ELMSOLAR

WEATHERING THE COLD:
A Tale of Two Renewable Energy Systems

Nestled in the heart of Omaha, Nebraska is Creighton University. On Creighton's campus, Graves Hall stands as a beacon of sustainability with its innovative renewable energy systems. A recent weather event put these systems to the test of how they would cope with extreme cold and heavy snowfall.

Graves Hall boasts two roof-mounted solar arrays, each with distinct characteristics. The first is a traditional solar PV array, covering 1,269 square feet and generating a nominal power output of 24.5kW. The second array utilizes Virtu HOT HD solar thermal collectors, spanning 1,358 square feet with a nominal power output of 69.6kW.

As the polar vortex gripped the region, temperatures plummeted, reaching nighttime lows below -15°F, and daytime highs barely scraping zero on some days. Several inches of snow blanketed the landscape, affecting the performance of the renewable energy systems.

During the challenging week from January 9th-16th 2024, the solar PV system produced a mere 33.8kWh of electricity, with a peak output of 3.57kW. In stark contrast Virtu HOT demonstrated remarkable resilience, producing 321kWh of thermal energy and peaking at over 36kW despite the harsh weather conditions.

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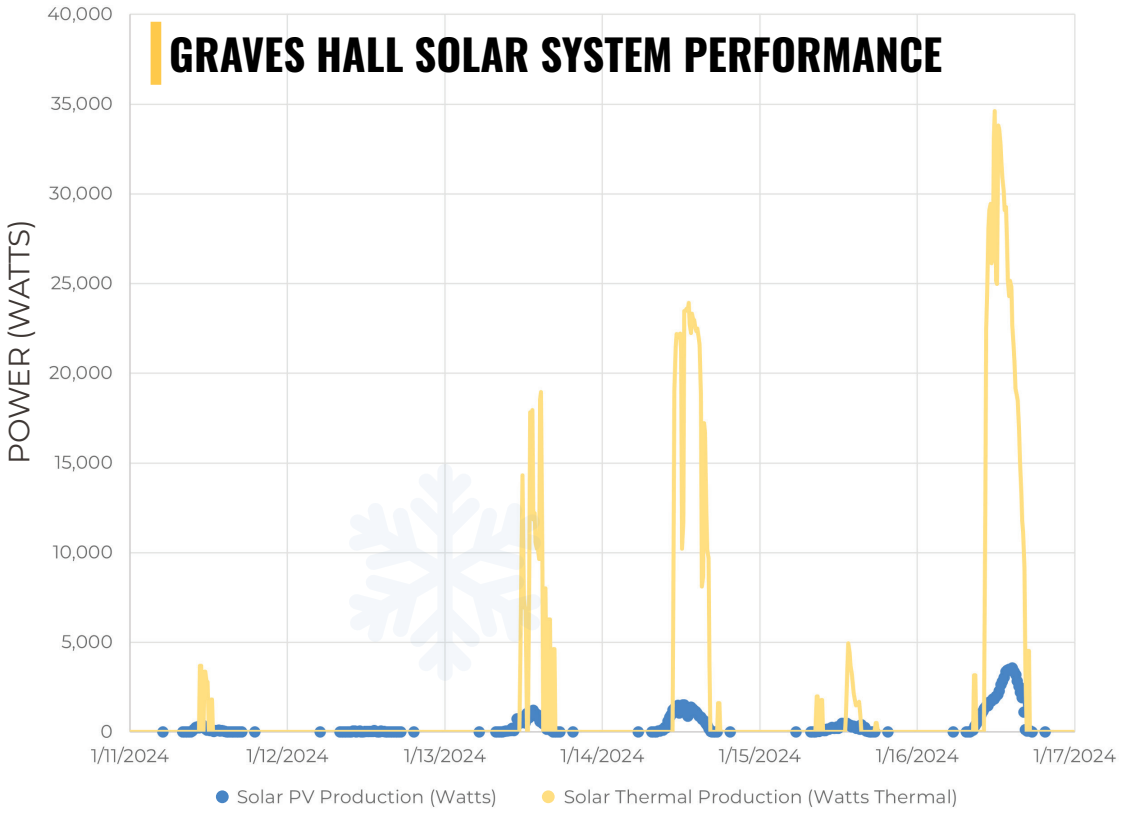
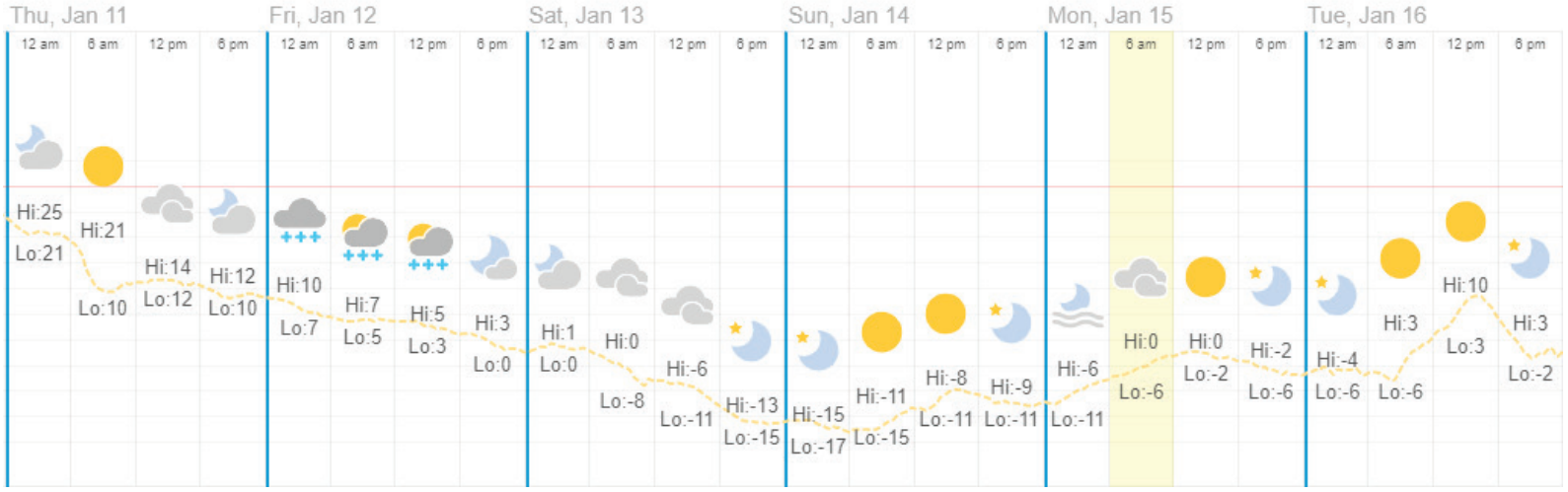
The impact of the systems' form factors became evident as snow covered the solar PV panels, hindering their performance. Virtu HOT's cylindrical shape fared much better.

The major achievement during this challenging period was Virtu HOT's ability to contribute to energy efficiency. The 321kWh of thermal energy produced was utilized to preheat water entering the building's boiler, reducing the need for natural gas combustion. This not only demonstrated the system's functionality but also highlighted its positive environmental impact.



In the face of extreme cold and heavy snowfall Graves Hall's Virtu HOT system stood as a resilient pillar of sustainability. The divergent performance of the solar PV and Virtu HOT collectors shed light on the importance of form factor and tolerance to partial obstruction in renewable energy systems. As we navigate a future with unpredictable weather patterns, the lessons learned from this experience will undoubtedly contribute to the ongoing evolution of sustainable energy solutions.

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