

Unlocking the “power” of big data:

Analyzing energy consumption across 50 million US households

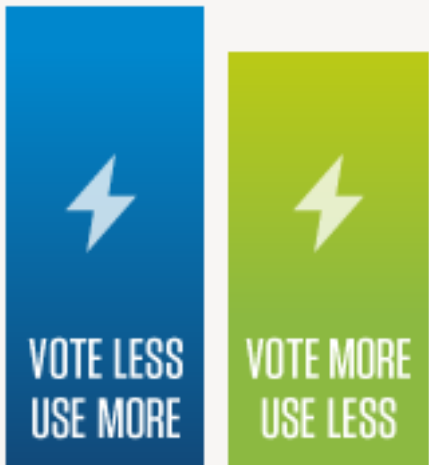
Barry Fischer

November 13, 2012



Who in here voted?

**Do Americans
who vote
use MORE or LESS
energy?**



**Frequent voters use
7-10% less electricity
than infrequent voters.**

How do we know that?

Opower works with 75+ utilities globally



**...to make energy data
understandable
to people**

Keep This Portion For Your Records

ACCOUNT NUMBER	12345-67890
NAME	Joe Smith
SERVICE AT	12345 Main St. Anywhere, State USA

BILL DATE	Aug 17, 2009
------------------	--------------

TOTAL AMOUNT DUE BY	Aug 31, 2009	\$189.86
AMOUNT PAYABLE AFTER DUE DATE		\$192.71

Payment Received on Aug 4, 2009 \$323.52

TYPE OF READING	METER NUMBER	SERVICE FROM	TO	NO. DAYS	METER READING		READING DIFFERENCE	METER MULTIPLIER	THERM FACTOR	USAGE	R D
					PREVIOUS	PRESENT					
Total Therm	04013633	07/13-08/13	31		9346.0000	9348.0000	2.0000	1.0000	1.00000	2.0000A	
Total kWh	10109168	07/13-08/13	31		1471.0000	2725.0000	1254.0000	1.0000		1254.0000A	

		Service To	SUMMARY		Service To
Total kWh		08/13/2009	1254.0000	Summer kWh	08/13/2009
Sales Therm		08/13/2009	2.0000		

NATURAL GAS SERVICE BILLING DETAIL

GDS-2 Small Gen Gas Del-Sp Ht		Service From	07/13/2009	To	08/13/2009
Customer Charge			\$31.49		
Delivery Charge Gas	2.00	@ \$.06331000	\$0.13		
Com Gas Env Chg	2.00	@ \$.01469900	\$0.03		
Rider GER Charge	2.00	@ \$.00456000	\$0.01		
Total Delivery Service Amount					\$31.66
Gas Supply		Service From	07/13/2009	To	08/13/2009
Gas Charge (PGA)	2.00	@ \$.55844456	\$1.12		
Total Supply Amount					\$1.12
Taxes		Service From	07/13/2009	To	08/13/2009
Illinois State Gas Revenue Tax			\$0.05		
Illinois State Commerce Commission Tax			\$0.03		
Total Tax Related Charges					\$0.08
Total Natural Gas Charges					\$32.86

