해수를 이용한 화력발전소 폐열회수 히트펌프 시스템

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Heat Pump System Using Heated Effluent of Thermal Power Generation Plant as a Heat Source

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In South Korea the gross generation and heated effluent of power generation plant was 259 TWh and 4.73 billion tons in 2008. And then the waste heat from power generation was 388 TWh. It shows that the efficiency of thermal power generation plant is about 40%.

Therefore to reduce CO_2 emission from thermal power generation plant, the energy of this heated effluent must be reused to heat buildings or farm facilities. In South Korea horticultural facilities of about 25% are heated in winter season. Total area of greenhouses which are heated is about 13,000 ha.

Total heat amount needed to warm greenhouse of 13,000 ha in winter season is only 3.4% of total waste heat from power generation plant. In this study a heat pump system was designed to reuse the waste heat from power generation. Especially new heat exchanger was developed to recover the thermal energy from waste water and this model considered anti-corrosion against sea water and low cost for economic feasibility.

This heat recovery system was installed in mango growing greenhouse around thermal power generation plant in Seogwipo-city, Jeju Special Self-Governing Province. The result of preliminary test shows that the heating cost of about 90% is saved as compared to boiler using tax free light oil as a fuel.

Key words : heat pump(히트펌프), thermal power generation plant(화력발전소), heat source(열원), heated effluent(온배수)

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