



Energy Efficient Appliances and Plug Loads

Presented by

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Outline

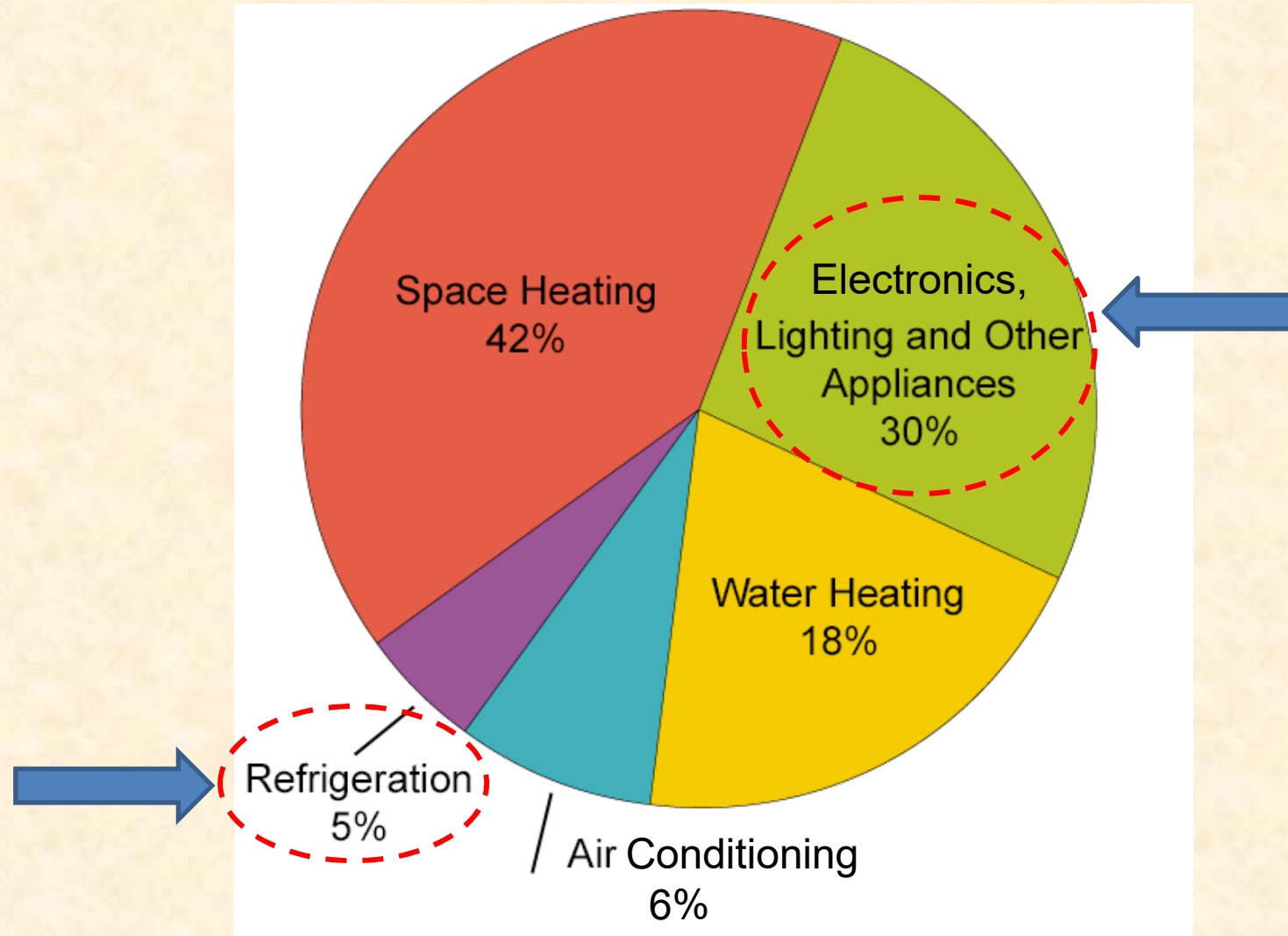
- What are “plug loads” at home?
- Why home appliances and plug-in electronics matter?
- How do plug-ins use energy?
- What are the solutions?
 - *The ENERGY STAR Program for energy efficient appliances and devices*
 - *Management of standby power*

What Are Plug Loads?

- Energy used by appliances/devices that are usually plugged into outlets.
- Are not related to general building lighting, heating, ventilation, cooling, and water heating.
- Typically do not provide comfort to the occupants.
- Plug loads can be surprisingly large!



