

# Energy Use Data:

## Evaluate, Target and Scale

# The Problem

U.S. residential and  
commercial buildings use  
~40% of U.S. energy use

# **The Solutions**

**Energy Efficiency +  
Demand Side Management +  
Green Buildings +  
Smart Grid**

U.S. states spend \$ 7 Billion of ratepayer money on energy efficiency programs

State level green building tax credits, property tax incentives, ~10,000 + buildings

\$ 4.5 Billion federal funds on smart meters (mostly)

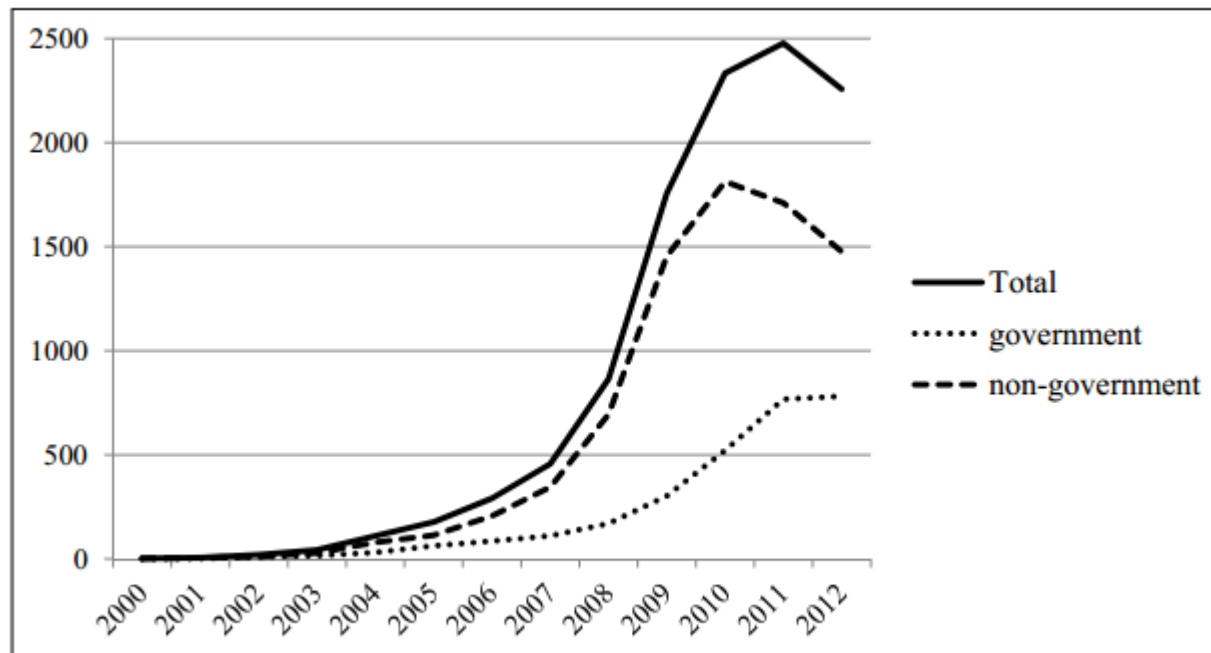


Figure 1. Annual trend of the number of new certified green buildings

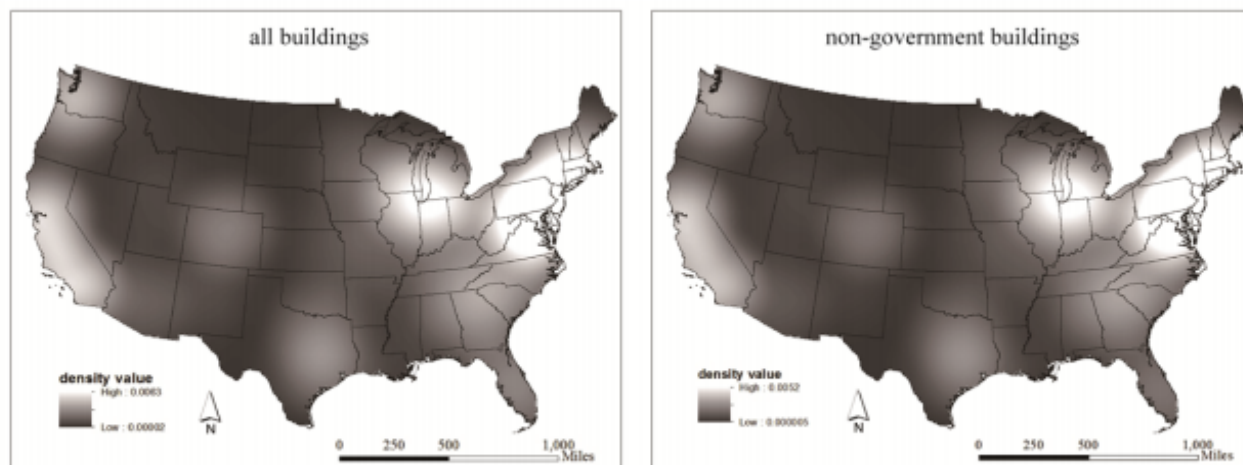


Figure 2. Kernel density surfaces

# U.S. Energy Data—Generation

## U.S. Department of Energy—EIA

### ELECTRICITY

[OVERVIEW](#)[DATA ▾](#)[ANALYSIS & PROJECTIONS ▾](#)[GLOSSARY >](#)[FAQS >](#)

*New Addition:* Use EIA's new interactive [Electricity Data Browser](#) to find generation, fuel consumption, sales, revenue and average price time series, and even drill down to the plant level data. Take it for a test drive and give us feedback!

Find statistics on electric power plants, capacity, generation, fuel consumption, sales, prices and customers.

[+ EXPAND ALL](#)

▶ Summary	Additional formats
▶ Sales (consumption), revenue, prices & customers	Additional formats
▶ Generation and thermal output	Additional formats
▶ Electric power plants generating capacity	Additional formats
▶ Consumption of fuels used to generate electricity	Additional formats
▶ Receipts of fossil-fuels for electricity generation	Additional formats
▶ Average cost of fossil-fuels for electricity generation	Additional formats
▶ Fossil-fuel stocks for electricity generation	Additional formats
▶ Revenue and expense statistics for...	Additional formats
▶ Electricity purchases, sales for resale, imports/exports, reliability	Additional formats

#### Most requested electricity data

##### Sales, revenue & prices

- [Retail price to customers](#)
- [Revenue](#)
- [Retail sales](#)
- [Wholesale market data](#)
- [Average electricity consumption](#)
  - [Residential](#)
  - [Commercial](#)
  - [Industrial](#)

##### Electric power plants

- [Existing capacity by energy source](#)
- [Electric generating capacity summary data](#)

