SEED: Standard Energy Efficiency Data Platform

2014 Building Technologies Office Peer Review

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Project Summary

**Timeline:**
Start date: 2013
Planned end date: Sept 30, 2014

**Key Milestones**
1. v1.0 launch; April 2014
2. Adoption by 2-3 cities; May 2014
3. v1.1 launch; July 2014

**Budget:**
Total DOE $ to date: $1,400,000
Total future DOE $: TBD, depends on market adoption

**Key Partners:**

<table>
<thead>
<tr>
<th>Building Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institute for Market Transformation</td>
</tr>
</tbody>
</table>

**Project Goal:**
SEED is designed to help State and local governments implement building performance reporting regulations for private and/or public buildings

**Target Market/Audience:**
organizations that manage and publish building energy data: City disclosure ordinances, portfolio managers, energy efficiency program managers, etc.
Purpose and Objectives

**Problem Statement:** Many organizations have a similar need to manage, analyze, and publish data on the energy performance of groups of buildings, in order to track progress toward overall energy goals.

**Target Market and Audience:** Target audience is organizations that manage and publish building energy data: City disclosure ordinances, portfolio managers, energy efficiency program managers, etc.

**Planned Contribution to Energy Efficiency:**

1. SEED is developing an open-source software system to help manage building energy performance data.
2. Market Impact:
   a. Near-term: adoption of SEED by pilot cities implementing municipal disclosure ordinances
   b. Intermediate-term: Adoption of SEED by other users; Development of a SEED Community to support development
   c. Long-term: SEED is standard tool for managing building energy performance data
Value of SEED

- Provides a free, open source platform to clean, manage and store data from multiple sources about the same buildings, and share it with selected external parties
- Reduces upfront cost of storing and managing data in a private, secure way
- Addresses workflow management and relieves administrative burden
- Data cleansing process increases data quality and saves staff time
- Common platform and data format increases consistency and permits collaboration between jurisdictions
- Consistent, vendor neutral, objective
- Facilitates sharing of data and applications
- Open and extensible architecture supports development of third-party applications and reduces needs for internal IT support
  - Idea is to allow third-parties to provide much of the analysis and visualization

- But these tactical values serve a bigger goal for the market – to make data and systems interoperable
SEED is designed to help State and local governments implement building performance reporting regulations for private and/or public buildings.

In the future it could be used by large portfolio owners, energy efficiency programs, and energy efficiency service providers.
Approach: How the SEED Platform works

- The SEED platform enables users to **import data from multiple sources** about a group of buildings, and **conduct analysis and reporting** of the information.
- SEED is a blank database; each user has their own private copy.
- SEED uses a standard data format – Building Energy Data Exchange Specification (BEDES).
- The owner of each SEED instance can choose which external parties can access their information, and what records and fields to share.
- An application programming interface (API) will enable third-parties to access the data, and offer add-on tools and services, in a replicable way.

**DATA SOURCES**
- Portfolio Manager
- Property Tax records
- Audit findings

**AGGREGATION PLATFORM**
- Standard Energy Efficiency Data (SEED) platform

**OTHER TOOLS**
- DOE Buildings Performance Database
- Third Party Tools
SEED v1.0 – Available Now

Data importing and merging

- Allow map/clean/merge (MCM) tax assessor data and import into SEED
- Upload and MCM a spreadsheet export of Portfolio Manager data (custom report integration)

Data editing, matching and updating

- Help users to reconcile and match records from different sources
- View/edit all data for given building and/or for select periods of time
- View which records do and do not meet a minimum set of compliance checks
- Change compliance status based on PM and city data completeness
- Label and group records

Data reporting and exporting

- Ability to export data in various formats

Platform Architecture

- Host on local servers or cloud
- Open-source software
Data importing and merging

• Support for importing datasets via API, XML, excel and .csv
• Ability to add new data fields and define their format

Data editing, matching and updating

• Audit trail to show history of data edits
• Ability to add comments and annotations on individual records

Data reporting and exporting

• Define fields and records that can be viewed publicly or by authorized parties
• Ability to export data in various formats, including via the API

Platform Architecture

• Improved error reporting, help screens & documentation
• One-click export to Buildings Performance Database
• API for publishing data to third-parties and the public
• Plug-in framework for third-party software extensions
• Multiple levels of user access and control
Getting Started

The Standard Energy Efficiency Data (SEED) platform is a software tool that provides a standardized format for collecting, storing and analyzing building energy performance information about large portfolios. Upload your buildings list to get started.

What's New in R2

Upload your data
Get started using SEED by uploading your buildings list (city tax assessor data) and then your EPA Portfolio Manager data. Make sure these files are each in .csv format. The SEED platform will help you map and clean your data in the process of loading.

