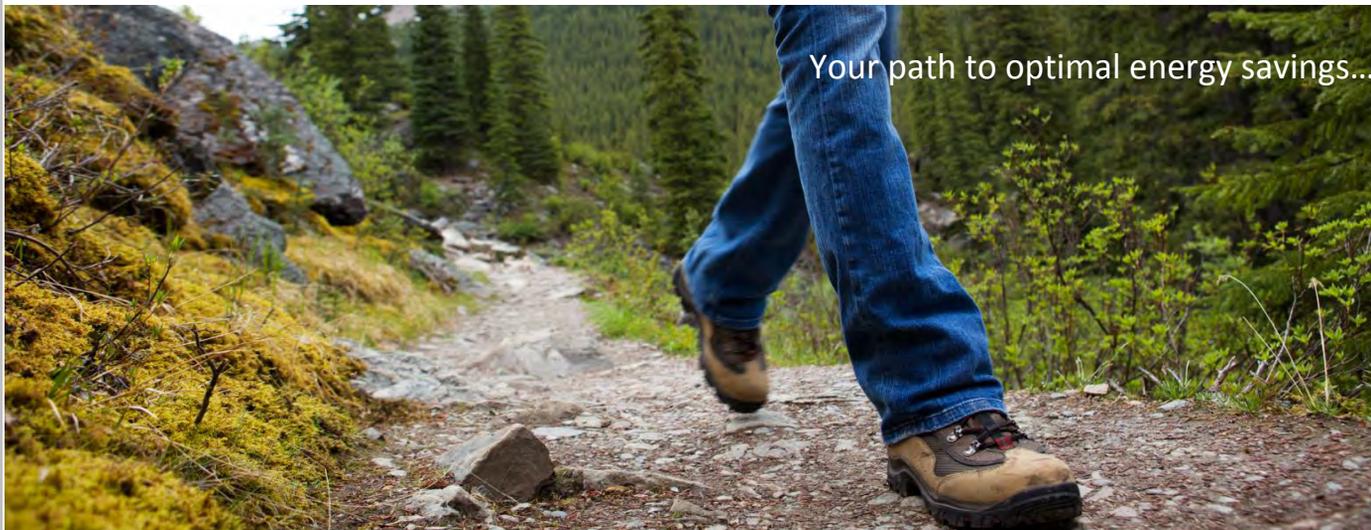


# Retro Commissioning Building Suitcase(RCx)

Energy Saving System for Small Commercial Buildings

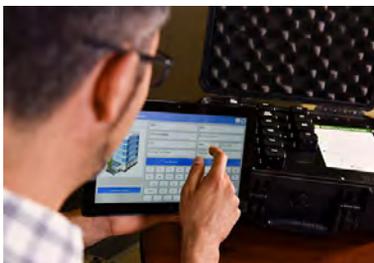


Your path to optimal energy savings...

## TECHNOLOGY DESCRIPTION

The RCx building suitcase provides a turnkey hardware-software solution that offers a degree of simplicity and automation that will enable realization of RCx at scale in small commercial buildings. It consists of five primary components delivered as a single integrated solution:

1. Easy-install battery-powered sensors (air temperature, light, and rooftop unit operating status) with on-board data storage.
2. A suitcase provides a means of transport, storage, charging capability and a communication networking hub.
3. Web-based software is used to configure sensors, document information of sensors installed, and provides installation guidance.
4. Diagnostic algorithms to generate recommendations to improve building operations, utility costs, and energy performance. The algorithms target high-impact problems in lighting and HVAC system operations.
5. A software application with graphical user interface, which automatically analyzes data and outputs building-specific improvement recommendations to the user, along with cost impacts.



## HERE'S HOW IT WORKS

The five-step application process of the sensor suitcase is briefly described here. **Step 1:** A tablet or cellphone is used to individually configure each sensor and install it in the building. **Step 2:** After about 4–6 weeks of collecting data, data is then sent to our cloud based software. **Step 3:** All data is stored on GreenPath's secure servers, ready for analysis. **Step 4:** The .csv sensor data files is used as inputs to the analysis software. **Step 5:** Run the software, and enter the building's utility bill information and occupancy schedule. The software then provides low-cost improvement recommendations and estimated utility costs savings from implementing the recommendations.

The following diagram describes the five components of the solution, categorized by the hardware and software.

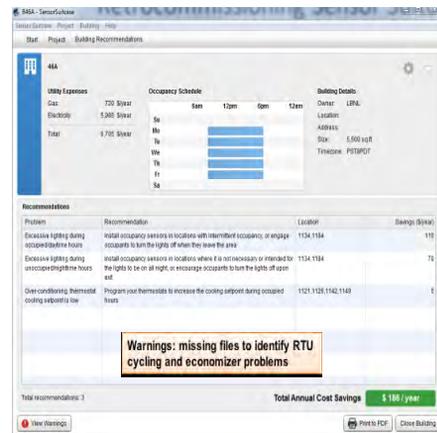


Retro-commissioning Building Suitcase System

# GreenPath's innovative energy savings building software offers a low-cost, low-risk approach to implementing Commissioning (Cx) services in small to medium-sized commercial buildings.

## Analysis Software

Rule-based diagnostic algorithms were developed and embedded in the analysis software to identify savings opportunities and generate recommendations for eight common, high-impact problems in the control and operation of lighting and HVAC systems in small commercial buildings. Implementation of the recommendations decreases energy costs, improves the comfort of occupants, and extends the life of building equipment. The software uses a graphical user interface to simplify user interactions and clearly present the recommendations. For each recommendation, the software provides the annual energy cost saving, an explanation of the existing problem, and a description of the recommended action to alleviate the problem, improve operations, and reduce building operating costs.



## Primary Target Use Buildings

Target application: Hard-to-reach small (50K -100K sf) commercial building (Does not have on-site energy management staff or in-house expertise, buildings served by packaged rooftop units).

**General Applicability: Technology could serve wide set of building systems types and regions:**

1. The algorithms and problems targeted have wide applicability.
2. A few exceptions: Laboratory bldgs.; Low energy use buildings, since the investment would be hard to justify.
3. The top candidates for RCx are those buildings with: A low ENERGY STAR rating or a high energy use index that cannot be explained, or unexplained increases in energy use; Persistent failure of building equipment, control systems, or both; Excessive occupant complaints about temperature, airflow, and comfort.



## RCx Building Suitcase Awards and Grants

- 2020 Federal Laboratory Consortium (FLC) Award for Excellence in Technology Transfer
- 2020 DOE Technology Commercialization Fund Grant - (funding is used to make enhancements and modifications in RCx unit that were identified during pilot testing)
- Lawrence Berkeley National Laboratory Director's Award for Exceptional Achievement - Tech Transfer in 2017
- E-Source's one of the top 22 technologies in 2014

To learn more about how you can save money and increase your asset values, please contact our account representatives today at [sgraham@greenpathes.com](mailto:sgraham@greenpathes.com).

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