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- HUMAN IMPACT ON EARTH SYSTEMS
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saguf

schweizerische akademische
gesellschaft für
umweltforschung und ökologie
société académique suisse pour la recherche
sur l'environnement et l'écologie
swiss academic society for
environmental research and ecology

Anticipating Gaps in Energy Research at Transdisciplinary and International Interfaces

A session chaired by saguf at the International Foresight Academic Seminar 2013 identified strengths and gaps in the energy research landscape in Switzerland. The discussion highlighted the need for inter- and transdisciplinary research and integration of the social sciences.

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To promote the transition of current energy systems towards sustainability, the Swiss *Energy Strategy 2050*¹ is to focus on increased energy efficiency and renewable energies. Main objectives are to ensure a reliable, cost-effective and environmentally sustainable energy supply to strengthen Switzerland's position as a marketplace for energy technology and maintain the high quality of Swiss energy research. Publicly funded energy research is carried out in line with the Federal Government energy research concept, which is updated every four years by the Swiss Federal Energy Research Commission (CORE). High priority is given to international co-operation and the efficient implementation of research findings (SFOE 2012).

saguf Working Group on Energy Future

The interdisciplinary working group on energy future within the swiss academic society for environmental research and ecology (saguf) focuses on the energy transition in Switzerland. It critically reflects on current energy research programmes in Switzerland and identifies needs for further research (Stauffacher et al. 2013). Big potential is seen in promoting the integration of social, natural, and technical sciences in energy research. In the consultation process to the Swiss *Energy Strategy 2050*,

the working group contributed to the statement of the Swiss Academies of Arts and Sciences. The working group's contribution indicated five topics in the energy domain that need to be better understood and promoted: transdisciplinary education and research in energy issues; strategies to promote energy sufficiency in addition to energy efficiency; a better understanding of the relationships between changes of social practices and energy use (e. g., home office days and commuting behaviour); a better understanding of social acceptance of new energy technologies (such as new renewables and smart grids); and social decision processes regarding energy portfolios and siting energy infrastructure as well as the trade-offs that need to be made.

The *International Foresight Academic Seminar*², which took place at Technopark Winterthur from 16 to 19 September 2013, provided an opportunity for discussing these issues in a future-oriented way. The conference was jointly organised by the Zurich University of Applied Sciences (ZHAW) and the International Foresight

Academy (Carabias-Hütter and Haegeman 2013). The working group co-organised and chaired a session entitled *Energy Future* to start discussions with national and international energy experts from research and practice.

International Foresight Academic Seminar at ZHAW

Approximately 80 foresight experts and researchers from more than 20 countries all over the world came together in Switzerland during four days to explore and compare the development and use of foresight approaches to enable a smarter, more participatory and sustainable future. Present-

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¹ www.energystategy2050.ch

² Abstracts, manuscripts and presentations can be accessed at www.ine.zhaw.ch/de/engineering/institute-zentren/ine/international-foresight-academic-seminar.html.

tations focused on the impacts and contributions of foresight in the past and in the future – especially the role of foresight in empowering citizens for engagement in decision-making processes and thus in shaping participatory governance systems and democratic societies to address and tackle future societal challenges. Case studies were presented in the areas of hazards and security, scarce resources, science and technology, future mobility and energy issues in international and local contexts.

Foresight contributes to policy framing, design and implementation. It does so by providing an environment that enables a shared understanding of the present and the conceptualization of possible futures, including disruptive ones. By doing so it empowers decision-makers to shape a joint direction that considers the perspectives of different stakeholders and is adaptable over time (Carabias-Hütter and Haegeman 2013).

Session on Energy Future

Members of the saguf working group co-organised a session on energy future and thereby triggered a process of knowledge exchange between the international foresight community and Swiss experts in en-

ergy research to advance knowledge generation in this field. The session started with an overview of Swiss energy research and continued by presentations about energy research projects in an international context and a general discussion.

Swiss Energy Research

An input presentation on current Swiss energy research programmes in support of the new energy policy was provided by **Tony Kaiser**, President of CORE. He introduced the *Federal Council's Coordinated Energy Research Switzerland Action Plan* aiming to promote energy research between 2013 and 2016. Central to the *Action Plan* is the creation of research competence centres or networks between higher education institutions and relevant stakeholders, to be known as Swiss Competence Centres for Energy Research (SCCERs). Their aim is to promote the innovation necessary to implement the *Energy Strategy 2050* sustainably, both on a technical and a socio-political level. The developments extend from basic and applied research and development to the transfer of research results to the market. The SCCERs are expected to build the required capacity and pursue the most promising ideas and approaches.

Furthermore, Kaiser highlighted the *National Research Programmes (NRPs) 70 Energy Turnaround*³ and *71 Managing Energy Consumption*⁴ as new integrative approaches striving for technically but also socio-economically innovative and sustainable solutions to reduce energy consumption, to promote the use of renewable energy and to cut CO₂ emissions. The latter programme is expected to develop a better understanding of the legal, economic, psychological and social factors promoting or constraining the diffusion of energy efficiency and sufficiency improvements. Both programmes concentrate the existing research potential, integrate different disciplines, and generate knowledge that will support politicians and the economy in the implementation of the *Energy Strategy 2050*. The focus will be on the supply of and demand for energy as well as on the interface between supply and demand. Special importance will be attached to facilitating the transfer to the decision-making realms.