Energy Use in Homes



Source:

U.S. Energy Information Administration, *Residential Energy Consumption Survey 2009*

Number of US homes

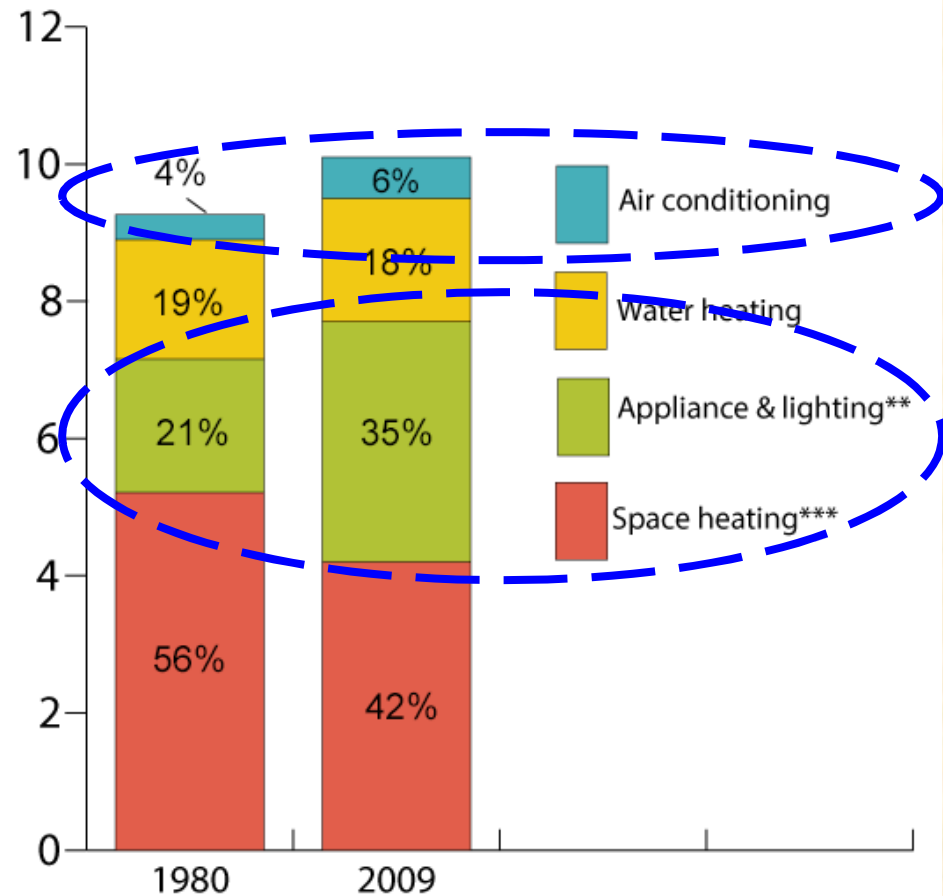


Over the past 30 years, U.S. population grew by 30% while the number of homes grew by about 40%.

But total home energy consumption grew at a slower rate!

Home Energy End-Uses: Share of Total Consumption, 1980 and 2009*

Quadrillion Btu



*The most recent year for which data are available.

