



Professional Considerations in Digital System Design

ENVIRONMENTAL AND PUBLIC POLICY CONCERNS

OUTLINE

- Why study environmental concerns?
- Basic environmental questions
- Where do our raw materials come from?
- Production and manufacturing costs
- The consumer lifecycle
- E-waste and electronics recycling
- What can be done
- Case studies

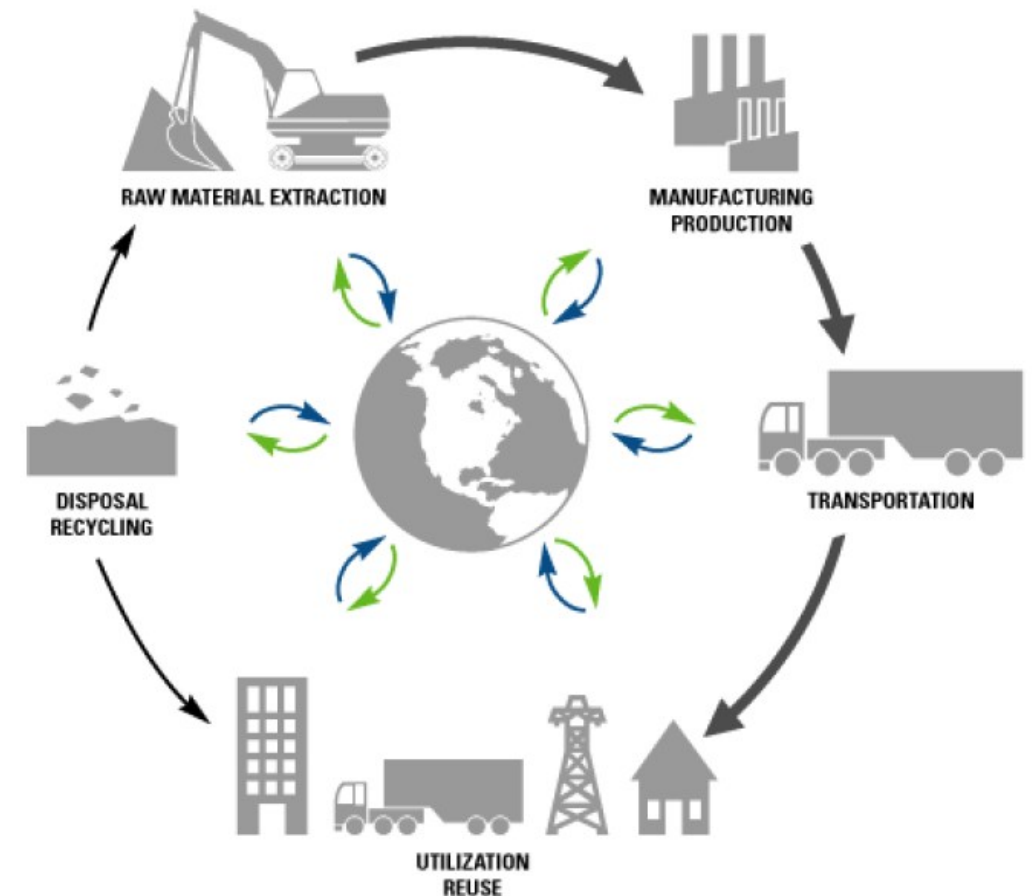
WHY STUDY ENVIRONMENTAL CONCERNS?

- Accreditation agencies (ABET) deem it an important part of all engineering curricula, including EE and CmpE
- Idea of “best engineering practice” – environmental factors are an important element of this
- Engineers have vast power to oversee the creation and development of designs and the environment, and thus have great responsibility to see to its care

“It is expected that commonplace practice of sustainable development and business practice will evolve over time, either by choice or catastrophe.” F. Splitt, Northwestern University

BASIC ENVIRONMENTAL QUESTIONS

- What are some of the environmental issues associated with the manufacture, use, and disposal of electronic devices?
- What obligation is there to lengthen useful lifetime of a product to the possible?
- What obligation is there to reduce the energy consumption of a product to possible?



RAW MATERIALS

Indium

What it's used for: Transparent conductive coating for LCD panels, semiconductor applications, LEDs, anti-corrosion agent in batteries

Where it can be found: Extremely rare, occurs only in the form of indium mineral compounds, none of which are known to occur in significant deposits. Generally extracted from deposits of lead, tin, copper, iron, and zinc

Worldwide Production: ~600 tons

EOL Recycling Rate: <1%

Remaining known supplies: ~14 years



RAW MATERIALS

Gallium

What it's used for: High-speed semiconductor devices, high-powered lasers.

Gallium arsenide (GaAs) and gallium nitride (GaN) are most common variants, accounting for 98% of commercial use

Where it can be found: Extremely rare, occurs only in the form of mineral compounds which are themselves too rare to mine. Extracted as a trace element from bauxite (aluminum ore) and sphalerite (zinc ore).

Worldwide Production: ~300 tons

EOL Recycling Rate: <50%

Remaining known supplies: Significant, but require substantial mining to access



RAW MATERIALS

Tantalum

What it's used for: High reliability tantalum capacitors, found in phones, computers, tablets, and other consumer electronics.

Where it can be found: Extremely rare, occurs in an estimated 1-2 ppm in the earth's crust. Primary sources include Australia, China, and central Africa. Tantalum mining is linked to warfare and thus Tantalum from these regions is considered a conflict mineral

Worldwide Production: ~1,600 tons

EOL Recycling Rate: ~25%

Remaining known supplies: < 50 years



RAW MATERIALS

Lithium

What it's used for: Primarily used in batteries due to its low weight and high energy storage capabilities

Where it can be found: Rare, although can be extracted from seawater or mined from the earth's crust in trace amounts (~20 mg per kg of crust). Largest known source is the Salar de Uyuni (left) in Bolivia, containing 50-70% of known global lithium reserves

Worldwide Production: ~20,000 tons

EOL Recycling Rate: ~25%

Remaining known supplies:

