Optimal Operation Scheduling of Energy Hubs using Robust Approach

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Microgrids (MGs) can be described as a group of distributed energy resources that can be connected to the main grid to meet the electrical and thermal load demands. Capturing the interactions among the electricity and the natural gas networks in natural gas-fired units, multiple energy carriers MGs are defined. In such MGs, electrical and thermal loads are supplied through energy hubs in the context of natural gas and electricity networks. Energy hubs are defined as energy systems that receive diverse energy carries as inputs to serve different types of loads as outputs. Stochastic scheduling methods can be used to optimally manage the energy hubs. However, in the stochastic approach, the main deficiency is that there exists the risk of experiencing the worst scenario. This work addresses the two-stage operation scheduling of energy hubs based on the worst scenarios. A novel robust approach is proposed comparatively with the stochastic approach. A robustness parameter is defined to control the compromise between the expected operation costs and the model robustness. It can be seen that the model is robust against all the realization of worst scenarios.