RESULTS

COMPANY PROFILE

FuelCell Energy (FCE) is the foremost producer of fuel cells and is recognized as the leader in commercial stationary fuel cell products. FCE employs 385 people in their Danbury and Torrington facilities. Danbury houses R&D, design and corporate functions while the Torrington facility produces the fuel cells.

FCE's fuel cells are designed to provide base load power for a wide range of customers including wastewater treatment facilities, manufacturers, hotels, hospitals, universities, utilities/ grid support — any company that requires reliable power twenty-four hours a day, seven days a week. FCE has produced nearly 100 fuel cell power plants that range in size from 250 kilowatts (kW) to 2.4 megawatts (MW) and in addition to the production of fuel cells, FCE services over 50 fuel cell power plant sites around the globe, generating more than 150 million kilowatt hours of electricity. FuelCell Energy also conducts research and development on next-generation fuel cell technologies to meet the world's ever-increasing demand for ultra-clean distributed energy.

The company was founded in 1969 as Energy Research Corporation, a contract developer of fuel cells and rechargeable batteries and was a subsidiary of larger corporations until a management-led buyout in 1988. Eleven years later, after spinning-off its battery division as Evercel, Inc., Energy Research Corporation changed its name to FuelCell Energy, Inc. to reflect its total focus on fuel cell products.

SITUATION

High production costs have historically been the major deterrent to the rapid commercialization of fuel cells. However, as manufacturing costs reduce, fuel cells of various types are expected to accelerate their penetration into the automotive, distributed electricity generation and utility markets. Consequently, manufacturing plays an integral role in FuelCell Energy's drive to deliver cost-effective products; FCE built its manufacturing operation with the purpose of developing and refining the processes that will lead to profitable large-scale manufacturing.

The manufacturing staff at the Torrington facility and the technical engineering staff in Danbury were aware of the importance of adopting Lean Manufacturing

FuelCell Energy

Torrington, Connecticut
385 employees
www.fuelcellenergy.com

Lean Manufacturing

- 45% reduction in distance traveled
- $4 million increase in annual sales
- $100K savings in WIP
- 50% reduction in lead time
- 15% increase in production capacity

CONNSTEP
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methodologies to improve the company's competitive position by reducing processing waste and optimizing the flow of product. In-house led efforts were being conducted in both facilities, when in 2005, Tom Lucas, Manager of Process Engineering, read about CONNSTEP's Lean Manufacturing services in The Manufacturers' Advantage, the CONNSTEP newsletter. Before long, FCE engaged CONNSTEP to assist in "Leaning" the company's manufacturing operations.

SOLUTION

CONNSTEP Lean specialists facilitated three Kaizen events – two at the Torrington manufacturing facility and one in Danbury. Each Kaizen was conducted by a cross-functional team comprised of process engineers, shift team leaders, quality and procurement specialists and area managers. Lean awareness and Value Stream Mapping (VSM) training was provided to the teams prior to the start of each Kaizen which enabled the team members to understand the need for change, identify waste and to prepare current and future state value stream maps.

The current state maps illustrated the work processes with real data and were vital for the teams to identify where improvement opportunities existed. With the assistance of CONNSTEP Lean specialists, future state value stream maps were prepared, leading the teams to develop a focused Lean Manufacturing strategy. The teams identified and implemented opportunities for reducing lead times, labor requirements and inventory in the anode, cathode and electrolyte processing areas, as well as in final assembly.

RESULTS

In the Torrington manufacturing facility, fuel cell assembly stations were cellularized to minimize cross-flow of material and reduce delays in processing. In the processing areas, labor was reduced by 15%, allowing for an increase in production capacity, yielding approximately $100K savings, annually. Methods were identified to reduce the distance traveled by 45% in five major production lines. This increased the production capacity from 28 units annually to 32 units annually, leading to an increased of approximately $4MM in annual sales revenue.

Additionally, a Pull/Kanban system was implemented that reduced work in process inventory by 25% and increased throughput rate yielding an overall WIP reduction savings of approximately $100K per year.

> "CONNSTEP worked with FuelCell Energy to educate and facilitate Lean initiatives to help meet our needs to establish an overall production improvement plan.
>
> This plan has been utilized over a period of time as 'guiding light' to spur numerous improvements that dramatically reduced our product cost."
>
> Tom Lucas
> Manager, Process Engineering
> FuelCell Energy

While on the DFC300 fuel cell line at the Danbury facility, the production of all major components was synchronized prior to release of the Balance of Power Plant to production. The capacity of final production processes was increased by 30%, equating to a potential annual sales revenue increase of $3,750,000. The long lead times of items being ordered late were also reduced by 50% through better planning.

Overall, the combined efforts at the two facilities illustrates how Lean Manufacturing enabled FuelCell Energy, Inc. to increase the fuel cell production capacity in excess of 15%, while lowering total manufacturing costs.

The robust implementation of the recommended Lean improvements has made a significant impact in FCE's important goal of becoming more competitive by lowering the overall cost of its commercial fuel cell power plants.

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