SEED Platform

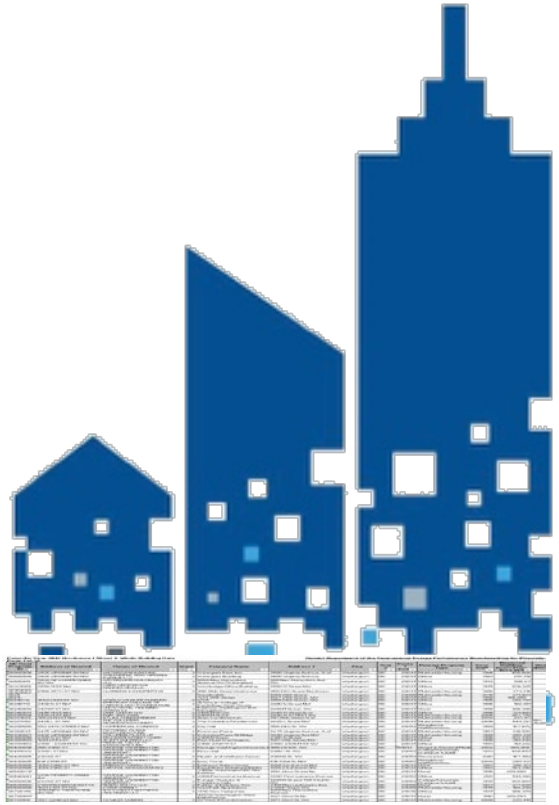
2017 Building Technologies Office Peer Review

UBI	GBA	BLDGS	Address	Owner	City	State	Zip	Property Type	AYB_YearBuilt
10107/71db4	264,949	1	120243 E True Lane	MileStone Community Builders	EnergyTown	Illinois	10107-7915	COMMERCIAL	1974
10107/c6596	322,701	1	95373 E Peach Avenue	Pangea Properties	EnergyTown	Illinois	10107-1544	COMMERCIAL	1962
10106/2f366	139,835	1	95864 SW Cottonwood Court	Matt Martin Real Estate Management	EnergyTown	Illinois	10106-7162	RESIDENTIAL-MULTI FAMILY	1965
10103/f111f	194,395	1	155371 W Cherry Loop	Celerity Ventures	EnergyTown	Illinois	10103-3578	COMMERCIAL	1967
10106/873c5	67,269	1	180821 S Tyler Lane	Marketplace Homes	EnergyTown	Illinois	10106-8191	RESIDENTIAL-MULTI FAMILY	1965
10104/fa70d	100,654	1	124217 W Horsechestnut Boulevard	Apartment List	EnergyTown	Illinois	10104-5427	COMMERCIAL	1967
10103/6a6b9	296,432	1	155830 SW Garfield Way	Econohomes	EnergyTown	Illinois	10103-5455	RESIDENTIAL-MULTI FAMILY	1965
10101/3b748	390,302	1	134217 SE Kennedy Lane	PropertyRate	EnergyTown	Illinois	10101-4786	COMMERCIAL CONDO	
10102/b0dbc	373,152	1	92496 E Tangarine Boulevard	Landmark Network	EnergyTown	Illinois	10102-8803	COMMERCIAL	1975
10108/335e9	271,912	1	180702 N Horsechestnut Loop	Memphis Invest	EnergyTown	Illinois	10108-5971	COMMERCIAL	1978
10106/913a0	337,844	1	94734 SE Honeylocust Street	ACT Appraisal	EnergyTown	Illinois	10106-4994	CONDO	
10108/9ec27	225,829	1	159308 SE Sycamore Court	Innotion Enterprises	EnergyTown	Illinois	10108-8006	HOTELS/MOTELS	1978
10101/f5ad2	272,997	1	129218 N Palm Highway	The Force Realty	EnergyTown	Illinois	10101-1619	CONDO	
10107/5bff1	379,591	1	44166 S Hoover Alley	PalmerHouse Properties	EnergyTown	Illinois	10107-6822	RESIDENTIAL-MULTI FAMILY	1966
10106/d0285	86,627	1	48633 NE Papaya Lane	CoesterVMS	EnergyTown	Illinois	10106-8933	RESIDENTIAL-MULTI FAMILY	1957
10104/94bd8	125,131	1	231069 SW True Way	Hawaii Life	EnergyTown	Illinois	10104-3290	HOTELS/MOTELS	1957
10101/6e866	298,654	1	90274 SW Madrone Court	Apex Home Loans	EnergyTown	Illinois	10101-2886	CONDO	
10106/f06b7	87,271	1	238539 SE Willow Street	Stress Free Property Management	EnergyTown	Illinois	10106-9457	CONDO	
10105/d237c	256,003	1	80219 SW Mandarin Court	Fairplay Financial	EnergyTown	Illinois	10105-7949	COMMERCIAL	1959
10107/a127a	181,115	1	119134 SE Lemon Highway	Nationwide Appraisal Network	EnergyTown	Illinois	10107-5333	COMMERCIAL	1986
10101/6fcb5	292,974	1	232204 SW Taylor Highway	Robert Paul Properties	EnergyTown	Illinois	10101-9602	COMMERCIAL	1983
10109/f6ce2	177,426	1	67162 SE Incense Lane	Trulia	EnergyTown	Illinois	10109-2252	HOTELS/MOTELS	1985
10103/9dcbf	333,188	1	214831 SW Cypress Boulevard	The Ruby Group	EnergyTown	Illinois	10103-6843	COMMERCIAL	1986
10102/aa5a9	344,019	1	179646 SW Date Highway	Valuation Management Group	EnergyTown	Illinois	10102-7607	COMMERCIAL CONDO	
10104/c5be7	270,366	1	206055 S Clementine Boulevard	Hipercept	EnergyTown	Illinois	10104-8059	RESIDENTIAL-MULTI FAMILY	2005
10108/cfa5b	186,905	1	197616 NE Garfield Avenue	Accurate Group	EnergyTown	Illinois	10108-4184	CONDO	
10109/a4dc5	161,964	1	197709 E Pineapple Highway	Nest Realty	EnergyTown	Illinois	10109-2482	CONDO	
10105/fd160	104,349	1	9773 N Citron Loop	JWB Real Estate Companies	EnergyTown	Illinois	10105-4684	COMMERCIAL	1991
10105/e565e	249090sf	1	28660 E Polk Road	Real Property Management	EnergyTown	Illinois	10105-1441	RESIDENTIAL-MULTI FAMILY	1959
10101/51bc2	319,123	1	179923 NE Washington Avenue	Distinctive Properties	EnergyTown	Illinois	10101-5472	RESIDENTIAL-MULTI FAMILY	1962
10105/ce1a8	258,869	1	108393 N Grapefruit Court	Clear Title Agency of AZ	EnergyTown	Illinois	10105-8589	HOTELS/MOTELS	1950

