Building Controls for Energy Efficiency: Adaptive Control

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

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Building Controls for Energy Efficiency: Adaptive Control

Team

Pacific Northwest NATIONAL LABORATORY

OAK RIDGE National Laboratory

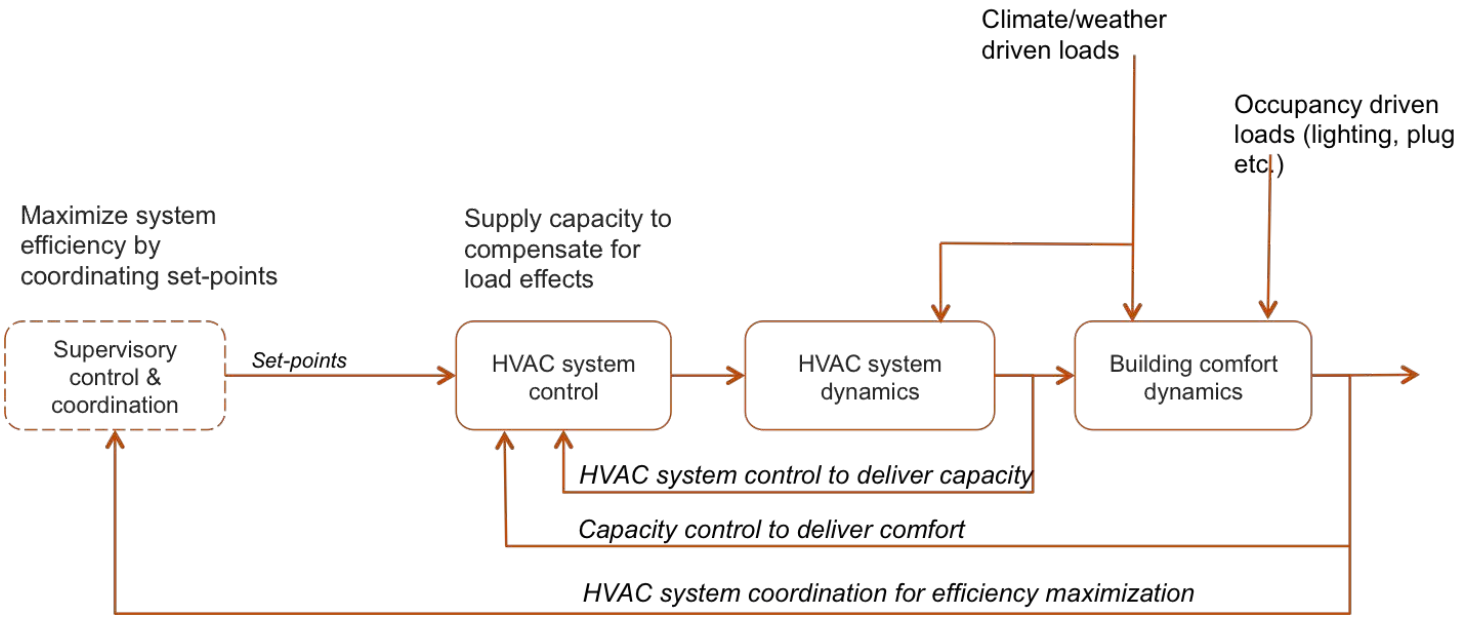
Advisory role

United Technologies Research Center

Johnson Controls

Building Controls for Energy Efficiency: Adaptive Control

Building HVAC controls challenge: coordinate operation in presence of uncertainty



Objectives

- Eliminate need for manual seasonal tuning of supervisory control
- Fault tolerant operation
- Scalable installation process

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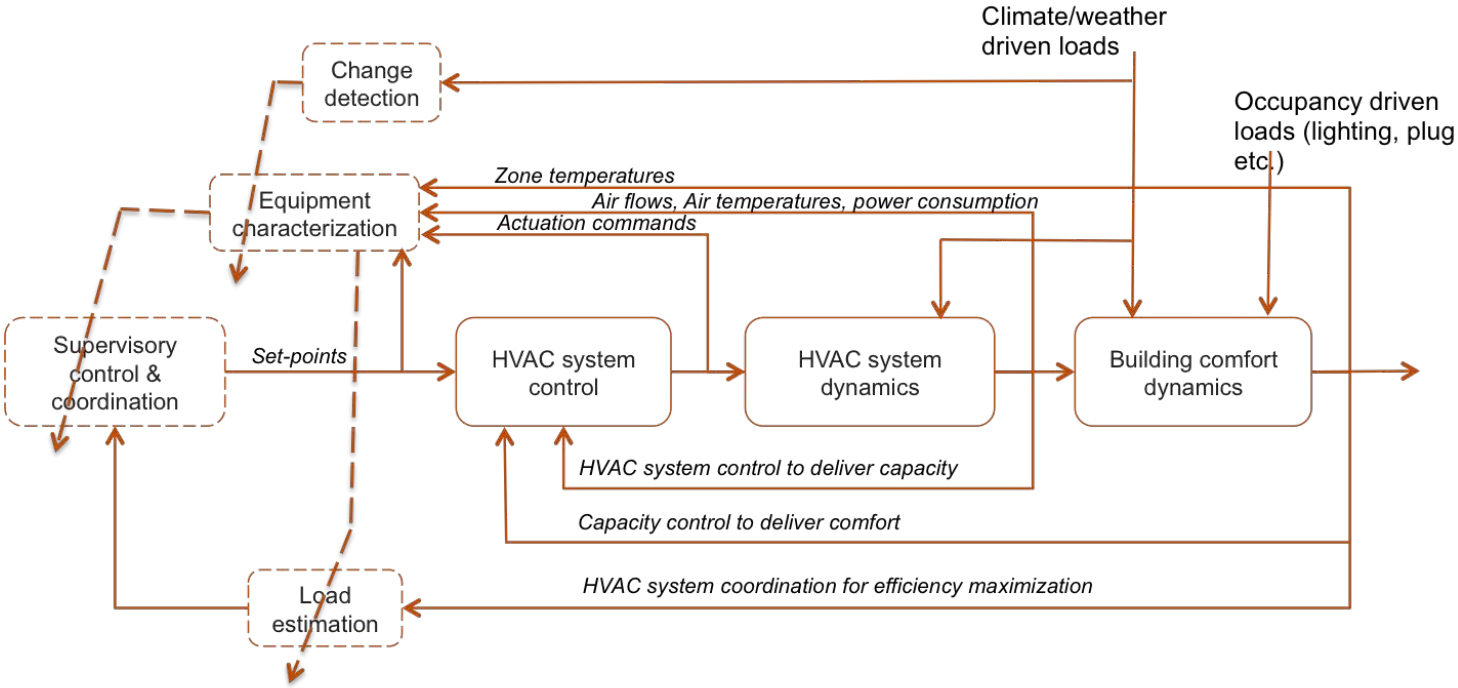
Coordinated equipment operation in presence of uncertainty



Approach

- Automated methods for performance monitoring and system characterization with uncertainty bounds
- Robust optimization for set-point coordination

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Advantage, Differentiation, and Impact

Performance targets

- 15% of HVAC energy use reduction compared with standard controls
- No comfort reduction or increase comfort

Cost targets

- No additional sensor required relative to state-of-the-art installations

Test and validate energy performance

- in simulation (Year 1)
- at building test bed site (Year 2&3)

Deployment options and installation process defined (Year 1)

Technology transition partners identified (Year 2)

Thank You

Draguna Vrabie (PNNL)