

Waste, Water, and Energy Benchmarking and Conservation Opportunities for Minnesota Hotels



Introduction

- Provided **32** site visits and **1** intern to hotel properties in Minnesota.
- Identified opportunities for **waste** and **water reduction** and **energy efficiency**.
- Analyzed **27** properties' utility bill data to generate **average resource use footprints** and **benchmarks**.
- Obtained additional original data through collection of **nameplate** information, **surveys** completed by hotel managers, and by **visual inspection** during site visits and internship.
- Focused primarily on **low-cost opportunities** for resource conservation.
- Explored a handful of larger **capital investment projects** that, if implemented, would bring more significant resource and cost savings.

Results

Potential Savings Identified:

- **268,800** pounds solid waste
- **9.8 million** gallons water
- **7.2 million** kWh electric energy
- **702,100** therms natural gas energy
- Representing a combined cost savings to our clients of **\$1 million**

Savings Implemented to Date:

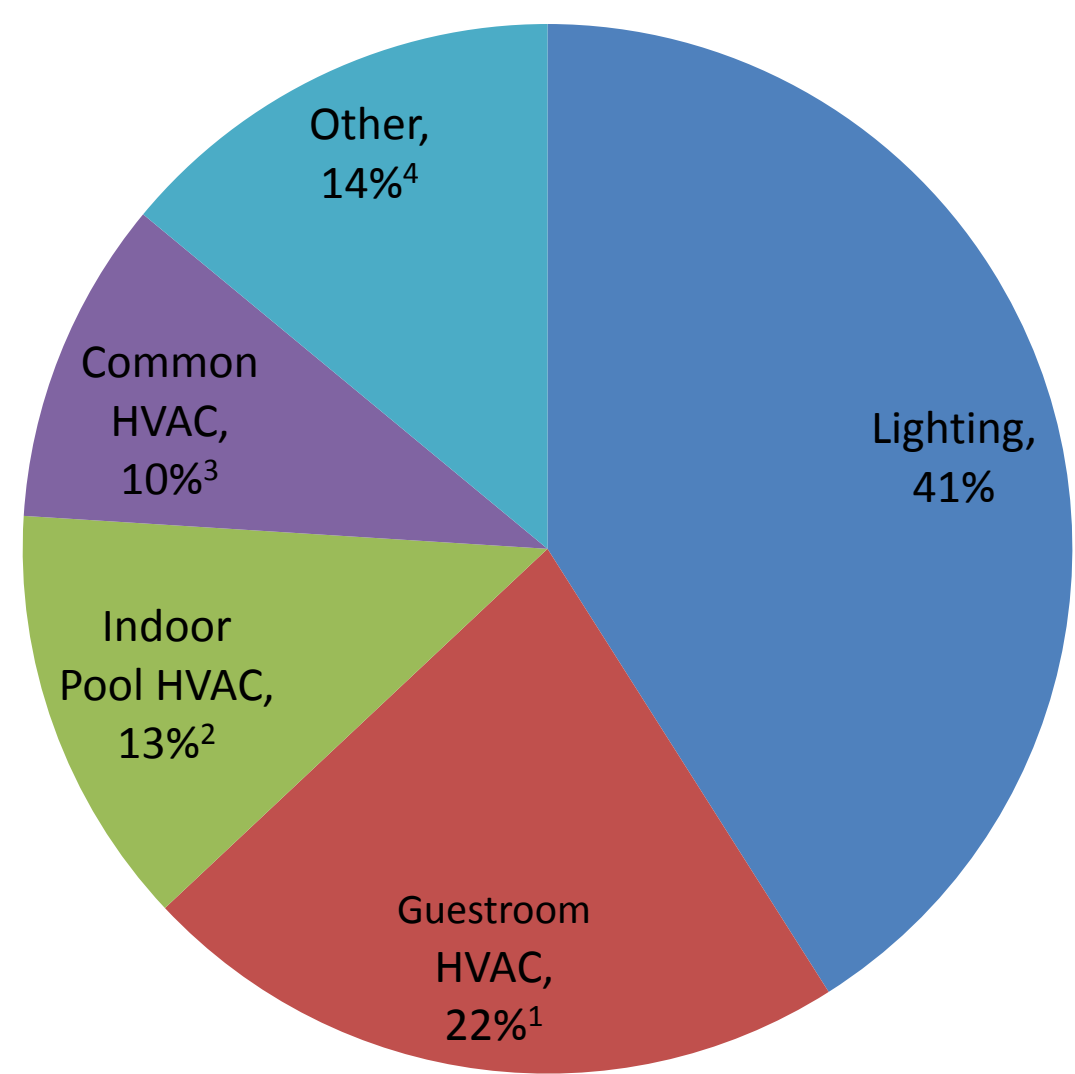
- **10,000** pounds solid waste
- **539,200** kWh electric energy
- **215,000** therms natural gas energy
- Representing a combined cost savings to our clients of **\$132,700**

