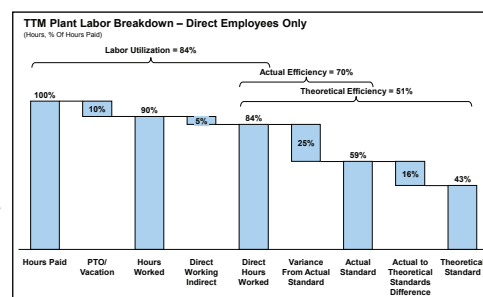


## Operations Diagnostic And Roadmap At Climate Control Product Manufacturer: Establishing End-Vision For A Fast-Growing, Entrepreneurial Company

**The Challenge:** Our client, a family office-owned manufacturer of specialized climate control products, has grown at 12% CAGR over the last 12 years, evolving from a small division within another company to a standalone company supplying a diversified line of 25+ product families to 4 distinct customer segments. The client's operations have grown accordingly, from a small building within the former parent company's plant to a separate 210K sq. ft. facility comprising 14 assembly lines and a global supply chain. The client was approaching the end of the current lease on its plant, with potential relocation an opportunity to improve its operations. The client asked Gotham to conduct a 3-week diagnostic of its operations with a focus on evaluating plant/assembly line layout and outsourcing opportunities to establish floor space requirements and identify opportunities to optimize manufacturing operations.

**3 Week Fact-Based Operations Assessment:** To assess the plant's floor space and manufacturing operations opportunities, Gotham rapidly built a solid fact base of the client's cost and operational performance, including:

- **Demand:** Our SKU-level analysis of sales and daily production established that several product lines have seasonal demand, with significant fluctuations in production driven by unpredictable weather-driven demand surges and supply chain inefficiencies.
- **Inventory:** We analyzed the client's SKU-level demand and inventory to develop segmented inventory turn profiles to understand the supply chain performance and inventory optimization opportunity.
- **Labor Efficiency:** We compared labor time sheet data against daily production and found that labor efficiency based on standard labor routing was 70%, much lower than reported numbers. After observing potential labor imbalances on the assembly line, we also took a deeper dive into how the client set labor standards, discovering that time studies conducted by the client's industrial engineers indicated labor requirements well below standards. We established that the long, serial layout of assembly lines was making it hard to balance direct labor on assembly lines, with true labor efficiency more in the 50% range.
- **Product Complexity:** To create a fact-based view of this complexity, we analyzed the bill of materials of all active SKUs to profile product complexity, including number and details of components by product function and the commonality of components across products and platforms.
- **Cost Structure:** To establish a cost baseline to quantify potential savings from identified opportunities, Gotham analyzed the client's general ledger data and built a 3-year cost profile by cost bucket, function, and expense type.



### 30% Reduction In Required Plant Footprint From Reimagining Assembly Line Layout

Given the complexity of the client's product line and lack of engineering and supply chain sophistication, we concluded that outsourcing is not a viable option in the near term. Instead, we worked with industrial engineering to develop solutions to address limited flexibility, underutilization, and labor imbalances driven by long, dedicated serial lines. The client's engineers, with guidance from senior Gotham operating partners, came up with a concept of work-cell based line design that would consolidate 7 existing lines into 2 integrated lines allowing the client to respond to demand surges by shifting production to high-demand SKUs and use labor more efficiently. Gotham estimated that migrating to this new line design would reduce space requirements by 30% and labor cost by over 25%. We also developed an end-vision for a labor performance measurement system and feedback process.

### 20-30% Reduction In Inventory From Supply Chain Optimization

From our ongoing discussions with the client's board, we perceived that the client was carrying a high level of inventory to meet weather-driven demand surges. Our subsequent analytical effort found that only 1/3 of the inventory was related to weather-driven demand surges. While there is some opportunity to trim back this inventory, the primary root cause of the high inventory levels is the suboptimal setup of the supply chain, e.g., safety stock levels not aligned with lead times, inconsistent system parameters, and excess buffers throughout the supply chain. Another driver of excess inventory was frequent product design changes causing a build-up of obsolete inventory (10% of the inventory was in stranded components that are no longer in any bill of materials). We developed a top-level supply chain vision and recommended that the client create segmented supply chain strategies, clean up system parameters, establish statistically driven safety stocks, and develop processes/KPIs to ensure sustainable performance.

### Product Design Standardization/Modularization To Reduce Complexity And Enable Operations Transformation

Gotham's quantification of product design complexity indicated that within the client's 25+ product families and 200 models, ~30% of components were only used in one product and ~75% of components were only used in one product family. The client's strong growth was driven by identifying niche market opportunities and quickly developing a superior product to meet the demand of these niche markets. With the emphasis on speed-to-market and creating superior functional performance, the client's design engineers focused on optimizing the design of individual products with no consideration for overall complexity. As a result, the client not only had lack of commonality among products and platforms, but also different design architecture among products and platforms, creating lack of commonality in assembly processes. Gotham recommended that the company fundamentally change its product design approach by leveraging a platform-based approach using a standard base architecture that explicitly considers design for manufacturing (DFM) requirements and creates common component palettes for engineers to work with. To ensure that complexity does not creep back over time, engineering process controls/KPIs have to be redesigned.

**The Outcome:** Gotham rapidly developed a fact-based end-vision of the company's operations with projected benefits including real bottom line results – 600bp EBITDA improvement, 20-30% reduction in inventory, and 30% reduction in the plant footprint – and capability enhancements that will allow the client to capture market opportunities and drive future growth. Client management participated in the creation of this transformative end-vision which the board wholeheartedly backed.