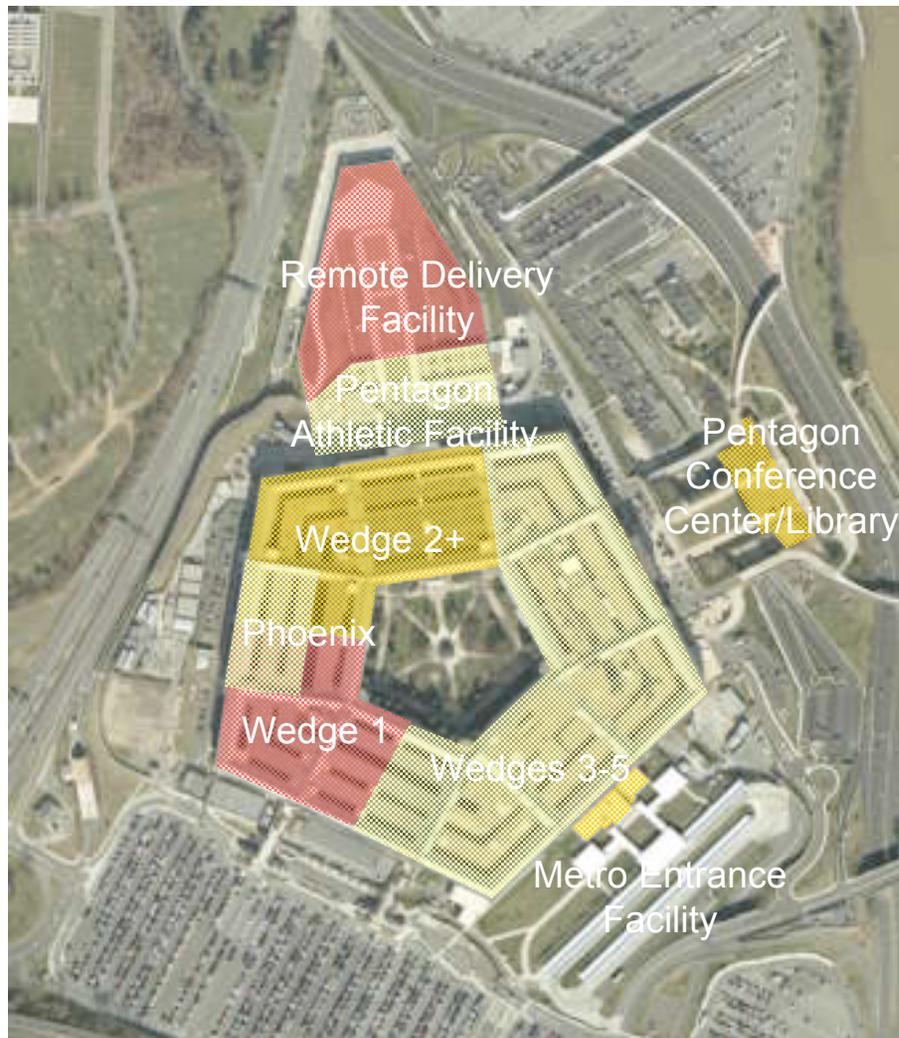




# Pentagon Renovation Program



**Under the Hood:  
Operations and Maintenance**



- 6 Million Sq Ft Renovation
- 1 Million Sq Ft New Const.
- Systems Cx'd
  - HVAC
  - Electric Power
  - Lighting Controls
  - Life Safety



# Pentagon Renovation Program



Under the  
Hood:  
Operations  
and  
Maintenance

- Design-Build Team
  - Owner: Washington Headquarters Service
  - Project Manager: Pentagon Renovation Program
  - Designer: SBA/SI/Dean
  - Builder: Hensel Phelps
  - Cx Specialist: Sebesta Blomberg



# Pentagon Renovation Program



Under the  
Hood:  
Operations  
and  
Maintenance

- Performance Goals
  - Meet Executive Order 13123
  - LEED EB Pilot / LEED NC
  - Life Cycle Analysis
  - M&V Program



# Pentagon Renovation Program



**Under the Hood:  
Operations and Maintenance**

- **Wedges 2-5 Performance Goals**
  - **Request for Proposal Targets**
    - Wedge 2: 100 kBtu/sf/yr
    - Wedge 3: 100 kBtu/sf/yr
    - Wedge 4: 73 kBtu/sf/yr
    - Wedge 5: 68 kBtu/sf/yr
  - **Wedge 2 Design Projections**
    - Initial: 93.1 kBtu/sf/yr
    - Final: 98.5 kBtu/sf/yr
  - **Wedge 2 Plug Load Diversity Adjustment**
    - Revised Target: 120 kBtu/sf/yr
    - Design Projection: 118.5 kBtu/sf/yr



# Mark O. Hatfield Federal Courthouse

Portland, Oregon



Photo by Timothy Shaver © USA

**Owner:** General Services Administration

**Project Type:** Retrocommissioning

**Size:** 590,000 ft<sup>2</sup>

**Rx Project Cost:** \$157,545 (Includes investigation, implementation, and CxP implementation oversight)

**Annual Savings:** \$56,000 for fully implemented measures  
\$26,800 additional savings associated with partially implemented measures  
Simple payback for implemented measures - 2.8 years

**Provider:** Portland Energy Conservation, Inc.



Under the  
Hood:  
Operations  
and  
Maintenance

## Continuous Cx is the key

### Continuous Cx Plan:

- Training
- M&V of savings
- Consultation and Support
- Energy Star Benchmarking

Mark O. Hatfield  
Federal Courthouse  
Portland, Oregon



Owner: General Services Administration  
Project Type: Retrocommissioning  
Size: 590,000 ft<sup>2</sup>  
RCA Project Cost: \$157,545 (Includes Investigation, Implementation, and O&M implementation oversight)  
Annual Savings: \$56,000 for fully implemented measures  
\$26,800 additional savings associated with partially implemented measures  
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