A multi-period stochastic programming model for utility supply network design under uncertain operating costs and carbon credit prices

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 Most of the previous studies to design the utility supply network address a static deterministic model
assuming that all parameters, as coefficients of an objective function in the model, are invariant over a given planning interval. But, the uncertainties of the parameters may exist in various factors that affect the utility supply network design.
 In this study, a multi-period stochastic programming model is developed for a utility supply network design under uncertain operating costs (e.g. electricity costs, water costs, fuel costs) and carbon credit prices with the scenario-based approach. The proposed model determines where and how much utility to produce and distribute for the purpose of minimizing the total cost of handling the uncertainty while meeting the utility demand during each time period of a given planning interval. The capability of the proposed model to assist correct decisions despite a changing uncertain environment is tested by applying it to designing the utility supply network of Yeo-Su industrial complex on the southern coast of Korea.