Financial Payback and Annual Savings for the Infinity Turbine IT250, IT1000, and IT10MW Systems

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https://www.infinityturbine.com/natural-gas-powered-supercritical-co2-power-systems-analysis-by-infinity-turbine.html

Analysis of payback period and yearly operating savings for the IT250, IT1000, and IT10MW natural gas fired supercritical CO2 power systems, using a heat rate of 10,000 BTU per kWh, standard US commercial natural gas pricing, and electricity costs of $0.20 per kWh.

This webpage QR code

PDF Version of the webpage (maximum 10 pages)

Financial Payback and Annual Savings Analysis

A detailed look at operating costs, annual savings, and payback periods for Infinity Turbine systems ranging from 250 kW to 10 MW, showing how high efficiency supercritical CO2 turbines outperform purchased grid electricity.

Financial Payback and Annual Savings Analysis

Below are the assumptions used for the comparison:

Key Assumptions

- Heat rate: 10,000 BTU per kWh
- Natural gas price: $10 dollars per MMBTU (average US commercial retail rate)
- Electricity value: $0.20 dollars per kWh
- Continuous operation: 24 hours a day, 365 days a year
- Hours per year: 8760

Gas Fuel Cost per kWh
10,000 BTU per kWh equals 0.01 MMBTU.
Natural gas at $10 dollars per MMBTU results in a fuel cost of $0.10 dollars per kWh.

Value of Produced Electricity
Electricity worth $0.20 dollars per kWh.
Fuel cost $0.10 dollars per kWh.
Net savings per kWh produced: $0.10 dollars.

Annual Operating Savings

Savings = Output in kW multiplied by hours per year multiplied by savings per kWh.

IT250 System

- Output: 250 kW
- Annual kWh: 250 x 8760 = 2,190,000 kWh
- Annual savings: 2,190,000 x $0.10 = $219,000

IT1000 System

- Output: 1,000 kW
- Annual kWh: 1,000 x 8760 = 8,760,000 kWh
- Annual savings: 8,760,000 x $0.10 = $876,000

IT10MW System
- Output: 10,000 kW
- Annual kWh: 10,000 kW × 8760 h = 87,600,000 kWh
- Annual savings: 87,600,000 kWh × $0.10 = $8,760,000

Payback Period Calculations

Payback equals system cost divided by annual savings.

IT250

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IT1000 System

• Output: 1,000 kW
• Annual kWh: 1,000 x 8760 = 8,760,000 kWh
• Annual savings: 8,760,000 x $0.10 = $876,000

IT10MW System
• Output: 10,000 kW
• Annual kWh: 10,000 kW × 8760 h = 87,600,000 kWh
• Annual savings: 87,600,000 kWh × $0.10 = $8,760,000