Nicholas Long, nicholas.long@nrel.gov
National Renewable Energy Laboratory

SEED Platform

2017 Building Technologies Office Peer Review



SEED
STANDARD ENERGY EFFICIENCY DATA
PLATFORM™

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

Nicholas Long, nicholas.long@nrel.gov
National Renewable Energy Laboratory

Project Summary

Timeline:

Start date: 03/01/2015

Planned end date: 9/30/2018

Key Milestones

1. Low-risk SEED code refactor for Version 2.0; 01/29/2017
2. Moderate-risk SEED code refactor for Version 2.1; 06/24/2017
3. Software developer adoption utilizing SEED-platform ; 09/30/2017

Budget:

Total Project $ to Date (1/21/2017):

- DOE: $1,580,000
- Cost Share: $0

Total Project $:

- DOE: $852,307
- Cost Share: $0

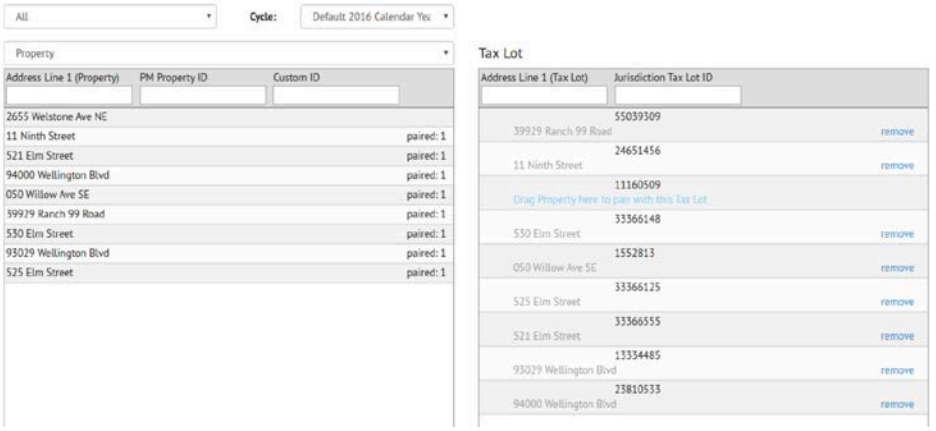
Key Partners:

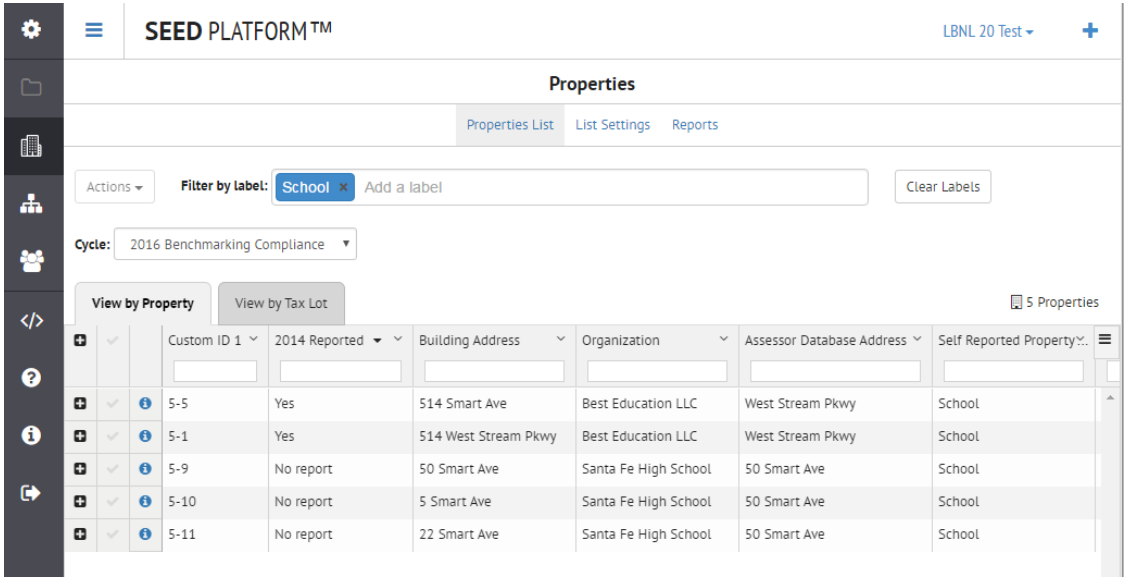
PSD Consulting (OEI)	National Labs
Earth Advantage	IMT
Cities and Municipalities	National Resources Canada
The Energy Coalition	Green Building Registry

