INTEGRATING SMART GRID TECHNOLOGIES AND BUILDING PERFORMANCE:
ASSESSING NEW AND EXISTING PROBLEMS IN RESIDENTIAL BUILDINGS

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OBJECTIVES & MOTIVATION

Motivation:
Smart Grid Technologies  
Big Data  

(1) Existing Problems in Buildings
• Detect and diagnose faults

(2) New Problems Introduced?
• Energy consumption with Smart Technologies
• Effects on the indoor environment?

Effects on the Built Environment
(1) EXISTING PROBLEMS IN BUILDING: DETECTING AND DIAGNOSING FAULTS

**Prevention:** Is there is a problem with my A/C? How do I know?

**Diagnosis:** A/C isn’t working; A/C never turns off… What’s going on?

Use energy and other “smart” data
(1) EXISTING PROBLEMS IN BUILDING:
DETECTING AND DIAGNOSING FAULTS

Air Conditioning Power vs. Outdoor Temperature
1. EXISTING PROBLEMS IN BUILDING:
   DETECTING AND DIAGNOSING FAULTS

(a) Model for the A/C system

(b) Introduce Faults

Restricted Air Flow

(c) Predicted Change in Energy Use

(d) Verify with Testing

Outdoor Temp (F)

Power Draw (W)