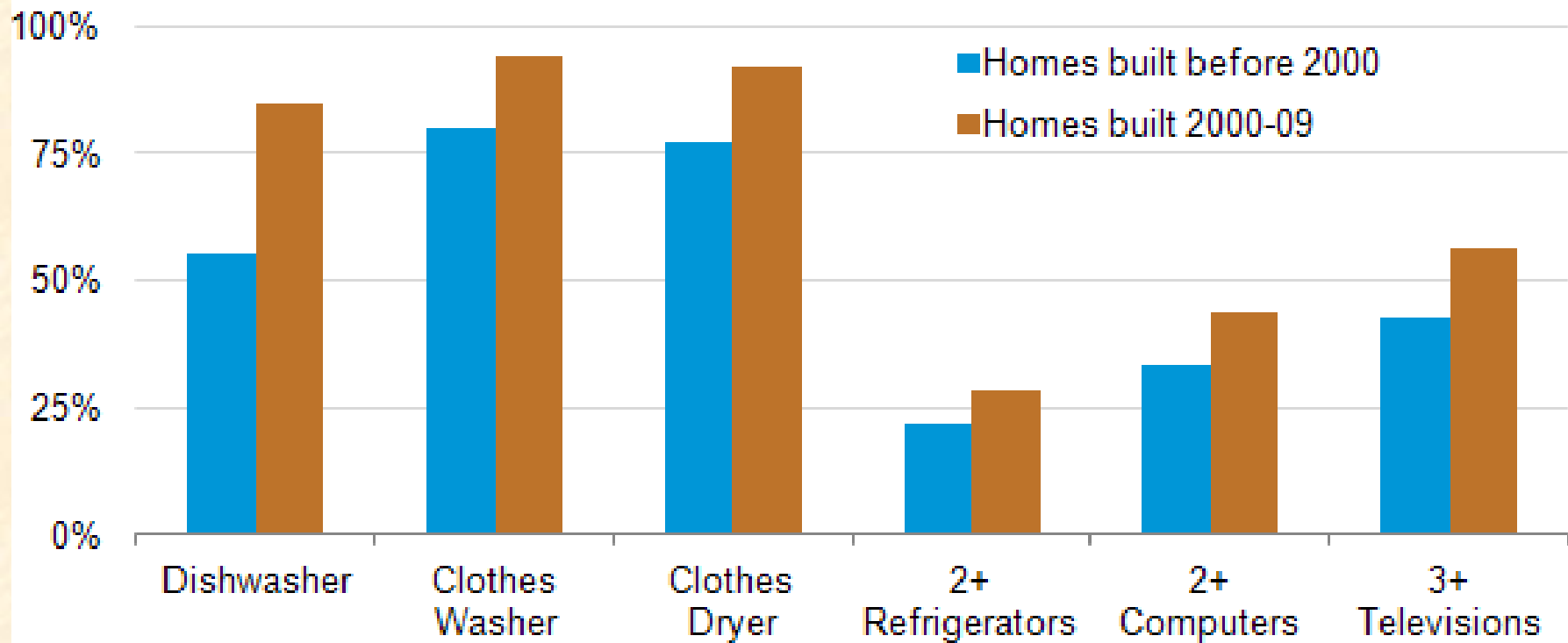
**Includes refrigeration.

***Does not include wood.

Source: U.S. Energy Information Administration, *Residential Energy Consumption Surveys 1980 and 2009*.

Households with selected appliances and electronics, 2009

percent of households



Source: U.S. Energy Information Administration, *Residential Energy Consumption Surveys 2000 and 2009*

















In addition:

- 79% had a DVD players and 43% had a DVR.
- Nearly 33% had at least 4 electronic devices such as cell phones, plugged in and charging.

How Do Plug-ins Use Energy?

- Plug-in appliances and devices consume energy while being kept on.
- Most home appliances and devices still use electricity while turned off or in standby mode.
- This type of energy use is called vampire energy, leaking electricity, etc.
- Around 8-10% of our home's electricity consumption is due to appliances left in the standby mode.
- The average U.S. household spends \$100 to power devices while they are off (or in standby mode).

Standby Electric Use

| Equipment | Typical Standby Use | Annual Cost | \$0 | \$5 | \$10 | \$15 | CO ₂ Emitted/Yr |
|-------------------------|---------------------|-------------|---|-----|------|------|----------------------------|
| Television | 4 watts | \$3.80 |  | | | | 65 lbs |
| VCR | 6 watts | \$5.69 |  | | | | 97 lbs |
| DVD | 2 watts | \$1.90 |  | | | | 32 lbs |
| Cable box | 12 watts | \$11.39 |  | | | | 194 lbs |
| Satellite receiver | 15 watts | \$14.24 |  | | | | 243 lbs |
| Component stereo | 7 watts | \$6.64 |  | | | | 113 lbs |
| Game console | 1 watt | \$0.95 |  | | | | 16 lbs |
| Cell phone charger | 2 watts | \$1.90 |  | | | | 32 lbs |
| Desktop computer | 4 watts | \$3.80 |  | | | | 65 lbs |
| Notebook computer | 1 watt | \$0.95 |  | | | | 16 lbs |
| Computer monitor | 1 watt | \$0.95 |  | | | | 16 lbs |
| Modem | 5 watts | \$4.75 |  | | | | 81 lbs |
| Wireless router | 2 watts | \$1.90 |  | | | | 32 lbs |
| Ink-jet printer | 2 watts | \$1.90 |  | | | | 32 lbs |
| Rechargeable power tool | 4 watts | \$4.18 |  | | | | 71 lbs |
| Battery charger | 2 watts | \$2.09 |  | | | | 36 lbs |

Total annual energy cost = \$67.03

Source: <https://www.mge.com/Images/PDF/Brochures/Community/StandbyPowerFAQ.pdf>

Solutions: Where to Start?