Project Outcome:

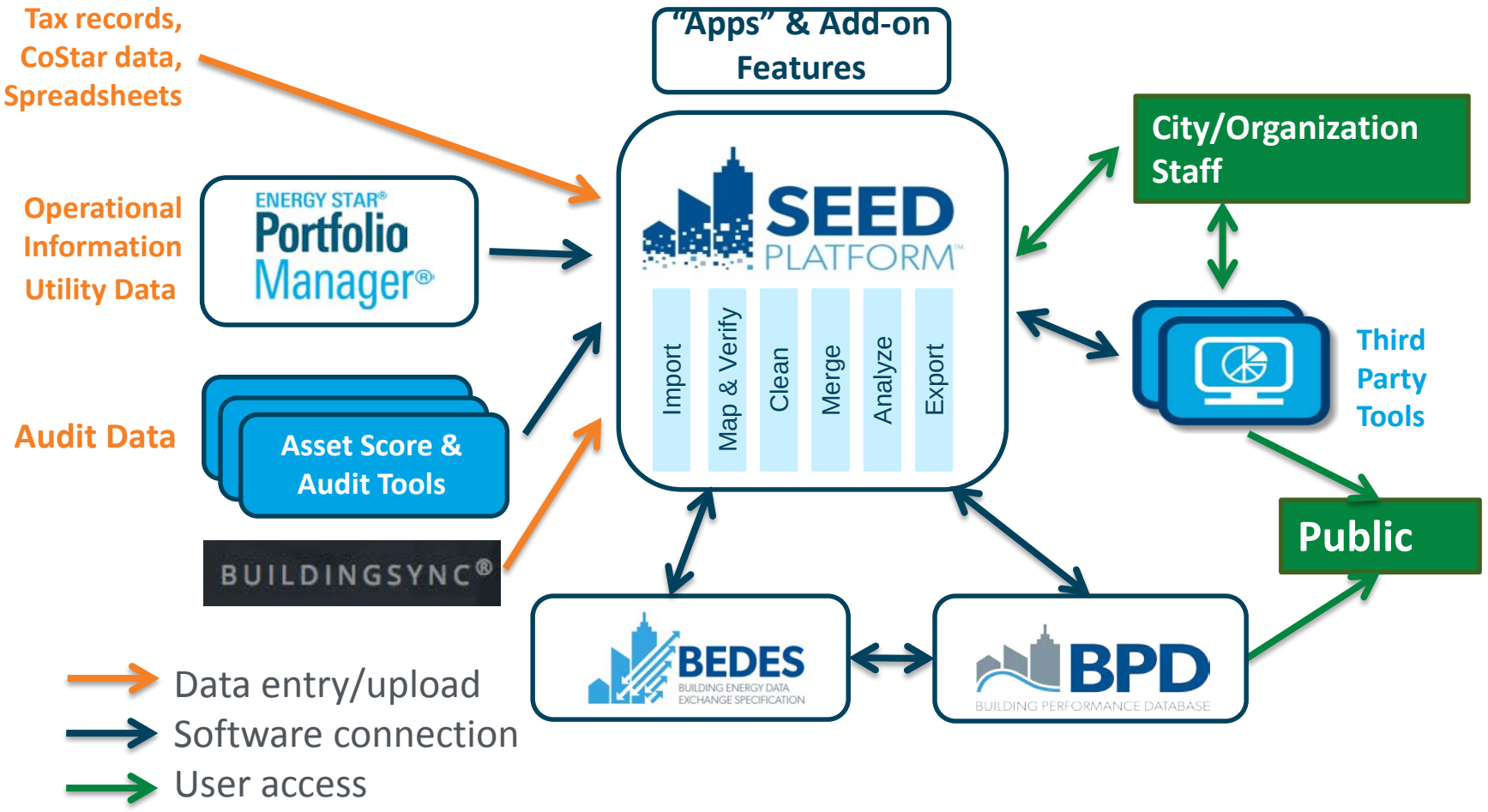
The SEED Platform will help organizations manage building data on the energy performance of large groups of buildings. SEED is easily deployable on cloud infrastructure or can be used via hosting providers. The core functionality is a flexible framework that can used for a range of purposes from benchmarking and audit data to home energy labeling information.

