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Abstract While promoting the development of new energy sources, China also requires emission reductions on the energy consumption side. The electrification of urban and rural residential energy consumption is a crucial one. However, simplifying other factors by considering only a single uncertainty often leads to multi-energy demand modeling methods lagging behind the latest research results in the single-demand modeling fields they involve. This study proposes an optimization model for township distributed micro-energy networks (TDMENet) oriented towards uncertainty, introducing the uncertainty modeling mechanism of Information Gap Decision Theory (InfoGT) to handle system uncertainty. By integrating and complementing resources from multiple villages, the cost of electricity purchase was reduced by 99.61%. In the event of an interruption in external energy supply, the critical load power supply rate of the township distributed micro-energy network was increased by 26.91% compared to the single-village model.

Keywords Township, Distributed Micro-Energy Network, Uncertainty, Information Gap Decision Theory.