

H5 Turbine Repair

Presented on November 14

2022

SM

INDEPENDENCE

★ POWER & LIGHT ★

Request for Purchase Order

- IPL staff recommends approval of a Purchase Order to General Electric (GE) to inspect and repair the turbine section of Combustion Turbine H5.



CT H5 Turbine Vibration

- One of our two gas fired turbines, most frequently called on by SPP
- Unknown vibration in the turbine section, preventing it from reaching continuous operating speed
- Manufactured and serviced by General Electric (GE)
- Proposal provided by GE to repair the unit and return it to service.



GE 5000 Series Generator Rotor



INDEPENDENCE

11/9/2022

★ POWER & LIGHT ★



GE 5000 Series Combustion Turbine



INDEPENDENCE

11/9/2022

★ POWER & LIGHT ★



Repair H5

- Purchase Order request to include multiple contingencies depending on scope of work required as well as moving forward the next Major Inspection
- GE representatives addressed the Council last year to provide technical expertise on GE Frame 5 Combustion Turbines and additional insight into the life expectancy of these units.

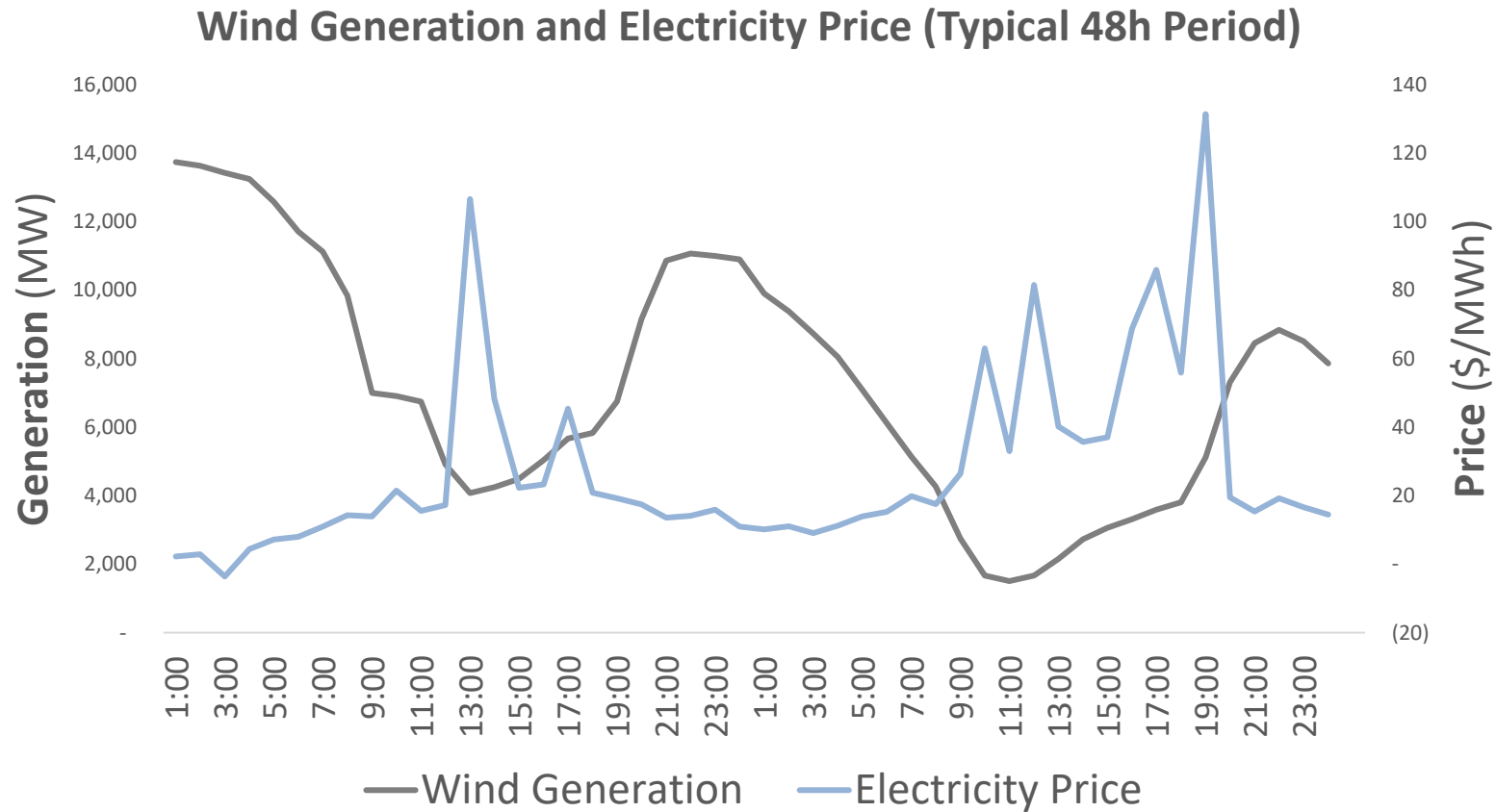


GE 5000 Series: Robust Workhorse

- Life extension inspections: 5000 fired startups or 200,000 fired hours.
- For comparison, H5 (2825 starts and 23,654 hours) H6 (2615 starts and 19,528 hours)
- Approximately 3000 Frame 5 and Frame 3 turbines still in operation.
- Approximately 60% of all Frame 5 turbines produced, still in operation



Increased wind turbine capacity contributes to volatility and price spikes when the wind drops off



INDEPENDENCE

11/9/2022

★ POWER & LIGHT ★



Growth of renewable-based capacity and volatility creates an opening for on system peaking units

- Renewable resources (mostly wind turbines) account for growing share of SPP capacity
 - Renewables only produce when the wind is blowing and sun is shining
- **SPP relies on other resources that can fill the gap left by renewables**
- Baseload units (traditional coal plants) have trouble competing with renewables on a cost basis and **can't turn on/off quickly enough to meet demand when the price is right**
- Peaking units (natural gas turbines) ramp up quickly to provide electricity for short periods of time when electricity demand and price are high
- Peaking units can fill gaps left by renewables, **quickly and cost competitively**



IPL CTs Support the Grid

- Calendar Year 2022 – IPL diesel fueled turbines have been called on more than 150 times.
- Generation credits with SPP (after fuel costs) have totaled almost \$750,000
- Typically, H5 is called on before the other units and more often had it been available.



Summary

- Repair H5 Turbine and maintain asset benefits
 - Maintain 17 MW of required Capacity
 - Return a productive asset to operation
 - Provide internal strength to IPL's system Reliability and Resilience
 - Keep options open for future decisions



Questions ?



INDEPENDENCE
★ POWER & LIGHT ★