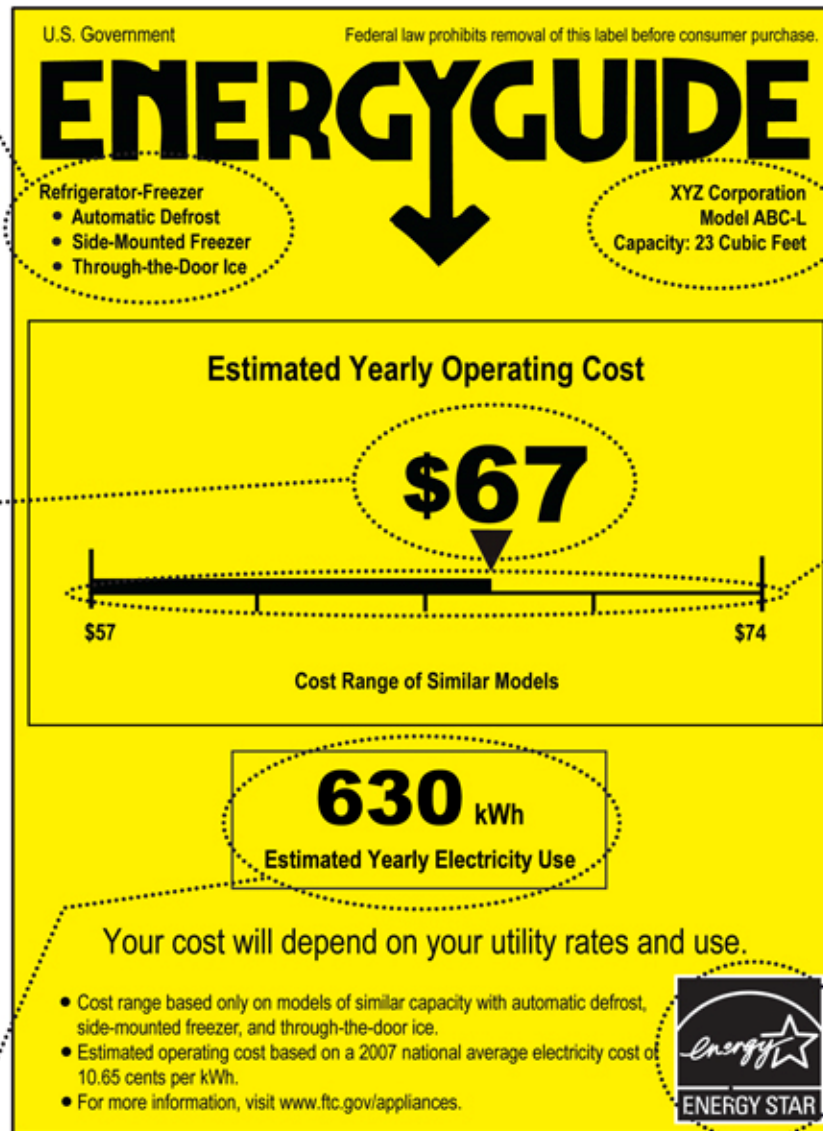
- Purchase energy efficient appliances – Find out through the **ENERGY STAR** program
 - A federal program created in 1992 by EPA and DOE to promote energy efficient products and services.
 - Its website lists certified products that generally save 20-30% energy compared to standard models.
 - The ENERGY STAR label is shown on the appliances and also on EnergyGuide label of qualifying products.



Lists key features of the appliance you're looking at and the similar models that make up the cost range below.

What you might pay to run the appliance for a year, based on its electricity use and the national average cost of energy. The cost appears on labels for all models and brands, so you can **compare** energy use just like you would price or other features.

An estimate of how much electricity the appliance uses in a year based on typical use. Multiply this by your local electricity rate on your utility bill to better judge what your actual operating cost might be.



The maker, model, and size tell you exactly what product this label describes.

The cost range helps you compare the energy use of different models by showing you the range of operating costs for models with similar features.

If you see the ENERGY STAR logo, it means the product is better for the environment because it uses less energy than standard models.

Source: Federal Trade Commission

ENERGY STAR Certified

Residential Refrigerators

Visit the [Residential Refrigerators](#) page for usage tips and buying guidelines.