# U.S. Energy Data—Emissions

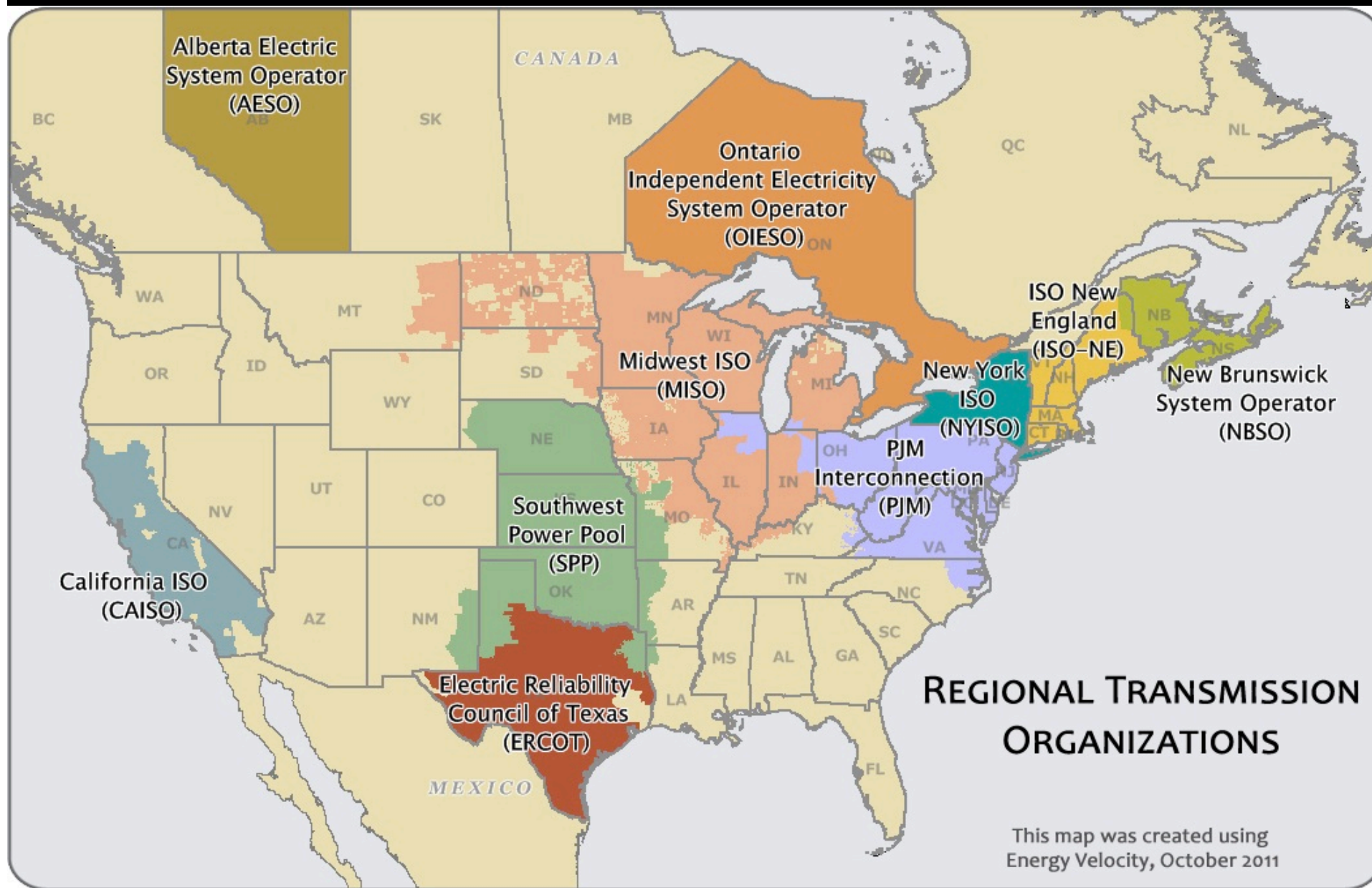
## ● U.S. Environmental Protection Agency eGRID

### eGRID2012 files

The following eGRID2012 Version 1.0 files are available for download:

