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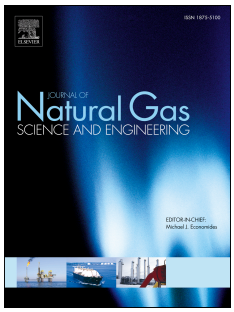

Gas turbine inlet air cooling system for enhancing propane recovery in a gas plant: Theoretical and cost analyses

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Gas Turbine Inlet Air Cooling System for Enhancing Propane recovery in a gas plant: Theoretical and Cost analyses

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Abstract

A local gas processing plant exhibits a decrease in propane recovery during summer. In this paper, the feasibility of using inlet air cooling system by utilizing a cold residue-gas stream to increase the cooling capacity of the plant's refrigeration system is theoretically and economically analysed. The theoretical study showed that as the inlet air temperature to the gas turbine decreases by 1^{o}C the generated power and the thermal efficiency of the gas turbine increase by 0.53% and 0.22%, respectively resulting in 0.192% increment of propane recovery. When the inlet air temperature of the gas turbine is cooled from 40^{o}C to 15^{o}C (ISO condition), the propane production rate increases by 245 bbl/day. This corresponds to savings of $18000 /day. The resulting payback period with 100% usage of the residue-gas is 8.5 months and that with 20% usage of residue gas is 2.5 years. In both cases, the internal rate of return (IRR) and Net Present Value (NPV) are very high making the investment highly lucrative prospect.

Keywords: Gas processing, Air Cooling, Gas turbine performance, Propane recovery

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