CHANGE
product category

Filter Your Results

filter by keyword

Type

- ☐ Top Freezer (274)
- ☐ Bottom Freezer (609)
- ☐ Side-by-Side (84)
- ☐ Freezerless and Single Door (39)
- ☐ Compact (746)

Additional Features

- ☐ Thru the Door Dispenser (289)
- ☐ Automatic Defrost (1392)
- ☐ Connected (44)
- ☐ Icemaker (671)
- ☐ Built-in (136)
- ☐ Counter Depth (449)

Capacity (Total Volume) (ft3)

- ☐ Less than 7 (741)

1707 Records Found

Sort by:

% Less Energy Use than the US Federal Standard



Whirlpool - WRF532SNB*

☐ Compare

Bottom Freezer

Capacity (Total Volume) (ft3): 22.2

Annual Energy Use (kWh/yr): 585

Date Certified: 04/08/2016

Bosch - B26FT81SNS

☐ Compare

Bottom Freezer

Capacity (Total Volume) (ft3): 24.8

Annual Energy Use (kWh/yr): 691

Date Certified: 02/14/2017

Bosch - B26FT50SNS

☐ Compare

Bottom Freezer

Capacity (Total Volume) (ft3): 25.0

Annual Energy Use (kWh/yr): 693

Date Certified: 02/14/2017

Samsung - RF28K9580**

☐ Compare

How Much We Save?

- ENERGY STAR certified **clothes washers**: 25% less energy and 45% less water than regular washers.
- ENERGY STAR certified **dryers**: 20% less energy than conventional models. A full-size electric certified dryer saves \$200 in energy over its life.
- ENERGY STAR certified **refrigerators**: Must save at least 20% energy than the minimum standard.
- ENERGY STAR-labeled **computers**: 30-65% less energy than computers without this designation, depending on usage.

Flip Your Fridge Calculator

Find out how much your old refrigerator or freezer costs to operate and how much you can save by flipping it to ENERGY STAR.

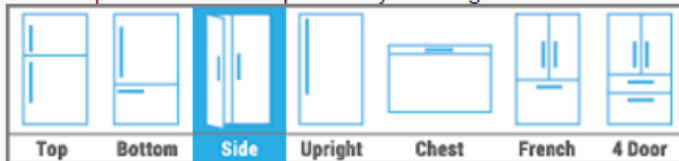
1. Pick one of the following for your savings:

- ☒ Replace my main refrigerator/freezer
☐ Remove my extra refrigerator/freezer

2. Find your [state's electricity price](#) per kilowatt hour or use the national average.

0.123 (Tip: Check your utility bill.)

3. Pick the picture that best represents your refrigerator/freezer:



Approximate Model Year:

2001-2010 ▼

Capacity (or Size):

24.5 Cubic Feet or More ▼

CALCULATE SAVINGS →

- Refrigerators 15 years or older use twice as much energy as a new ENERGY STAR refrigerator.
- Other savings: \$50 rebate for certified refrigerators through utility providers; \$50 for recycling old refrigerators at working condition.



| | |
|--------------------------|--------------------------------------|
| Model: | 24.5 Cubic Feet or More Side-by-Side |
| Electricity Rate: | \$0.123 |
| Annual Cost: | \$118.82 |
| Annual kWh: | 966 kWh |