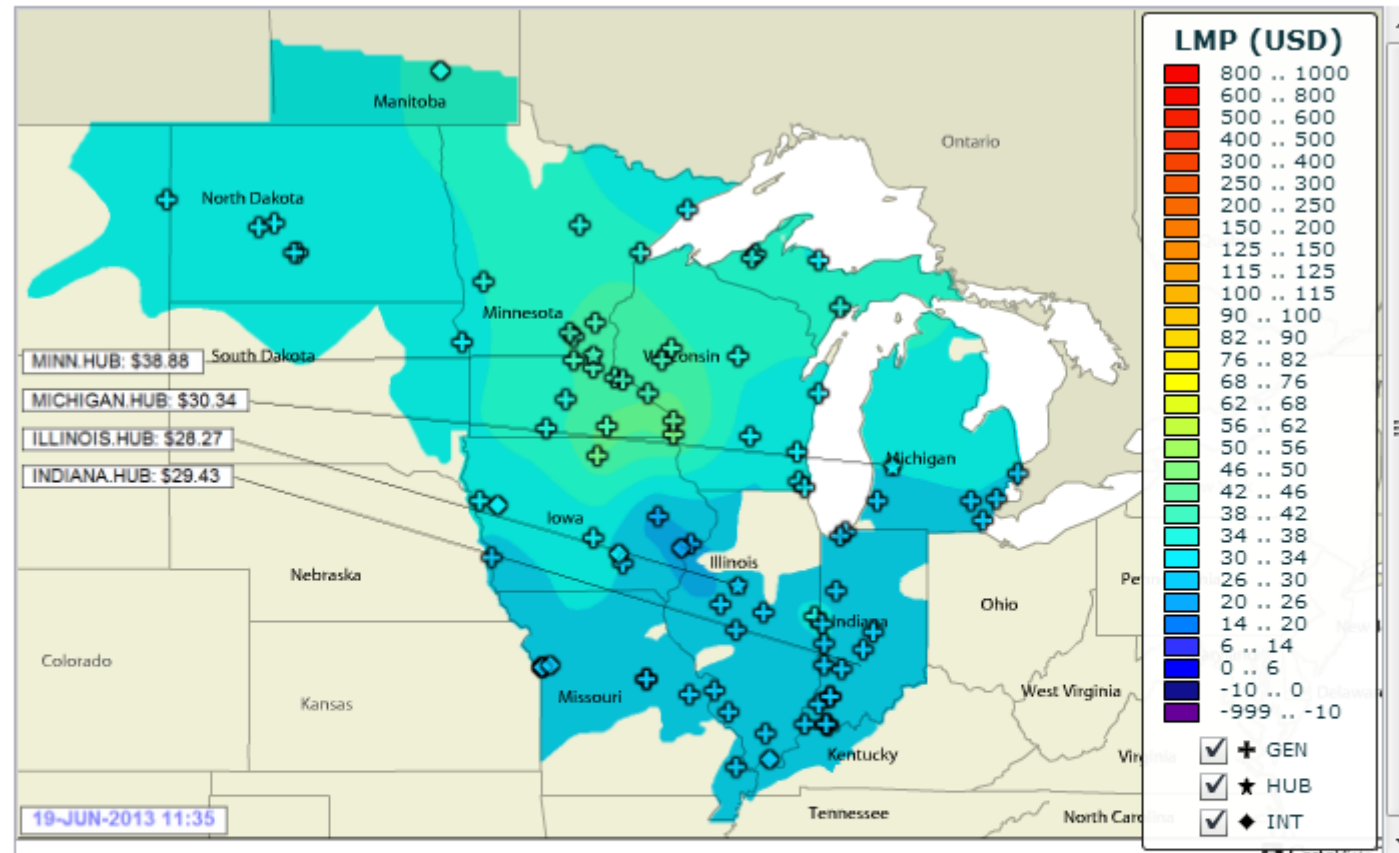
- [eGRID2012 Version 1.0 - all files \(ZIP\)](#) (34.2M) – contains spreadsheet files, state import-export files, Technical Support Document, file structure document, Summary Tables, GHG output emission rates, the EUEC2010 paper, and graphical representations of eGRID subregion and NERC region maps. Data in this file encompasses years 2009, 2007, 2005 and 2004.
- [eGRID2012 year 2009 data files \(XLS\)](#) (16.9M)
- [eGRID2012 year 2009 Technical Support Document \(PDF\)](#) (104 pp., 612K)
- [eGRID2012 year 2009 Summary Tables \(PDF\)](#) (13 pp., 1.47M)
- [eGRID2012 year 2009 eGRID subregion GHG output emission rates \(PDF\)](#) (1 pg., 312K)
- [eGRID2012 NERC region representational map \(JPG\)](#) (525K)
- [eGRID2012 eGRID subregion representational map \(JPG\)](#) (635K)
- [eGRID2012 release notes \(TXT\)](#) (6K)
  
- [eGRID2010 year 2007 plant and aggregation files and file structure document \(ZIP\)](#) (6.4M)
- [eGRID2010 state import-export files \(XLS\)](#) (108K)
- [eGRID2010 year 2007 Technical Support Document \(PDF\)](#) (120 pp., 1.5M)
- [eGRID2010 year 2007 Summary Tables \(PDF\)](#) (13 pp., 2.4M)
- [eGRID2010 year 2007 eGRID subregion GHG output emission rates \(PDF\)](#) (1 pg., 278K)
- [eGRID2010 release notes \(TXT\)](#) (4K)
  
- [eGRID2007 year 2005 plant and aggregation files \(ZIP\)](#) (5.7M)
- [eGRID2007 year 2005 Technical Support Document](#) (100 pp., 1.0M)
- [eGRID2007 year 2005 Summary Tables \(PDF\)](#) (12 pp., 511K)
- [eGRID2007 year 2005 subregion GHG output emission rates \(PDF\)](#) (1 pg., 193K)
  
- [eGRID2006 year 2004 plant and aggregation files \(ZIP\)](#) (4.89M)
- [eGRID2006 year 2004 Technical Support Document \(PDF\)](#) (86 pp., 3.0M)
- [eGRID2006 year 2004 Summary Tables \(PDF\)](#) (9 pp., 3.03M)
  
- [Paper: The Value of eGRID and eGRIDweb to GHG Inventories \(PDF\)](#) (13 pp., 296K)

Year 1996-2000 data can be downloaded from the [eGRID Archive](#) page.