ELECTRIC SERVICE BILLING DETAIL

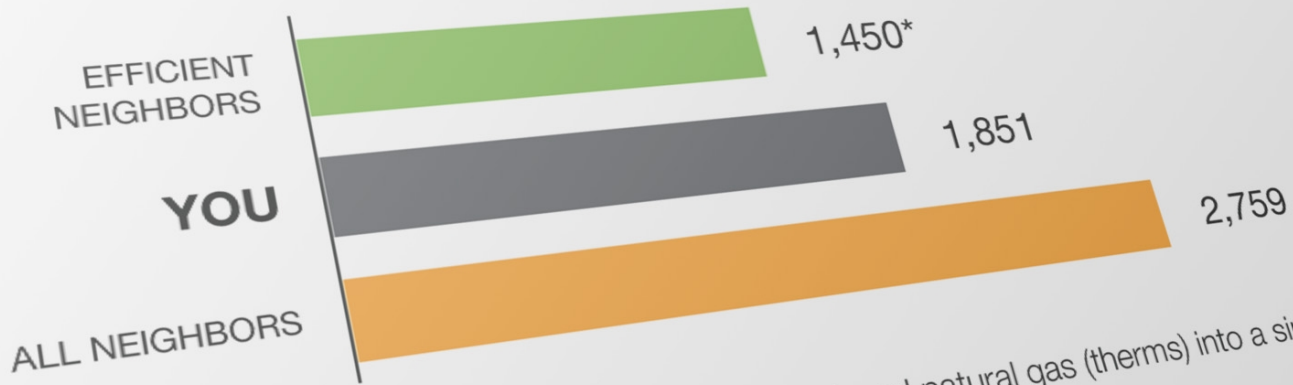
DS - Small General Service (DS-2)		Service From	07/13/2009	to	08/13/2009
Customer Charge			\$12.46		
Meter Charge			\$5.15		
Distribution Deliv Chg Summer	1,254.00 kWh	@ \$.02554000	\$32.03		
Rider EDR Charge	1,254.00 kWh	@ \$.00098846	\$1.24		
Total Delivery Service Amount					\$50.88
Electric Supply (BGS-2)		Service From	07/13/2009	to	08/13/2009
Purch Elec Summer	1,254.00 kWh	@ \$.07729000	\$96.92		
Purchased Electric Adj	1,254.00 kWh	@ -.00201708	-\$2.53		
Rider PER Supply Cost Adj	1,254.00 kWh	@ \$.00068000	\$0.85		
Transmission Service Charge	1,254.00 kWh	@ \$.00379000	\$4.75		
Total Supply Amount					\$99.99
Taxes		Service From	07/13/2009	to	08/13/2009
Peoria Municipal Charge			\$4.85		
Illinois State Electricity Excise Tax			\$4.14		
Total Tax Related Charges					\$8.99
Total Electric Charges					\$159.86

MISCELLANEOUS CHARGES DETAIL

Credit	CR	\$2.86	
Total Miscellaneous Charges			-\$2.86
Current Month Charges			\$189.86

November Neighbor Comparison

You used **28% MORE** energy than your efficient neighbors



* This energy index combines electricity (kWh) and natural gas (therms) into a single measurement.

WHO ARE YOUR "NEIGHBORS"?

ALL NEIGHBORS
Approximately 100 occupied nearby homes that are similar in size to you (avg 2,023 sq ft) and have both electricity and natural gas service.

Neighbor Comparison

You used **74%**
This costs y

Big Data

75+ utilities

28 US states

6 countries

80 billion meter reads per year



Customer Interaction History



High-resolution weather data



Local government data on house type and size

480 kWh



Comparing to other houses in the neighborhood

Opower Outlier Blog: Making energy data interesting

The image shows a screenshot of the OPOWER Outlier Blog homepage. The page has a blue header with the OPOWER logo on the left and the word "BLOGS" on the right. Below the header, there are three featured blog posts, each with a representative image and a title:

- OUR THINKING**: "New Frontiers for Peak Power Reduction" (Image: A futuristic car dashboard).
- OUTLIER**: "How much does it cost to charge an iPhone 5? A thought-provokingly modest \$0.41/year" (Image: An iPhone 5 being charged).
- OUTLIER**: "Hot and heavy energy usage: How the demand and price for electricity skyrocketed on a 100° day" (Image: A melting blue popsicle).

Below these posts, there is a section for a featured article:

- OUTLIER**: "Turning weather forecasts into power outage forecasts" (Image: A stylized face wearing glasses).

The article by Barry Fischer, dated October 30, 2012, has 4 tweets, 3 likes, and 1 share. It includes social media sharing buttons for Twitter, Facebook, and Google+. The article text begins with: "Is it possible to examine a hurricane forecast and figure out in advance how many customers will lose power because of the storm? An innovative engineering professor at Johns Hopkins University is demonstrating that it can be done with reasonable accuracy."

On the right side of the page, there is a "SUBSCRIBE" button, a search bar, and a list of links: "Opower Elsewh...", "Opower Careers", "Opower on Facebook", and "Opower on Twitter".

A large, semi-transparent OPOWER logo is overlaid on the right side of the page. The logo features a stylized blue face wearing glasses, with the word "OPOWER" in a bold, blue, sans-serif font below it.

