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Abstract Integrated energy systems can greatly improve the efficiency of energy use, but the main problem for their planning is the uncertainty of the load in the long cycle. Therefore, this paper establishes an integrated energy system extended planning model incorporating multiple energy sources of gas, heat, and electricity, while long-term uncertainties are taken into account. Given the low accuracy of long-term forecasts and the small amount of uncertainty information, information gap decision theory is used to handle the uncertainty of electric load growth for coordinated planning. Finally, the validity of the proposed planning model is verified by taking an actual park as an example. Uncertainty can be managed effectively by regulating the avoidance factor, giving planners a quantitative tool and the superiority of integrated energy system planning over standalone planning is compared.

Keywords integrated energy system, uncertainty, information gap decision theory, planning.