

## **Energy Efficiency in Cold Chain Logistics**

Energy costs are among the most controllable expenses in a refrigerated warehouse, yet often unmanaged. The focus has mostly been on maintaining food and drug safety in controlled temperature and humidity environment, optimized logistic management to ensure timely deliveries and efficient storage to maximize occupancy and revenues.

As most cold chain logistic firms have implemented systems and processes towards maximizing food safety, delivery agility and operational efficiency in warehouse management, time has come now for these firms to improve contribution margins from reducing one significant cost item – power consumption.

Industrial Internet of Things (aka Industrial Internet), which has significantly reshaped logistic management, integrating sensor technologies and RFID with GPS and warehouse management, is now getting serious attention in reducing energy bills.

## **Industrial Internet for Energy Efficiency**

Energy Efficiency is not a new use case for Industrial Internet. In large Data Centers for example, energy costs had been hovering around 40% of operating costs in the early part of this decade. While it started with a few early adopters, many more have now implemented energy monitoring and management systems using key performance indicators like Power Usage Effectiveness (PUE) and HVAC Effectiveness. Once monitoring of power and cooling systems were completed, which alone led to savings as high as 15% from their original bills, the next stage for Data Center operators has been towards employing analytic and

artificial intelligence (AI) technologies for further savings.

We can expect similar results in the Cold Chain Logistics industry if refrigerated warehouses and cold storage facilities aren't already equipped with monitoring systems among other things such as poor door quality and insulation. Deriving energy efficiency from Industrial Internet is a key Industry 4.0 objective.

## **GFS Crane CIM**

GFS Crane CIM is an Industrial IoT application that combines industrial machine monitoring with sensor analytics to deliver Industry 4.0 solutions for Buildings, Power Utilities and Manufacturing.

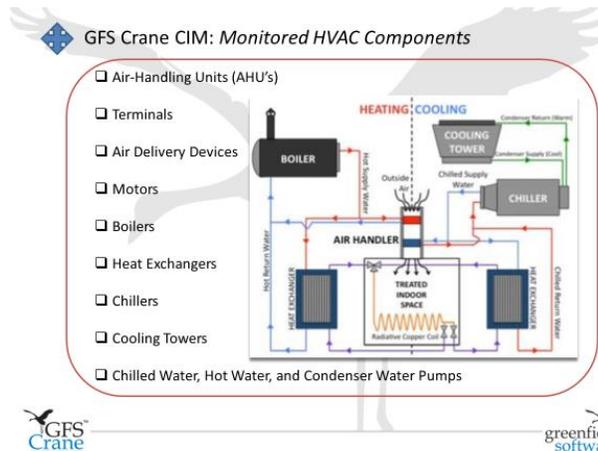
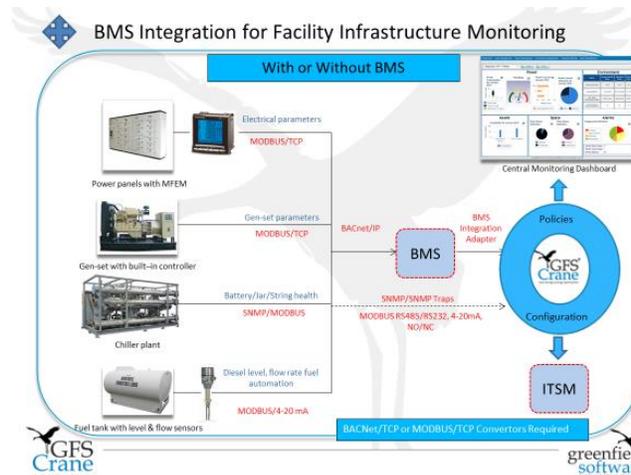
Enabled with multiple protocol support to connect heterogeneous machines, devices & sensors, GFS Crane CIM provides centralized automated monitoring, control & management of distributed facilities of buildings, power utilities and manufacturing plants.

GFS Crane CIM provides number of business benefits, commonly labelled as Industry 4.0 outcomes:

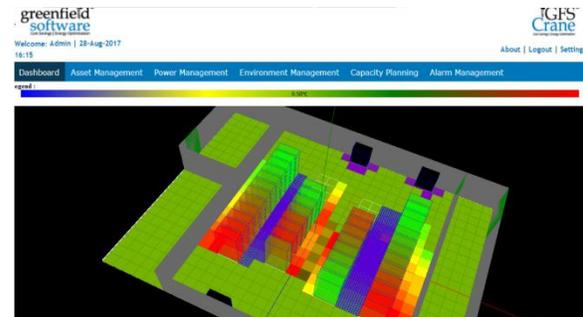
- Mitigates risk of machine, system & infrastructure failures
- Improves energy efficiency (power & fuel), reduces carbon footprint
- Identifies security risks: monitoring surveillance systems & integrating video analytics
- Ensures quality consistency, industrial safety
- Improves field service through remote machine monitoring

## How GFS Crane CIM Can Help Cold Chain Logistic Firms

**Monitoring & Alerts:** Cold Chain logistic facilities are usually equipped with Chiller Plant and Building Management System (BMS) that centrally monitor HVAC systems and temperature/ humidity in different halls to ensure compliance. GFS Crane CIM integrates with Chiller Plant Manager and BMS to display device status, send alerts and report on monitored data. If BMS is not in place, then GFS Crane can do monitoring and control functions as illustrated below.



**Thermal Map:** GFS Crane CIM will provide thermal map of halls with occupancy details. This can provide insights and opportunity areas for reducing energy consumption.



By monitoring Precision Air Conditioners (PAC) supply and return air temperatures as well as temperature & humidity sensors in the aisles, one may conclude that low occupancy areas could do with lower cooling and therefore reduce power consumption.

**Sustainability Reporting:** Reducing power consumption would have positive impact on carbon footprint in the halls. GFS Crane CIM provides CO<sub>2</sub> emission progress reports based on power consumption reductions achieved over time and against benchmarks set by management. If heat recycling is undertaken during winter months, that too can be measured and reported. Water consumption or use of gas in chiller plants could also be monitored and reported upon should management consider them also important for sustainability reporting.

GFS Crane CIM is Industry 4.0 enabler for improving energy efficiency and sustainability management for this energy-intensive industry.