“Outlier” has attracted a diverse, popular audience

Los Angeles Times

POLITICO

Forbes



ELECTRIC LIGHT & POWER

Mashable

THE HUFFINGTON POST



SCIENTIFIC AMERICAN



MacRumors
news and rumors you care about



greentechmedia:

GIGaom

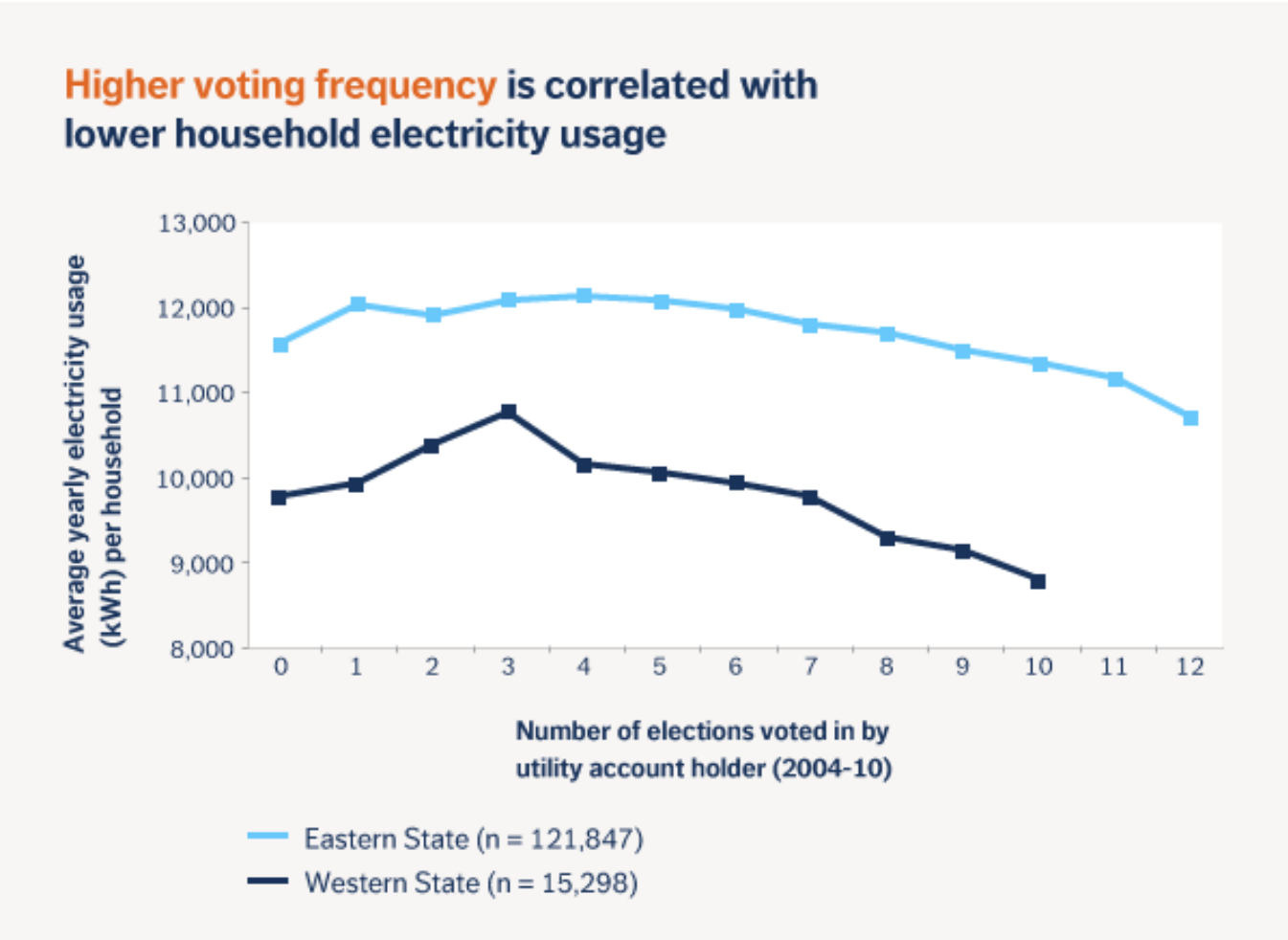
FASTCOMPANY

Do Americans who vote more also use less energy?

