Anything They Can Do We Can Do Better: Examining Major Retailers' Pricing Trends to Optimize an Efficiency Marketplace

New products enter the market daily and traditional evaluation methods cannot account for the rapidly changing options available to consumers. Webscraping is an innovative and inexpensive tool that can be used to provide frequent updates on pricing, features, and regional availability of appliances and other products of interest to program administrators. This tool can be used to monitor price changes for products in existing programs and to collect data in advance of planning for future programs or other market interventions. Utilizing webscraping in place of manual data collection procedures cuts time and resources by 75%; for other applications, it expands the scope and efficiency of a project beyond what is feasible through traditional collection methods.

The authors harnessed this tool for a Northeastern utility, which provides an online marketplace for its customers where they can purchase energy-saving products or claim rebates offered for a variety of products covered by their programs. This utility periodically surveys the market to collect pricing information on these products. The authors identified online retailers that also sold products available on the marketplace and automated the data collection, providing price updates more frequently and efficiently than prior manual efforts. In this case, the authors confirmed the stated retail price on most products in the utility's marketplace catalog is similar to the average price at other retailers, affording a measure of confidence that the online platform was offering products at competitive prices.

The authors also utilized webscraping to collect data on pricing and features from six product categories at two major home improvement retailers. Because these major retailers offer location-specific services to their customers, notifying them of in-store sales and availability, the authors collected product data from retailer locations within the utility's service area. The authors analyzed trends in pricing and features, which revealed some notable findings, explored in this poster.

Webscraping enabled the authors to collect all product data to see which features were most influential in predicting price; a traditional data collection approach would limit the number of variables to be considered for analysis. This project demonstrates that webscraping is a useful "big data" application that can be leveraged for projects, including questions about program design at the local level.

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Examining Major Retailers' Pricing Trends to Optimize an Efficiency Marketplace

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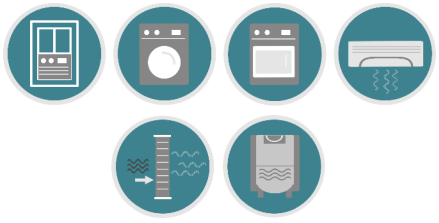
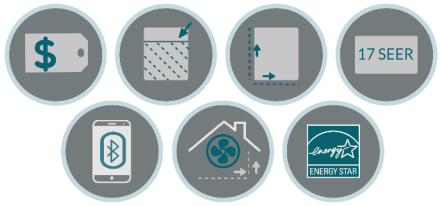
Methodology

We used web-scraping tools to gather data on pricing, product availability, and features from two home improvement retailers. To gather the most relevant data, the store locator was set to upstate New York.



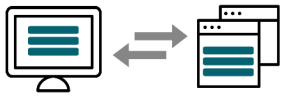
Product categories included air conditioners (window, room, and portable), washers, dryers, ductless mini-splits, air purifiers, and dehumidifiers.

Product Features



The scraper collects data on all available product features, including price, capacity, dimensions, energy efficiency, "smart" features, coverage, and more.

To verify ENERGY STAR status, we downloaded data on qualified products from energystar.gov and matched across datasets.



For programs that rely on incentives to encourage customers to adopt energy-efficient products, it is critical that eligible ENERGY STAR products are correctly labelled.

Compared to manual data collection, webscraping reduces time and resources by 75%

New products enter the market daily. Webscraping can be used to monitor price changes and collect data for program planning.

ENERGY STAR-Qualifying Products

Comparison of average price and selected features by ENERGY STAR status

		ENERGY STAR	Non-ENERGY STAR-qualified products
Top-Loading Washer	Mean Price: Mean Capacity:	$869* 15.4 cubic ft*	$515 10.7 cubic ft
Electric Dryer	Mean Price: Mean Capacity:	$980* 7.3 cubic ft*	$690 5.9 cubic ft
Natural Gas Dryer	Mean Price: Mean Capacity:	$1,030* 7.6 cubic ft	$876 7.5 cubic ft
Air Cleaner	Mean Price: Mean Coverage:	$377 512 square ft	$346 559 square ft
Dehumidifier	Mean Price: Mean Pints Per Day:	$233 55.4 pints	$209 49.2 pints
Window Air Conditioner	Mean Price: Mean Coverage:	$369 600 square ft	$400 537 square ft
Through-the-Wall A/C	Mean Price: Mean Coverage:	$507* 466 square ft*	$808 522 square ft
Ductless Mini-Split	Mean Price: Mean Coverage:	$1,684* 790 square ft*	$1,886 1,094 square ft
Front-Loading Washer	Mean Price: Mean Capacity:	CEE Tier II[1] $1,104* 4.3 cubic ft	CEE Tier I $898 3.8 cubic ft

[1] Nearly all front-loading washers qualify as ENERGY STAR, so comparisons are between CEE Tiers.
* Indicates value is significantly different from non-ENERGY STAR-qualified at the 90% confidence level.

Marketplace Products

NMR compared products available on the National Grid Marketplace to other retailers where customers might shop for similar energy-saving products.

nationalgrid | MARKETPLACE

National Grid offers smart thermostats, water saving products, LEDs, advanced power strips, electric car chargers, and connected home applications. Customers are eligible for rebates on some products.

We recommended adjustments for eight products in three categories (connected home, smart thermostats, and water saving products) with average prices less than the "retail price" (before rebate) advertised on the Marketplace.
Price differences ranged from $7 to $41.

Considerations for Future Applications

Some products had incorrect ENERGY STAR labeling. Innacurate or difficult to locate ENERGY STAR labels might result in a lower adoption of energy-efficient products.

ENERGY STAR status does not drive price differences in all product categories. Size, capacity, and smart features may influence average prices for some popular appliances.

Webscraping can save time and resources and reduce errors, but the data collected is only as good as the information provided by the retailers or manufacturers.