

Utilizing Student Preferences to Improve Payback Periods for Energy Efficiency Upgrades to Apartment Renovations

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This study investigated the energy and water efficiency, sustainability, and clean energy upgrades that would be financially feasible for existing student-targeted rental properties that were not built to current sustainability standards or energy codes. Typically, student apartments are constructed at least cost with little regard for resource efficiency or sustainability. However, providing resource efficient rental properties to students may provide financial advantages to apartment owners. In a recent survey, 77% of students indicated that they were “concerned” or “very concerned” with environmental issues. Providing more sustainable apartments and marketing property as “green” or “eco-friendly” could differentiate those units from the rest of the market and thereby appeal to environmentally aware students. Furthermore, energy and water efficiency upgrades would reduce utility bills, thereby providing annual savings.

The research was designed to ascertain: (a) whether college students are willing to pay more rent in order to live in an environmentally friendly apartment, and (b) which environmental/efficiency upgrades would be economically viable for owners. The study was performed in the following three step sequence. First, a survey was distributed electronically to 16,611 upper-level students of Illinois State University (population) to determine their level of interest in a variety of efficiency measures and to estimate their willingness to pay for sustainability upgrades. Useable responses were received from 548 students, for a response rate of about 3.3%. The survey was pilot tested for face validity with a group of 27 students in the renewable energy major. Second, energy and water usage data for a local apartment building was acquired and analyzed to provide a cost baseline. Third, the energy and water usage reductions from a variety of efficiency upgrades were compared to the initial costs to calculate a payback period and net present value.

The findings indicated that a majority of respondents would be willing to accept a rental increase of 22-33% for a package of sustainability upgrades. Interestingly, four of the 13 upgrades had a payback of less than three years with no rental increase (CFL lighting, water heater insulation, programmable thermostats, and low-flow water fixtures). With a “green” rental increase of 11%, nine of the 13 upgrades had a payback period of less than two years.

The sustainability upgrades were packaged into two recommended scenarios predicated upon payback periods and whose personnel performed the work. The first scenario included a bundle of efficiency upgrades that could be completed by maintenance personnel for a nearly 20% reduction in combined water and electricity bills and a payback period of approximately six years. This scenario provides a reasonable rate of return on upgrade investment without requiring a lengthy and expensive building renovation; however, students are unlikely to pay more rent for apartments so renovated. The second scenario was premised on a rental increase of up to 33% and would require a major building renovation that incorporated a variety of efficiency measures with payback periods ranging from seven and 13 years. This scenario would require a large initial investment but would provide more substantial “green” marketing value and increased rent revenues over time.

Key Words: Energy efficiency, Sustainability, Payback, Remodeling, Survey research