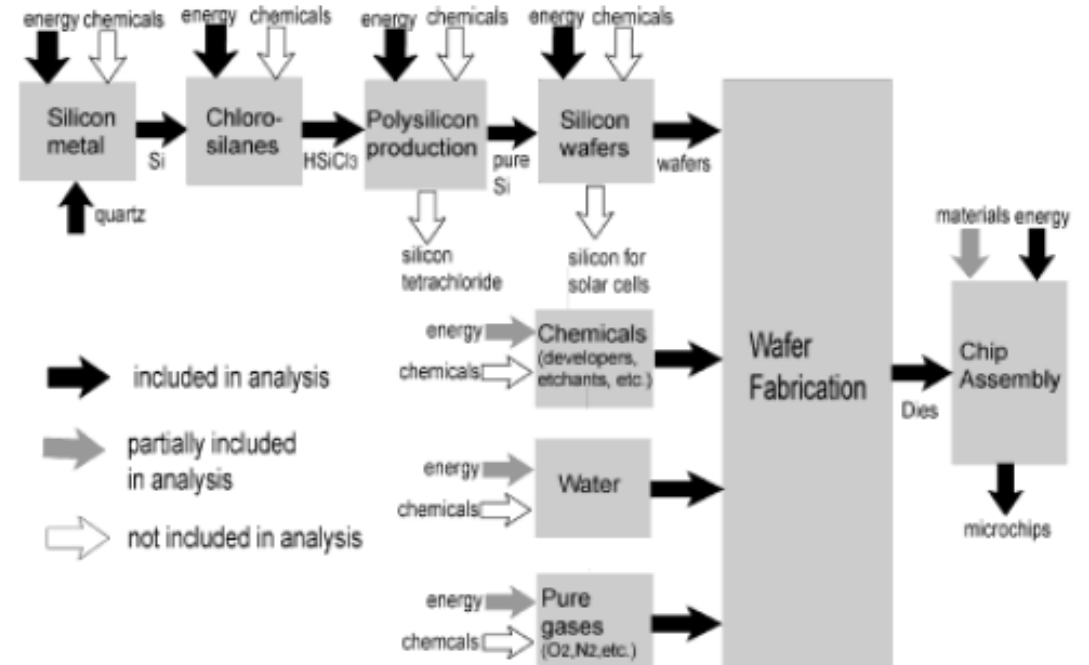
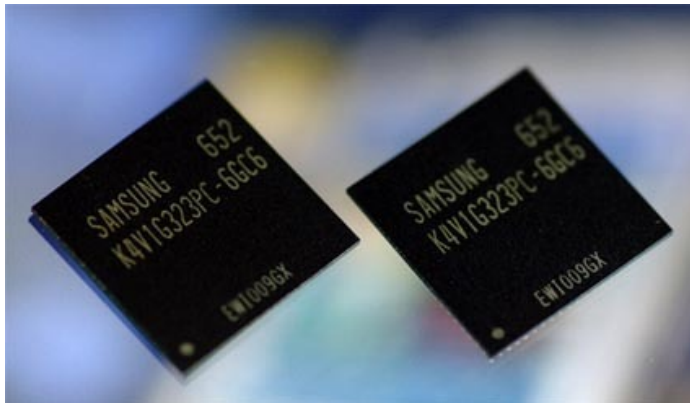
< 100 years



PRODUCTION AND MANUFACTURING

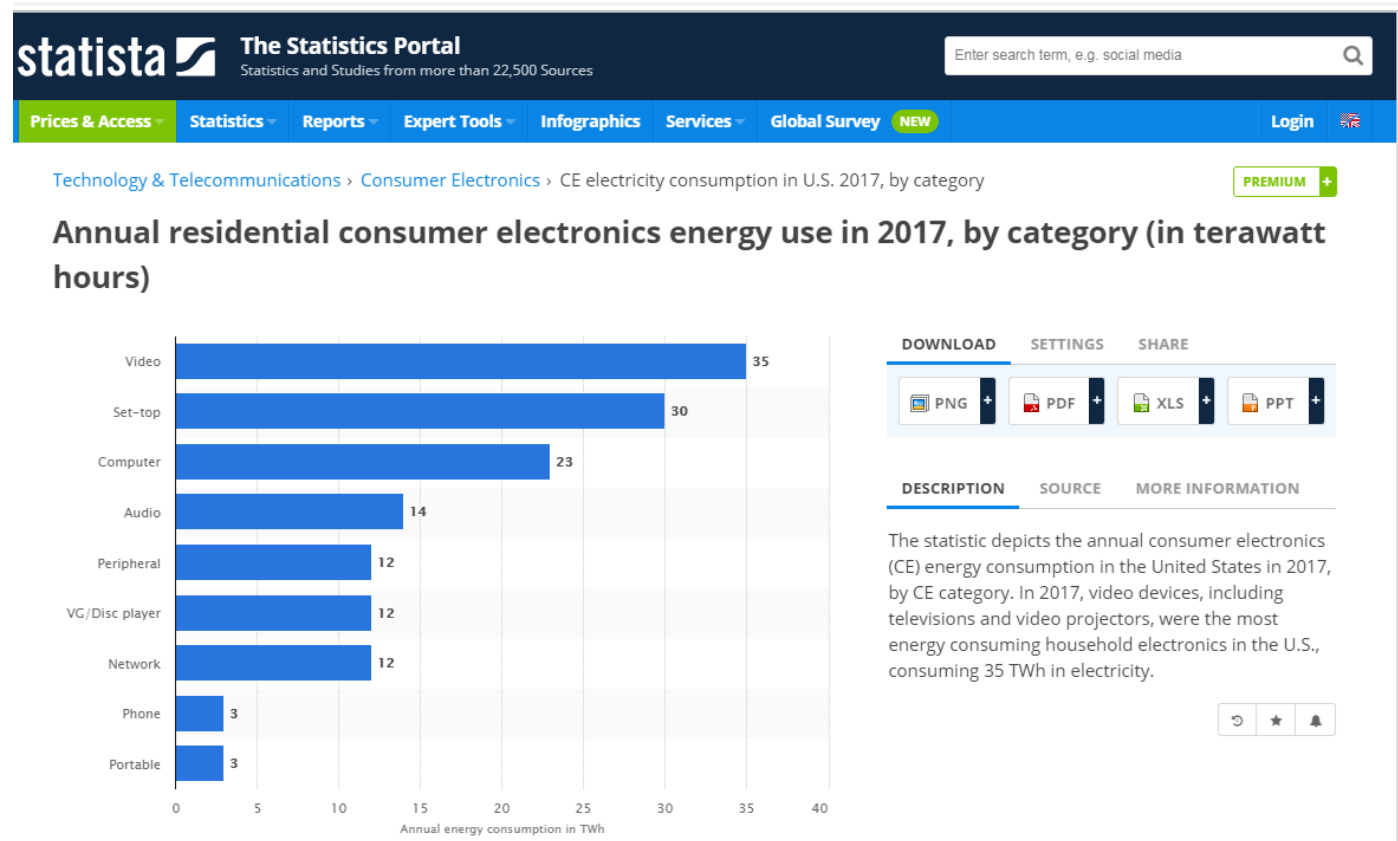
- Modern electronics require highly purified base materials which are rare, scarce, and challenging to extract. Due to the complex designs involved in integrated circuits, the cost and material usage of electronics is much higher than many other products.
- A single 2-gram DRAM chip uses an estimated 1.6 kg of “fossil” fuels and 72 g of chemicals; large amounts of water (32 kg) are required as well.

