The Swiss Competence Centers for Energy Research
Heat & Electricity Storage

Thomas J. Schmidt
What is the biggest challenge we face?
Energy Use

- 3.4% Lighting
- 2.8% Building Operation
- 1.3% Entertainment
- 9% Drives and Process
- 12.5% Kinetic energy
- Mobility 30.3%
- 33% Space Heating
- 18% Efficiency loss (Heat)
- 12.2% Process Heat
- 5.8% Hot Water

23.01.2015
Let’s talk about Electricity … Switzerland

http://www.uvek.admin.ch/themen/03507/03509/03514/

23.01.2015
Importance of Energy Storage
Importance of Energy Storage

Intermittency of Renewable Energy Sources calls for ENERGY STORAGE SYSTEMS
Importance of Energy Storage

**EPEX SPOT AUCTION**

![Graph showing energy storage importance](image)

- **Preis**: Graph shows the price variation over time with peaks and troughs indicating energy storage's impact.
- **Volumen**: Graph illustrates the volume of energy traded during different hours, highlighting key periods.

The data spans from 11.09 to 17.09, indicating a comprehensive view of energy storage's role in market dynamics.
Importance of Energy Storage

High Electricity Supply and low Electricity Demand:
Peak Load Prize falls below Base Load Prize
We need to tackle two major challenges

- Replacement of potentially dangerous nuclear energy (sooner or later)
- Reduction of CO₂ emissions

→ Electricity gap needs to be closed

Cap at 60 TWh consumption
Increase energy efficiency (saving)
Maximize hydropower (37 → 40 TWh)
Increase Renewables (1.3 → 22 TWh)
Complement with fossil fuel production

2035: 60 % renewable electricity
Complement with fossil fuel production
Increase energy efficiency (saving)
Energy Strategy 2050
• Solutions to problems arising from the “energy revolution”
• Research plays a strategic role

Coordinated Energy Research in Switzerland Action Plan
• Swiss Competence Centers for Energy Research (CHF 72 million)
• R&D projects in the energy field (CHF 46 million)
• Funding schemes for young scientist (CHF 24 million)

Swiss Competence Centers for Energy Research (SCCER)
• Inter-university research networks
• Seven predefined action areas
• Supervised by the Commission for Technology and Innovation (CTI) and the Swiss National Science Foundation (SNF)
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WP 2: Storage of thermal energy (heat)

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Sophie HAUSSNER (EPFL)

WP 3: H₂ Production & Storage

Andreas ZUTTEL (EMPA)
Kevin SIVULA (EPFL)

WP 4: Catalytic & Electrocatalytic CO₂ Reduction

Paul DYSON (EPFL)
Christophe COPERET (ETH)

WP 5: Technology Interactions of Storage Systems

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Urs SENNHAUSER (EMPA)
## SCCER Goals

### Goals of SCCER Storage

- Capacity build-up in Energy Research
  - Education of PhD Students, Scientists and Technicians
- Establishment of world-leading center for topics related to energy storage
- Establishment of experimental and technical platforms for trans-institutional R & D
  - Ensure transformational R&D in multi-institutional teams by sharing expertise and know-how and by close collaboration with industry
- Bridging activities from fundamentals to applications
- Technology transfer to Swiss Industries