

EDITORIAL

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# Interdisciplinary research for the transformation of the energy system

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The series of articles which will be published in *Energy, Sustainability & Society* during the next months results from presentations at the International Conference “Micro Perspectives for Decentralized Energy Supply” which took place at Technische Universität in Berlin in April 2011 (more information at <http://www.microenergysystems.tu-berlin.de/conference2011>). The conference brought together scientists from different disciplines as well as practitioners in the field of decentralized energy supply from all over the world. The conference focused on the challenges and potentials of a transformation from a fossil fuel based energy supply towards a supply with energy from different renewable sources. This transformation, which includes a shift from centralized to decentralized systems, is currently taking place in highly industrialized countries as well as in developing countries. The discussion showed that there are some challenges or crucial points which are quite similar worldwide even if the economic and social structures as well as the available natural resources differ substantially. Some of these points are taken up by the papers of this and the following issues.

Several of the selected contributions stress the fact that there is no “one fits all”-technology but that the implementation of certain technologies and the mix of energy supply from different renewable sources should be the result of assessing economic as well as ecological and social aspects. Scenarios - as they are developed in some of the papers - which compare the energy potential and costs of different options, help to identify the appropriate energy mix for certain contexts. Since it is not easy for administration and planners to consider multiple perspectives, some authors work on instruments or tools which facilitate decision making by visualizing the results of different parameters and integrating them on a certain spatial level, for example with geographical information systems (GIS). These tools also make

it possible to compare the impacts of certain technologies or production methods on different natural resources such as biodiversity or water and soil quality versus the reduction of climate gas emissions.

Other contributions focus on the analysis of case studies such as family farms or renewable energy regions, identifying organizational aspects which allow realizing sustainability potentials on the level of single enterprises or regions. Benefitting from synergies in cooperative structures and maintaining flexibility for continuous innovation processes seem to be crucial factors in very different contexts.

Last not least it seems important to analyse the mechanisms and impacts of governance policies which support the transformation of the energy system. One important aspect is the question about the type of constellation which is necessary for the rise of innovative policies. Another aspect are the unforeseen impacts of certain policies. Different authors mention the negative ecological side effects of certain policies which were aiming at reducing climate gas emissions by supporting the production of biomass for energy use.

While the individual focus of the papers is very different, they have in common that they often take up topics which are located in the intersection of several disciplines. As the editors - Mr Narodoslawsky and Mrs Fiedler - pointed out in the first editorial of this journal, this type of research is necessary in the complex field of innovative energy systems and sustainable development. We are therefore very grateful that the journal *Energy, Sustainability & Society* provides a floor for the discussion of results from interdisciplinary energy research and want to express our thanks to the reviewers who accepted the challenge of reviewing papers which might not have been at the core of their discipline. We are convinced that it is this type of learning process which is necessary for a successful transformation of the current energy system.

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