[\(Source: American Chemical Society\)](#)



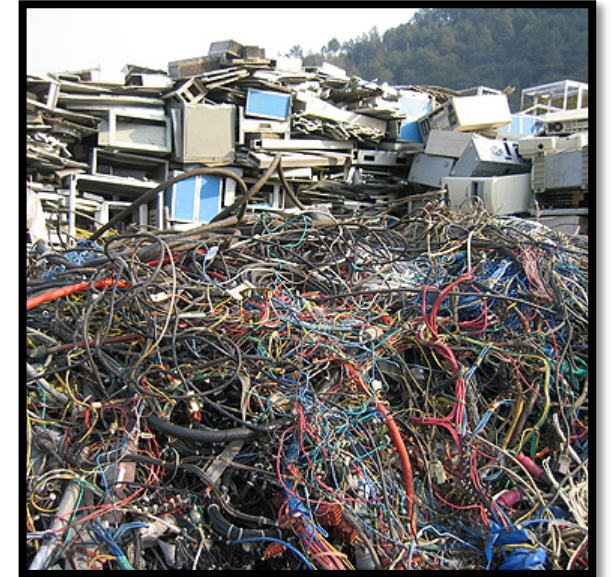
CONSUMER LIFECYCLE

- Once products are manufactured and shipped, they are operated by end users for the intended application over the product's usable lifecycle
- The primary environmental impact at this stage involves energy consumption
- In 2017, U.S. consumer electronics devices used an estimated 144 TWh of energy



E-WASTE AND RECYCLING

- Increased consumption and demand for electronics in modern society has led to enormous amounts of electronic waste (E-waste)
- In 2014, the United States alone generated an estimated 11.7 million tons of E-waste, much of it sent to landfills (recycling rate is about 30%)
- Some E-waste is exported, largely from developed countries, to developing and poor countries, for recycling
- Recycling of E-waste involves large amounts of labor with numerous environmental and human hazards
- E-waste is often burned, producing byproducts such as lead fumes and metallic toxins, which are extremely dangerous to human health



WHAT CAN BE DONE

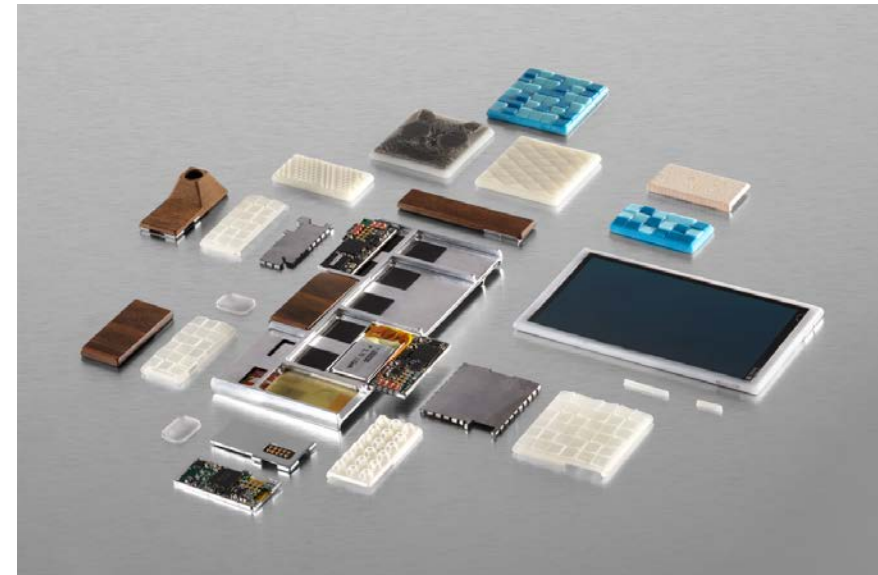
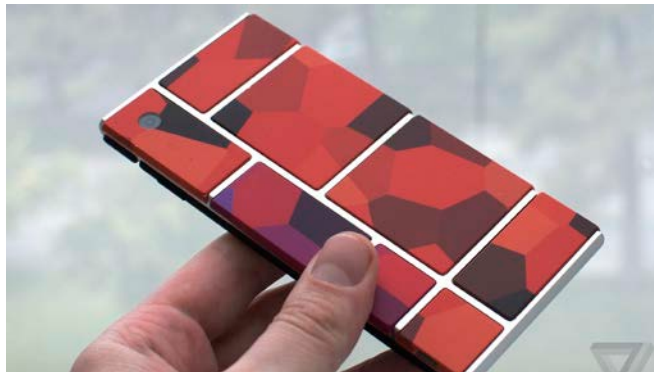
- As engineers, resource depletion and electronic waste can be mitigated in the following steps:
- Eliminate: New devices and designs which eliminate the need for previously existing classes of products (example: smartphones eliminating need for separate MP3 player)
- Reduce: New devices and designs which use fewer resources and energy than their predecessors
- Reuse: New devices and designs which are easily repairable, upgradeable, and multifunctional
- Recycle: Send remaining salvage to recyclers to responsibly recycle old electronic materials



ENVIRONMENTAL & PUBLIC POLICY QUESTIONS

Project Ara

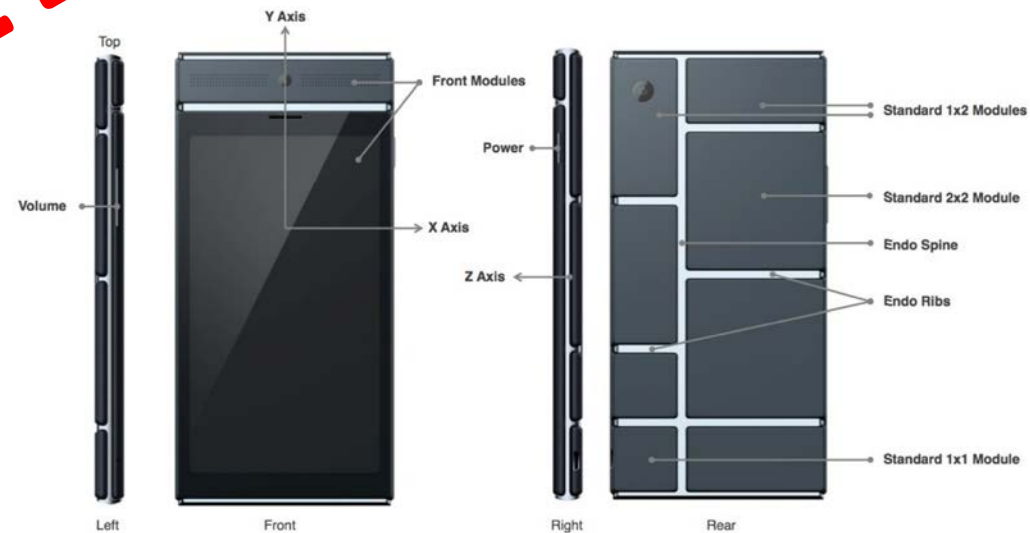
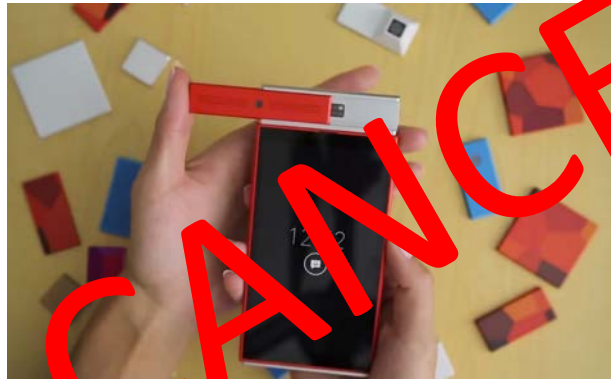
- Google/Motorola initiative - modular smartphone design
- End users can decide which components and functionality their phones need, and purchase modules on this basis
- When an upgrade is desired or a repair needs to be made, the module can be replaced without needing to discard the entire device
- Project Ara concept video: <https://www.youtube.com/watch?v=TQjGBEEiejU>



ENVIRONMENTAL & PUBLIC POLICY QUESTIONS

Project Ara

- Relevant questions:
 - What are the positive environmental impacts of this project?
Negative impacts?
 - Would you buy a device like this? What premium would you be willing to pay compared to a normal disposable device?

