

Central Plant Retro-Commissioning at Boston Logan International Airport

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Case Study: Massport CHP Retro-Commissioning

Boston Logan International Airport

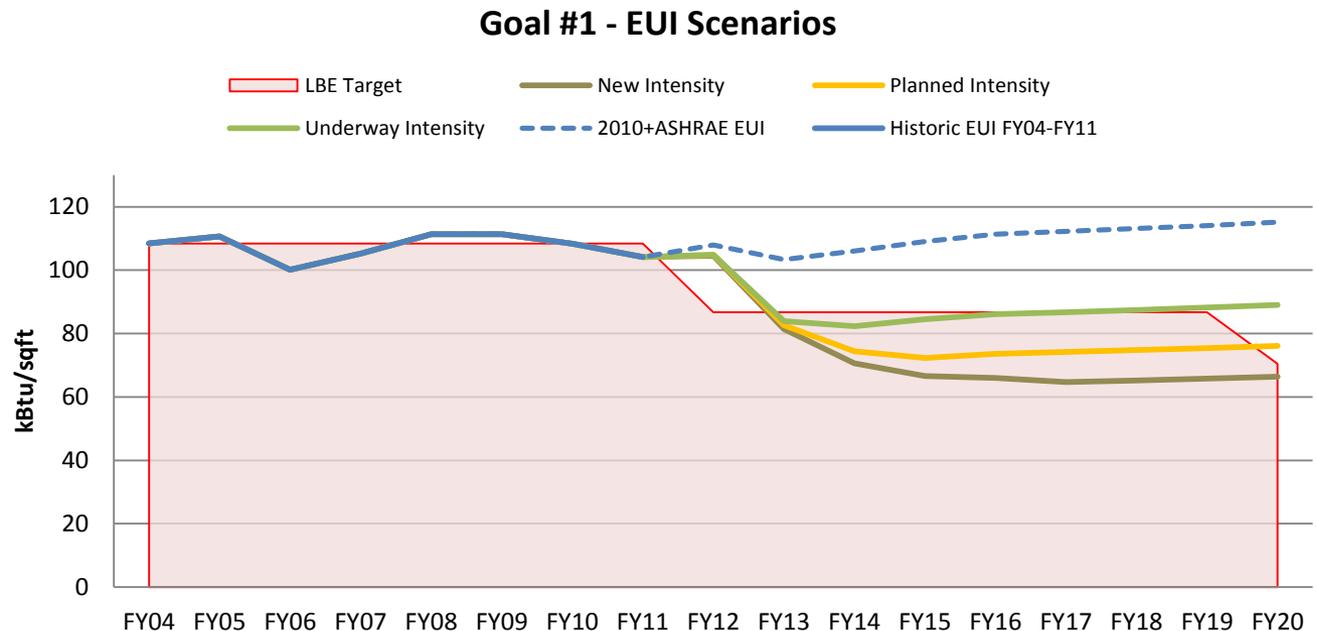
- 20th Busiest Airport in the US
- Over 30 Million Passengers/yr
- Over 361,000 Takeoffs and Landings/year
- 203 Gates/ Four Terminals



Case Study: Massport CHP Retro-Commissioning

Massachusetts EO 484: Leading by Example

- Reduce energy intensity (Btu/sf) by 35% by 2020
- Reduce greenhouse gases (GHG) by 40% by 2020