Energy Research in an International Context

Following the presentation of the current Swiss energy research programmes, it was interesting to discuss energy research in an international context.

In the energy scenarios for Asian countries, developed by **Richard Silbergliit** from the American RAND Corporation, energy security faces significant challenges and calls for higher energy efficiency as well as shares of renewable energies.

José Luis Cordeiro, Millennium Project Venezuela, presented energy scenarios for Peru and assessed their possible long-term impacts using a typical STEEP (social, technological, economical, environmental and political) analysis.

According to **Denis Lacroix** from the Institut Français de Recherche pour l'Exploitation de la Mer, foresight studies appear in the second phase, linking research, industry and politics, as in the case of launching a French policy for marine renewable energy (e.g., offshore wind farms).

FIGURE: The highest wind generator in Europe is located at 2465 metres a.s.l. near Griespass in Switzerland. Energy research provides technological solutions for the energy transition – but it also needs to consider societal issues, such as acceptance of renewable energy production.



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³ www.nrp70.ch

⁴ www.nrp71.ch

An interdisciplinary research project coordinated by *Harry Spiess* at ZHAW explores the current and future acceptance of wind energy production in the Swiss energy region Goms (see figure). In this context, the method of the focus group proved to be a valuable participatory foresight instrument. However, assessing the future visions of young people requires a stronger engagement. The discussion with the audience showed that neighbouring countries apply similar approaches and face the same challenges (see also Schippl et al. 2012, Heinrichs et al. 2011).

Discussion

The participants of the session acknowledged the role of foresight as a consensus catalyst and means for reflection. It allows for concrete proposals (e. g., through scenario generation) and elaboration of programmes of action, such as the identification of hotspots (e. g., smart cities) and gaps (e. g., convergence of disciplines) in the energy research landscape. In this context, the relevancy of the Swiss energy research programmes was acknowledged. Major conclusions of the session presentations and discussion:

- isolated technical solutions do not suffice to develop politically and societally robust approaches for the forthcoming energy transition in Switzerland;
- knowledge and experiences from the social sciences are not yet well reflected in the Swiss discourse about the energy transition;
- by promoting inter- and transdisciplinary research approaches, a better integration of social scientific insights in energy research could be established.

An important question refers to the possible contribution of social scientists beyond pure acceptance research. Examples are research on societal decision processes, contributing social scientific insights in scenario construction processes, as well as critical reflections upon assumptions in technical approaches (cf. Stauffacher and Moser 2010). However, interdisciplinary collaboration is difficult due to the dominance of disciplinary structures at universities. In particular in energy research, in-

terdisciplinary research groups are needed that integrate disciplines from natural, technical, and social sciences and link scientific insights with practical knowledge and experiences. This claim is supported by the Swiss energy research programmes.

Conclusions

Purely technological solutions will not be sufficient to implement the energy transition in Switzerland. Relevant social, economic and political issues need to be considered and integrated as well. At the same time, challenges associated with the *Energy Strategy 2050* will not be met solely with the aid of new business models or legal reforms, but require also a technological understanding and technical innovation.

For this purpose, the *NRPs* and *SCCERs* promote interdisciplinary and solution-oriented research. In particular, the *NRP 70 Energy Turnaround* fosters joint interdisciplinary projects along a value chain from the supply to the demand side, where technological and socio-economic issues are expected to converge.

The enhanced integration of natural, technical, and social sciences as well as of knowledge and technology transfer is acknowledged in the recent research funding schemes and is in line with *saguf's* request brought forward in the consultation process to the Swiss *Energy Strategy 2050*.

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KAPP-FORSCHUNGSPREIS FÜR ÖKOLOGISCHE ÖKONOMIE AUSSCHREIBUNG 2014

Der *Kapp-Forschungspreis für Ökologische Ökonomie* richtet sich an junge Wissenschaftlerinnen und Wissenschaftler im deutschsprachigen Raum und soll Studien zur Ökologischen Ökonomie fördern. Für die Ausschreibung 2014 lautet die übergeordnete Themenstellung:

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Von Interesse sind wissenschaftliche Beiträge, die sich den Wachstumsursachen und -zwingen moderner Ökonomien, der (Un-)Vereinbarkeit wirtschaftlichen Wachstums mit nachhaltiger Entwicklung sowie den Merkmalen und möglichen Funktionsweisen einer Wirtschaft ohne Wachstum widmen.

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Interessierte erhalten die Bewerbungsunterlagen über die Geschäftsstelle des Kapp-Forschungspreises (Adresse siehe unten). Die Bewerbungsfrist endet mit dem

1. März 2014

Die Preisträger werden von einer unabhängigen Jury ausgewählt. Der Rechtsweg ist ausgeschlossen.

*Der Kapp-Forschungspreis wird
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