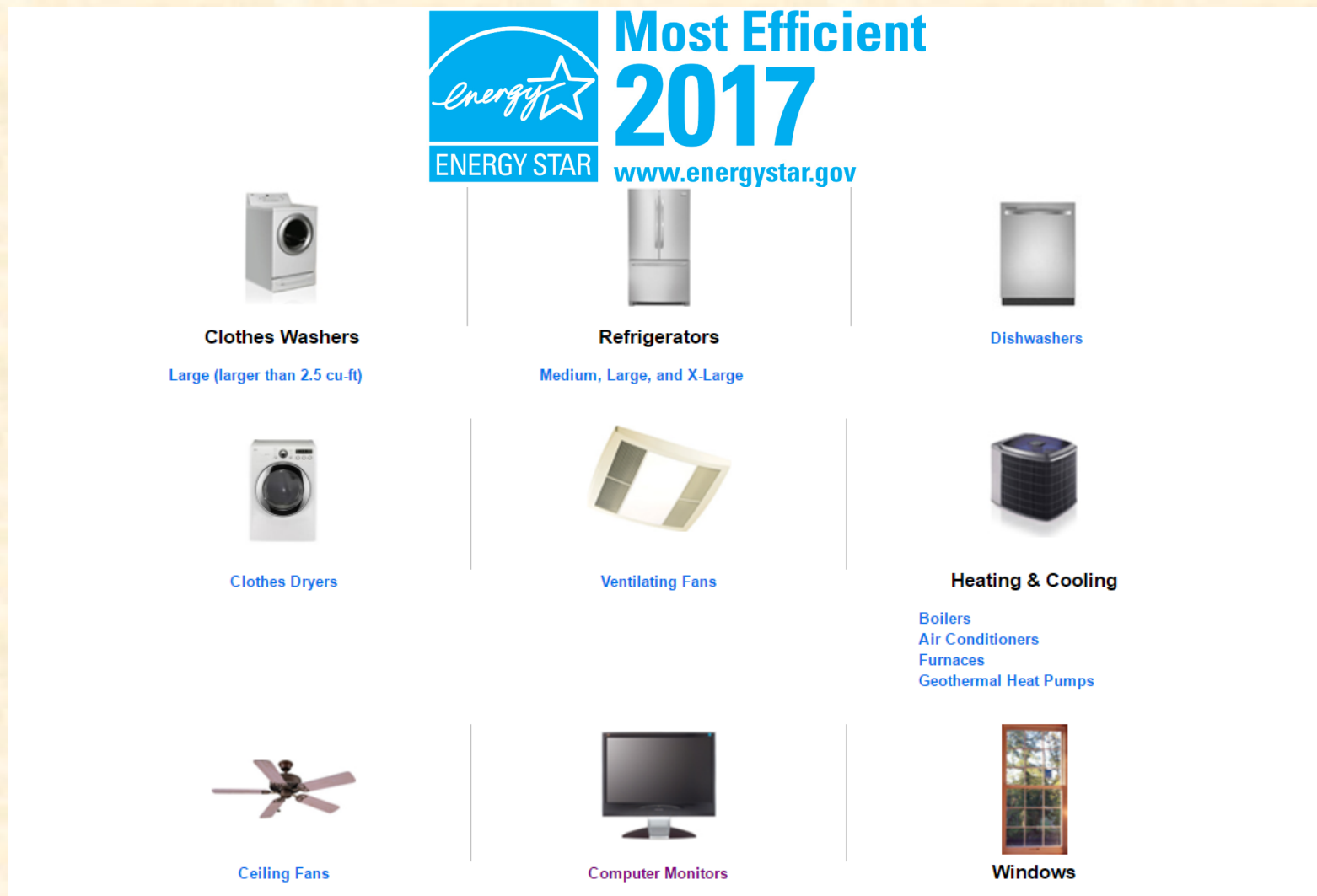
Flip Your Fridge Savings

\$170 over five years

476 lbs of carbon pollution over five years


1,680 lbs more of carbon pollution when you properly recycle your old refrigerator

- The **ENERGY STAR Most Efficient** label launched in 2011 identifies the most energy-efficient products among ENERGY STAR qualified appliances annually.



- EPA is also adding price and location information for **ENERGY STAR Most Efficient** products to improve customer experience.

[All](#)
[Bottom Freezer \(12\)](#)
[Top Freezer \(40\)](#)
[Side-by-Side \(1\)](#)



Bosch
B10CB80NVW/01

| | |
|---|------|
| Automatic Defrost ⓘ | Yes |
| Thru the Door Dispenser ⓘ | No |
| Capacity (Total Volume) (ft3) ⓘ | 11.4 |
| Annual Energy Use (kWh/yr) ⓘ | 314 |
| <div>Low High</div> <div>\$2,244.10 - \$2,249.99 at 5 Online stores</div> | |

📍 Retail Locations

💰 Pricing

ℹ️ Product Specs

CLICK FOR PRODUCT DETAILS

Features

- The LED Lighting Shines Exceptionally Bright and Saves Energy
- The HydroFresh Drawer Keeps Fruit and Vegetables Fresh Longer
- Use the Wine Rack to Store Your Favorite Wine Bottles
- Ideal for Compact Kitchen Layouts in Metropolitan Areas



LG
WT7700H*A

| | |
|--|------|
| Volume (cu. ft.) ⓘ | 5.7 |
| Annual Energy Use (kWh/yr) ⓘ | 150 |
| Annual Water Use (gallons/yr) ⓘ | 5381 |
| <div>Low High</div> <div>\$1,148.40 - \$1,599.97 at 10 Online stores</div> | |