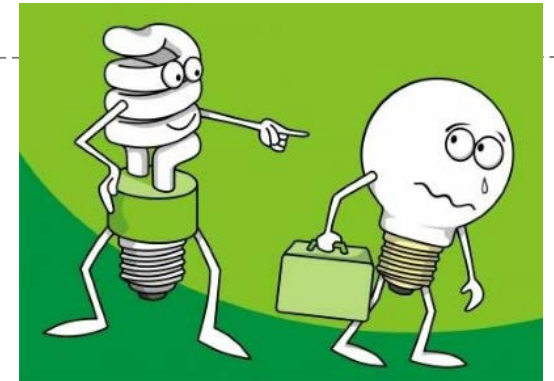


ENVIRONMENTAL & PUBLIC POLICY QUESTIONS

Energy Independence and Security Act of 2007

Household Lighting

- It does not ban the **use or purchase** of incandescent bulbs.
- It does not ban the **sale or manufacture** of **ALL** incandescent bulbs, just those common household incandescent (and other) bulbs that are not energy-efficient.
- **It does not require the use of compact fluorescent bulbs (but...CFL was the only technology available at the time the law went into effect that met the requirements)**
- It requires about 25 percent greater efficiency (that is, 25 percent less energy use) for household light bulbs that have traditionally used between 40 and 100 watts of electricity.
- Many bulbs, including specialty bulbs, three-way bulbs, chandelier bulbs, refrigerator bulbs, plant grow lights and others, are exempt from the law's requirements.
- It was passed by Congress and is implemented by the [U.S. Department of Energy \(DOE\)](#).



Regulatory Updates Since the 2007 Law Went Into Effect

- In January 2017, DOE issued two regulations to expand the scope of the 2007 law to include [incandescent reflector bulbs](#) and [candle-shaped bulbs used in chandeliers, reflector bulbs used in recessed lighting, three-way incandescent bulbs, and certain other specialty bulbs](#). These regulations would have taken effect in January 2020.
- In February 2019, DOE issued a [proposal to withdraw the January 2017 regulations](#), on the basis that the legal rationale underlying those revisions misconstrued existing law. Learn more about the current state of these regulations on [DOE's Appliance and Equipment Standards Rulemakings and Notices page](#).

ENVIRONMENTAL & PUBLIC POLICY QUESTIONS

Home Lighting

- Should the government promote bulbs that can be made in the U.S.?
- Was the promotion of CFLs a good idea?



EE/Times

DESIGNLINES | POWER MANAGEMENT DESIGNLINE

Whatever Happened to CFLs?

By Bill Schweber, 06.27.18 □ 19

Not too long ago, the compact fluorescent lamp was supposed to be the efficient and perhaps dominant lighting source of the future, but that future didn't last long; there's a broader lesson here beyond lighting.

It wasn't that long ago that compact fluorescent lamps (CFLs) were hailed as the "next big thing" for the foreseeable future of home and office lighting. And they were fairly successful, at least for a short while. Using them made sense, as they saved significant energy compared to incandescent lamps, with efficiency of about 2-5% (about 13-18 lumens per watt) for the latter, versus 7-10% (55-70 lumens per watt, and often more) for the former. They also fit in many existing fixtures (called luminaires in the lighting trade), and while they were more costly to purchase – anywhere from \$1 each to several dollars each, compared to around \$0.50 to \$1 for an incandescent lamp, their longer life and lower total cost of ownership were very strong points in their favor.

But times change and they change quickly, at least where technology is concerned. On a recent visit to local big-box stores – Home Depot and Lowe's – and small, independent hardware stores, I couldn't find a single CFL. In their place were extensive displays of LED-based lamps of all sizes and styles, including the small-base candelabra size. It looks like the window of fame for CFLs came quickly and left even more quickly. (For both, of course, the immediate market drivers were their lower operating costs and longer life (impact on labor cost of replacing) along increasingly stringent world-wide regulatory mandates.

So, what happened? Apparently, several factors conspired to knock CFLs out of the contention box. Among them, the top one is most likely that LEDs reached parity in cost at comparable efficiency, while offering other benefits: more pleasing physical appearance, better color performance and options (color temperature and color rendering index, CRI), and better fit with both existing and new luminaires.

There's one other area where LEDs soon surpassed CFLs: ease of dimming. Although there are ways to dim CFLs driven directly from the AC line, the added circuitry in the CFL bulb was tricky to implement and IC vendors invested significant effort to make it happen. Worse, the dimmable CFLs had to be dimmer-compatible with the ubiquitous, low-cost TRIAC-based dimmers already installed by the millions in homes. The low-cost, very effective TRIAC-dimming approach based on zero-crossing PWM had to be "mapped" to a CFL-friendly dimming approach. Consumer would be frustrated by CFLs marked as "non-dimmable" on labels they did not see or read, and then be angry when they didn't work or dim in their installed incandescent socket which used to dim just fine.

...leveling: CFLs are sensitive to frequent on/off cycling. ... hours are reduced in ... switched on and off very often. ... the lights are needed for brief ... descent or LED bulbs.

... available for lights using a ... package; not all CFLs can be ... using a regular CFL with a dimmer ... n.

... outdoors, but should be covered ... ts. Low temperatures may reduce ... kage label to see if the bulb is suited

... ot spot lights. Retail store display ... narrow focus beams for stronger spot ... for area lighting.

... contain small amounts of mercury ... This metal may be released if the bulb ... disposal. For more information about ... below.

ENVIRONMENTAL & PUBLIC POLICY QUESTIONS

Energy Star Thermostats

Note: The EPA **suspended** the **ENERGY STAR programmable thermostats specification** effective December 31, 2009. Currently only “smart” thermostats can qualify for ENERGY STAR qualification.

The screenshot shows the Energy Star website's page for Programmable Thermostats for Consumers. The page includes a navigation bar with links to 'energy efficient products', 'energy savings at home', 'energy efficient new homes', and 'energy strategies for buildings & plants'. Below the navigation bar, there's a breadcrumb trail: 'Home > Products > Programmable Thermostats'. The main heading is 'Programmable Thermostats for Consumers' with a sub-link '(Are you a partner? See For Partners)'. The page is divided into three tabs: 'Overview', 'Specification', and 'Buying Guidance'. The 'Overview' tab is active, showing a description of programmable thermostats and a list of two bullet points. To the right of the text is an image of a programmable thermostat. Below the text is a table titled 'Programmable Thermostat Setpoint Times & Temperatures'. To the right of the main content is a 'Did you know?' section and a 'RESOURCES' section with links to 'Special Offers', 'Programmable Thermostat Tool', 'Programmable Thermostat Video', and 'Savings Calculator (XLS)'. At the bottom right, there's a '20th Anniversary Retrospective' banner. The bottom of the page features a 'Simple Steps to Energy Savings with Programmable Thermostats' section with two bullet points.

ENERGY STAR

energy efficient products | energy savings at home | energy efficient new homes | energy strategies for buildings & plants

Home > Products > Programmable Thermostats

Products that save energy & help prevent climate change

Certified Products | How a Product Earns the Label | Save Energy at Home | Join Our Movement | Product Specifications Search

Programmable Thermostats for Consumers

(Are you a partner? See [For Partners](#))

Overview | Specification | Buying Guidance

A programmable thermostat helps make it easy for you to save by offering four pre-programmed settings to regulate your home's temperature in both summer and winter - when you are home, asleep, or away.

