

Marycrest Assisted Living

Ensuring Resident Comfort



DENVER
City Energy Project
A program of the City & County of Denver

Marycrest Assisted Living was built by the Sisters of St. Francis in 1989, and its buildings were inefficient from the beginning. Lightly Treading, Inc. was hired to perform an ASHRAE Level 2 energy audit on the buildings. A leaky building envelope lost conditioned air out of the building, bypasses from each floor leaked into the vented attic, and much of the ductwork was poorly connected with tape instead of screws. Once the building management team became aware of the energy efficiency opportunities in the buildings, they made a concerted effort to measure, analyze, and remedy building energy inefficiencies. A combination of operational and physical improvements to the building system has reduced their annual energy usage by 23%, saving over \$31,000 per year between the two buildings.



Marycrest houses 161 residents in the 55,000 sf. Serenity building and the 28,000 sf. Harmony building. In 2011, the current owner and operator of the facility, the Health Dimensions Group, spent over \$145,000/year on energy bills for both buildings. The average 2011 energy costs per Denver resident living in detached homes was \$475, and Marycrest was spending over \$900 per resident. Detached homes are generally less efficient than multiunit buildings, and Marycrest’s deviation from this rule suggested high levels of energy waste. Despite (or because of) their high energy usage, the heating and cooling systems often resulted in hot and cold spots, prompting regular complaints of temperature related discomfort.

Analysis

In late 2011, the Health Dimensions Group took action to manage their exorbitant energy bills and residents discomfort by hiring Lightly Treading, a local team of building performance professionals. This team was tasked with identifying, prioritizing, and implementing cost effective energy efficiency upgrades through a Building Performance Analysis.

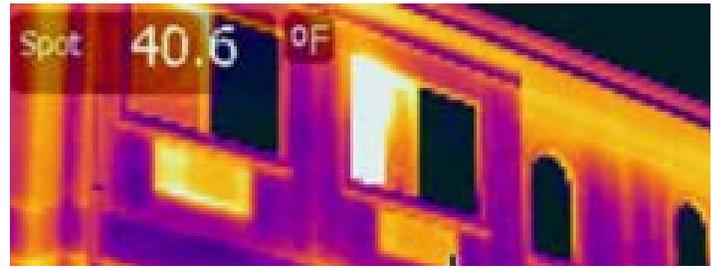
Building System	Strategy
Envelope	Blown in ceiling insulation
	Tinting and glazing on 60% of the building’s windows
HVAC	Replacement of rooftop air conditioning units
	Reconnection of air conditioning ductwork
	Repairs to attic by-passes
Lighting	Replacement of incandescent lighting with LED’s and CFL’s
Monitoring	Real time monitoring system to track and manage building performance
Kitchen	Replacement of hot water commercial dishwasher with chemical sterilization

A Building Performance Analysis (BPA) assesses a building's envelope (insulation, air-leakage, windows, doors), heating, cooling, ventilation, and lighting systems through manual testing and computer modeling. Marycrest's BPA was performed in early 2012, and found many opportunities for cost effective energy efficiency improvements, including:

- Insulation and air-leakage issues
- Heating and cooling systems operating in competition with one another
- Ductwork from the rooftop units leaking enough air-conditioned air into the attics that they were unintentionally being cooled by more than 30 degrees.
- Windows allowed too much heat in during summer and too much out in winter.
- Lighting was that was overused and inefficient

Prioritization

As part of the BPA, the building performance team's computer modeling estimated the cost and savings from reduced energy bills to arrive at an estimated return on investment (ROI) for each potential upgrade. For many upgrades, the return on investment was already attractive, but the entire package of options was made more financially attractive by the inclusion of grants and rebates available for energy efficiency improvements. Marycrest's status as a not for profit housing and care facility qualified it for a grant through the Colorado Division of Housing, defraying upfront costs.



Implementation and Results

The upgrades were completed by Lightly Treading in October of 2012, and have resulted in decreased temperature related resident complaints, and an estimated 400,000 kWh reduced annual consumption, at annual savings of \$32,000. The Serenity building improved from a Portfolio Manager score of 21 to 45, and the Harmony building score went from 26 to 49. The payback was 9.7 years on energy savings alone, but the actual payback will be quicker given the significant staff time that has shifted from responding to temperature related complaints to providing other resident services.

Next Steps

The building managers will monitor the buildings energy usage and energy related systems through the Building Automation System, and to update their account in Portfolio Manager. Operational changes and continued building system upgrades will help them achieve their goal of improving the Portfolio Manger score by 5% each year.

This case study is an abbreviated version of an original article published in Colorado Assisted Living and later in Senior Living Times written by Lightly Treading's Principal, Paul Kriescher.

Total Project Cost (post rebate)	Energy Savings (\$/yr)	Estimated Payback (yrs.)
189,000	19,570	9.7 (does not include savings from reduced staff time spent dealing with resident comfort complaints)

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