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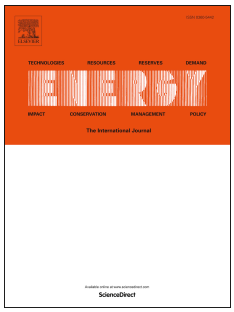

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A Real Option Assessment of Flexibilities in the Integrated Planning of Natural Gas distribution Network and Distributed Natural Gas-fired Power Generations

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Abstract

There is an increasing integration of distributed natural gas-fired electric power generations across the globe. The natural gas-fired power generators are dependent on the availability of reliable natural gas distribution systems. This interdependency coupled with the scalability of the natural gas-fired distributed power generators presents the management of an energy utility with an option to execute, delay or abandon long-term expansion plans based on new realities of electric power demand. A real options analysis of these flexibilities is carried out in this paper. The assessment of these options includes the identification and valuation of the identified options. The value of flexibilities and options is illustrated by assessing the options to implement, delay or abandon expansion plans in the presence of uncertain electric power demand on 9 and 33 bus electricity distribution systems.

Keywords: Long-term energy system planning, real option analysis, integrated planning of energy systems, natural gas distribution network, natural gas fired distributed generators

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