Scope

- Properties ranged from **40 to 400** guestrooms; average **98**.
- **27** properties provided **two years** of historical utility consumption data used to generate the water and energy use footprints and benchmarks.
- **1** waste sort was conducted to estimate solid waste makeup.
- The annual resource benchmarks are normalized by dividing the resource total by the number of rooms and average occupancy rate to allow meaningful comparisons of relative resource efficiency across the properties analyzed.

Electricity

Average Electricity Use Footprint



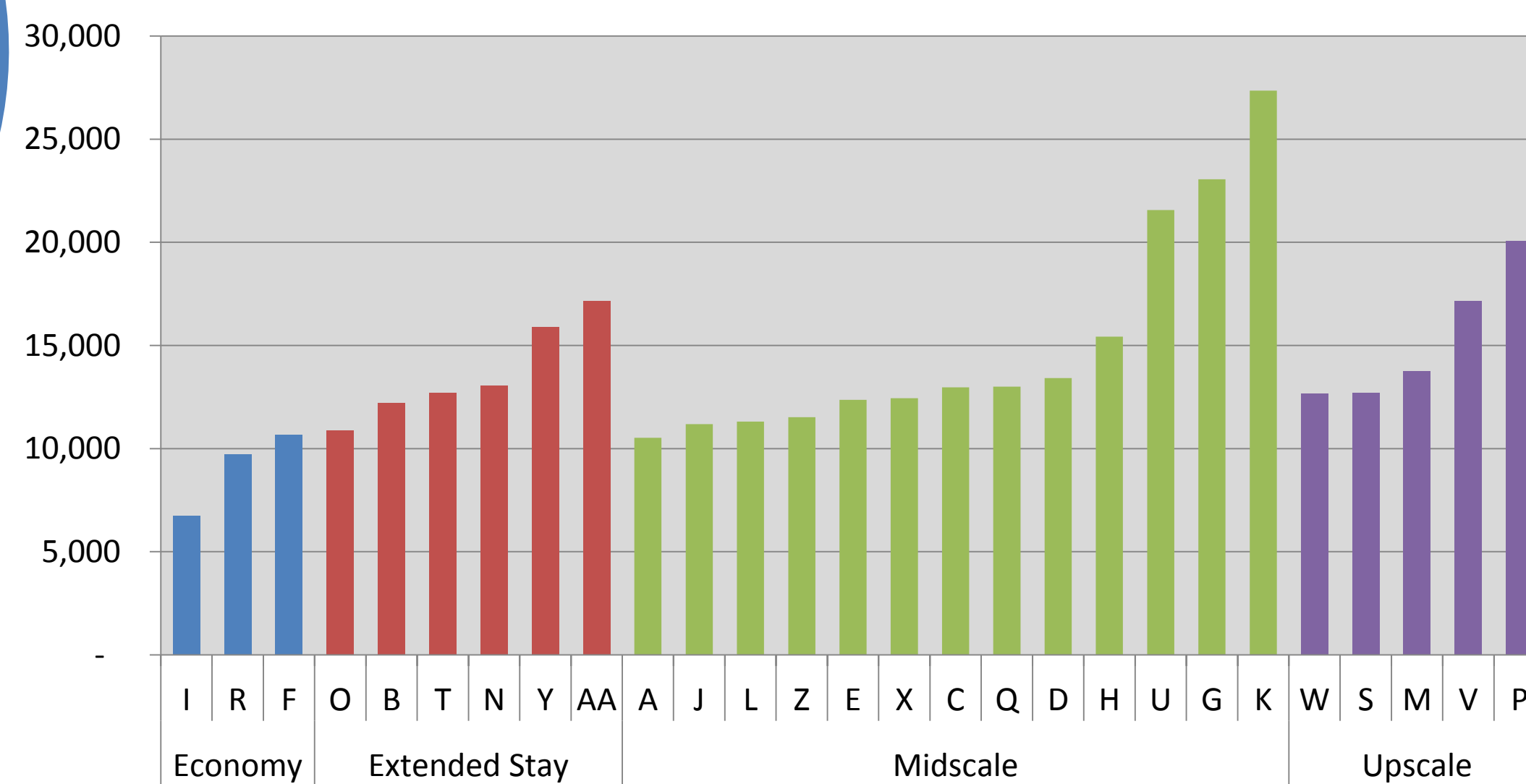
¹All properties used in-guestroom packaged terminal air conditioners (PTACs) with electric resistance heating.
²Amount of electricity used by dehumidification and space cooling in indoor pool areas.
³Space cooling and ventilation in all other areas other than guestrooms and pool area.
⁴Includes all other uses of electricity, for example, plug loads for guestroom amenities, business center computers, exercise equipment, laundry systems, etc.