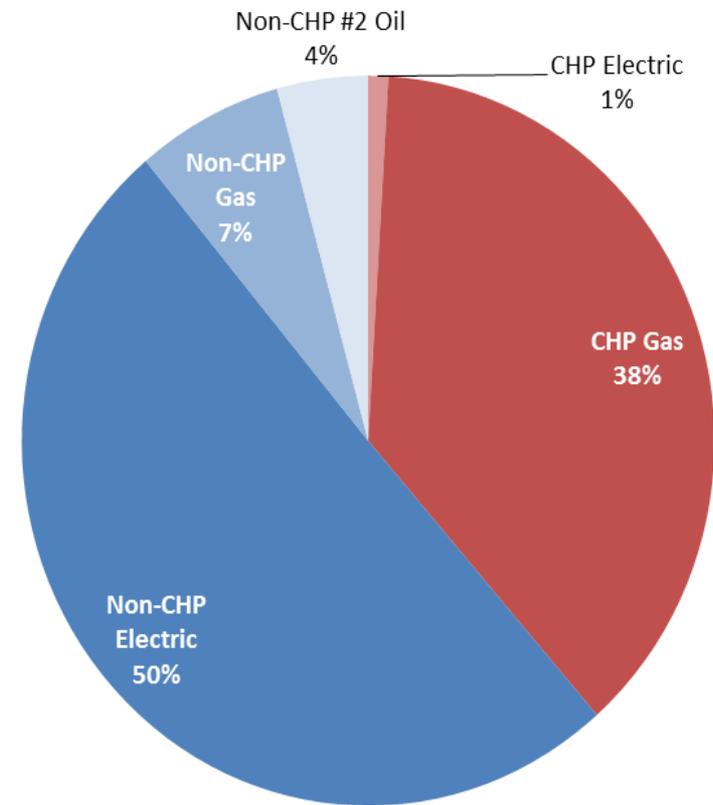


Case Study: Massport CHP Retro-Commissioning

Massport Central Heating Plant (CHP)

- Provides chilled water and steam to airport facilities
- 385,000 lb/hour heating capacity
- 15,850 tons cooling capacity
- Accounts for 50% of Massport's energy/GHG's

FY10 Total Logan Energy kBtu
Vertical Structures



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CHP Retro-Commissioning – Investigation

- Systematic review of operations
- Identify opportunities to improve performance
- Field testing
- Data review and analysis
- Hydraulic Modeling
- Investigation Report



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Efficiency of Consumption

Condition
Occupancy
Energy Systems
Efficiency
GHG

Efficiency of Production

Age
Condition
Configuration
Internal Loads
Efficiency
GHG

Distribution
Efficiency of Delivered
Service

Integrated Approach

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CHP Retro-Commissioning – Recommendations

Operational Projects

- Decrease Delta P Setpoints
- Modify Controls on CHW Pump VFDs
- HVAC TAB
- HVAC Controls Testing/ Repair
- Reset Chilled Water Supply Temperature
- Operate Electric Chillers

Massport CHP Retro-Commissioning

CHP Retro-Commissioning – Recommendations

Capital Projects

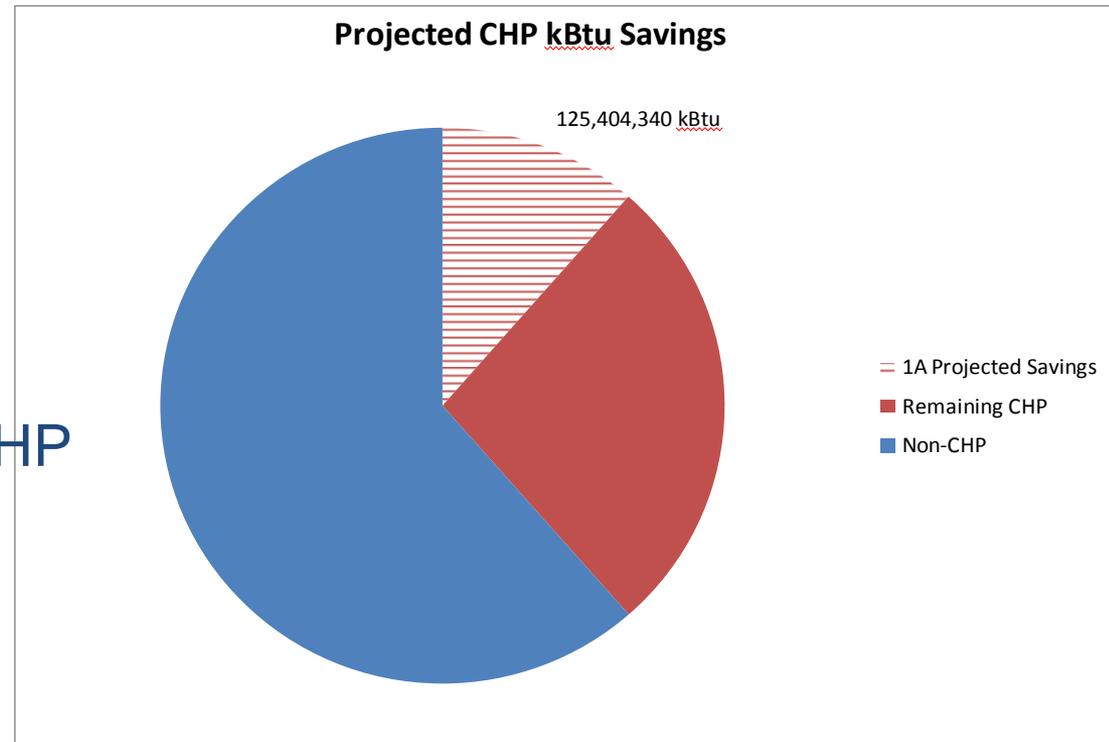
- Bypass Building Pumps
- Upgrade Plant Metering
- Address Steam System Losses
- Install VFDs on Cooling Tower Fans



