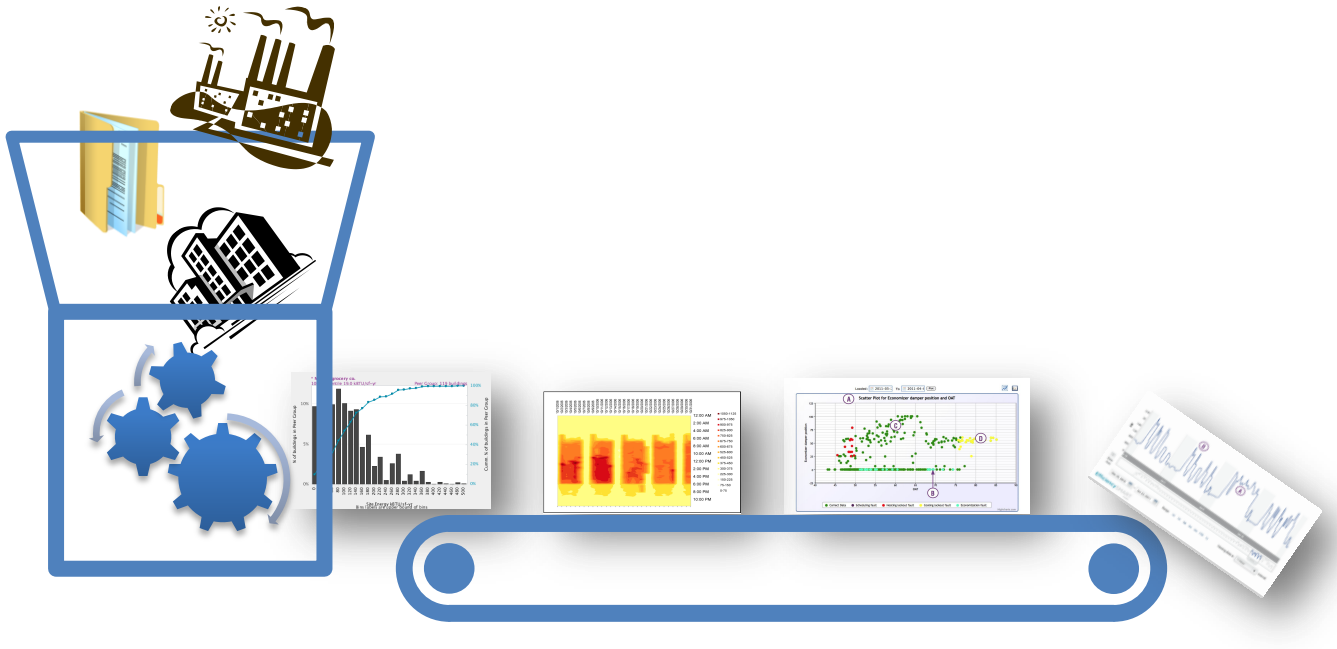

OpenEIS (energy information systems)

Jessica Granderson

Lawrence Berkeley National Laboratory

JGranderson@lbl.gov, 510.486.6792

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Purpose & Objectives

Problem Statement: Advanced algorithms and analyses can enable 5-40% savings, yet are rarely adopted; 3 relevant barriers include:

1. Lack of awareness that simple analytics can be used to generate valuable insights and actionable information, without further training
2. Risk averseness
3. Prohibitive costs, particularly for small commercial buildings

Objectives:

- Develop a software requirements specification for a cloud-based open-architecture platform to upload and analyze building energy, operational data
- Create market pull for existing commercial solutions, and lower the transaction cost for new and existing service providers

Purpose & Objectives

Impact of Project: Based on CBECS data, and assuming 15% average savings, adoption of analytics throughout the <100k sf stock would enable 500 TBtu (.5 quads); total commercial consumption is 5800 TBtu, or 5.8 quads (excluding malls)

Project Focus:

- Supports midterm BTO goal of 40% savings in energy to operate existing commercial buildings, at < cost of energy saved
- Aligns with ET strategy to: develop and commercialize technologies that significantly reduce energy use and are cost-effective
- Enables increased adoption of continuous commissioning, a high-impact technology as identified in the BTO prioritization tool