📍 Retail Locations

💰 Pricing

ℹ️ Product Specs

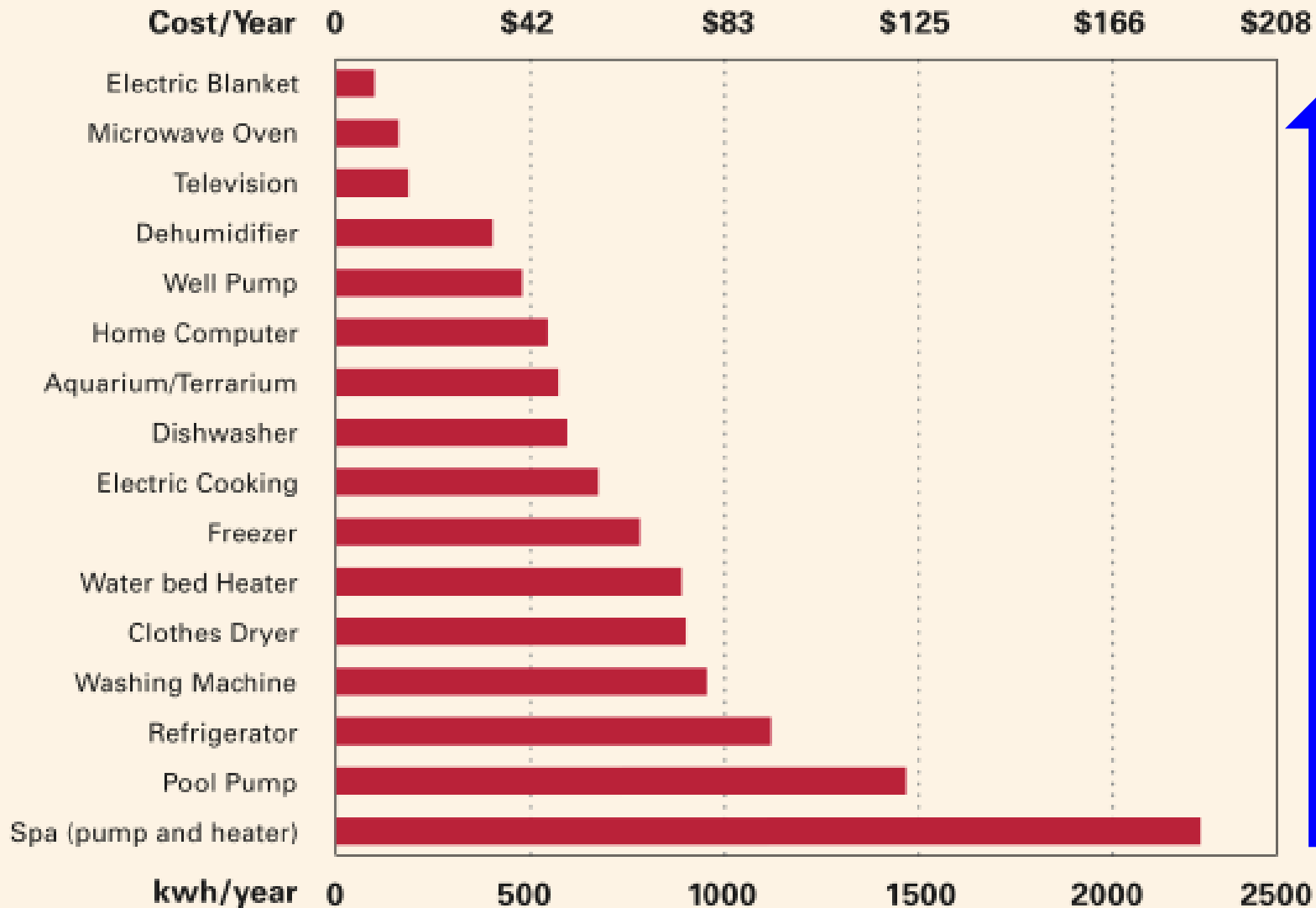
CLICK FOR PRODUCT DETAILS

Features

- Super Large 5.7 cu. Ft Capacity
- Direct Drive Motor 10 Year Manufacturer's Limited Warranty
- ColdWash™ Technology
- 6Motion™ Technology
- Fast & Clean TurboWash™ 2.0 Technology
- AAFA certified Allergiene™ Cycle with Steam
- Smart TagOn™ Technology
- Slam Proof Lid



