

Modeling and Optimization of Integrated Reverse Osmosis and Gas Turbine Systems

Iman Janghorban, 유창규*, Liu Hongbin,
Payam Ghorbannezhad, 강은유
경희대학교
(ckyyoo@khu.ac.kr*)

Reverse osmosis systems (RO) are more energy efficient than thermal desalination systems. Since RO systems consume only mechanical energy, the gas turbines (GT) can be coupled with RO systems. The RO energy consumption decreases by increasing the feed water temperature, while both efficiency and power output of GT increase using compressor intercooler, and direct evaporative cooling (DEC). This paper contributes to a new integration scheme of RO and GT. Compressor intercooler waste heat is recovered to preheat the RO feed water, where a part of the fresh water is used to cool the intake air of GT. Mathematical model is developed in EES software. The optimum temperature of the intake air to the gas turbine in order to minimization of the power consumed to produce 1 m³ of freshwater is obtained.

Acknowledgement: Financial supports from Korea Science and Engineering Foundation (KOSEF) (Grant No. KRF-2009-0076129) [funded by the Korea government (MEST)], and the Seoul R&BD Program (CS070160) are gratefully acknowledged.