What is SEED?





What is SEED?



Impact of Project

General Outcomes:

- *BTO MYPP Strategy 3*: Accelerate adoption of energy saving solutions by developing market infrastructure to enable markets to deliver greater investment in energy efficiency.
- Open-source application that can be used to combine (map, clean, validate, match, and pair) dissimilar building data sources.
- API for 3rd Party Integration

Near-term: Continued support for complex building/tax lot configurations. Enhanced robustness of API. Increased use of agile software development practices including continuous delivery

Mid-term: Software support, bug fixes, ease of deployment. Added community member for development.

Long-term: Community adoption of software maintenance and feature development.

Purpose and Objectives

Problem Statement:
Building data is inherently problematic and difficult to manage due to its diverse data sources and continual untracked changes. There are many use cases where the end user desires a consistent, tracked, version-able data source of building data in order to

a) meet programmatic standards and requirements,
b) perform retrofit upgrade saving calculations, and/or
c) track building changes.

Target Market and Audience:
Organizations implementing building-scale benchmarking or audit programs, building portfolio managers, energy efficiency program managers, and more.

Credit: Amanda Lloyd, CBEI

User and Technical Support Approach

Development Approach:

Gather use cases from interested parties. New features requires a high level design document describing the use case, users, proposed design, testing strategy, and potential issues.

User Support Approach:

Application user support is mostly managed by LBNL (under separate agreement).

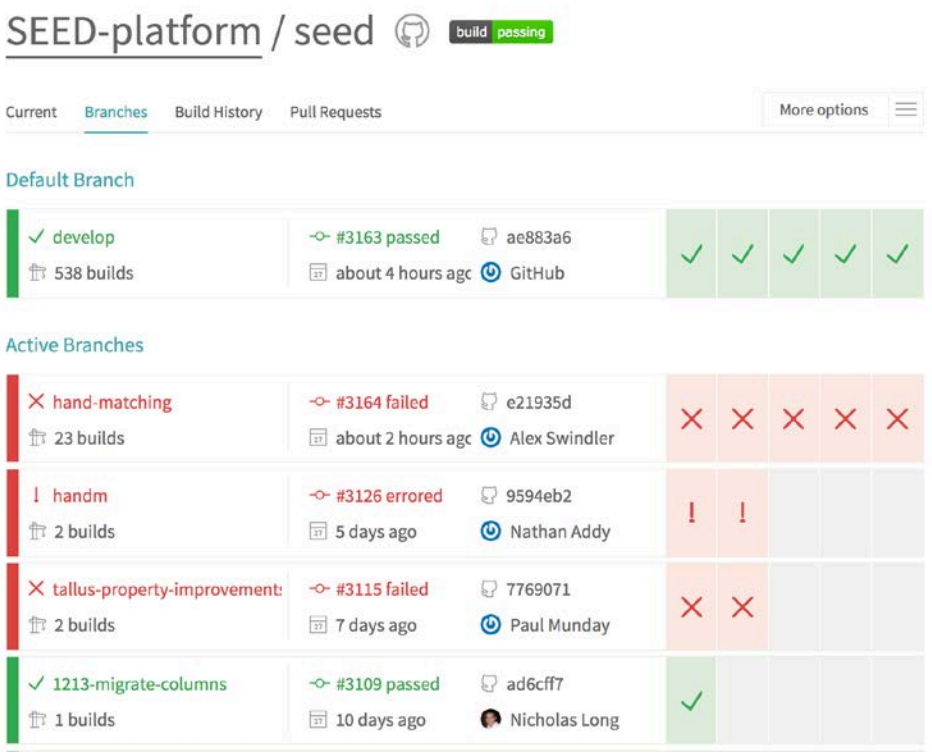
- General communication (email, phone) as needed.
- Conduct webinars every other month on status of the project. Provide outreach and technical support to adopters, software developers and third-party vendors.

- Technical user support is managed by NREL
  - Ad hoc technical discussions around development, design, and deployment.