# U.S. Energy Data—Markets



Jun. 19, 2013 - Interval 11:35 EST

	Hourly Day-Ahead			Five Minute Real-Time			Delta			Last Hour Estimated		
	HE 12			11:35						HE 11		
Location	LMP	MLC	MCC	LMP	MLC	MCC	LMP	MLC	MCC	LMP	MLC	MCC
AEC	31.72	-1.89	-1.27	30.59	-1.49	-0.05	1.12	-0.39	-1.22	45.95	-2.29	-0.7
AFCT	28.34	-2.47	-4.07	29.32	-2.11	-0.70	-0.98	-0.36	-3.37	44.40	-3.25	-1.3

# Information Asymmetry

- ⦿ Level of regulation
  - States, counties, towns
- ⦿ Level of access
  - Individual researcher and utility non-disclosure agreement
- ⦿ Temporal and spatial considerations on energy use on the distribution network

# U.S. Energy Use Data

- ⦿ Federal Surveys and Modeling
  - RECS: Residential Energy Consumption Survey
    - 2009, 12,000 households
  - CBECS: Commercial Building Energy Consumption Survey
    - 2003 (released 2008)
  - MECS: Manufacturing Energy Consumption Survey
    - 2011 with 2013 release, 15,000 facilities

# Survey Use Data Problems

## **EFFECTIVE TRACKING OF BUILDING ENERGY USE**

**Improving the Commercial Buildings and  
Residential Energy Consumption Surveys**

Panel on Redesigning the Commercial Buildings and  
Residential Energy Consumption Surveys of the  
Energy Information Administration

William F. Eddy and Krisztina Marton, *Editors*

Committee on National Statistics  
Division of Behavioral and Social Sciences and Education

Board on Energy and Environmental Systems  
Division on Engineering and Physical Sciences

NATIONAL RESEARCH COUNCIL  
OF THE NATIONAL ACADEMIES

# Concerns

- ⦿ Privacy of Smart Grid Data
  - Ownership
  - Use
  - Third Party Access
- ⦿ Cybersecurity and Smart Grid Data
- ⦿ ¿How to balance public accountability with these concerns?

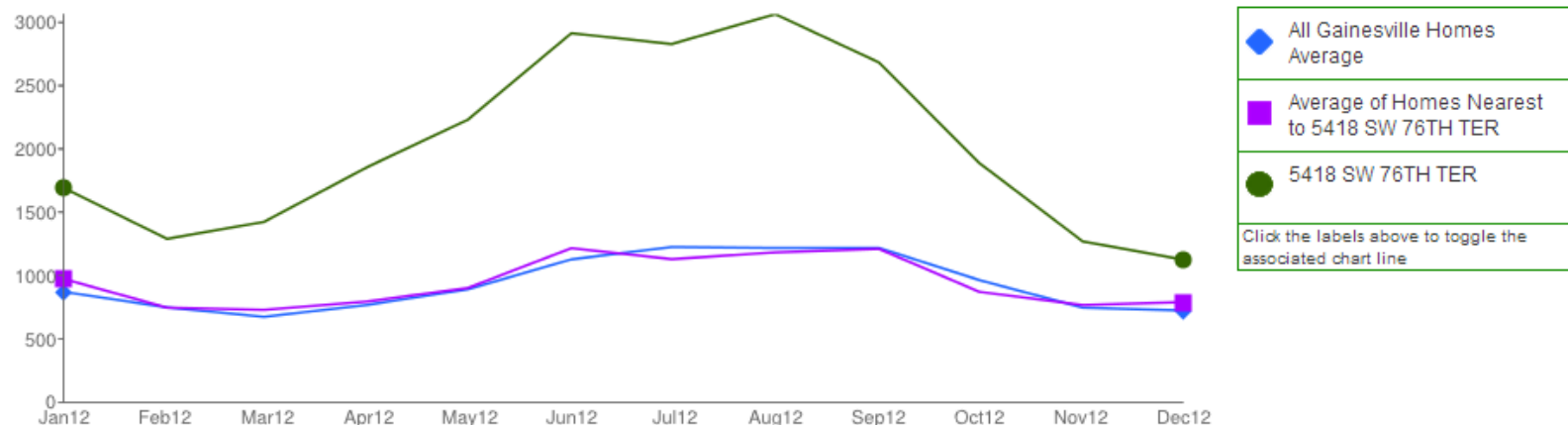
[Address Search](#)
[Map Search](#)
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### Compare your Home's Energy Use

