Solar® Turbines

A Caterpillar Company

Powering the Future Through Sustainable, Innovative Energy Solutions

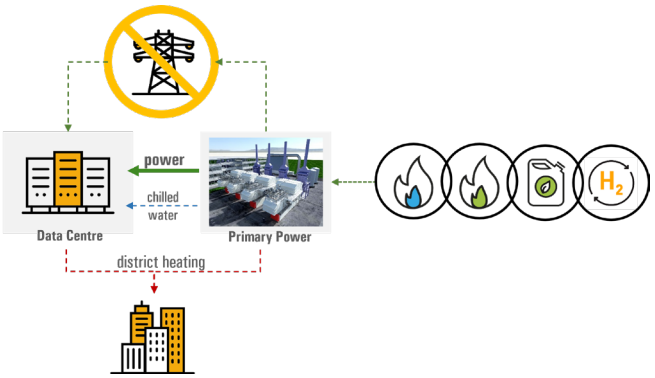
DATA CENTER OPERATIONS CASE STUDY

Combined Cooling and Power to Decrease Power Usage Effectiveness

Case Study 3: Combined cooling and power in hot ambient to decrease power usage effectiveness (PUE) and operating expenses (OPEX).

For data centers operating in hot climates, the need for chilled water results in high PUE and can significantly increase OPEX. To reduce cost, installing an absorption chiller to generate chilled water while producing electricity can be a cost-effective solution, particularly when the price differential between gas and electricity is substantial.

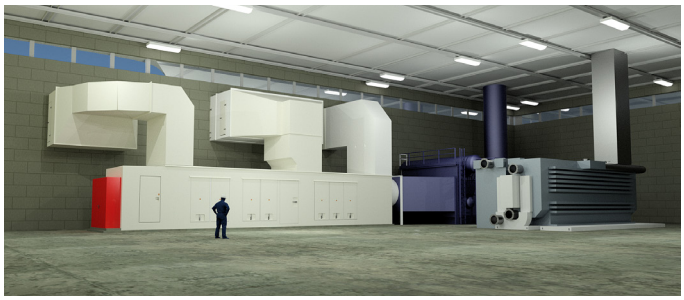
Some regions have started to regulate the data center growth and its energy consumption. In high temperature ambients, it is sometimes done by putting a maximum limit on PUE. Installing a primary combined chilling and power plant, sometimes called trigeneration, can relieve the power grid and decrease the PUE by producing electricity on site and using a non-electrical cooling system, enabling data center growth in high ambient PUE regulated areas. Additionally, trigeneration often results in a decrease in CO2 in countries where the utility grid is dominated by coal power generation.



Chilled water, high power density primary power plant.

Solar Turbines' scalable combined cooling and power solution includes:

- Modular PGM (Power Generation Module) gas turbine
- Chilled water produced either in absorption chillers (direct exhaust and water/steam) or steam turbine-driven compression chillers
- Maintaining the benefit of high power density, dual fuel, low NOx emissions, lower PUE, and green fuel ready (H2, HVO, biogas)
- Total thermal efficiency of 80%+
- Ability to run in island mode or parallel to the grid
- Ability to take 100% load blocks



Trigeneration Plant: PGM130 with heat recovery steam generator (HRSG) and steam absorption chiller producing 16.5 MW electrical power and approx. 28 MW chilled water (approx. 8000 RT)

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