Technical Support Approach

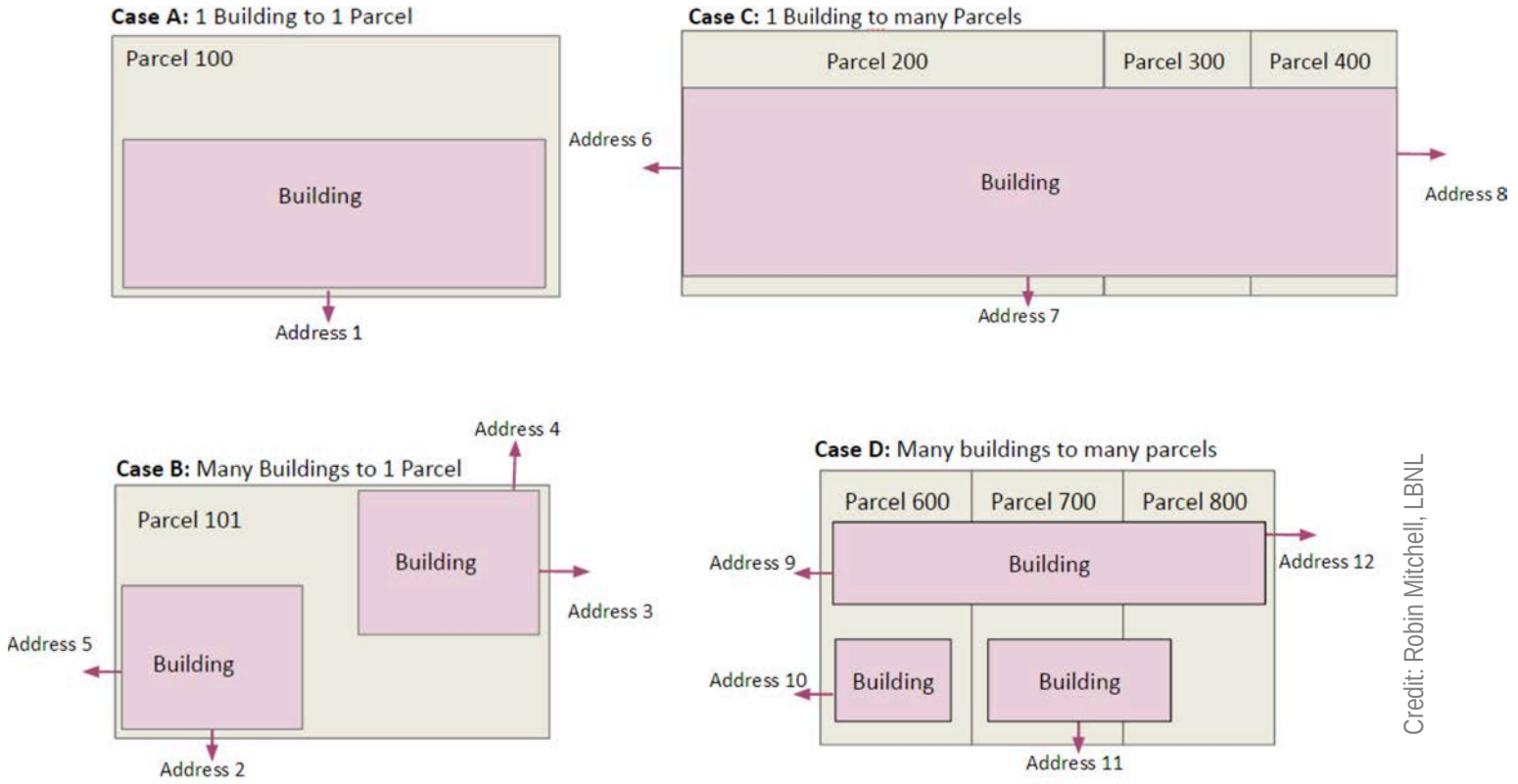
Key Issues:
Code refactor complexity and lack of substantial automated testing. It is common that new bugs are created as code is updated to handle new features and workflows.

Distinctive Characteristics:
SEED is designed to be a code base that can be deployed by interested parties. This presents unique challenges in having to design a solution that is use case agnostic while still meeting the needs of core program partners.



Progress and Accomplishments

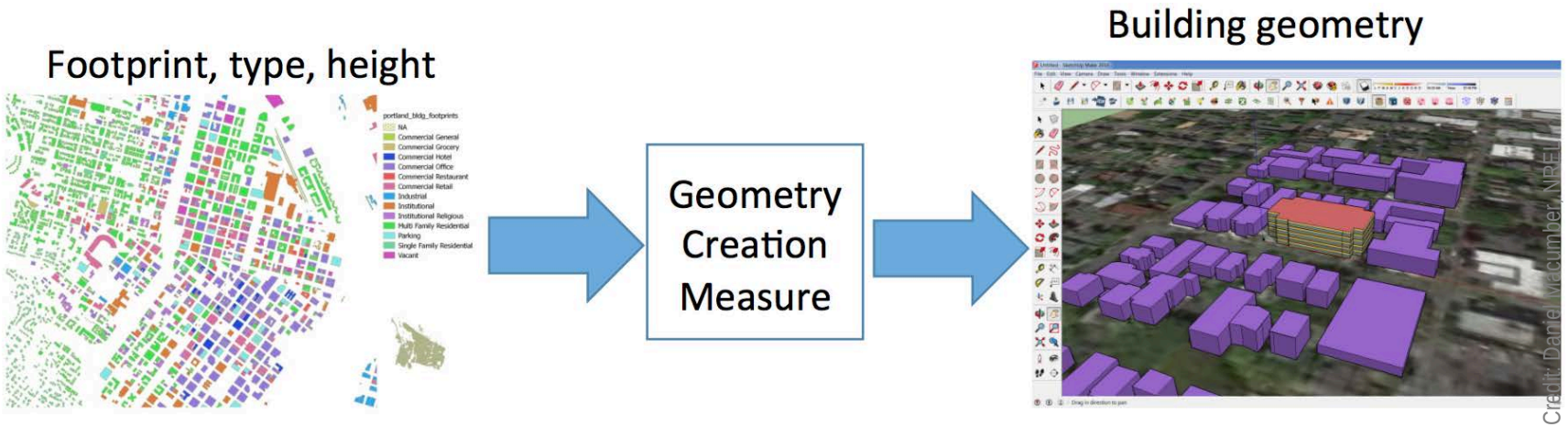
- *Major code refactor* to support many-to-many relationships between properties and tax lots
- New pairing front end to pair properties with tax lots



