The case for ubiquitous energy guide labeling

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Aim

Significantly reduce residential electricity use for little or no cost. To influence human behavior through **wide spread energy usage labeling**.

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Smoke alarm:
Static energy usage
52 KWh $7.80 per year
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Motivations

- Change behavior and public debate, by labeling the majority of retail electrical devices with their expected static state or quiescent energy usage. To spread the debate from supply side (more power stations, coal vs. renewable vs. nuclear) to demand side.
- Spur competition by making energy efficiency a key product feature that can be compared as easily as the price per quart of orange juice.
- Reduce hostility to carbon cap and trade. There is opposition to costs being passed onto the consumer. If the consumer is not equipped with adequate means to reduce consumption there will be greater hostility.
- Moral imperative to provide the public with the means to reduce energy usage.
- Since federal minimum standards major for white appliances were introduced the residential energy consumption pattern has changed significantly.

Example problem

Which uses more electricity, your refrigerator or your smoke alarms?

If you have wired smoke alarms, there is a good chance that 6 smoke alarms could use more electricity than a large (25 cu ft) refrigerator.

I found that 14 out of 15 wired smoke detectors in my house used 6W of power. Because they are connected 24x365 the annual power usage for those 14 smoke detectors was 6x14x24x365/1000 KWh or 736KWh which is almost twice as much as my refrigerator uses! Out of only a few models tested power use varied wildly between 0.5W and 12.3W.

Qualifications

Over the past 3 years I have converted my very average 1960 built ~2000 sq ft home to net-zero energy, it generates as much energy as it uses including heating. This means zero heating oil / gas usage and net zero electricity usage. I also have an engineering degree.

http://netzeroenergy.org/energyguide.pdf

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Contact your Congressman

Example labeling systems that work

Problems with other approaches

- Smart meters tell the consumer how much electricity their home is using not which devices are using the electricity.
- Smart billing compares consumers' electricity bill with their neighbors' and with their own prior use. This alerts consumers to excessive household usage.
- Measurement of individual appliances using a $25 device such as a kill-a-watt (Google kill-a-

watt). This is popular with eco enthusiasts, but unlikely enter common use.
- Professional auditing is too costly.
- Minimum standards have been set including by Department of Energy, California Energy Commission, the European Union, and various other authorities. This only changes the behavior of some manufacturers and only by a discrete amount.
- Energy Star badge offers an optional standard. But manufacturers often do only the bare minimum to qualify (evidence is how many refrigerators use exactly 20% less energy than the federal mandate). It does not foster competition between devices with the badge, and is not available for enough device classes. It does not give the consumer comparative information.

None of these approaches are likely to significantly change human behavior; none help the consumer make an informed comparison when making new purchases. Changing human behavior at the point of sale is important, because once purchased the device may be using electricity 24x365 for the next ten years.

Benefits of a ubiquitous labeling system

- Information labeling systems are proven to aid behavioral change and information spread, especially at point of purchase. Examples include, EPA fuel consumption labels, food nutrition facts, gas prices, per unit prices on grocery store shelves, and existing energy guide labeling of some major appliances such as refrigerators.
- Information is available at the point of purchase (measurement after purchase is of limited use).
- Consumers have long been used to on the shelf per unit pricing. Which is the better deal 56 oz of orange juice at $3.49 or 64 oz for $4.39? With per unit pricing the answer is clear. Energy usage labeling allows the consumer to make a similar choice. Should I buy a smoke detector that costs $29.99 and uses $15 of electricity per year, or one that costs $39.95 and uses $0.50 of electricity per year?
- Targeting only major appliances was appropriate 20 years ago, now there are many more household devices. Major appliances are purchased infrequently. Labeling most house hold devices will put the information in the face of consumers every time they visit a store.
- Labeling will force competition for the lowest energy usage. Some manufacturers of food already complete on nutritional facts, but only because labeling is compulsory, gas stations compete by price, auto manufacturers compete on EPA ratings. This is a virtuous circle, as manufactures compete by energy usage, they will advertise this, thus making the public more aware, and further encouraging consumer behavioral change. To protect brand image manufactures will discontinue the most inefficient devices.

Criteria for labeling

Currently there is a federal mandate for a limited number of major appliances to carry energy guidance labels. Labeling for more big ticket items is in the pipeline. Big ticket items often have standby modes and typically use significantly different amounts of energy depending on their mode of operation which necessitates detailed test procedures for each category.

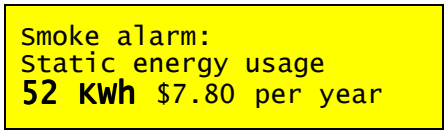
Extremely simple and expedited test procedures can be created for a vast array of devices that do not have such varied power requirements. For example, smoke detectors, answer machines, irrigation controllers, HVAC controllers, internet routers, garage door controllers, alarm systems, paper shredders, wireless phones, GFI receptacles, door bells, and battery chargers. The annual energy consumption of these devices is dominated by the power they use in a quiescent / static state.

Several approaches to determine which devices require a label could be taken.
- All devices using more than 1W continuously, or better still 0.5W.
- Devices that are expected be connected to a utility power source for more than 4 months in a year (this would include pool pumps and irrigation controllers).
- A list of specific devices.

The aim is to have an inclusive policy, because without ubiquitous labeling human behavior is less likely to change.

If brand A of a device uses only 0.5W and brand B uses 12W there is clearly no technical reason why brand B cannot be made to be efficient

Example label:



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Contact your Congressman,
The Department of Energy, and
The Office of Information and Regulatory Affairs.