

Context

Boeing Everett Factory

- World's largest building
 - Can fit Disneyland inside with room for parking
- Manufacturing site for Boeing's 747, 767, 777, and 787 commercial planes
- Over 1 million light fixtures
- 35 supporting buildings and office spaces



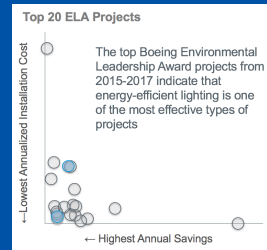
Problem

Inefficient Lighting System

- The lights within the factory and its supporting office buildings are never turned off
- Outdated lighting control system requires changes to be programmed by engineers
 - More complicated and permanent than flipping a switch

Our Solution

- Develop a permanent lighting schedule based around consistent hours of vacancy of each building section



Project Plan

- Identify hours of vacancy using survey response platform
 - Sent to each building coordinator
- Develop optimal lighting schedule using vacancy data
 - Varying hours for different sections within each building
- Implement lighting schedule to achieve reduction in energy usage
 - Implementing through Boeing Facilities & Asset Management



Results and Conclusions

Survey Findings

- Primary production areas operate 24 hours/day
- Those with hours of vacancy averaged 7.5 hours/day
 - Mainly office spaces and ancillary production areas with an estimated 230,000 light fixtures (F&AM)

Carbon Reduction Calculation

$$\frac{7.5 \text{ hours}}{\text{day}} \times \frac{10 \text{ Watts}}{\text{fixture}} \times \sim 230,000 \text{ fixtures} = \frac{17,250 \text{ kWh}}{\text{day}} \times \frac{365 \text{ days}}{\text{year}} = \frac{6,296,250 \text{ kWh}}{\text{year}} \times \frac{.98 \text{ lb CO}_2}{\text{kWh}} = \frac{6,170,325 \text{ lbs CO}_2}{\text{year}}$$

Cost Savings Calculation

$$\frac{6,296,250 \text{ kWh}}{\text{year}} \times \frac{\$0.112}{\text{kWh}} = \frac{\$705,180}{\text{year}}$$

Current Status

- Lighting Schedule approved by Boeing Facilities & Asset Management
- Lighting schedule awaiting implementation
- By F&AM

Roadblocks

- Strict information release policy
- Slow survey response rate

Stakeholder Engagement

- Facilities & Asset Management and Environmental Health & Safety teams provided assistance as our project lined up with Boeing's 2025 environmental goals



Future Potential

- Continued collection of survey data can lead to periodic lighting schedule updates
- Many other Boeing production sites across the country can replicate this project
 - 737 plant in Renton, WA
 - Boeing Defense & Space production facilities

Sources

- Boeing Facilities & Asset Management
- Boeing Environmental Health & Safety
- https://www.bls.gov/regions/west/news-release/averageenergyprices_seattle.htm