Progress and Accomplishments

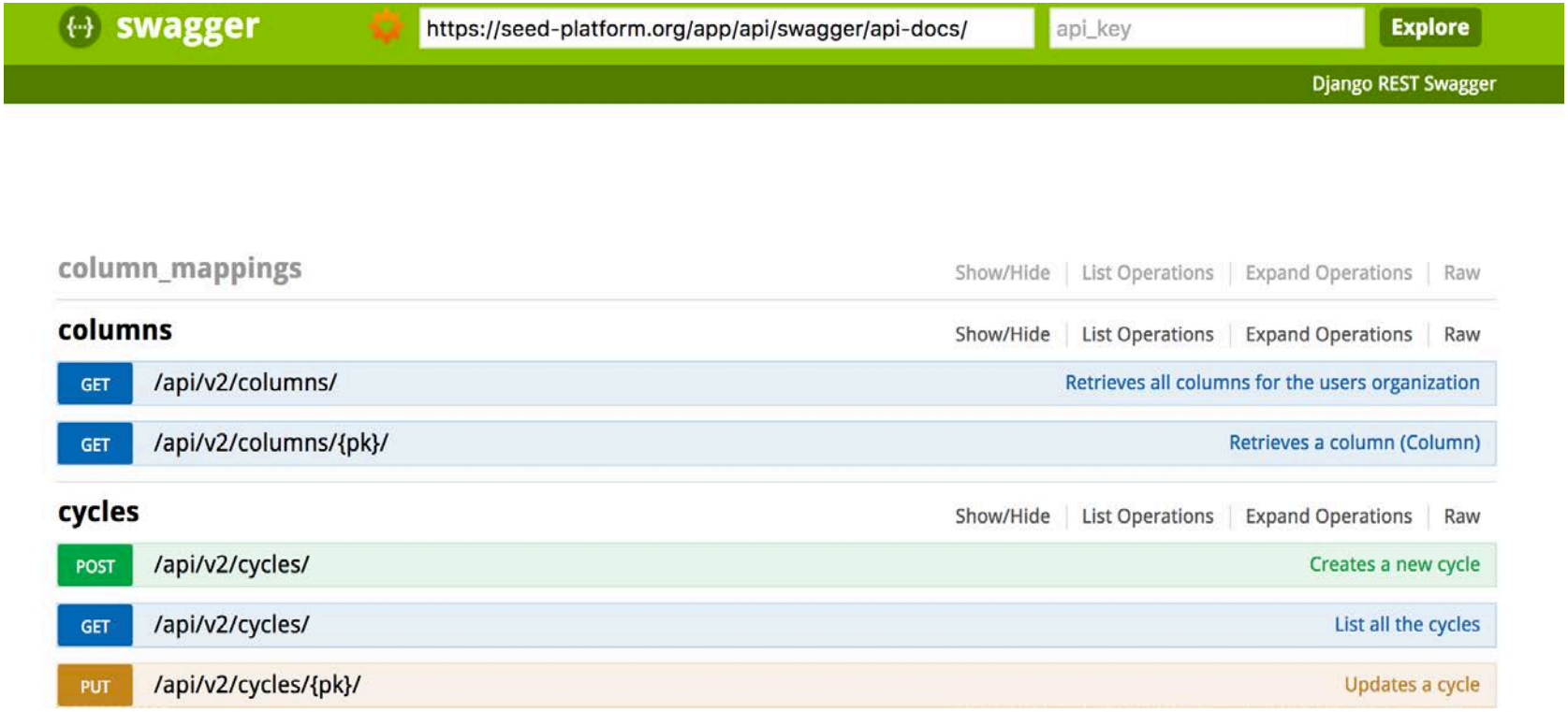
- New development teams and contributors have joined SEED to add new features and expand scope:
  - National Resources Canada – Internationalization and Dual Units
  - Green Building Registry/HELIX – Residential Use Case
  - NREL Residential – HPXML Support

- New projects have started to incorporate SEED as the "core" database:
  - BayREN / BRICR
  - City of Portland



Progress and Accomplishments

- Automated testing framework and code coverage to ensure consistent quality
- Three planned releases in FY17
- New API and Documentation



https://seed-platform.org/app/api/swagger/#!/cycles

Progress and Accomplishments

Market Impact:

- Developing a common data platform for managing building data reduces the cost of manually managing data
- Several new uses for SEED are under development including using SEED for:
  - Tracking potential retrofit upgrades for cities
  - Using SEED to store both Portfolio Manager and Asset Score data in order to better target building upgrades

Awards/Recognition: Forthcoming

Lessons Learned:

- Using open source tools allows us to more easily integrating with outside developers with different use cases
- Shifting priorities require agile management

$0.30 of every EE program dollar is spent on *administration* including data collection, management, and verification.