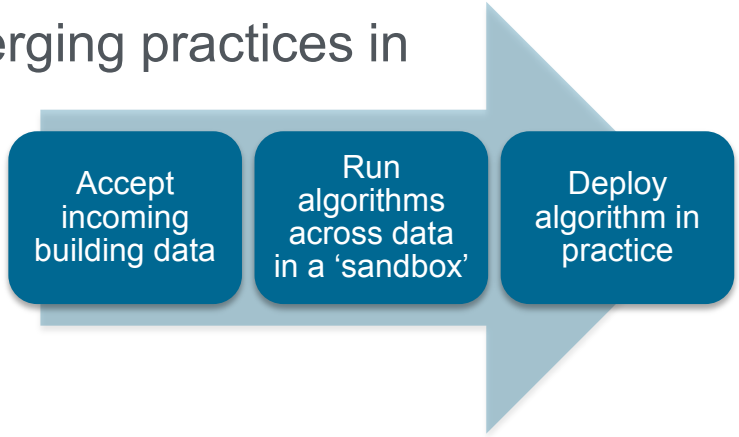
Approach

Approach: LBNL, PNNL and Navigant team knowledge + stakeholder workshops, to integrate subject matter expertise in SRS development; integrate previous labs algorithm work into open-source tool format

Key Issues: Early and frequent engagement of vendor, owner, practitioner community for concept awareness, technical input

Distinctive Characteristics: Increases demand by providing a 'sandbox' to illustrate benefits *prior to* investment in products and services increasing market awareness, and reducing risk

Cross-cutting effort to organize best and emerging practices in market and national lab R&D efforts



Accomplishments and Progress

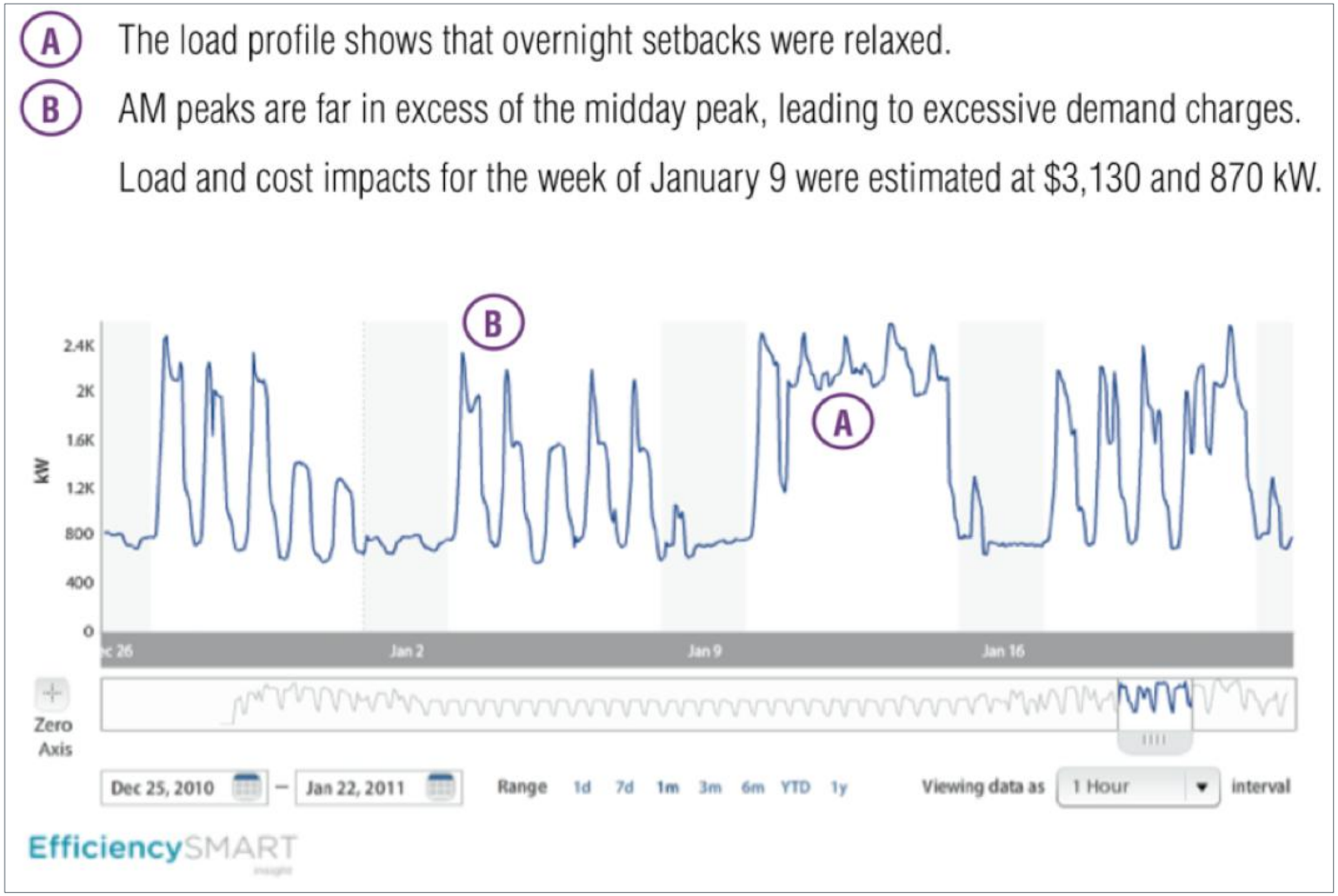
Accomplishments: Workshop #1 of 2, with 30 industry domain experts to identify high-priority algorithms that OpenEIS should provide