Match your data
Match-up your buildings list with the Portfolio Manager dataset to tie records together. SEED will help you by auto-matching high confidence pairings and then provide you with tools to match the rest of your dataset.

Manage compliance
You are ready to start managing the compliance of individual buildings to your data disclosure requirements! Use SEED's flexible, easy-to-use labeling system and project groupings to track the status of data submission, review, and compliance.
## View Imported Datasets

### DataSets

#### FILEs

<table>
<thead>
<tr>
<th>Building list files:</th>
<th># OF BUILDINGS</th>
<th>MAPPING &amp; VALIDATION</th>
<th>MATCHING</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC_CoveredBuildings_50k_y2_March2013_expanded.csv</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Portfolio Manager energy data files: | | |
|--------------------------------------|------------------|
| DC_ESPM.csv | | Passed | matching |
Map a dataset into the standard format

SEED matches similar field names and provides an interface to make/confirm matches. SEED then remembers your decisions for future imports.

### Mapping Your Data to SEED

For each row in the table below select a SEED header that best maps to the header of the file you uploaded. SEED will then attempt to map this row of data and surface any validation errors it finds. The map column indicates if a successful mapping was created and whether your data has validation errors or not.

### Mapping Key:
- **○** - mapping successful.
- **○** - mapping successful but some data is not valid.
- **△** - mapping unsuccessful or a duplicate.

<table>
<thead>
<tr>
<th>SEED</th>
<th>MAP</th>
<th>HEADER</th>
<th>ROW 1</th>
<th>ROW 2</th>
<th>ROW 3</th>
<th>ROW 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Tax Lot Id</td>
<td>000440027</td>
<td>00060813</td>
<td>00080806</td>
<td>00080808</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Gross Floor Area</td>
<td>70854</td>
<td>123856</td>
<td>449825</td>
<td>507133</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Building Count</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Address Line 1</td>
<td>2626 PENNSYLVANIA AV NW</td>
<td>2600 VIRGINIA AV NW</td>
<td>2500 VIRGINIA AV NW</td>
<td>2600 VIRGINIA AV NW</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Owner</td>
<td>SALVATION ARMY</td>
<td>GEORGE WASHINGTON UNIVERSITY</td>
<td>WATERGATE EAST INC</td>
<td>GREENPEZ 2600 VIRGINIA AVENUE LLC</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>City</td>
<td>Washington, DC</td>
<td>Washington, DC</td>
<td>Washington, DC</td>
<td>Washington, DC</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Postal Code</td>
<td>20037</td>
<td>20017</td>
<td>20057</td>
<td>20057</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>District</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>SIZE CLASS</td>
<td>050-100k</td>
<td>150-200k</td>
<td>200+</td>
<td>200+</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>OWNER CLASS</td>
<td>Private</td>
<td>Private</td>
<td>Private</td>
<td>Private</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>PROFITYPE</td>
<td>COMMERCIAL</td>
<td>COMMERCIAL</td>
<td>RESIDENTIAL-MULTI FAMILY</td>
<td>COMMERCIAL</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>Use Description</td>
<td>Commercial-Office-Large</td>
<td>Dormitory</td>
<td>Coop-Vertical-Mixed Use</td>
<td>Commercial-Office-Large</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>Year Built</td>
<td>1974</td>
<td>1963</td>
<td>1943</td>
<td>1963</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>Recent Sale Date</td>
<td>10-Nov-98</td>
<td>30-Jan-00</td>
<td>03-Jan-00</td>
<td>25-Nov-11</td>
</tr>
</tbody>
</table>
Match records from multiple datasets

SEED does a similar process for helping match records from different source datasets.

### Matching (Erik’s Demo Dataset)

**How to Match Your Data:**
Here we will talk about the glories of matching, how it builds canonical buildings and how rad it is.

<table>
<thead>
<tr>
<th>Displaying:</th>
<th>21 Unmatched Buildings</th>
<th>513 Matched Buildings</th>
</tr>
</thead>
</table>