Cities are spending 0.5-1.0 FTEs each year at a cost of $50-100,000 on data needs related to energy benchmarking and compliance.

http://energyoutlook.naseo.org/Data/Sites/8/media/presentations/Hartke.pd

Project Integration and Collaboration

Project Integration:
The project source code, change requests, and issue management is through GitHub in order to effectively track changes in an open and transparent manner.

Project management and software development tracking is through Pivotal Tracker, allowing the developers transparent access and steady *prioritization* of tasks. The majority of developer communication occurs through the Slack messaging client. Continuous testing using Travis CI.

Team communication and software development planning and collaboration is facilitated through iteration planning meetings (every 2 weeks), and regular, brief scrum meetings (3 times/week)

Communications:
LBNL hosts webinars each quarter with the SEED collaborative members.

Project Integration and Collaboration

Partners, Subcontractors, and Collaborators:

BERKELEY LAB
Lawrence Berkeley National Laboratory

DEPARTMENT OF ENERGY · UNITED STATES OF AMERICA

OPEN METER

NASEO
National Association of State Energy Officials

IMT
INSTITUTE FOR MARKET TRANSFORMATION

PERFORMANCE SYSTEMS DEVELOPMENT

NATIONAL LEAGUE of CITIES

earth advantage

McQuillen Interactive

Miles Clark

devetry

Quick Left

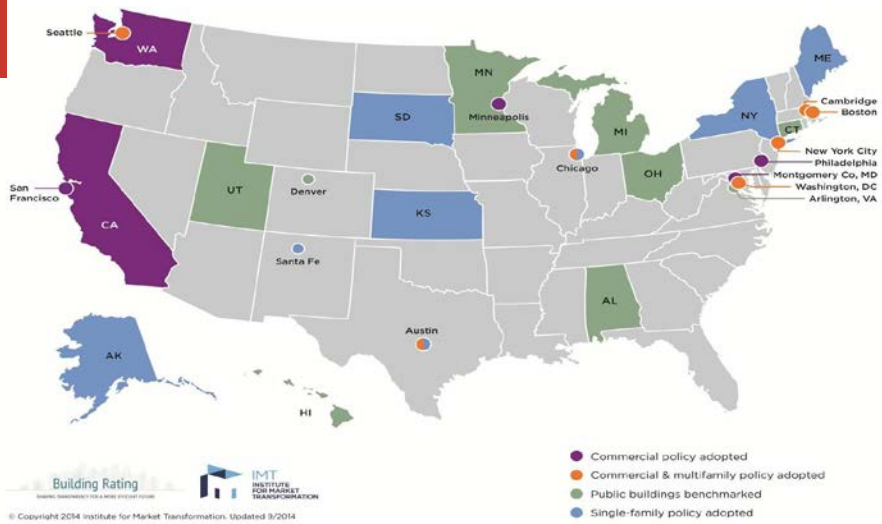
C40 CITIES

NRDC
NATURAL RESOURCES DEFENSE COUNCIL

CAKESYSTEMS™

Vermont Energy Investment Corporation

MAALKA



Natural Resources Canada

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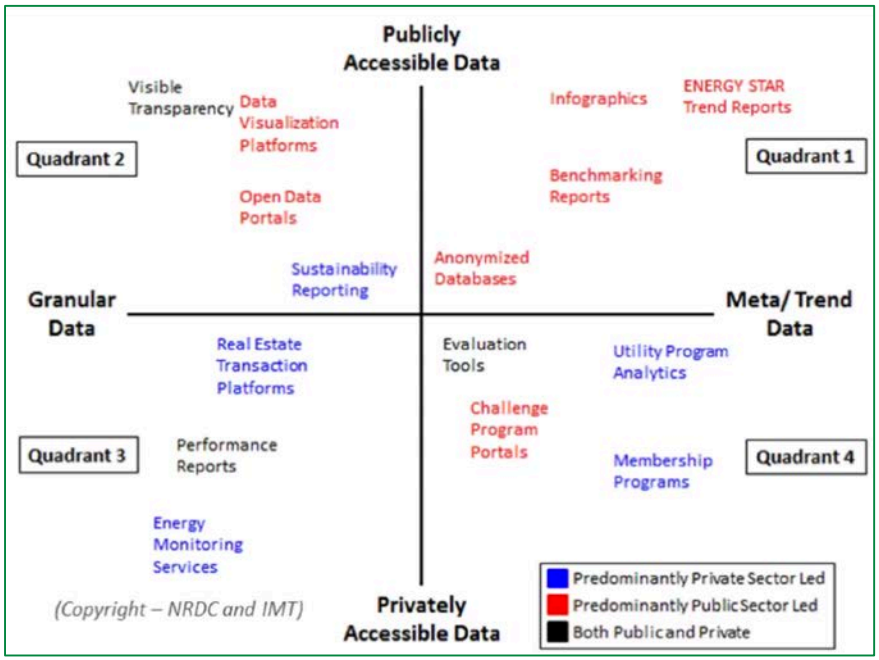
Next Steps

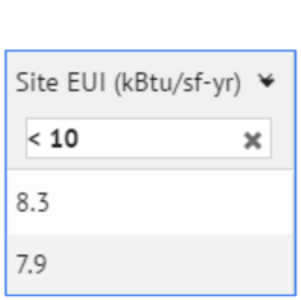
FY17 Delivery:

