Devices For Economy-Wide Rebound

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Introduction

Energy efficiency can be a worthy goal for institutions and individuals; reducing energy consumption decreases demand for fossil fuels and consumes energy more sustainably. However, more cost-effective devices can lead to behavioral changes that ultimately *increase* energy consumption, even though the devices themselves are more energy efficient: This called the rebound effect. Rebound occurs when less energy is saved than expected. This can be a result of several factors: increased use of the device drawing more energy, manufacturers using more energy to create the new device, or money saved by the users being re-spent in the economy. The combination of these three values produces an economy-wide rebound where the market saves less energy than planned.

Objectives

The Engineering 333 class at Calvin University has been conducting research with the goal of determining the economy wide rebound effect of adopting new energy efficient technologies.

Each class broke into teams, investigated the rebound of two devices per team

These devices were divided so that each team got one large device and one small device, both from Calvin's campus and from anywhere in the world. This spread of possible devices allows for a large diversity, hopefully giving a more accurate view of economy wide rebound across an entire economy.

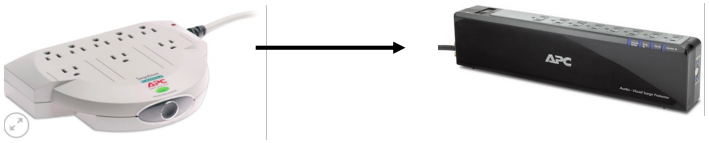
Methods

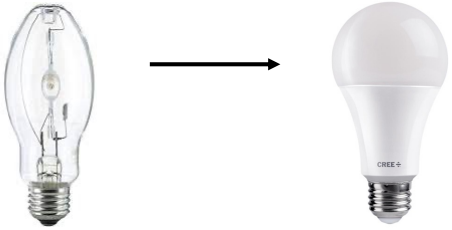
Table 1: *Large and small scale projects for each team*

Team	Large Scale Project	Small Scale Project
Team 1	Low flow shower heads	Large appliances
Team 2	Dorm heating	Computers
Team 3	Gas -> Electric autos	Incandescent -> LED Lighting
Team 4	HVAC (general)	Windows
Team 5	Autos (gasoline)	Windows
Team 6	Lighting control	Smart power strips
Team A	Resident Hall Windows	LED Lighting
Team B	Refrigerators	Motion Sensor Lighting
Team C	Gas to Hybrid Automobiles	Smart Power Strips
Team D	Gas Automobiles	Computers

Some of Replaced devices look almost exactly the same, like this dryer replacement form Team 1 (above)

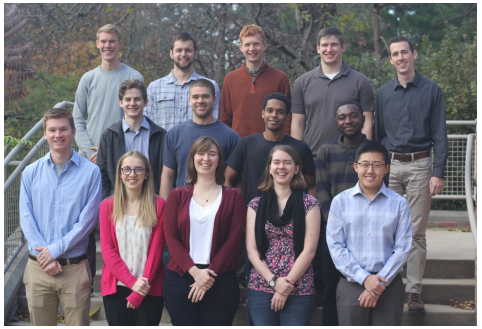
While other devices look entirely different like the power strips from Team 6 (right). The goal was just to find two device which were as comparable as possible





Some devices were devices used and improved on Calvin's campus like switching from halide to LED bulb in the TNT from Team A (above

ENGR 333 Section A Team (below)
ENGR 333 Section B Team (left)



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