Electricity Conservation Opportunities – Average per Property

Recommendation	Annual Energy Savings (kWh)	Annual Cost Savings	Implem. Cost	Payback Period
Replace incandescent lighting with CFLs or LEDs	38,000	\$2,700	\$1,500	7 mo.
Install occupancy-sensor power management on vending machines	4,900	\$430	\$560	16 mo.
Use pool covers to reduce indoor pool cooling and dehumidification	86,000	\$6,900	\$16,300	16 mo. ⁵
Install occupancy-sensor power management on guestroom HVAC	112,000	\$9,000	\$28,900	39 mo.

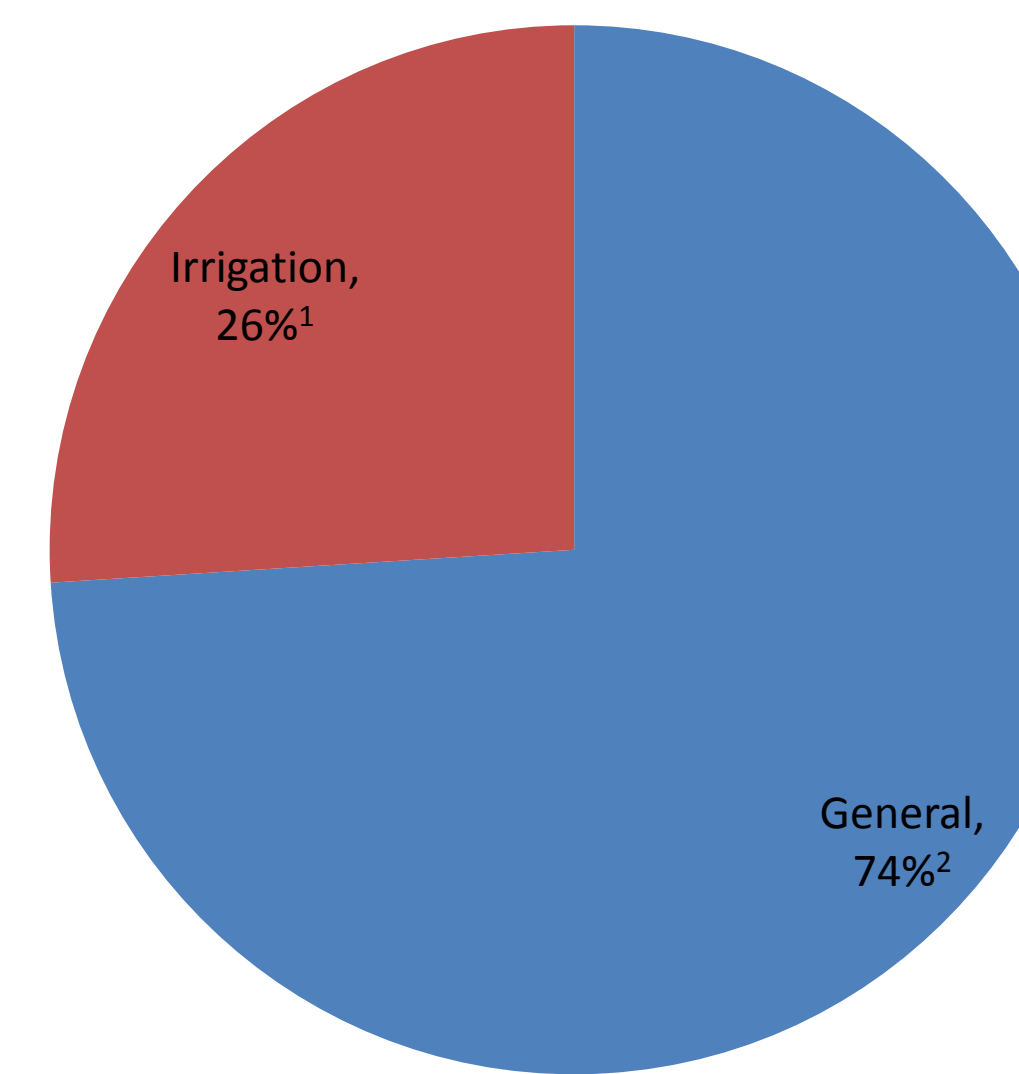
⁵Payback period reflects natural gas savings in addition to electric savings.

Annual Electric Use Benchmarks, by Market Segment [kWh/(year * % occupancy * # rooms)]