Home Energy Report for: 5418 SW 76TH TER

[Claim this Home](#)
[Add To Group](#)
[Print](#)
[f](#)
[t](#)
[e](#)
[ShareThis](#)

1/2012 to 12/2012 electricity consumption (kWh) - [View More Graphs](#)



Select Type:



Electricity

Comparing to:

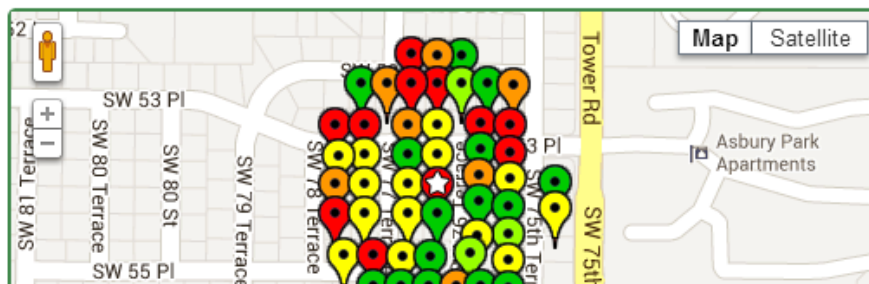
Nearest 100 homes

For Year:

2012

Normalize per 1000 sq. feet.

☐ Yes ☒ No



Electricity makes up the bulk of most energy usage. The major factors here are your air conditioner, refrigerator, clothes dryer, water heater, and stove.

[Download this electricity data](#)

Home Information:

5418 SW 76TH TER, GAINESVILLE, FL 32608

[Map](#)
[Satellite](#)

[View Larger Map](#)

[Terms of Use](#) [Report a map error](#)

he home.

ger bills \$\$\$\$) High



# Other Sensitive Data

- ⦿ TRI and “Right to know”
- ⦿ Health Care
- ⦿ School Performance
- ⦿ Security and Exchange Commission and Financial Trading
- ⦿ Surface Transportation Board
- ⦿ U.S. Census

# Other Considerations

- ⦿ Data intervals and granularity
  - Seconds, minutes, hours, days, weeks, months years
  - Plug, house, substation
- ⦿ Different data for different questions
- ⦿ Political contours



	Electricity Markets	DG: e.g. Sizing Buildings for Solar	EE: Evaluate	EE: Target	EE: Scale	Energy Models (carbon, building, demand)	Long- term System Planning
second							
minute							
15 minute							
hour							
day							
month							
year							



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

## **TVA's New CO<sub>2</sub> Accounting System Provides Improved Customer Accuracy**

TVA just developed a first-of-its-kind program that provides customers with the specific CO<sub>2</sub> lbs/MWh content of their electric purchases using their actual consumption profile. Just as the underlying cost of electricity varies from customer to customer (depending on their electric usage), the carbon content of those energy purchases differ too. In the past, TVA relied on a system-wide average for carbon content to share with customers.

This exciting new pilot program initially targets TVA's directly served customers. Information provided to customers in this manner is consistent with generally accepted carbon accounting standards, such as *The Climate Registry's Electric Power Sector Protocol* and *The Greenhouse Gas Protocol's Corporate Accounting and Reporting Standard*.



# Outstanding issues

- ⦿ Standard format
- ⦿ Access
- ⦿ Funding
- ⦿ Political capital

Other examples?

