Optimizing Long-Term Investments for a Sustainable Development of the ASEAN Power System

Abstract:
The electricity consumption in the Association of East Asian Nations (ASEAN) region is one of the fastest growing in the world and will lead to a dramatic increase in greenhouse gas emissions in the next decades. A decarbonization of the region’s electricity supply is thus a very important measure when taking action on global climate change. This paper defines cost-optimal pathways towards a sustainable power system in the region by employing linear optimization. The proposed model simultaneously optimizes the required capacities and the hourly operation of generation, transmission, and storage. The obtained results show that all different kinds of renewable sources will have to be utilized, while none of them should have a share of more than one third. The findings give reason for setting up an ASEAN power grid, as it enables the transportation of electricity from the best sites to load centers and leads to a balancing of the fluctuations from wind and solar generation. We suggest fostering a diversified extension of renewables and to elaborate on political and technical solutions that enable to build up an transnational supergrid.

Stichworte:

Zeitschriftentitel:
Energy