Water

Average Water Use Footprint

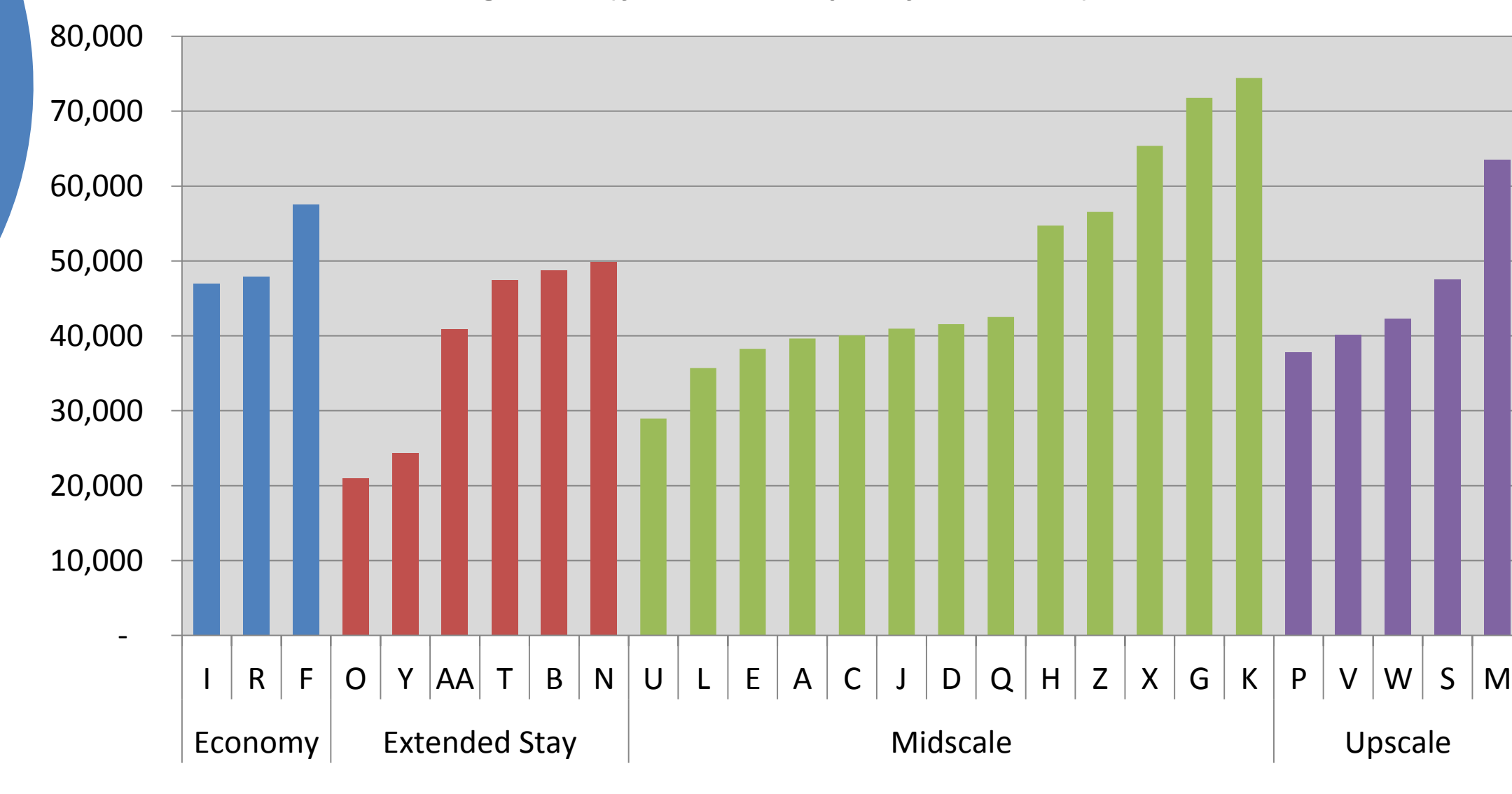


¹Irrigation sub-meter data not available at all properties.
²Due to lack of additional sub-meter data or methods to estimate other water use categories, "General" includes all water use other than for irrigation.