### Source 1: DC_ESPM.csv

<table>
<thead>
<tr>
<th>PM PROPERTY ID</th>
<th>TAX LOT ID</th>
<th>CUSTOM ID 1</th>
<th>ADDRESS LINE 1</th>
<th>POSTAL CODE</th>
<th>GROSS FLOOR AREA</th>
<th>MATCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1029551</td>
<td>0457-0039</td>
<td></td>
<td>600 E Street, NW</td>
<td>20004</td>
<td>552,667</td>
<td>✔</td>
</tr>
<tr>
<td>1030273</td>
<td></td>
<td></td>
<td>1919 Pennsylvania Ave, NW</td>
<td>20006</td>
<td>291,330</td>
<td>✔</td>
</tr>
<tr>
<td>1034322</td>
<td>0197-0853</td>
<td></td>
<td>1155 16th Street, N.W.</td>
<td>20036</td>
<td>115,470</td>
<td>✔</td>
</tr>
<tr>
<td>1034352</td>
<td>0197-0854</td>
<td></td>
<td>1550 M St, NW</td>
<td>20036</td>
<td>84,886</td>
<td>✔</td>
</tr>
<tr>
<td>1045010</td>
<td>0214-0109</td>
<td></td>
<td>1120 Vermont Avenue, N.Y.</td>
<td>20005</td>
<td>505,443</td>
<td>✔</td>
</tr>
<tr>
<td>1045335</td>
<td>04030836</td>
<td></td>
<td>999 9th Street Nw</td>
<td>20001</td>
<td>715,000</td>
<td>✔</td>
</tr>
<tr>
<td>1050505</td>
<td>01-40-0089</td>
<td></td>
<td>1899 L St, NW</td>
<td>20036</td>
<td>159,817</td>
<td>✔</td>
</tr>
<tr>
<td>1066315</td>
<td></td>
<td></td>
<td>900 19th Street NW</td>
<td>20006</td>
<td>108,038</td>
<td>✔</td>
</tr>
<tr>
<td>1069662</td>
<td>0675-0853</td>
<td></td>
<td>999 North Capitol Street, NE</td>
<td>20002</td>
<td>317,251</td>
<td>✔</td>
</tr>
<tr>
<td>1069664</td>
<td>0403-0839</td>
<td></td>
<td>900 Seventh Street NW</td>
<td>20005</td>
<td>339,591</td>
<td>✔</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source 2: Existing Buildings</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM PROPERTY ID</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>5248552</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>1155 16TH ST NW</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>3100 14TH STREET NW</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Discoveries: Cities implementing disclosure ordinances have the most difficulty simply aggregating and managing data they receive from building owners.

Accomplishments:
• Competitive solicitation published and software developer selected
• Intensive user engagement program conducted, with in-depth interviews and focus groups
• SEED v1.0 available both as a hosted service and open-source package

Project Contribution to Energy Efficiency: The purpose of benchmarking and disclosure requirements is to give owners and occupants the information they need to understand their building’s relative energy performance, and help identify opportunities to cut energy waste. SEED makes it easier to implement these laws.
  1. SEED has been carefully designed to meet the needs of these agencies
  2. SEED team is working closely with initial adopters to ensure a good experience in using the software

Awards/Recognition: None
Project Integration: The SEED development team has been in regular contact with potential users to understand their needs and translate that into software requirements.

Partners, Subcontractors, and Collaborators:
• Software developer: Building Energy
• User outreach and engagement: Institute for Market Transformation

Communications:
• monthly conference calls with user community
• in-depth interviews of potential users
• focus groups with potential plug-in developers and API users
Next Steps and Future Plans:

• Provide technical assistance to early users to speed adoption
• Continue development of software to add full feature set in v1.1, expected July 2014
• Support further adoption by new types of users:
  • DOE State Energy Program grantee reporting
  • AIA 2030
  • State of California, other state and local governments
• Ensure SEED is used for any BTO projects that are collecting energy performance data from large groups of buildings
• DOE to continue supporting development if enough market adoption
• Develop business plan to eventually transition SEED to an open-source “SEED Community” that will manage ongoing development
REFERENCE SLIDES
Project Budget:
FY13: $900,000
FY14: $300,000 original contract. $200,000 increase for additional software features to SEED v1 and LBNL oversight and open source management.

Variances: Additional software features were identified through stakeholder interactions. Increase in LBNL oversight and rollout and open source management added to change in scope and cost.

Cost to Date: $499,274 or 35.7% of total $1,400,000 budget

Additional Funding: None

Budget History

<table>
<thead>
<tr>
<th>October 1, 2013– FY2013 (past)</th>
<th>FY2014 (current)</th>
<th>FY2015 – (planned)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOE</td>
<td>Cost-share</td>
<td>DOE</td>
</tr>
<tr>
<td>$900,000</td>
<td>0</td>
<td>$500,000</td>
</tr>
</tbody>
</table>
The project has four tasks, corresponding to four project objectives:
Task 1 Complete development of a production-grade version 1 of SEED and release it to the market.
Task 2 Complete development of a production-grade version 1.2 of SEED and release it to the market.
Task 3 Provide technical support for users and third party developers and assist DOE with promotion.
Task 4 Maintain and support the SEED open-source software project, including the source code repository.