



Lucerne University of  
Applied Sciences and Arts

**HOCHSCHULE  
LUZERN**

Engineering and Architecture  
FH Zentralschweiz

# RESEARCH GROUP POWER ECONOMY

[hslu.ch/PowerEconomy](https://hslu.ch/PowerEconomy)



1'766

**STUDENTS IN  
BACHELOR'S DEGREE PROGRAMS**

128

**STUDENTS IN  
MASTER'S DEGREE PROGRAMS**

821

**STUDENTS IN  
CONTINUING EDUCATION**

350

**RESEARCHERS**

857

**ONGOING  
RESEARCH PROJECTS**



**LUCERNE SCHOOL OF ENGINEERING AND ARCHITECTURE**  
**WHERE PEOPLE AND IDEAS MEET!**



## Economic solutions for the power economy

To master the innovation dilemma means to strike a balance between operative efficiency and strategic development. The research group Power Economy combines distinct competences in three fields of action:

- Electricity Grids, Energy and Flexibility Markets
- Business Model Innovation for Energy Technologies in the Built Environment
- Fostering Energy Efficiency through the Assessment of Multiple Benefits

Within each of these research areas, a dedicated team of experts addresses current topics relating to the energy industry. Our overarching goal is to support the energy transition by providing practical solutions for a sustainable energy future.



### Electricity Grids, Energy and Flexibility Markets

The structural change of the energy market offers new opportunities to all market players. The development of new business models as well as the performance of market and technology analyses supports the market introduction of new products and services.



### **Business Model Innovation for Energy Technologies in the Built Environment**

The energy industry faces radical transformations. New and flexible business models that are built around customer's needs and the peculiarities of new technologies support the transition towards a higher share of renewable energy in buildings and districts.



### **Fostering Energy Efficiency through the Assessment of Multiple Benefits**

The realisation of an energy efficiency measure is beneficial for the environment. The extent to which also a business can profit from the implementation of an energy efficiency measure can be indicated by identifying, quantifying and monetising the associated multiple benefits.



## ELECTRICITY GRIDS, ENERGY AND FLEXIBILITY MARKETS

Flexibility is a key enabler for a successful future energy infrastructure, integrating a higher share of renewable electricity. Whether flexibility is provided by industrial processes or designated new technologies: We have the appropriate tools for a comprehensive economic assessment.

The Paris agreement, individualization, urbanization and changing mobility patterns act as the driving forces for innovations regarding the energy infrastructure. At the same time, flexibility and expansion are considered the key enablers of success. We develop new business models, perform market and technology analyses and assist the market introduction of new products and services in order to support our partners during the fundamental change of the energy market.

### Core Activities

- Responsibility for the assessment of European grid service markets in the Horizon 2020 project FCH-01-1-2016 QvalyGridS
- Solutions for the electricity sector: supporting the identification of market opportunities
- Development of new business models: market and critical success factor analysis, value propositions and business logic development
- Performance auditing and innovation management: risk assessment, business case calculations and introduction of invention- and realization processes



## BUSINESS MODEL INNOVATION FOR ENERGY TECHNOLOGIES IN THE BUILT ENVIRONMENT

Whether it is a decentralized multi-energy system in the urban environment or a platform for Peer-to-Peer electricity exchange: Building upon solid collaborations with public and private actors, we guide through the development of new business models for energy efficient technologies in the built environment.

The way energy services are generated, delivered and traded is expected to change completely in the coming years. This requires new flexible business models built around customer's needs and the peculiarities of the new technologies such as decentralized multi-energy hubs or digital trading platforms. We support the transition towards a higher share of renewable energy in buildings and districts through our expertise in technologies, customer needs, stakeholder management, and regulatory and financial boundaries.

### Core Activities

- Business model innovation for energy technologies in the built environment, particularly for multi-energy systems
- Modelling of energy flows and energy revenues and -costs considering different scenarios in decentralized energy systems
- Collaborative processes for the renovation of buildings and districts
- Valorisation of new possibilities in the energy sector such as the provision of demand side flexibility or data analytics
- Research in cooperation with the Swiss Competence Centers for Energy Research – Future Energy Efficient Buildings and Districts (SCCER – FEED&D)







## FOSTERING ENERGY EFFICIENCY MEASURES THROUGH THE ASSESSMENT OF MULTIPLE BENEFITS

The valuation of Multiple Benefits of energy efficiency measures supports the decision-making process and leads to a sustainable increase of competitiveness. We develop methods and approaches, which are exclusively aligned to the specific requirements of our industrial partners in order to assess the profitability of energy efficiency investments based on a full-cost analysis.

Apart from the evident energy savings and CO<sub>2</sub> emission reductions, energy efficiency measures have additional positive effects on core business activities and strategic goals of a company: These effects are referred to as Multiple Benefits, such as for example the reduced need for maintenance, an improvement of process control or the increase of comfort. Our cross-sectoral approach to comprehensively identify, quantify and monetize Multiple Benefits enables businesses to emphasize the strategic character of an energy efficiency measure and simplifies the assessment of future investments.

### **Core Activities**

- Responsibility for the implementation and validation of M-BENEFITS methodology into pilot projects in the Horizon 2020 project EE-15-2017
- Methodology development for the identification, quantification and monetization of Multiple Benefits
- Advancement of a standardized approach for full-cost analysis of energy efficiency measures, applicable to all industry sectors
- Research in cooperation with the Swiss Competence Centers for Energy Research – Efficiency of Industrial Processes (SCCER – EIP)

## Contact

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