ICRERA 2024

13th INTERNATIONAL CONFERENCE ON RENEWABLE ENERGY RESEARCH AND APPLICATIONS

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Abstract

Title: Modeling of Reneables and Storages in PyPSA and Julia tools: case study for electricity system of Kazakhstan

Developments in the fields of renewable energy, energy storages, and digitalization have led to a change in the trends of the components of the mix of types of energy sources: there has been a shift from the use of conventional fuel energy carriers to green energy, where renewable energy influenced with high importance. Renewables are a key energy solution against climate change. Only the development of green energy and the introduction of energy efficiency measures can reduce GHG emissions, according to the Strategy of Kazakhstan up to "Net-Zero" by 2060. Will be discussed and compared different development scenarios for allocation of high share of renewables.

Each storage system as an independent Agent of the energy system will be modeled by focusing on individual cost-benefit maximization behavior in the system. In agent modeling, the parameters of active agent objects are first set, and their behavior is determined. Regional energy service companies, generating facilities, industrial consumer companies, etc., will be represented as other agents in the system. Individual dispatching schedules of each agent will be simulated in GAMS, PyPSA, and Julia environments. Discrete-event modeling and system dynamics will show the best solution for separate scenarios.

In this tutorial session will be described research analyzing steps for different tools in using renewables with storages as a new electricity market design. The accuracy and productivity of the models also will be tested and will be presented at the conference.

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- **Research Interest**: power system modeling, energy modeling, optimization problem in energetics, smart grid.