- The pre-programmed settings that come with programmable thermostats are intended to deliver savings without sacrificing comfort. Depending on your family's schedule, you can see significant savings by sticking with those settings or adjust them as appropriate for your family.
- The key is to establish a program that automatically reduces heating and cooling in your home when you don't need as much. Use the programmable thermostat calculator to see what you can save with set-back temperatures that work for your family. The pre-programmed settings for a programmable thermostat are:

Setting	Time	Setpoint Temperature (Heat)	Setpoint Temperature (Cool)
Wake	6:00 a.m.	≤ 70° F	≥ 78° F
Day	8:00 a.m.	Setback at least 8° F	Setup at least 7° F
Evening	6:00 p.m.	≤ 70° F	≥ 78° F
Sleep	10:00 p.m.	Setback at least 8° F	Setup at least 4° F

Programmable Thermostat Setpoint Times & Temperatures

Simple Steps to Energy Savings with Programmable Thermostats

Achieve significant energy and money savings that are possible through the proper use of your programmable thermostat. Learn how to:

- Have your thermostat properly installed** - Here's what you need to know about proper and safe installation of your programmable thermostat, as well as when you should call a certified HVAC contractor to handle the installation for you.
- Properly set and use your thermostat** - Follow these guidelines to achieve savings.

Did you know?
The average household spends more than \$2,000 a year on energy bills - nearly half of which goes to heating and cooling. Homeowners can save about \$180 a year by properly setting their programmable thermostats and maintaining those settings.

RESOURCES

Special Offers
[Programmable Thermostat Tool](#)
[Programmable Thermostat Video](#)
[Savings Calculator \(XLS\)](#)

20th Anniversary Retrospective
[Order Your Copy](#)

ENVIRONMENTAL & PUBLIC POLICY QUESTIONS

Nest Learning Thermostat Energy Savings Claims

In one year, the Nest Thermostat could save you:

\$167 - \$480

BUY NOW AND EARN \$75

You can earn \$75 from Vectren IN when you enroll with them.

Or buy it from our store

Enter Zip or Postal Code
47905

How big is your home?
3000-4000 square feet

Do you have central AC?
☒ yes ☐ no

What type of heating do you use?
Gas

This is an estimate, not a savings guarantee.
Learn more >

Vectren Indiana 2019 Residential Rebate Application



Thank you for participating in Vectren's Indiana Residential Rebate Program! Refer to the information below to ensure you are eligible for program rebates and your application is complete. Please retain a copy of your completed application and all invoices for your records. Visit vectren.com/SaveEnergy to apply online and view complete terms and conditions.

Need Help?

For assistance completing this application, call 1-866-240-8476 or email SaveEnergy@vectren.com to reach a Vectren Energy Efficiency Advisor.

What You Will Need

- A copy of your itemized invoice that contains all equipment and installation information (please keep the original for your records)
- Your Vectren account number from your most recent bill
- Installing contractor information (if applicable)
- AHRI Certificate or AHRI Certificate Number for the appropriate equipment
- For self-installation, please provide a purchase receipt for equipment installed

HOW TO APPLY FOR A REBATE

Step 1:

Determine Eligibility

Step 2:

Complete Application and Attach Invoices

Step 3:

Submit Paperwork

- Homes using Vectren natural gas or Vectren electric as the primary heat source are eligible for this rebate. Dual fuel systems are not eligible.
- Rebate available for existing homes only; new construction is not eligible.
- "Smart" thermostat: Must be Wi-Fi capable and connected to the home. Must be ENERGY STAR certified as "Smart." Limit of two thermostats per home ("Wi-Fi" and/or "Smart").
- Wi-Fi enabled thermostat: The product must be Wi-Fi capable and connected to the internet for programming and adjusting remotely. Limit of two Wi-Fi enabled thermostats per home ("Wi-Fi" and/or "Smart").

PURDUE
UNIVERSITY

□ THERMOSTATS

Equipment specifications (please ✓)		Unit controlled (please ✓)	
<input type="checkbox"/> Wi-Fi thermostat \$50 rebate	<input type="checkbox"/> Smart thermostat \$75 rebate	<input type="checkbox"/> Central air source heat pump	<input type="checkbox"/> Gas furnace/boiler with A/C
		<input type="checkbox"/> Electric furnace with A/C	<input type="checkbox"/> Electric furnace no A/C
		<input type="checkbox"/> Gas furnace/boiler no A/C	

Manufacturer	Model number	Serial number	Date installed
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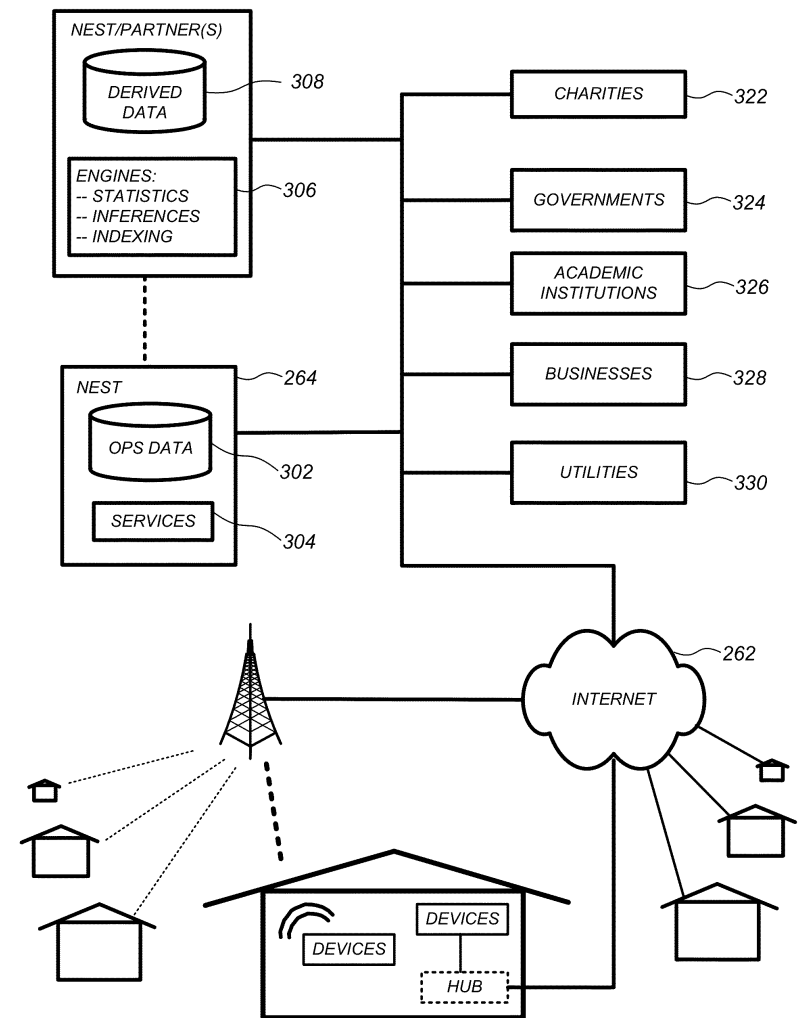
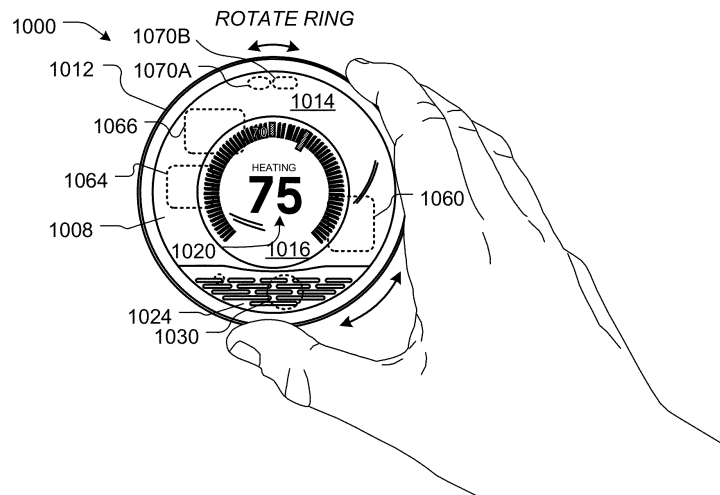
Manufacturer	Model number	Serial number	Date installed
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- Homes must have Vectren natural gas or Vectren electric as the primary heat source to be eligible for this rebate. Dual fuel systems are not eligible.
- Rebate available for existing homes only; new construction is not eligible. If replacing existing (non Wi-Fi) thermostat in newly constructed home, thermostat is eligible.
- Must be Wi-Fi capable without the use of additional equipment and connected to the internet for programming and adjusting remotely.
- Serial number is preferred, but not required.
- Must be ENERGY STAR® certified smart thermostat to be eligible for \$75 incentive.
- Household limit is two thermostat rebates.

