

## IDEA

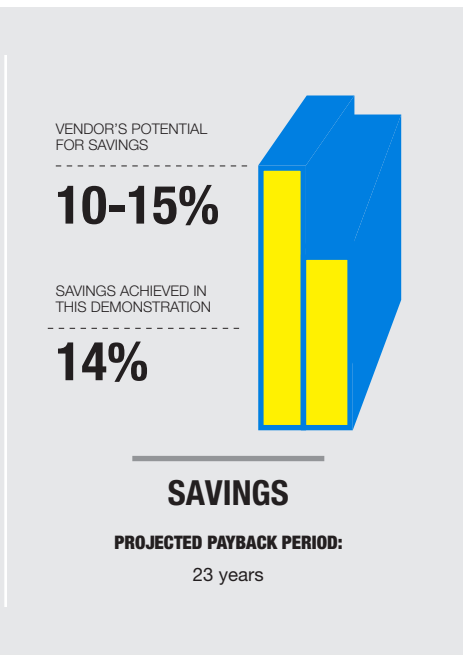
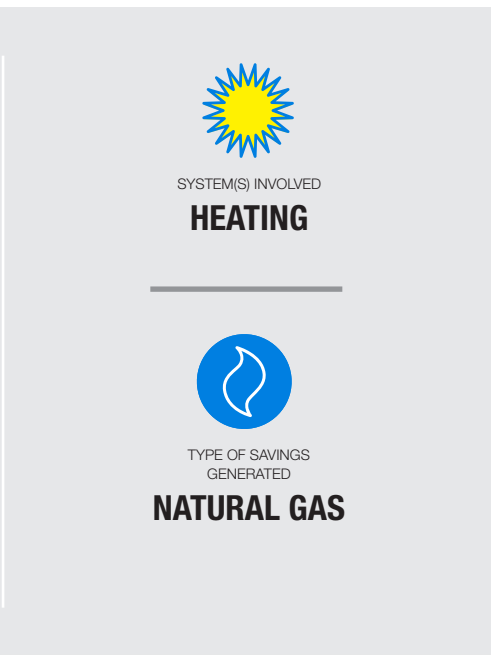
## PHASE 3 TECHNOLOGY DEMONSTRATION HIGHLIGHT

**COMPANY**  
Spartan Peripheral Devices

**TECHNOLOGY**  
Control Valves and Wireless Thermostats

**DEMONSTRATION SITE(S)**  
Williamsburg Public Library, 240 Division Ave., Brooklyn, NY 11211

**DEMONSTRATION PERIOD**  
October 2017 to October 2018



### Technology Description

Spartan Peripheral Devices and Leonard Powers, Inc. replaced sixty-six (66) thermostatic valves in the hydronic heating system at the Williamsburg Public Library. The new valves used flat on/off plungers and temperature sensing heads with Spartan control valve bodies with inline replaceable cartridges. They were integrated with wireless control valve actuators and wireless room sensors which allowed building operators to divide the library into separate zones with adjustable setpoints for maximum occupant comfort. The devices use the lighting in the space as an energy source, and can be installed and relocated if required as well as adapted for facilities with new or upgraded mechanical systems.

In addition to improving control, the new valves were sized for appropriate flow coefficient values for improved proportional control. Spartan also installed a new outdoor reset system to control the boiler water temperature in relation to outdoor air temperature (OAT) and to provide night setback capability.

### Optimal Facility Characteristics

- Facilities with low pressure steam or hot water heating system with individual radiators.
- Municipal buildings with various independent heating zones.
- Facilities with existing pneumatic thermostat system.

- Facilities with daylight spaces where thermostats can be installed to take advantage of their energy harvesting benefits.
- Facilities that plan to improve their building automation system (BAS).
- Facilities where thermostatic radiator valves (TRVs) have been installed on radiators and still have undesired temperature swings between spaces.
- Facilities where radiators are enclosed and a conventional TRV does not sense the space temperature.
- Facilities requiring zoning or re-zoning.
- Facilities requiring replacement of discontinued control valves

### Demonstration Results & Discussion

- Spartan found a 19% savings based on a degree day analysis of monthly gas bills.
- A much higher level of comfort and control was achieved based on Library staff feedback.
- CUNY Building Performance Lab (BPL) regressed whole-facility monthly gas consumption against monthly average OAT for the pre- and post-retrofit periods and created an adjusted baseline model to calculate estimated savings. BPL found that there was an annual 14% adjusted gas savings with a 38% savings uncertainty, at a 90% confidence interval, between the pre- and post-retrofit periods.

### Recommendations for Implementation

- Install thermostatic sensors according to manufacturer's recommendations in locations that have some available daylight to properly power the thermostat. (They have up to 200 hours operation capacity in complete darkness.)
- Thermostats must be paired to actuators, which is simplified if the thermostat and actuator are both in an open space. Thermostat placement should not exceed manufacturer's recommendations for distance and signal strength.
- Locate thermostats so that they are reading a reasonably average temperature in the space.