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Effect of summer weather conditions on the environmental impact of a power plant in the UAE**Zin Eddine Dadach**

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This work investigates the effect of summer weather conditions on the environmental impact of an Open Cycle Gas Turbine in Abu Dhabi (UAE) using an exergoenvironmental analysis. The results are used to suggest measures for reducing the calculated impact. Actual operational data are verified with simulation data using commercial software. Compared to standard weather conditions, the summer weather conditions decrease the overall exergetic efficiency of the plant by 4.3% and increase the total environmental impact per generated KWh by 7.9%. The addition of a heat recovery steam generator could increase the net power output and decrease the total environmental impact of the plant. The main contributor to the environmental impact of energy destruction is the combustor. Summer conditions increase this impact by 21.5%. The compressor has the second highest environmental impact, increased by 14.6% for summer conditions. A process control system for continuous measurement of exhausted O₂ and CO can help to reduce the excess air and, consequently, the associated environmental impact. This may also decrease the power required by the compressor. Lastly, a cooling system for the ambient air may also help to increase the power output of the plant by decreasing the power required by the compressor.

Biography

Zin Eddine Dadach is currently Assistant Professor at the Chemical and Petroleum Engineering Department of the Higher Colleges of Technology in the UAE. He is involved in academic research in Higher Education, Teaching Methods and Vocational Education. His industrial projects include simulation of chemical processes and exergy-based analyses of energy-conversion systems.

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