ENVIRONMENTAL & PUBLIC POLICY QUESTIONS

Energy Star Certification

- Should a public utility (gas, electric) have the authority to **monitor** and/or **control** your thermostat settings?
- Should consumers be required to purchase a **specific product** to participate in a government-sponsored (mandated) “energy savings/control” program?
- Should a “consent clause” be included in the purchase agreement for a “Smart” / Wi-Fi enabled thermostat?
- Is there any potential for abuse of data?



ENVIRONMENTAL & PUBLIC POLICY QUESTIONS

Opinion Poll

Indicate **your opinion** on the following statement: *“I am OK with a utility company **monitoring and controlling** my **energy use** (via a smart, Wi-Fi enabled thermostat) in exchange for a lower monthly bill.”*

- A. strongly agree
- B. agree
- C. neutral (no opinion)
- D. disagree
- E. strongly disagree



ENVIRONMENTAL & PUBLIC POLICY QUESTIONS

Energy Star Certification

- Are there any **consequences** associated with the promotion of “energy star compliant” products?



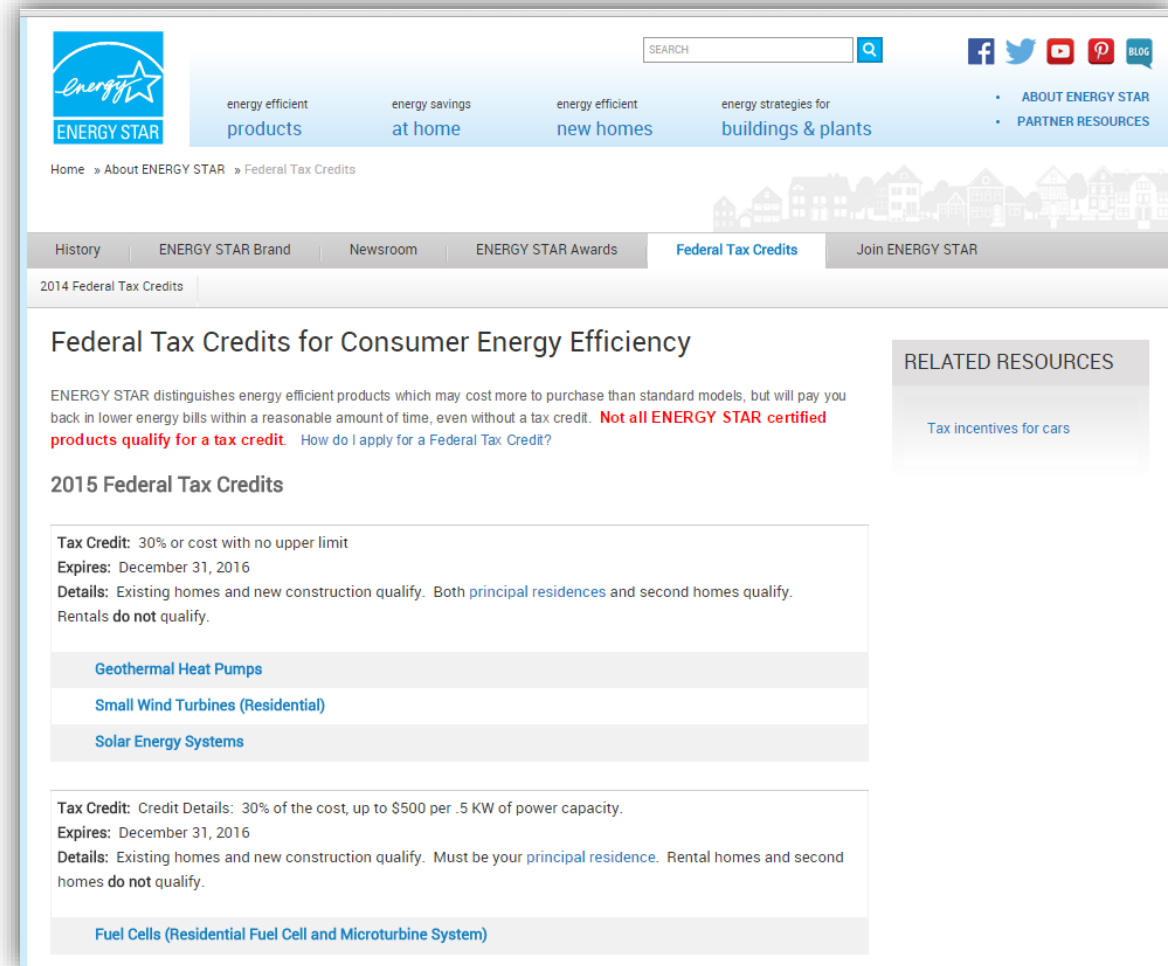
ENVIRONMENTAL & PUBLIC POLICY QUESTIONS

Energy Star Certification

- Should the government offer **tax credits** for the purchase of energy star certified products?



