An optimization-based investment planning for a complex renewable energy systems (CRES)

한슬기, 김지용†
인천대학교
(jykim77@incheon.ac.kr†)

This study presents a new framework to plan and analyze a strategic investment for design of an integrated renewable energy source (RES)-based energy supply system. We first generate the RES-based energy system superstructure, which includes different sources (wind, solar and biomass) and various energy technologies (production, storage and transportation) along with three types of the final demand (electricity, hydrogen and fuel). We then develop a network optimization model using a mixed integer linear programming (MILP) to determine investment timing and allocation of the underlying system: types and quantities of utilized RES, the quantities and timing of investment, and types, number, and location of technologies installed. This study supports a decision making of a stakeholder in energy business and a policy maker of government and local authority in the strategic planning of a sustainable energy system.