Participants:

- Gov, Academic - NIST, Stanford, LBNL
- Controls - Trane, Siemens, UTRC,
- Analytics Vendors - NorthWrite, EnerNOC, First Fuel, EnergyAi,
- Services - McKinstry, Weidt group, Taylor Engineering, KW engineering, QuEST, Building Intelligence Group
- Owners – Duke Realty, Cal State Universities
- Utility – Pacific Gas and Electric

High Priority Algorithms

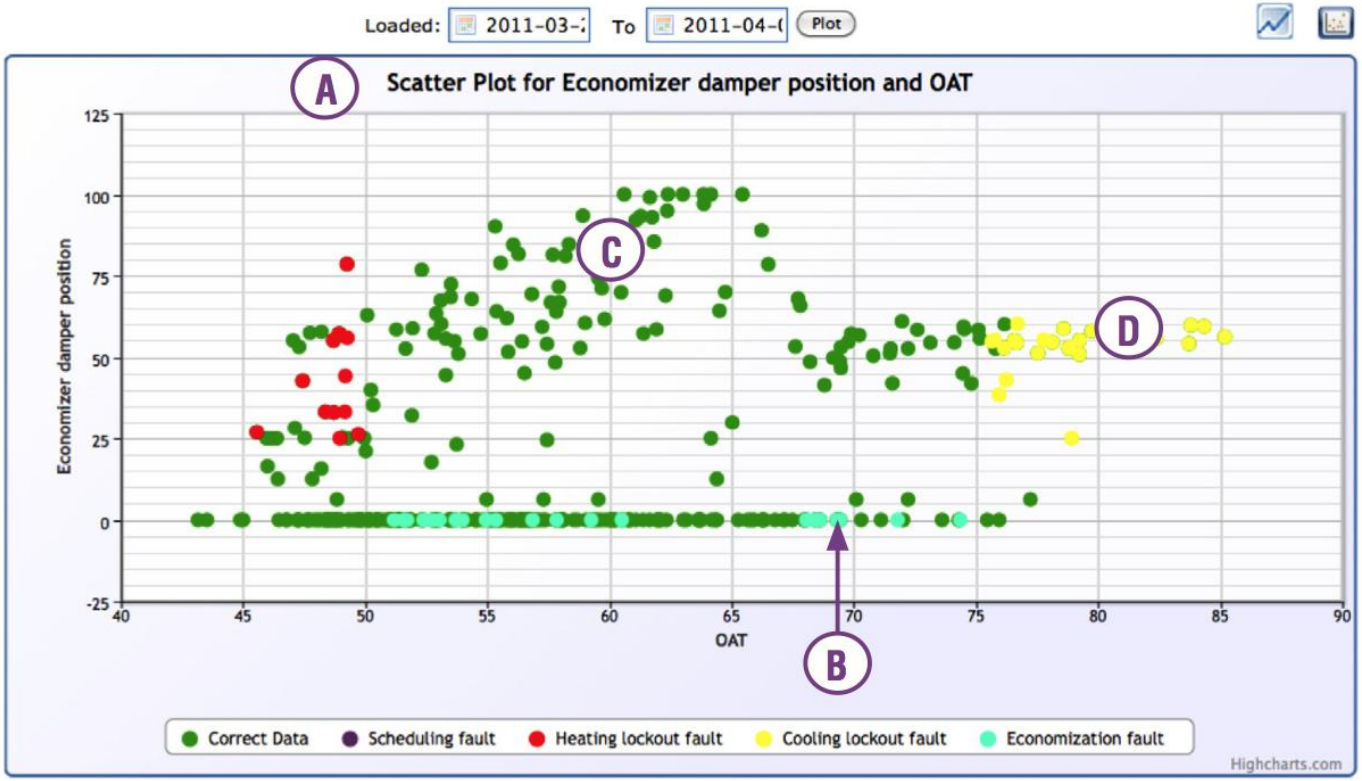
- Load Profiling



Source: EnerNOC

High Priority Algorithms

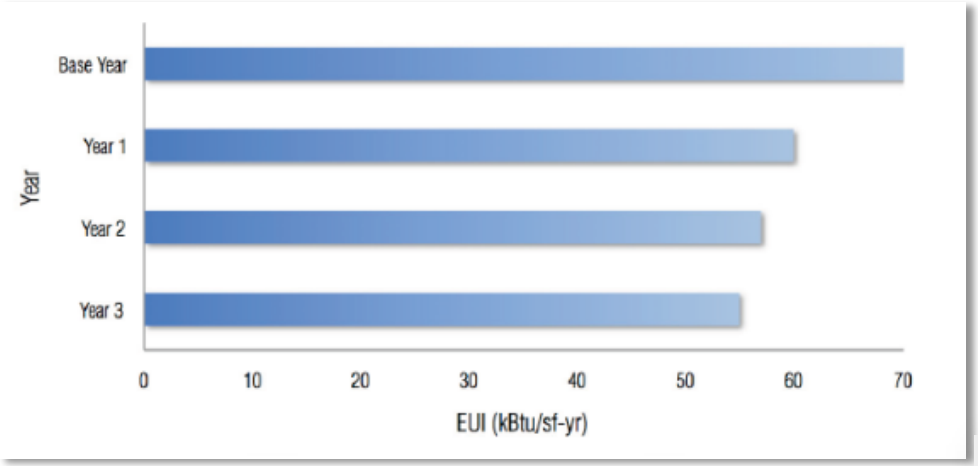
- Economizer Diagnostics

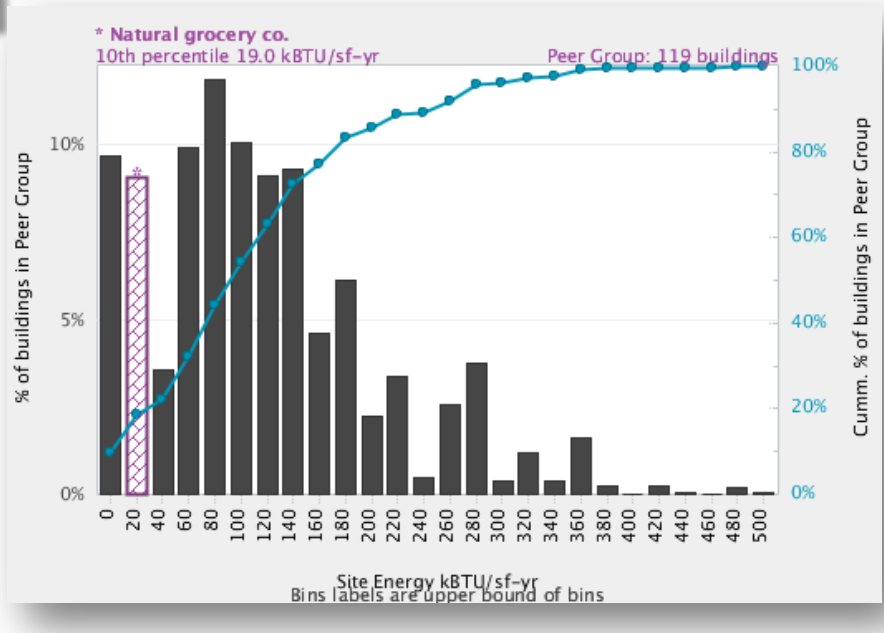


Source: Serious Energy. Not economizing (light green), heating/cooling lockouts (red/yellow), fault free (dark green)

