

# Moderate Renovation for Affordable Suburban Living

## PERFORMANCE OUTCOMES:

**\$20,400**

ANNUAL ELECTRIC  
COST SAVINGS

**\$13,400**

ANNUAL NATURAL GAS  
COST SAVINGS

SIENNA GREEN I, NONPROFIT APARTMENT BUILDING, ROSEVILLE, MINNESOTA

## PROJECT SUMMARY

### HVAC

- ★ Condensing gas boilers (95% efficiency)
- ★ High-efficiency common area heating (90% AFUE)
- ★ ENERGY STAR® wall air conditioning units (9.4 EER)
- ★ ENERGY STAR® bath exhaust, 2-speed fans

### ENVELOPE

- ★ R-40 roof assembly with a white membrane
- ★ Building air sealing
- ★ Fiberglass framed double pane low E with argon windows (U-0.3)

### LIGHTING & APPLIANCES

- ★ CFL unit and common area lighting
- ★ ENERGY STAR® refrigerators

### DOMESTIC HOT WATER

- ★ High-efficiency domestic hot water

Aeon's Sienna Green I Apartments is a 120-unit, moderate renovation project of a 1965, five-building apartment complex in suburban Saint Paul. Formerly known as the Har Mar Apartments, the development provides rents affordable for households earning 50 percent of the area median income (AMI), and has 17 units without income restrictions. The project also includes six units designated for individuals transitioning out of homelessness earning 30 percent or less of the AMI. The renovation was the first phase of a project that included construction of a 50-unit apartment building consisting of one- two- and three-bedroom apartments to serve area families

Sienna Green I Apartments were in need of significant upgrading. The project undertook replacement of all major mechanical systems, and improved the building envelope. The project team took on the challenge of maximizing the investment with pre-design assistance from the Center for Energy and Environment and Xcel's Energy Design Assistance program. The project included improvements to the envelope, mechanical, and plumbing.

### SOLUTIONS

Due to the poor condition of the existing mechanical systems, their replacement was a forgone conclusion. Thus decision making focused on finding additional incremental energy and cost savings above code minimums. The existing boilers were original to the buildings. The buildings were overheated due to multiple controls and thermostats. New 95 percent efficient condensing gas boilers now feed the

*“...preserving and investing in existing buildings is a key part of sustainability.”*

— James Lehnhoff,  
Aeon, Vice President  
of Housing Development

**PROJECT OVERVIEW**

- DEVELOPER/OWNER** Aeon
- UNITS** 120 **BUILDINGS** 5
- YEAR OF CONSTRUCTION** 1965
- YEAR OF RENOVATIONS** 2010
- UTILITY PROVIDER** Xcel Energy
- ELECTRICITY/GAS** Master-metered
- HEATING** Hot water boiler
- COOLING** Through-wall A/C units
- UTILITY PAYMENT STRUCTURE**  
Owner-paid heat and hot water

baseboard radiators controlled in the units by thermostats. They provided the largest portion of total cost savings with an estimated payback of 15 years without incentives. New ENERGY STAR® wall air conditioning units (EER 9.4) and sleeves were also installed.

The new domestic hot water heaters run at more than 92 percent efficiency and replace heaters of various ages and efficiencies. The incremental cost of improving the efficiency from a code based 80 percent to high efficiency was \$6,430. The resulting annual energy cost savings of \$1,864 produces a payback of 3.4 years.

**BENEFITS**

Sienna Green I received an incentive for energy-efficient construction for the improvements made to the building shell, which improved resident comfort in addition to providing energy and cost savings. Measures included insulation upgrades and window replacement of the original single-pane windows, which had failed.

The lighting retrofit included indoor and outdoor common areas, and the installation of new ENERGY STAR®

fixtures and of CFLs in the remaining fixtures in the units. The lighting upgrades not only reduced energy costs with short paybacks of a few months to a year, but also improved the quality of light in the units and across the development.

**BACKGROUND**

Aeon’s Sienna Green I was a sustainable development pilot project. In addition to producing energy and cost savings, the renovation significantly improved the quality of the indoor environment. The project transformed existing, sprawling parking lots into a vibrant apartment community surrounded by green spaces laced with rain gardens and a new play area.



PROJECT SUMMARY	INCREMENTAL ENERGY IMPROVEMENT COST	REBATE	ANNUAL COST SAVINGS	ANNUAL ENERGY SAVINGS
HIGH-EFFICIENCY BOILER	\$76,045	\$4,676	\$5,082	466,200 kBtu
>92% EFFICIENT WATER HEATER	\$6,430	\$872	\$1,864	171,000 kBtu
<b>PROJECT TOTALS</b>	<b>\$82,475</b>	<b>\$5,548</b>	<b>\$6,946</b>	<b>637,200 kBtu</b>

Rebate, energy, and cost savings reported by Xcel Energy Design Assistance program

For more information and ways to act, visit: <http://www.mnshi.umn.edu/program/EE4A>

To learn more about the importance of choosing healthy, non-toxic building materials for energy efficiency retrofits, visit: <http://www.bgadata.org/EEHousingProducts/about/about-database>

