What is the most energy efficient and economic solution to ensure the integrity of Corning’s manufacturing plants in the event of an electrical outage?

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Corning Inc. is an energy-intensive, optical fiber manufacturing company whose current asset protection strategy relies on diesel back-up generators to provide emergency power when the grid power is interrupted. This expensive asset must have power restored within 1 hour to assure the integrity of their product, which makes reliability of power a critical factor to keep their assets protected. This leads to our question: Are their current back-up generators the most reliable and cost-effective solution?

**Specific Aim 1: Combined Heat & Power (CHP)**

CHP technology increases energy efficiency by recovering the heat exhausted from power generation to be used for space cooling with absorption chillers. From the range of CHP technologies currently available in the market, we have selected natural gas combustion turbines due to its relatively low cost and the existing source of natural gas at the Corning sites. Absorption chillers eliminates electricity consumption that would otherwise be required to produce chilling energy.

**Specific Aim 2: Economics & Risk Mitigation**

The duration of the outage positively correlates with the likelihood of damaging the furnace. The financial model calculates the total financial losses associated with an outage.

**Conclusions**

Energy and carbon savings increase with CHP capacity. Capital cost per MW generated gets cheaper with at larger scales. The large systems also have more efficient heat rates.

In many industries, back-up generators are employed as the back up power generation solution. From our research, energy savings and carbon emission reductions from using CHP, instead of running a backup diesel generator, result in a positive solution and benefits increase with larger capacity. Also, the costs of CHP and heat rate decrease with larger-scale CHPs. For Corning, 10MW CHP system with absorption chillers is recommended as the most energy efficient and economic solution to strengthen their current asset protection strategy. Therefore, combined heat and power (CHP) system in combination with the installment of absorption chillers reap greater energy savings, increase reliability, and reduce carbon emission.

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