Capacity \leq 100 KW

A screenshot of the Energy Star website's 'Federal Tax Credits' page. The page features the Energy Star logo, a search bar, and navigation links for 'energy efficient products', 'energy savings at home', 'energy efficient new homes', and 'energy strategies for buildings & plants'. Below the navigation bar, there's a breadcrumb trail: 'Home > About ENERGY STAR > Federal Tax Credits'. The main content area is titled 'Federal Tax Credits for Consumer Energy Efficiency' and includes a paragraph explaining that ENERGY STAR distinguishes energy efficient products which may cost more to purchase than standard models, but will pay you back in lower energy bills. It also states that 'Not all ENERGY STAR certified products qualify for a tax credit'. Below this, there's a section for '2015 Federal Tax Credits' which lists 'Geothermal Heat Pumps', 'Small Wind Turbines (Residential)', and 'Solar Energy Systems'. Each item has a 'Tax Credit' detail: 30% or cost with no upper limit. The expiration date is December 31, 2016. Details specify that existing homes and new construction qualify, but rentals do not. A 'RELATED RESOURCES' sidebar on the right lists 'Tax incentives for cars'. At the bottom, there's a section for 'Fuel Cells (Residential Fuel Cell and Microturbine System)' with a 'Tax Credit' detail of 30% of the cost, up to \$500 per .5 KW of power capacity, expiring December 31, 2016. Details specify that existing homes and new construction qualify, but rental homes and second homes do not.

ENVIRONMENTAL & PUBLIC POLICY QUESTIONS

Alternate "Green" Energy Sources

- Should the government **subsidize** alternate energy production?

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Home » Residential Renewable Energy Tax Credit

RESIDENTIAL RENEWABLE ENERGY TAX CREDIT
< Back

ELIGIBILITY
Residential

SAVINGS CATEGORY
Solar Water Heat, Photovoltaics, Wind, Fuel Cells, Geothermal Heat Pumps, Other Solar-Electric Technologies, Fuel Cells using Renewable Fuels

MAXIMUM REBATE
Solar-electric systems placed in service after 2008: no maximum
Solar water heaters placed in service after 2008: no maximum
Wind turbines placed in service after 2008: no maximum
Geothermal heat pumps placed in service after 2008: no maximum
Fuel cells: \$500 per 0.5 kW

PROGRAM INFO
PROGRAM TYPE
Personal Tax Credit
REBATE AMOUNT
30%
Established by The Energy Policy Act of 2005, the federal tax credit for residential energy property initially applied to solar-electric systems, solar water heating systems and fuel cells. The Energy Improvement and Extension Act of 2008 extended the tax credit to small wind-energy systems and geothermal heat pumps, effective January 1, 2008. Other key revisions included an eight-year extension of the credit to December 31, 2016; the ability to take the credit against the alternative minimum tax; and the removal of the \$2,000 credit limit for solar-electric systems beginning in 2009. The credit was further enhanced in February 2009 by The American Recovery and Reinvestment Act of 2009, which removed the maximum credit amount for all eligible technologies (except fuel cells) placed in service after 2008.
A taxpayer may claim a credit of 30% of qualified expenditures for a system that serves a dwelling unit located in the United States that is owned and used as a residence by the taxpayer. Expenditures with respect to the equipment are treated as made when the installation is completed. If the installation is at a new home, the "placed in service" date is the date of occupancy by the homeowner. Expenditures include labor costs for on-site preparation, assembly or original system installation, and for piping or wiring to interconnect a system to the home. If the federal tax credit exceeds tax liability, the excess amount may be carried forward to the succeeding taxable year. The excess credit may be carried forward until 2016, but it is unclear whether the unused tax credit can be carried forward after then. The maximum allowable credit, equipment requirements and other details vary by technology, as outlined below.
Solar-electric property


- There is no maximum credit for systems placed in service after 2008.
- Systems must be placed in service on or after January 1, 2006, and on or before December 31, 2016.
- The home served by the system does not have to be the taxpayer's principal residence.

Customers | Contact us | Are you a contractor | FAQ

Heating & Air Conditioning » Solar Kits » 10KWACPV SOLARKIT

IWAE GENERATION 2 ACPV Grid Tied 10 kW (10,560 Watts AC) Complete Solar Energy Kit
Item #: 19456 Model #: 10KWACPV SOLARKIT

Product | **Reviews** | **Price Match**


enlarge
Write a Review

PayPal CREDIT
Get 6 Months to pay on \$99 or more
Check out with PayPal and choose PayPal Credit
Subject to credit approval. See terms. US customers only.

Regular Price **\$21120.00**
If Paid By Check* - \$422.40
PressPlay Rewards** - \$844.80
Total w/ Savings **\$19,852.80**
Found a lower price?

Available Options:
Roof Type::


Add To Cart

Free Shipping (Liftgate Included)

Free T-Shirt with coupon code: HOTWIFE
Click here to choose your free t-shirt.

* Instant savings if order paid by check
** Total rebate amount is subject to the PressPlay Rewards program terms & conditions

PRESSPLAY
REWARDS

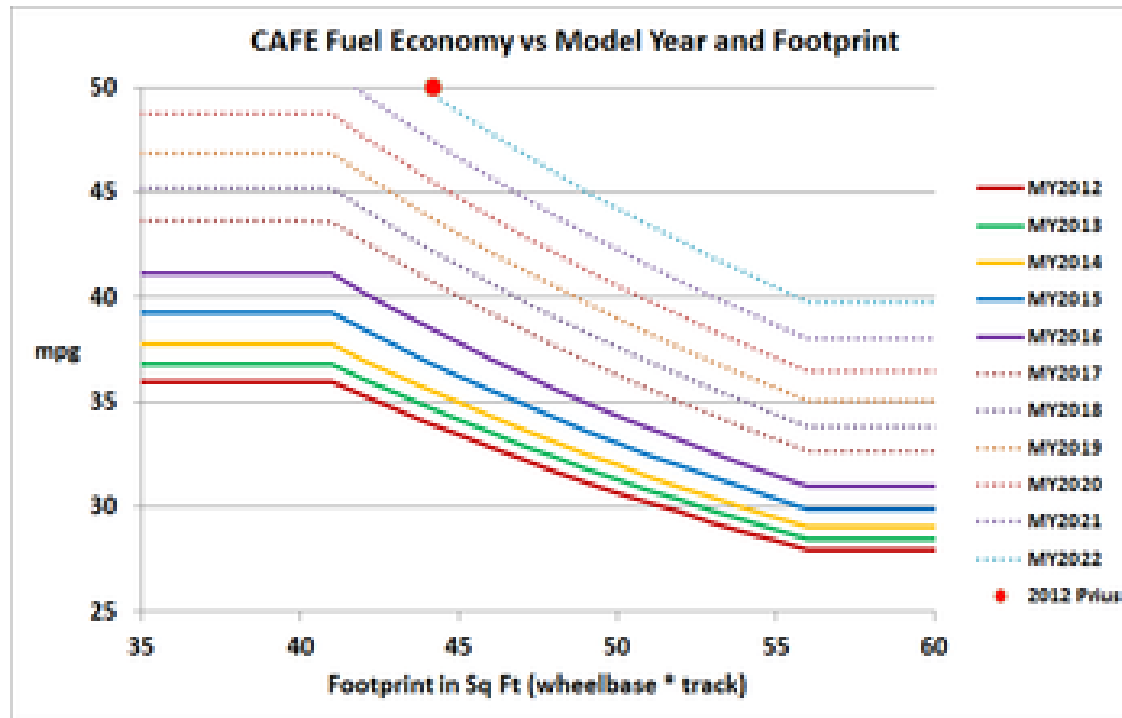

Powered by TreePodia™ 00:00 / 00:30

IWAE GENERATION 2 ACPV Grid Tied 10 kW (10,000 Watts AC) Complete Solar Energy Kit

ENVIRONMENTAL & PUBLIC POLICY QUESTIONS

Transportation

- Should the government have the authority to establish **fuel economy** (Corporate Average Fuel Economy or “CAFE”) standards for automobiles?