Water Conservation Opportunities – Average per Property

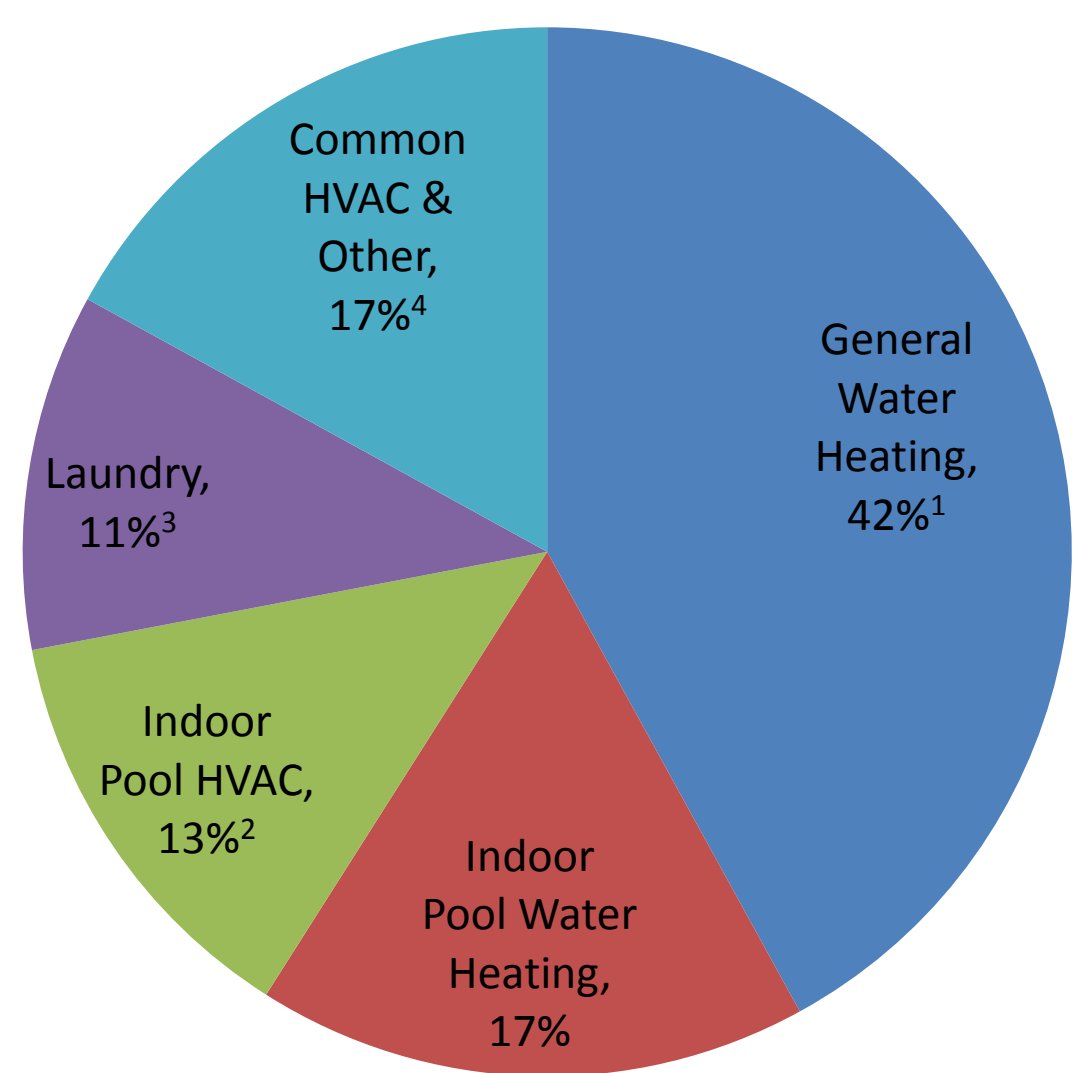
Recommendation	Annual Water Savings (gal)	Annual Cost Savings	Implementation Cost	Payback Period
Install low-flow faucet aerators (reduction of 0.5 GPM)	38,500	\$59	\$46	9 mo.
Install low-flow shower heads (reduction of 0.5 GPM)	109,400	\$220	\$770	42 mo.
Install low-flow toilets	254,800	\$510	varies	N/A

Annual Water Use Benchmarks, by Market Segment [gallons/(year * % occupancy * # rooms)]