*Trust but verify.  
And verify again . . .*

*– Ronald W. Reagan*

Support: National Science Foundation **NSF-SES 1127697**  
And IREE

### 1. Does EIA have official EIA energy consumption statistics for counties, cities and ZIP codes?

EIA does *not* produce any energy consumption and end use statistics for sub-State geographies. Because the RECS is a small sample survey, tables only show data for the U.S., Census Regions, Census Divisions, and selected States. A larger sample of households in the 2009 RECS expanded the State program to 16 States. [Read more ›](#)

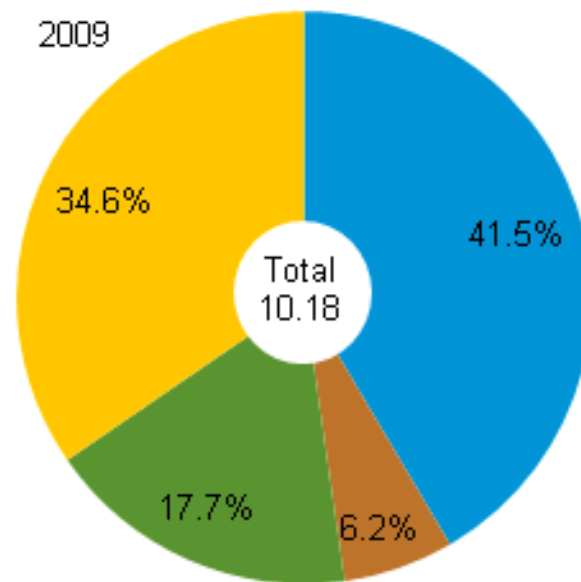
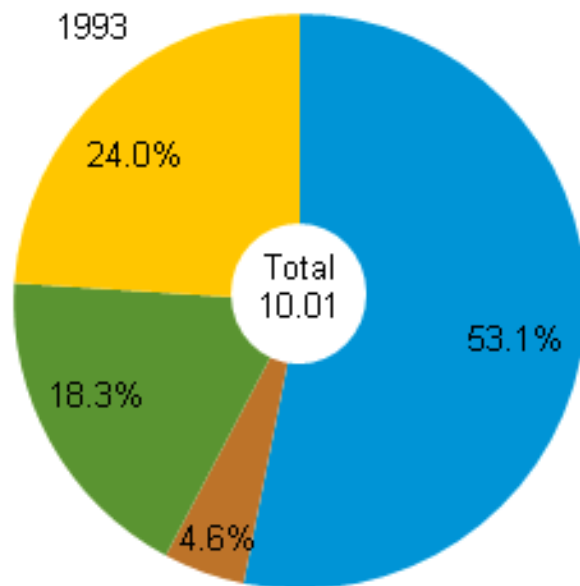


# Residential Energy Use

MARCH 7, 2013

## Heating and cooling no longer majority of U.S. home energy use

**Energy consumption in homes by end uses**  
quadrillion Btu and percent



■ space heating ■ air conditioning ■ water heating ■ appliances, electronics, and lighting

