



## **Karl Storz Endovision Clean Room Case Study**



### **The Challenge**

Karl Storz is an international leader in the design and manufacture of high-quality medical components and endoscopic devices. Their Charlton, MA Endovision facility manufactures glass fibers, fiber optic camera scopes, and electronic light transmission and receiving units. Due to the sensitive nature of glass and electronics manufacturing, nearly all component assembly is done in four clean rooms varying in classification from Class 1,000 to Class 100,000. The AHUs serving clean rooms were significantly oversized, providing air change rates and velocities equivalent to 2 classifications lower than required. Additionally, the in-room Liebert cooling units did not have enough cooling capacity to consistently maintain space temperature and humidity requirements.

### **The Opportunity**

Karl Storz was eager to improve the energy efficiency and performance of their HVAC systems and requested assistance from their electric utility National Grid. B2Q Associates, Inc was engaged by National Grid to conduct a multi-phase analysis of energy and operating performance enhancement opportunities. Phase I of our work involved a clean room optimization screening to identify promising energy efficiency and operating improvements worthy of further investigation. In Phase II, B2Q Associates conducted a detailed engineering analysis and conceptual design of the selected measures from Phase I. These included removing the Lieberts and installing dedicated make-up air units and cooling units serving new coils in the recirculation fans, as well as, replacing the recirculation fans with new high-efficiency fans with VSD control to optimize clean room airflows and velocities based on particle generation. As a part of this effort, we utilized data loggers and power metering equipment to establish the baseline cooling and fan load and energy profiles, conducted airflow and pressure cascade measurements, and partnered with a firm to perform computational fluid dynamics (CFD) models of each clean room to determine allowable airflow reduction levels based on particle count generation.

### **The Results**

Karl Storz elected to implement each of the measures identified in our report. The implementation of the measures resulted in annual energy savings of over 2,000,000 kWh and utility cost savings of \$230,000 per year. This project had an initial cost of \$1,750,000 however; B2Q's study qualified Karl Storz for an \$875,000 rebate from the utility, resulting in a net cost of \$875,000 and a simple payback of less than 4 years. The key to the success of this study were the detailed measurements and CFD modeling that provided the confidence to Karl Storz these measures could be implemented to increase system performance and significantly reduce energy use while maintaining clean room and productivity standards. Karl Storz engaged B2Q to provide construction management, scheduling, and commissioning of these energy efficiency and clean room cooling improvements. Under B2Q's guidance, the project came in on budget and met the company's strict 10-day downtime schedule.