Natural Gas

Average Natural Gas Use Footprint



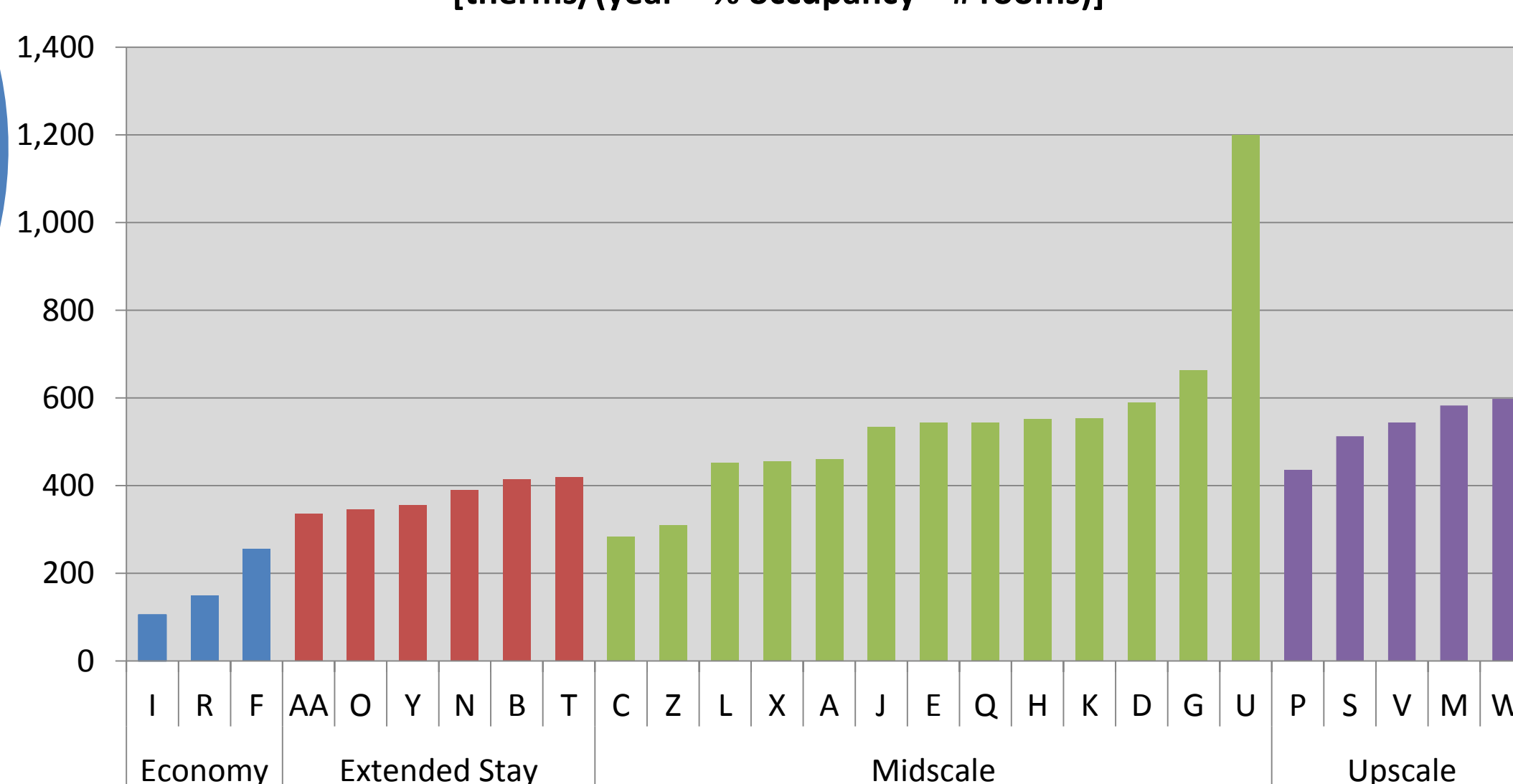
¹Includes water heating for guestrooms and laundry washing machines.
²Space heating, ventilation, and air makeup in indoor pool areas.
³Natural gas used in laundry drying machines.
⁴Includes space heating, ventilation, and air makeup in hotel common areas and all other unidentified uses of natural gas.

Natural Gas Conservation Opportunities – Average per Property

Recommendation	Annual Energy Savings (therms)	Annual Cost Savings	Implementation Cost	Payback Period
Reduce laundry dryer run time by 5 minutes	5,200	\$4,200	\$0	Immed.
Use pool covers to reduce indoor pool heating load	7,000	\$5,600	\$16,300	16 mo. ⁵