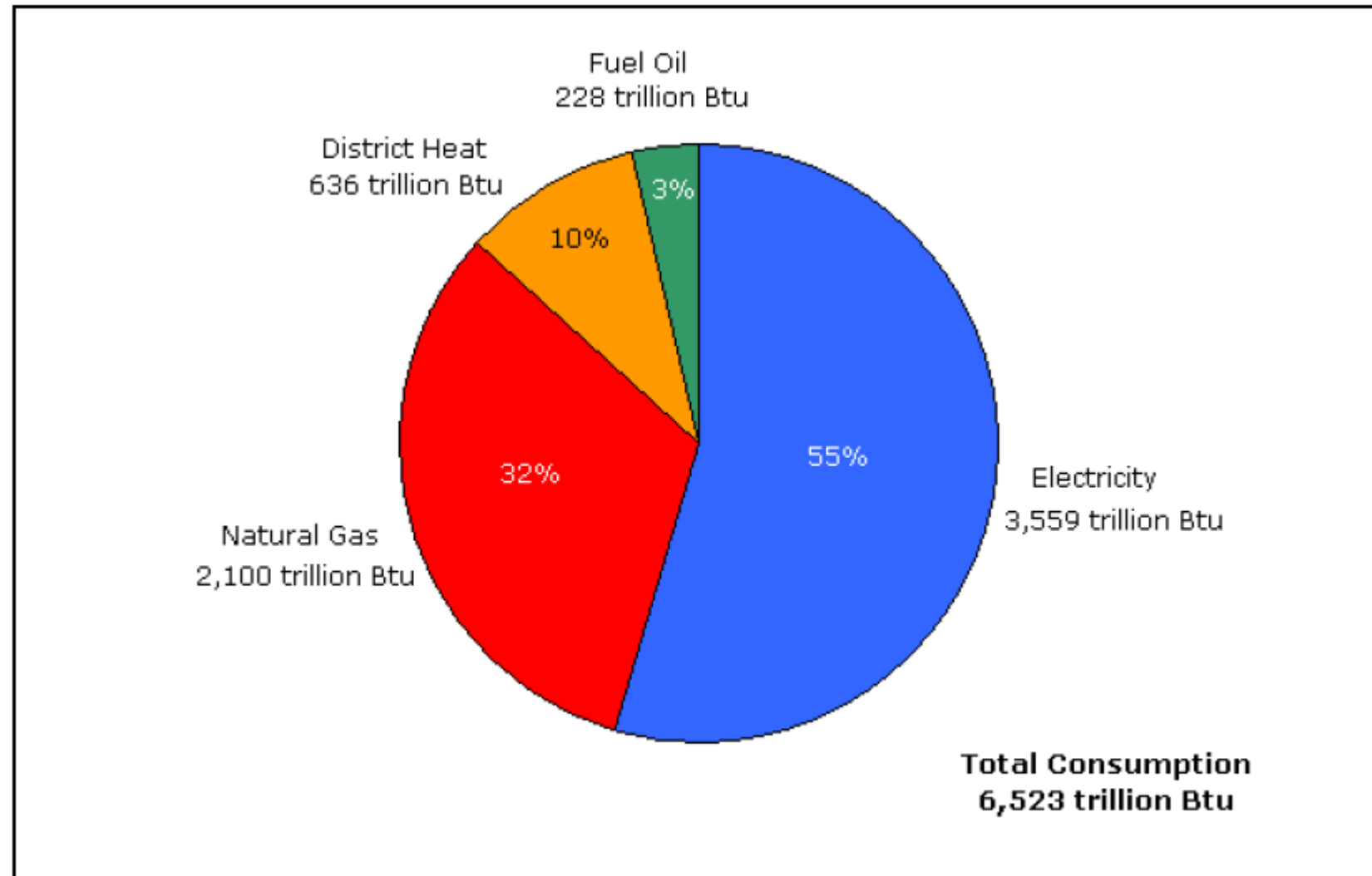
Source: U.S. Energy Information Administration, Residential Energy Consumption Survey.

Note: Amounts represent the energy consumption in occupied primary housing units.

<http://www.eia.gov/todayinenergy/detail.cfm?id=10271>

# Commercial BECS 2003

Figure 1. Electricity accounts for more than half of energy consumed by commercial buildings.



Source: Energy Information Administration, 2003 Commercial Buildings Energy Consumption Survey, [Table C1A](#).

#### **4. How does the public obtain copies of financial and statistical data submitted by the railroads to the STB?**

Answer. As a matter of policy, we routinely share the annual and periodic data submitted by the railroads to the STB with other government agencies and the public. We have a conference room which we make available to the public where the data can be reviewed. Since this room is made available to the public by appointment only it is important that the public contact either Scott Decker at (202) 245-0330 or Paul Aguiar (202) 245-0323 to arrange for your visit. In order to have certain data copied and mailed to your address, please contact the Office of Congressional and Public Services at (202) 245-0230 for any fees involved in retrieving and copying the requested data.

### **What are the uses of Master Waybill File?**

Answer. **Data** from the Waybill Sample are used as input to many STB projects, analyses, and studies. Federal agencies (Department of Transportation, U.S. Department of Agriculture, etc) use the Waybill Sample as part of their information base. The Waybill Sample is also used by States as a major source of information for developing state transportation plans. In addition, non-government groups seek access to waybill sample **data** for such uses as market surveys, development of verified statements in STB and State formal proceedings, forecast of rail equipment requirements, economic analysis and forecasts, academic research, etc.

### **Who can get access to information from the Master Waybill File?**

Answer. Because the Master Waybill File contains sensitive shipping and revenue information, access to this information is restricted to: railroads; Federal agencies; the States; transportation practitioners, consultants and law firms with formal proceedings before the STB or State Boards; and certain other users. Rules governing access to Waybill **Data** are described in [49 CFR 1244.9](#).

### **Who can access the Public Use File?**

Answer. Anyone can access the non-confidential **data** in the Public Use File by sending a written request to: OEEAA, Surface Transportation Board, 1925 K Street, N.W., Washington, D.C., 20423-0001. The content of waybill requests are described in [49 CFR 1244.9](#).