Most Effective Appliances Upgrades



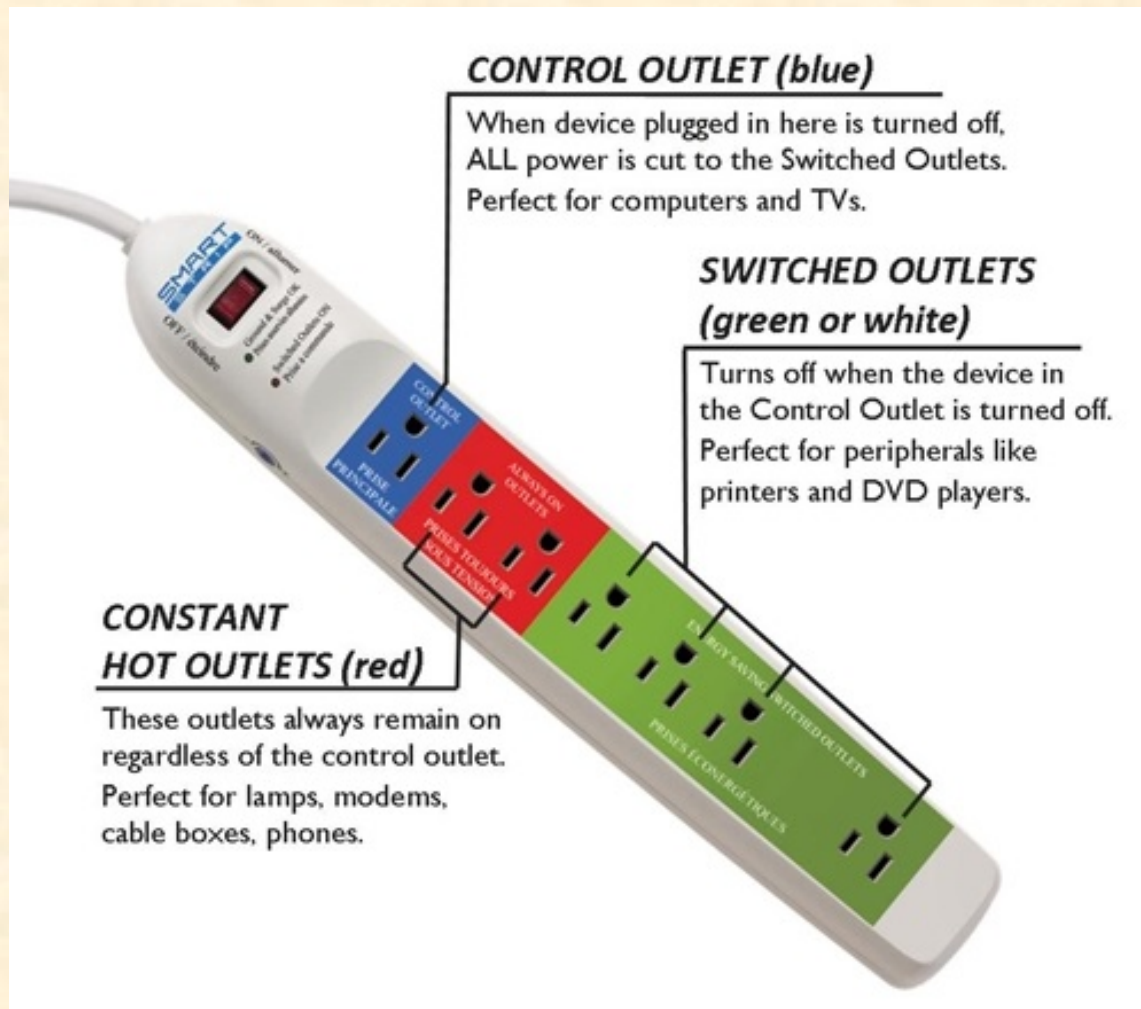
Typical energy consumption for various appliances by DOE

Solutions to Standby Energy Use

- **ENERGY STAR certified products** already have efficient power management and low standby power.
- If you aren't frequently using a device, **unplug** it (e.g., extra TV in the guest bedroom or the VCR).
- Turn off the monitor if not using your PC for more than 20 minutes; turn off both the CPU and monitor if not using the PC for more than 2 hours.
- Buy a low-cost **watt-meter**, measure the devices, and take targeted action.



- Use a **switchable power strip** for clusters of computer or video products or use **smart strips** to organize plugged-in appliances and devices.



Green switch

Sends a wireless signal to other outlets, light switches, and thermostats in your home to turn off power; still expensive at present



Thank you!

Questions & Comments?