High Priority Algorithms

- Longitudinal and Cross-Sectional Benchmarking

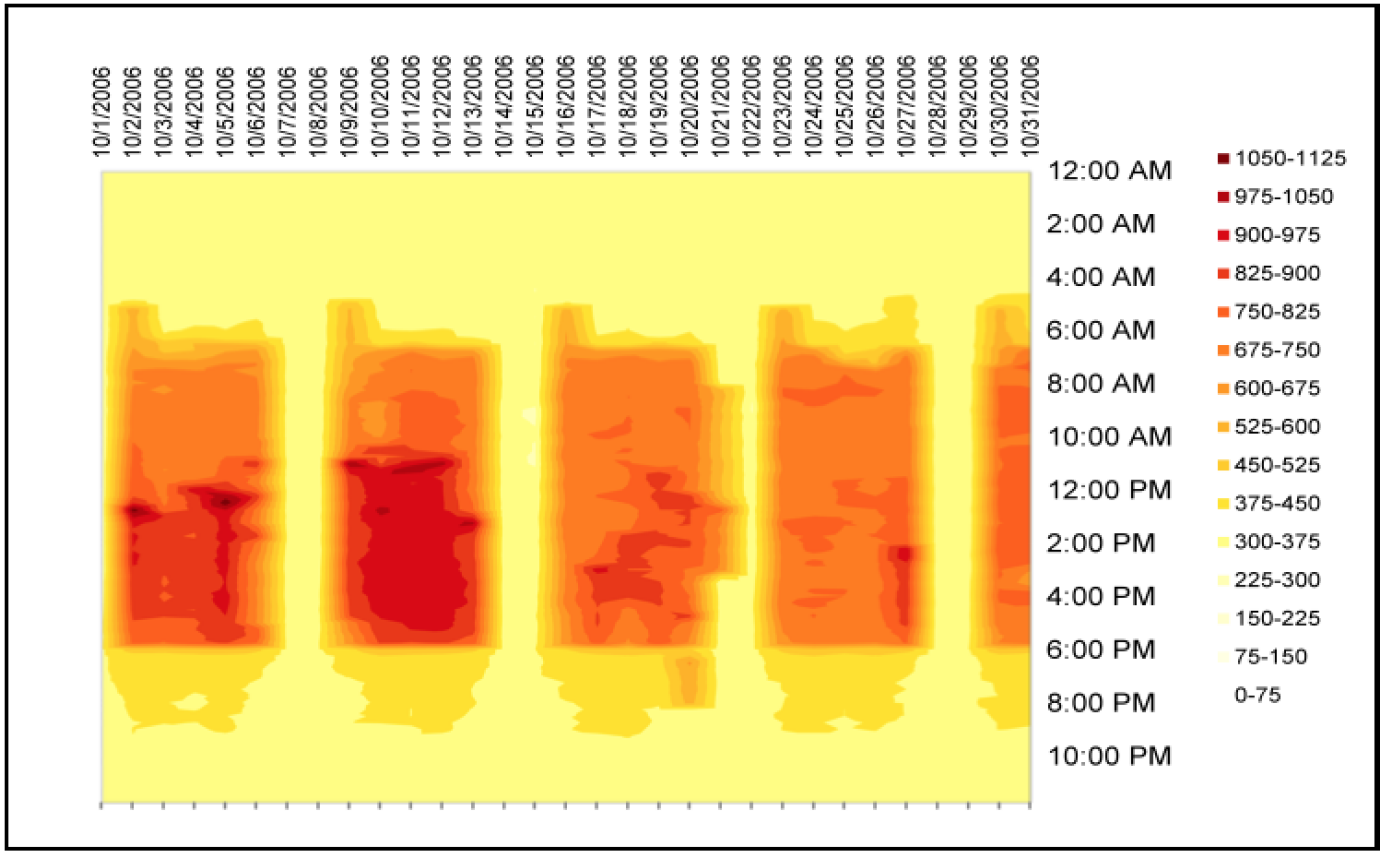




Source: EnergyIQ

High Priority Algorithms

- Heat maps or carpet plot visualizations



Accomplishments and Progress

Progress on Goals: Project is progressing as planned relative to original goals

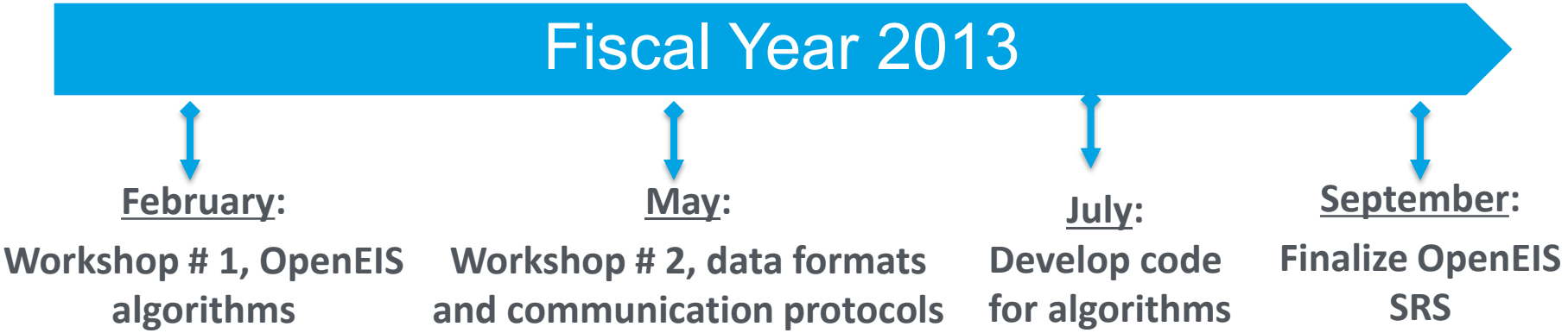
Awards/Recognition: n/a

Project Plan & Schedule

Project initiated November 2012

Planned completion by September 2013

On schedule, no slips



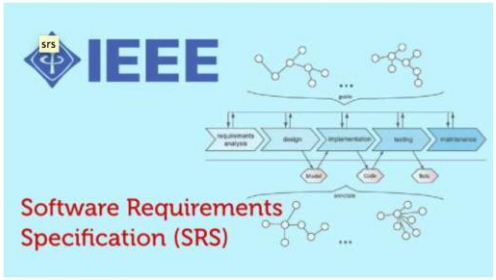
Project Plan & Schedule

Task 1 Identify high-value analytical applications and diagnostic algorithms, Q2 (complete)

Task 2 Identify data protocols and formats for accommodation within OpenEIS, Q3

Task 3 Develop algorithms in open-source format, Q4

Task 4 Develop software requirements specification, Q4



IEEE Recommended Practice for Software Requirements Specification

Project Budget

Project Budget: $300K LBNL lead (does not include PNNL or NCI costs)

Variances: None expected

Cost to Date: $60K, expected increase in spend rate, through summer to support algorithm programming and 2nd workshop

Additional Funding: n/a

Budget History			
FY2013		FY204	
DOE	Cost-share	DOE	Cost-share
$300K	n/a	TBD	

Project Integration, Collaboration & Market Impact

Partners, Subcontractors, and Collaborators: Partners, Pacific Northwest National Laboratory and Navigant Consulting

Technology Transfer, Deployment, Market Impact: Increased adoption of analytics with proven market value; expansion of services into small commercial sector; common platform to transfer lab-developed algorithms to industry; DOE in discussion with potential early adopters

Communications: Developing communications plan with DOE; potential venues include BBA efficiency forum, ESource Annual Forum, GovEnergy, ACEEE, National Conf on Bldg Commissioning

Next Steps and Future Plans

Next Steps and Future Plans: By FY end deliver formal software requirements specification; project team will support DOE future plans for technology build-out and products dissemination (standardized algorithms and usage documentation)