



Digitally transform your manufacturing plant operations

The Abound™ Insights platform enables facilities to improve operations, increase energy efficiency and reduce costs.



The manufacturing industry as a whole is a leading wealth generator in the global economy. The various sectors within it employ a massive share of the labor force to produce materials and goods. Currently, different segments of the manufacturing industry are facing several challenges, including increased competition, rising energy and labor costs, adapting to technological advances along with changing regulations and compliance requirements. Manufacturers are under pressure to consistently innovate to remain competitive and stay relevant. There are means through which manufacturers can find the necessary solutions and leverage technological advancements to combat these challenges effectively and continue their growth trajectory.

Industrial manufacturing is one of the biggest users of energy, and therefore the potential impacts of energy efficiency measures are very large. These industrial manufacturing organizations have always been at the forefront of adopting the use of data-driven technologies. Traditionally, they invested in software or applications with the objective to save energy and reduce operational expenses - whether it's deploying the Supervisory Control and Data Acquisition (SCADA) system for managing the production process or the use of automation systems for quality improvement or even designing layouts and equipment. However, in recent times manufacturing organizations have fallen behind those in retail, hospitality, etc. in use of innovative data-driven technologies to reduce energy costs without incurring massive capex needed for machine upgrades.

Evolving technology has helped deploy additional cutting-edge sensors and meters to monitor equipment performance, energy consumption and thereby costs. These systems generate a large amount of data on a daily basis, which only builds over time. Most organizations have limitations in terms of how to use this data effectively. Even though there are massive opportunities, the following are the key areas which usually slow down a successful implementation – proprietary nature of certain areas of the manufacturing process, lack of consistent data capture strategies adopted by the organization, including inadequate existing information capture and inherent mistrust of any recommendations of these data-driven technologies by shop floor operators.

Benefit from comprehensive solutions for manufacturing facilities by Carrier Abound

Our IoT and Digitization solutions enable manufacturers to connect and manage their facilities digitally through predictive insights. We have a strong track record of delivering positive cash-flows through our context-based approach and expertise. Our solutions can be quickly scaled across multiple facilities and help manufacturers get

the best out of their equipment, whether they are lighting systems, heating, ventilation and air-conditioning (HVAC), or refrigeration.

We have designed and built the Abound Insights platform, which implements our context-based approach as well as collects data from multiple sources in order to analyze and contextualize it. The platform then offers predictive insights and even acts on them autonomously to provide better equipment operations and continual savings.



We provide manufacturing customers with the following services:

1. Compliance Monitoring and Operation Analytics
 - Enterprise-level monitoring of compliance
 - Platform-based reporting of compliance and operation performance
2. Energy Efficiency and Performance Management
 - Analytics-based management of process and asset operations in the connected facilities
 - Actionable insights for the operations team
3. Maintenance Management and Analytics Service
 - Analytics-based model to migrate to condition-based maintenance
 - Remote and guided maintenance recommendations for operational teams in the plant
4. Peak Demand Management Service
 - Analytics-based demand management and monitoring service
 - Manage demand without compromising on standard requirements

Every manufacturing plant and the equipment within it is unique. We understand the context in which plants and equipment operate and the challenge of getting them connected. We leverage the available data from multiple systems like Supervisory Control and Data Acquisition (SCADA), Manufacturing Execution System (MES), and Maintenance Management System (MMS), as the Abound Insights platform is product-agnostic.

Manufacturers have partnered with us to transform their operations from being reactive to proactive, leading to these transformational benefits:



Improved
Energy Savings



Better Compliance
and Quality Scores



Reduced Operating
Cost



Proactive Maintenance
Management



Improved Plant
Efficiency



Reduced Plant
Downtime



Agile
Operations



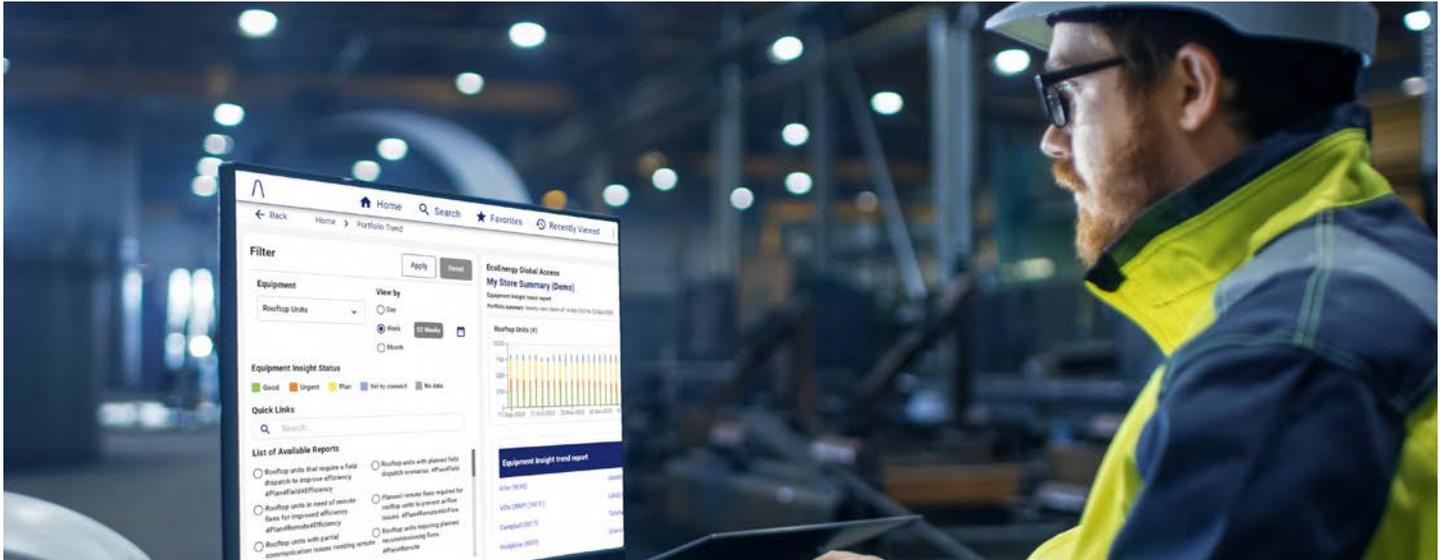
Smarter
Manufacturing

How we do it

Carrier Abound provides services for support assets like HVAC and Refrigeration and then moves to key operational assets depending on the comfort of the customer. End-to-end responsibility is also provided to deliver the desired results and pricing for industrial customers is based on their individual needs.

We have built analytical models and correlation logics to deliver data analytics outputs supporting energy efficiency and operational improvement measures for plant and utility managers. Our analytics capabilities coupled with the ability to harness the power of IoT bridges the gap between information and action to achieve cost savings. We leverage our 24/7 Carrier Customer Command Centers to uncover energy saving opportunities and plug them in immediately.

Operation managers typically face challenges in obtaining visibility of the performance and efficiency of the equipment. The Abound Insights platform converts the collected data into Insights or actionable intelligence about equipment or a system. The prioritization of insights helps the operations manager to make decisions and prioritize the most relevant activities.



Most of the time, operators tend to respond to problems only after they occur. With our context-based approach and the Abound Insights platform, they can now run operations in a proactive manner. The predictive insights on process and equipment irregularities enable managers to prioritize actions even 2-4 weeks in advance.

The platform provides operations managers with access to information about equipment performance at their fingertips. It is an effective operations tool that displays insights through simple actionable visualizations. The insights on equipment performance are offered in the following categories:

- 1. Availability:** Insights allow operation managers to plan activities and ensure plant operations are not affected by equipment downtime.
- 2. Compliance:** Operators are empowered with insights to maintain specifications and ensure compliance.
- 3. Health:** Operation managers are able to detect equipment health issues proactively before they deteriorate and lead to a situation requiring an urgent dispatch. This will also help in reducing maintenance costs and address compliance and efficiency issues arising from poor equipment health.
- 4. Efficiency:** Operators can improve equipment operation efficiency leading to energy cost savings on both the demand and supply side.

The insights from the Abound Insights platform are conveyed using the Abound Insights Assistant web portal and mobile applications. The insights are then summarized as work lists and help the operations manager or the plant maintenance manager to plan the activities in an efficient manner. The Abound Insights platform not only helps to predict issues before the equipment fails, but also empowers the maintenance manager's post-service performance insights, thereby increasing the effectiveness of the maintenance activities.

Given that operation managers need to focus on various aspects of the manufacturing process, they can leave the analytics to us through which we carry out the actions and take advantage of the predictions from the Abound Insights platform. The Carrier Customer Command Centers have teams of domain experts, data scientists, analysts and controls engineers who manage requisite interventions, define action plans and ensure their comprehensive completion in a timely manner. The team ensures the predictive insights are deployed to proactively intervene before an issues arises. They also look at the trends of developing problems and work with the manufacturer to ensure the necessary technology and process changes are carried out to improve the quality of operations and equipment performance.

Business outcomes delivered to an industry leader

One of the world's leading players in heating, air conditioning and refrigeration solutions operates a large USA manufacturing plant producing products for the residential market. This facility has been operational for over 5 decades and is spread across an area of 900,000 square feet, churning out over 1.2 million units annually. The facility faced difficulty in identifying issues with equipment performance that hampered the overall efficiency of the plant. Secondly, the facility struggled to meet its sustainability target of 3% reduction in greenhouse gas emissions.

The Abound Insights platform transformed the manufacturing plant's maintenance processes by making them proactive. The platform predicted issues that could lead to equipment failure. These issues when attended to promptly, enabled the plant to avoid problems that typically led to equipment downtime. Besides increasing the efficiency of the plant operations, the Abound Insights platform empowered the plant maintenance manager with critical insights on equipment performance post a service activity. This enabled them to determine whether the issue had been correctly addressed or not, thereby confirming the effectiveness of the maintenance activities. Here's a look at the improvement in six months:

- a. 5.5 % average energy savings
- b. 9% average reduction in gas consumption
- c. 6.3% reduction in CO2 emission
- d. 22% improvement in thermal compliance

Write to us at abound@carrier.com for more on how we can help your company achieve its business and sustainability goals.

About Carrier Abound

Carrier Abound provides digitally connected lifecycle solutions and services for diverse building portfolios. The solutions and services enable building management to see deeply and broadly across their assets, prioritize and act on real-time insights, and refine, adapt, and scale on a continual basis to improve energy efficiency and asset performance, enhance occupant comfort and productivity, and streamline compliance reporting. Carrier Abound is part of Carrier Global Corporation, global leader in intelligent climate and energy solutions.

For more information, please visit abound.carrier.com and join the conversation on [LinkedIn](#).