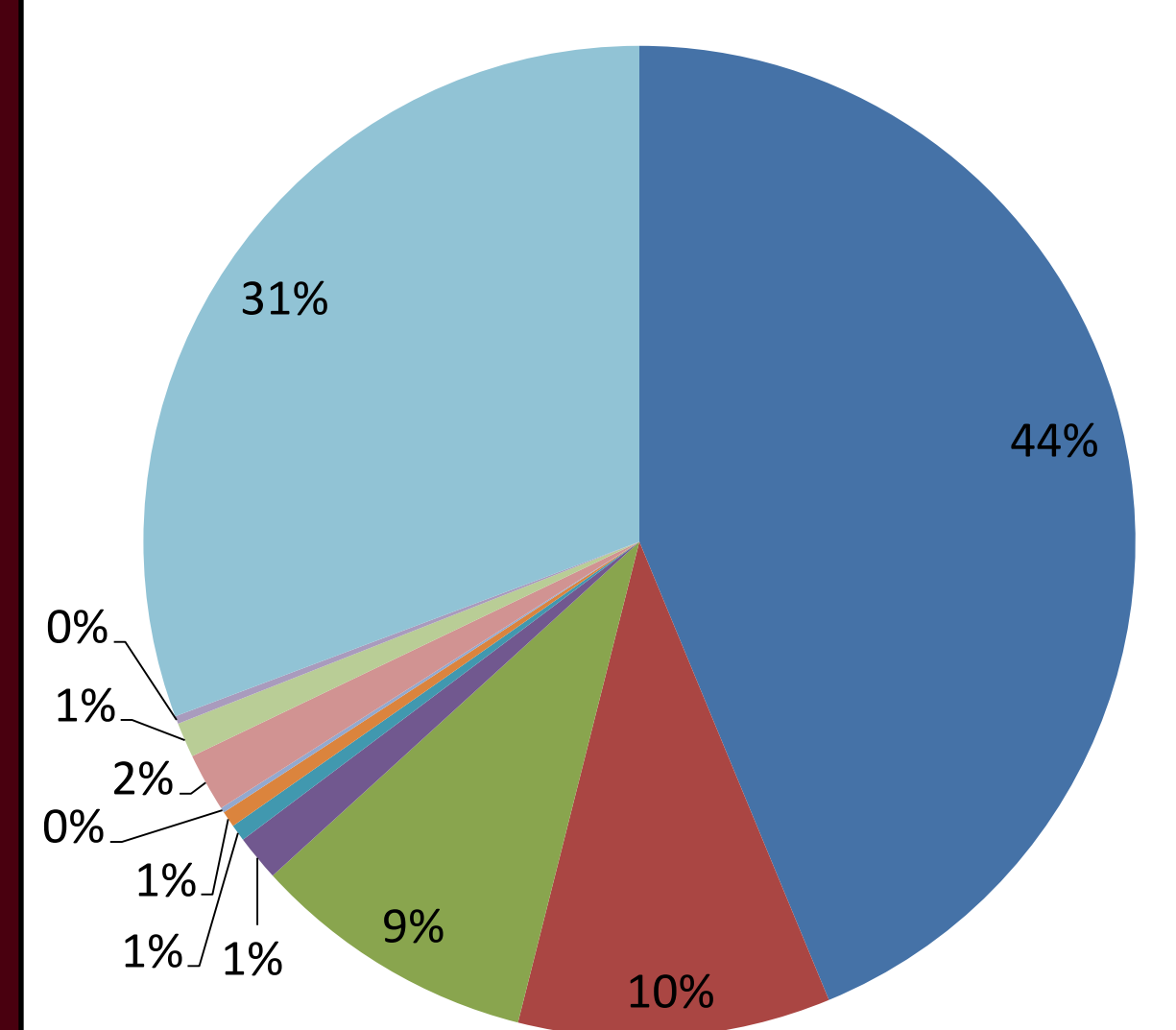
⁵Payback period reflects electricity savings in addition to natural gas savings.

Annual Natural Gas Use Benchmarks, by Market Segment [therms/(year * % occupancy * # rooms)]



Solid Waste

Waste Sort Results¹



¹Waste sort conducted at one hotel property only; unlike energy and water use footprints these results are not meant to represent averages.

Solid Waste Conservation Opportunities – Average per Property

Recommendation	Annual Solid Waste Savings (lbs)	Annual Cost Savings	Implementation Cost	Payback Period
Replace disposable amenity bottles with bulk dispensers	3,900	\$3,200	\$2,500	9 mo.

Additional Opportunities Observed:

- Start an in-house or externally managed organics collection program to reduce the amount of food waste.
- Start in-room recycling collection program to reduce the amount of recyclable materials going to waste. Estimated to divert an average of 34,000 lbs. annually from landfills, per property.

Historical Solid Waste Data Unavailable, Solid Waste Benchmarks Not Generated