SHOWCASE PROJECT: PORTLAND PUBLIC SCHOOLS: MARYSVILLE ELEMENTARY SCHOOL

SOLUTION OVERVIEW

Marysville Elementary School is located in the Foster-Powell neighborhood of Southeast Portland, Oregon, serving students in grades K-8. Originally built in 1921, Marysville has since gone through many retrofits and additions. As a result of this upgrade to the HVAC, controls, and lighting systems, the district expects to realize an annual energy savings of 48 percent and annual cost savings of $22,000 (42 percent).

Portland Public School (PPS) owns and operates 90 schools serving over 48,000 students. Marysville Elementary is part of a larger energy savings performance contracting (ESPC) project, under which 13 schools underwent energy audits targeting lighting, direct digital controls (DDC), and HVAC systems. The school suffered extensive temperature discrepancies, as it was being controlled by two different DDC systems with some pneumatic components; classroom temperatures could vary between 58 and 80 degrees.

SECTOR TYPE

Education

LOCATION

Portland, Oregon

PROJECT SIZE

53,490 Square Feet

FINANCIAL OVERVIEW

$640,540

SOLUTIONS

Portland Public Schools conducted a thorough audit of the facility, which revealed a number of inefficiencies, including HVAC controls issues, poor interior and exterior lighting efficiency and quality, and steam trap failures of 45 percent.

As a result of the audit, PPS implemented a number of energy conservation measures (ECMs) to reduce consumption and improve reliability of the building's systems. The chart below outlines the

individual savings measures and associated costs, utility incentives from the Energy Trust of Oregon, estimated annual cost savings, and details regarding the upgrades.

Savings Measure	Cost*	Energy Trust Utility Incentives	Savings Estimates	Notes
HVAC Controls upgrade from pneumatics to DDC energy management system	$396,290	$62,105	$15,796	• Includes replacement of the steam vacuum condensate pumps and tank as well as corrections to problems with the new unit ventilators.
Steam trap repair/replacement	$68,827	$10,000	$3,219	• Individual audits/tests conducted on 89 steam traps, which were rebuilt/replaced as needed.
Interior LED lighting retrofit	$49,570	$5,225 (includes exterior lighting)	$2,459	• Nearly 20,000 W saved with interior lighting consumption reduced from 37,645 W to 17,989 W • To make retrofit more cost-effective, PPS reused fixtures when possible, replacing fluorescent lamps with LED.
Exterior LED lighting retrofit	$7,331	See above	$224**	• Exterior lighting consumption cut by more than half, reduced from 987 W to 408 W.

*Additional project costs for construction management fees, commissioning, and overhead were incurred in excess of these measures.

**This measure was bundled together with other ECMs to shorten the payback period.

OTHER BENEFITS

PPS anticipates large maintenance savings upon project completion. The modernized DDC system will enable staff to monitor HVAC schedules and equipment remotely, ensuring smoother and more efficient operation of the school while also reducing the need for repairs. The LED lighting upgrade will improve light quality to optimize the learning environment and reduce the need to replace lamps throughout the facility. The steam trap replacement project enabled the district to compile a detailed

equipment inventory and obtain updated mechanical drawings.

Annual Energy Use
(Source EUI)

Baseline(2016)
92 kBtu/sq. ft.

Expected(2019)
48 kBtu/sq. ft.

Actual(2019)
Coming Soon

Energy Savings
48%

Annual Energy Cost

Baseline(2016)
$52,000

Expected(2019)
$30,000

Actual(2019)
Coming Soon

Cost Savings
$22,000

Marysville Elementary School