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Investigation Report Economics

- \$0.8 million cost
- \$1.1 million/year energy savings
- 0.8 year payback
- 30% reduction in CHP energy/ GHGs



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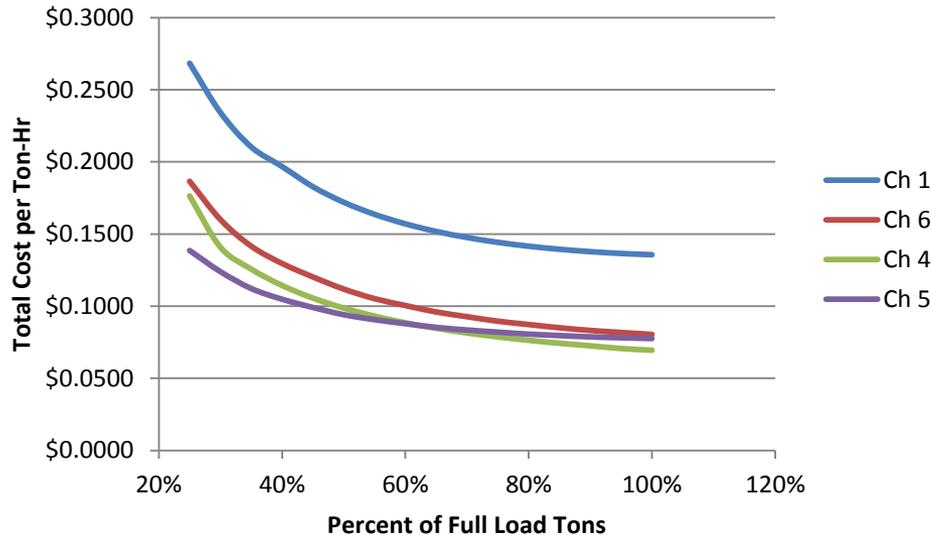
Chilled Water System Hydraulic Modeling

- Convert 3-way valves
- Open balancing and deny valves
- Shut down and bypass tertiary pumps
- Eliminated future deny valve and tertiary pumps – \$1 million cost savings



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Chiller Performance



Operate Electric Chillers

- Operated steam chillers in summer to load boilers
- VFDs on FD/ ID fans
- Successful implementation
- Renegotiate gas supply contract
- Over \$500,000/year energy cost savings

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Metering

- Can't Control What You Can't Measure
- HTHW, Steam, CHW
- IT Network Communications
- Energy Dashboards



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Reduce Steam System Losses

- Replaced 77 Steam Traps
- Standardized With Flanged Connections – Maintenance
- Insulation Repairs



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Implementation

- \$3.8 million cost
- \$1.2 million/year energy savings
- 3.3 year payback
- Removed Terminal E
- Meters: 12 → 65
- Steam Traps: 77 → 349
- Stringent Procurement Requirements – 3 Years!



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Retro-Commissioning Critical Success Factors

- Motivated Facilities Staff
- Consulting Team Experienced with Design and Operation – Retain Through Implementation
- Procurement/ Budget
- Monitoring and Verification
- Training – Ongoing Persistence

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Questions?

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