krysiak, Professor for Environmental Economics and Dean of Research, University of Basel; head of Swiss Competence Centre for Energy Research – Society in Transition (SCCER CREST); member of the Federal Energy Research Commission (CORE)

Answers to the questions as to why numerous issues in the area of energy research call for cooperation between various groups and disciplines, and why it is that the NRPs and SCCER facilitate the necessary cooperation, are provided here on the basis of two examples.

2. Energy demand in Swiss households

» Professor Dr. Stefanie Hille, Assistant Professor for Energy Consumer Behaviour, University of St Gallen
» Professor Dr. Frank Krysiak, Professor for Environmental Economics and Dean of Research, University of Basel; head of SCCER CREST; member of the Federal Energy Research Commission (CORE)

The main aim of this annual survey is to identify the influence of socioeconomic (income, age, etc.), psychological and social factors (values, social norms, emotions, etc.) on energy consumption behaviour in Swiss households. The resulting data are used for a variety of purposes, including obtaining detailed information about energy consumption among different population groups. In addition, with the aid of the “choice experiments” methodology, from 2017 onwards the aim is to also analyse the effects of political and market-oriented instruments on energy-relevant behaviour and decision-making.

3. Energy perspectives in the transport sector – sharing = saving

» Professor Dr. Kay Axhausen, NRP 71 research project director; Swiss Competence Centre for Energy Research – Mobility; Institute for Transport Planning and Systems, Federal Institute of Technology, Zurich

The transport sector is among the largest energy consumers in industrialised countries. The aim of this project is to look for ways to minimise the negative impacts of transport. It examines concepts such as car and bike sharing, car pools, etc., from the point of view of their growth potential, their interactions with the existing transport system and their degree of acceptance among the population.

AFEM – Analysis of future electricity markets

» Professor Dr. Hannes Weigt, Assistant Professor for Energy Economics, University of Basel; NRP 70 research project leader
» Dr. Christian Schaffner, Executive Director, Energy Science Centre, Federal Institute of Technology, Zurich; NRP 70 research project leader

Analysing future electricity markets increases knowledge about electricity market mechanisms, in particular with respect to coordinating short-term flexibility and long-term investment goals for policy making activities. It also provides insights into the question of which future market models will be required for the second phase of “Energy Strategy 2050” after 2020.

4. Energy System Integration (ESI) platform

» Dr. Serge Biollaz or Dr. Tilman Schildhauer, General Energy Research, Paul Scherrer Institute; SCCER Biosweet
The “Biosweet” and “Heat and Electricity Storage” Competence Centres for Energy Research are jointly analysing ecological and economic aspects of “power-to-gas” technology. Holistic energy system analyses are being carried out on the ESI platform, and comparisons are then being made with alternative solutions.

5. Shaping the future Swiss electricity networks

» Prof. Dr. Mario Paolone, Distributed Electrical Systems Laboratory – EOS; Federal Institute of Technology, Lausanne; head of Swiss Competence Centre for Energy Research – Future Swiss Electricity Infrastructure (SCCER FURIES)
Seamless and sustainable supply to Swiss households, businesses and municipalities by working together with the industry and distribution/transmission network operators to develop and demonstrate the essential technologies for a sustainable and stable electricity infrastructure, integrating cleaner and more reliable feed-in and storage devices.

6. Political instruments/technology to market

» Professor Dr. Volker Hoffmann, Professor for Sustainability and Technology, Federal Institute of Technology, Zurich
How do feed-in tariffs, tax benefits and financing concepts influence the market penetration of energy technologies? How are innovative products brought onto the market, and how can the process be supported through political decisions?

Panel discussion 1: Balance of the past four years of energy research: findings and expectations for the future

» Professor Dr. Konstantinos Boulouchos, Head of Swiss Competence Centre for Energy Research – Mobility; head of the Institute for Energy Technology, Federal Institute of Technology, Zurich
» Professor Dr. Sophia Haussener, Assistant Professor, Laboratory of Renewable Energy Science and Engineering, Federal Institute of Technology, Lausanne; NRP 70 research project leader
» Dr. Peter Richner, Deputy of Director Empa, Head of Swiss Competence Center Future Energy Efficient Buildings and Districts SCCER FEEB&D
» Frédéric Varone, delegate of the National Research Council; Professor at the Faculty of Science and Economics, University of Geneva; tutor in public management
» Professor Dr. Andrea Vezzini, head of BFH-CSEM Energy Storage, Bern University of Applied Sciences; member of the Federal Energy Research Commission (CORE)
» Professor Dr. Alexander Wokaun, head of Energy and Environment Research Division, Paul Scherrer Institute, member of the CORE, co-author of the “Coordinated Energy Research Switzerland” action plan

Panel discussion 2: Energy research in the period from 2017 to 2020 and beyond

» Dr. Beat Hotz-Hart, co-author of the “Coordinated Energy Research Switzerland” action plan; member of the executive committee of the Council of the Federal Institute of Technology, Zurich; co-author of the Federal Institute of Technology Strategy; member of NRP 71 Steering Committee; Professor em. at the University of Zurich
» Dr. Tony Kaiser, President of the Federal Energy Research Commission (CORE); member of NRP 70 Steering Committee
» Professor Dr. Jean-Marc Piveteau, Rector, Zurich University of Applied Sciences
» Walter Steinlin, President of CTI; President of the SCCER Steering Committee
» Dr. Walter Steinmann, Director of the Swiss Federal Office of Energy SFOE

» Dr. Andrea Leu (moderator), Head of Knowledge and Technology Transfer, NRP 70 and NRP 71; Senarclens, Leu & Partner AG, Zurich

Further information

Contact for enquiries

Federal Department of the Environment, Transport,
Energy and Communications DETEC
Swiss Federal Office of Energy SFOE
energieforschungskonferenz@bfe.admin.ch
www.bfe.admin.ch

Conference venue

KKL Luzern
Europaplatz 1
6002 Lucerne
www.kkl-luzern.ch

Dinner 14.4.20166

Hotel Schweizerhof Luzern
Schweizerhofquai 3
6004 Lucerne
www.schweizerhof-luzern.ch



Directions

The KKL is three minutes walk from Lucerne main station. Paid parking is available in the station car park.

The Hotel Schweizerhof is less than ten minutes walk from Lucerne main station.

Alternatively, there are several buses from the bus stop "Luzern Bahnhof" to "Schwanenplatz".