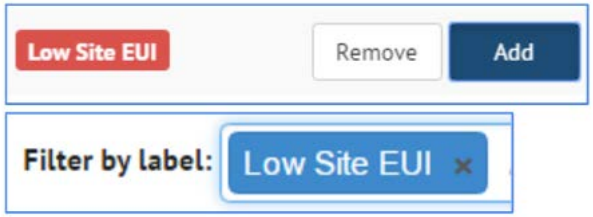
- Solid software to support the immediate needs of the program partners and early adopters
- Robust testing to future proof features

FY17 Features:

- ESMP connection enhancements
- CRM functionality design
- Audit use case
- Expanded data quality checking



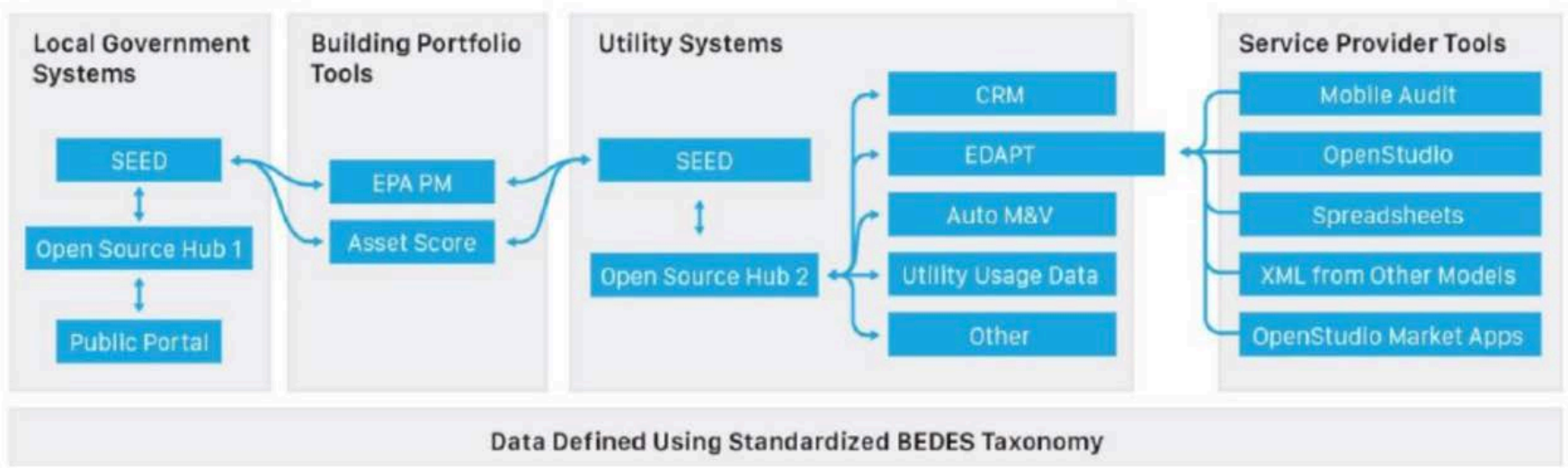




Future Plans

Data Interconnection

- Use SEED API to connect data for various use cases
  - Various CRM Databases
  - Asset Score
  - Energy Design Assistance Project Tracker
  - Building Energy Modeling
  - Advanced Analysis Engines



REFERENCE SLIDES

Project Budget

Project Budget: $1,580,000
Variances: Funding has been added throughout as NREL's scope expands.
Cost to Date: $852,307
Additional Funding: None

Budget History					
FY 2015 – FY 2016 (past)		FY 2017 (current)		FY 2018 – FY 2019 (planned)	
DOE	Cost-share	DOE	Cost-share	DOE	Cost-share
$1,030,000	$0	$550,000	$0	TBD	$0

Project Plan and Schedule

Project Schedule													
Project Start: 3/1/2015		Completed Work											
Projected End: 9/30/2018		Active Task (in progress work)											
		Milestone/Deliverable (Originally Planned) use for missed											
		Milestone/Deliverable (Actual) use when met on time											
		FY2016				FY2017				FY2018			
Task		Q1 (Oct-Dec)	Q2 (Jan-Mar)	Q3 (Apr-Jun)	Q4 (Jul-Sep)	Q1 (Oct-Dec)	Q2 (Jan-Mar)	Q3 (Apr-Jun)	Q4 (Jul-Sep)	Q1 (Oct-Dec)	Q2 (Jan-Mar)	Q3 (Apr-Jun)	Q4 (Jul-Sep)
Past Work													
Q1 Milestone: Continuous Integration System													
Q2 Milestone: Low-risk Code Refactor													
Q2 Go/No-Go													
Q3 Milestone: Moderate-risk Code Refactor													
Q4 Milestone: Improvements, Adoption													
Q1 Milestone: Subcontractor Selection													
Q2 Milestone: Low-risk Code Refactor													
Q2 Go/No-Go													
Current/Future Work													
Q3 Milestone: Moderate-risk Code Refactor													
Q4 Milestone: Improvements, Adoption													