



FEI COMPANY CUTS ENERGY USED BY CLEAN ROOM AIR HANDLERS

DEMAND-CONTROLLED VENTILATION PROVES FEASIBLE AND SAVES 67 PERCENT

Technology is at the core of FEI Company, a leading producer of premier scientific instruments based in Hillsboro. After boosting energy efficiency throughout its operation, FEI is using an established technology—variable frequency drives (VFDs) - in an innovative new approach to saving energy in its clean room. The process, known as demand-controlled ventilation, couples VFDs with integrated particle counters to control and lower fan speed and air flow, resulting in estimated annual savings of 712,132 kilowatt-hours with no impact on the clean room's stringent environmental conditions.

Before installing the VFDs, three 100-horsepower air handling units were operating uncontrolled for 24 hours per day to provide conditioned recirculation air to the clean room. With the VFDs in place, FEI has reduced fan speed by 50 percent for the majority of occupied hours and for all unoccupied hours. The VFDs work in tandem with sequencing controls that receive data from eight particle counters that are located throughout the clean room. The particle counters, which FEI had in place before the project, continuously sample the air, calculate the average particle count and send that information to the sequencers and VFDs. The end result is a ventilation system that ramps up or down in stages, matching the energy load to the ventilation need and saving 67 percent on energy used by clean room air handlers.

The innovative project was highly cost-effective for FEI, which manufactures electron and ion-beam microscopes. The company received a \$34,685 Energy Trust incentive and also applied for a 35-percent Oregon Business Energy Tax Credit from the Oregon Department of Energy.



Energy Trust's incentive helped to make the project's return on investment quite favorable. Energy Trust also provided excellent technical assistance, including a post-installation study, which confirmed that clean room particle count, static pressure, temperature and humidity levels are being maintained within acceptable levels.

Steve Siegfried,
senior facilities engineer
FEI Company



Energy Trust's local program delivery contractor, Nexant, Inc., supported FEI by helping to identify energy-saving opportunities, quantifying energy and cost savings and streamlining the receipt of incentives by completing and coordinating paperwork and other program requirements. Nexant also arranged for the post-installation study.

"We applaud FEI for recognizing the potential of demand controlled ventilation to save energy and money in clean room air handling units," said Kim Crossman, senior industrial sector manager, Energy Trust. "Fan size and speed are often oversized in clean rooms, well beyond what is recommended to meet specifications in these critical areas. Several high-tech companies have expressed interest in using VFDs and controls to optimize their air handling systems and with the success of FEI's project, we expect this approach to be repeated by others."



To learn more, visit www.energytrust.org or call **1.866.368.7878**.

PROJECT AT-A-GLANCE

- 112,000 square feet
30,000 square feet of ISO*
- Class 7 clean room area
- 300 employees

**ISO stands for International Standards Organization, and is a stringent series of standards against which an organization can be certified by a third party.*

BENEFITS

- Reduced energy costs
- Less variation in clean room particle levels
- Reduced carbon footprint

PROJECT

- Variable frequency drives on clean room air handling units
- Integration of particle counter sensors with sequencing controls

FINANCIAL ANALYSIS

- \$57,809 project cost
- \$34,685 in cash incentives from Energy Trust
- Applied for a 35-percent Oregon Business Energy Tax Credit from the Oregon Department of Energy

ESTIMATED SAVINGS

- 712,132 kilowatt-hours annually
- 270 tons of carbon-dioxide emissions avoided