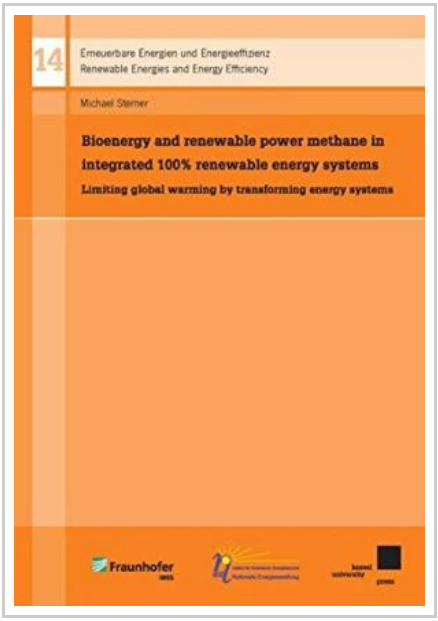

Bioenergy and renewable power methane in integrated 100% renewable energy systems

By Michael Sterner

Kassel University Press Mai 2010, 2010. Taschenbuch. Book Condition: Neu. 211x146x17 mm. Neuware - The two major challenges in global energy systems are to reduce energy-related greenhouse gas emissions and to maintain energy supply security. This thesis presents one solution to both problems. It proposes strategies for the transformation of current energy systems into 100% renewable, stable and almost emission-free energy systems without making use of nuclear energy or carbon capture and storage. Bioenergy is analyzed in the broader context of climate change, energy systems and land use. A techno-economic and ecologic analysis of 78 bioenergy pathways is done in order to identify the strategic role of bioenergy in future energy systems. For the first time, both traditional and modern biomass pathways are compared in a single assessment, identifying the range of maximum greenhouse gas reduction potential of bioenergy. However, the identified bioenergy potential is neither sufficient to balance fluctuating renewable power nor to fully replace fossil fuels in heat and transport on a global scale. To solve this bottleneck, new concepts of converting renewable power into methane are developed. In this way, renewable power can be stored in the natural gas network and used temporarily and spatially flexible for...

Reviews

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