

A systematic analysis of the effects of renewable energy sources (RES) and carbon capture and storage (CCS) on Korean energy system

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We present a new framework for design the renewable energy source based energy system of future Korea. We first generate a new energy network by including RES as a new primary resources and CCS system for the existing technologies. In this energy network, different RESs along with conventional sources, various energy technologies (production, storage and transportation) for satisfying three types of demand such as electricity, fuel and hydrogen. We then develop a new network optimization model for the underlying system using a mixed integer linear programming (MILP) technique. The proposed model determines where and how much energy to produce, store and transport so as to satisfy the three types of demand, while meeting the zero-carbon emission constraint. The capability of the proposed model is illustrated through a case study of the design problem of the transportation sector of future Korea.