NHTSA
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

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CAFE - Fuel Economy
Child Passenger Safety
Disabled Drivers and Passengers
Electronic Stability Control (ESC)
Manufacturer Info
Other Equipment
Seat Belts
Tires
Vehicles

CAFE - Fuel Economy

Corporate Average Fuel Economy (CAFE)
First enacted by Congress in 1975, the purpose of CAFE is to reduce energy consumption by increasing the fuel economy of cars and light trucks. NHTSA has recently set standards to increase CAFE levels rapidly over the next several years, which will improve our nation's energy security and save consumers money at the pump. This site contains an immense amount of information about the CAFE program including a CAFE overview, rulemaking actions, fleet characteristics data, compliance activities, summaries of manufacturers' fuel economy performances since 1978, and related studies.

NHTSA Consumer Research on Fuel Economy, GHG and Alternative Fuels
Read the final reports and webinar presentation for focus groups and online surveys NHTSA conducted to inform development of a consumer education campaign.
» Focus Groups Details and Results
» Online Survey Details and Results
» Webinar Materials on Research

LATEST NEWS
Proposed Rule Alternative Fuel Badging and Consumer Information
NHTSA is proposing to require badges, labels and owner's manual information for new passenger cars, low-speed vehicles (LSVs) and light-duty trucks rated at not more than 8,500 pounds gross vehicle weight, in order to increase consumer awareness regarding the use and benefits of alternative fuels.
This proposed rule would implement specific statutory mandates that manufacturers be required to: Identify each vehicle capable of running on an alternative fuel by means of a permanent and prominent display affixed to the exterior of the vehicle; add proposed text describing the capabilities and benefits of using alternative fuels to the owners' manuals provided for alternative fuel vehicles; and identify each vehicle that is capable of running on an alternative fuel by means of a label in the fuel filler compartment.
» View or download a copy of the proposed rule
» Please submit any comments on or before April 21, 2014, to docket number: NHTSA-2010-0134

Phase 2 of the DOT and EPA Fuel Efficiency and GHG Emission Program for Medium- and Heavy-Duty Vehicles announced
President Obama directs the National Highway Traffic Safety Administration (NHTSA) and the Environmental Protection Agency (EPA) to develop and issue the next phase ("Phase 2") of medium- and heavy-duty vehicle fuel efficiency and greenhouse gas (GHG) standards by March 2016. Under this timeline, the agencies are expected to issue a Notice of Proposed Rulemaking (NPRM) by March 2015. This second round of fuel efficiency standards will build on the first-ever standards for medium- and heavy-duty vehicles (model years 2014 through 2018).

Fuel Economy Program Reports
» 2004 Report
» 2003 Report
» 2002 Report
» 2001 Report
» 2000 Report
» 1999 Report

Summary of Fuel Economy Performance
» December 2014 Summary of Fuel Economy Performance
» Flexible Fuel Credits (2003-2013)
» Summary of CAFE fines (Updated August 2014)
» CAFE Credit Status for Models Year 2008 through 2012
» New Passenger Car Fleet Characteristics
» Domestic Passenger Car Fleet Characteristics
» Imported Passenger Car Fleet Characteristics
» Light Truck Fleet Characteristics

ENVIRONMENTAL & PUBLIC POLICY QUESTIONS

Transportation

- Should the government offer **tax incentives** for all-electric vehicles and plug-in hybrids?



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Form 8936, Qualified Plug-in Electric Drive Motor Vehicle Credit

Use this form to figure your credit for qualified plug-in electric drive motor vehicles you placed in service during your tax year. Also use Form 8936 to figure your credit for certain qualified two- or three-wheeled plug-in electric vehicles acquired after 2011.

Current Products

[Form 8936](#)

Recent Developments

Other Items You May Find Useful

[All Form 8936 Revisions](#)

[Notice 2009-89](#), New Qualified Plug-in Electric Drive Motor Vehicle Credit

[Notice 2012-54](#), Qualified Plug-in Electric Drive Motor Vehicle Credit; Update of Notice 2009-89

[Publication 463](#), Travel, Entertainment, Gift, and Car Expenses

[Other Current Products](#)

Comment on Form 8936

Use the [Comment on Tax Forms and Publications](#) web form to provide feedback on the content of this product. Although we cannot respond individually to each comment, we do appreciate your feedback and will consider all comments submitted.

CAUTION: We cannot respond to tax-related questions submitted using this page. Instead, please see our [Tax Law Questions](#) page.

Page Last Reviewed or Updated: 23-Feb-2015

Related Items

- Form 1040, U.S. Individual Income Tax Return
- Form 1040NR, U.S. Nonresident Alien Income Tax Return
- Form 1065, U.S. Return of Partnership Income
- Form 1120S, U.S. Income Tax Return for an S Corporation
- Form 4562, Depreciation and Amortization
- Form 5695, Residential Energy Credits
- Form 8834, Qualified Plug-in Electric and Electric Vehicle Credit
- Form 8910, Alternative Motor Vehicle Credit

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ENVIRONMENTAL & PUBLIC POLICY QUESTIONS

Transportation

- Should the government **require** oil companies to manufacture ethanol (E85) fuel as well as add 10-15% ethanol to gasoline?

It takes 1.5 gallons of ethanol (E-85) to drive as many miles as one gallon of gasoline.

Every gallon of ethanol removes 53 cents from the Federal Highway Trust Fund because of a special tax break for producers.

The screenshot shows a web page from Green Car Reports. The article title is "Ethanol A Victim Of Change As Gasoline Sales Have Flatlined?". The author is John Voelcker, with 48 comments and 3,346 views, dated Dec 11, 2013. The article features a photo of a man speaking at a podium next to a sign that says "E85". The text of the article discusses the impact of ethanol on gasoline sales and the federal highway trust fund. On the right side of the page, there are several promotional banners: "Take Us With You! Green Car Reports All-New for iPhone & iPad", "SPRING SALES EVENT EV CHARGING", "News In Your Inbox GreenCarReports", and "The OIL BOOM IS HERE!".

SUMMARY

Economics / Freedom / Personal Responsibility

- What aspects of environmental protection and sustainability should be determined or mandated by government?
- Why are *some* regulations ultimately necessary?
- Would we as citizens be better off with a more *limited* government (greater *free-market* based determination of environmental policies), or would we benefit from additional regulations in this area?
- What is our *personal responsibility* toward ensuring environmental protection and sustainability?

ENVIRONMENTAL IMPACT ANALYSIS REPORT

Homework Assignment (Part 2)

- Outline the environmental impact of your product at various stages of its life-cycle
 - manufacture (natural resources, hazardous chemicals, energy)
 - normal use (expected product lifetime, EMI, energy consumed when both “on” and “off”)
 - disposal/recycling (instructions for hazardous waste handling and disassembly/recycling)
- Discuss how you would address each of the environmental impact concerns outlined in your report