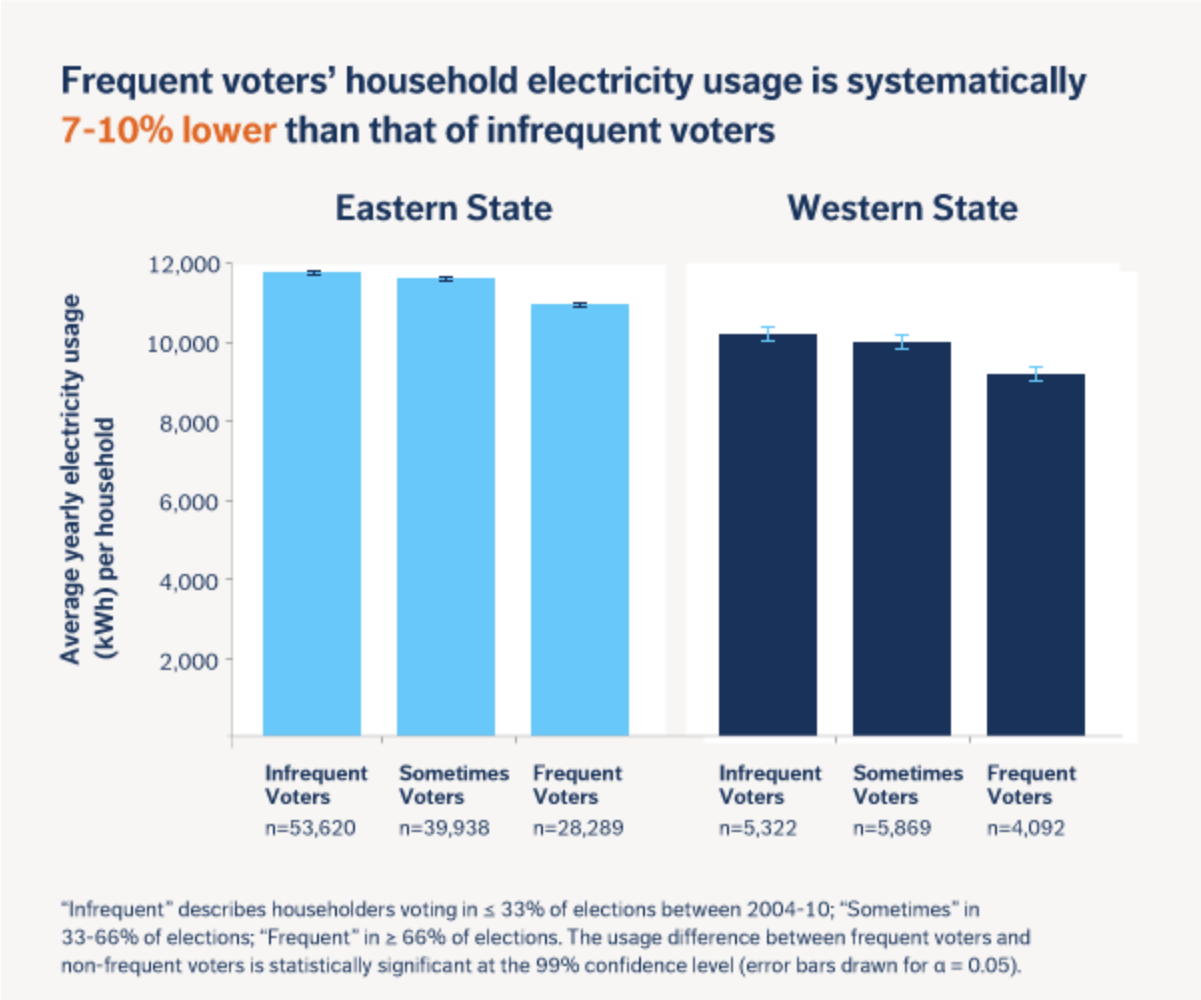


- **137,000 households across two states**
- **Each household matched with 7 years of household-level voter turnout data (~10 elections between 2004-2010)**
- **Third-party data on age, income, heat type, occupancy, etc. controlled via a multivariate regression model**

Do Americans who vote more also use less energy?

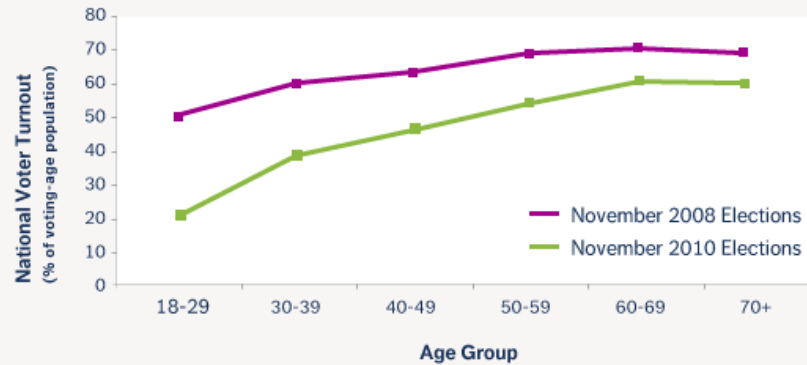


Do Americans who vote more also use less energy?



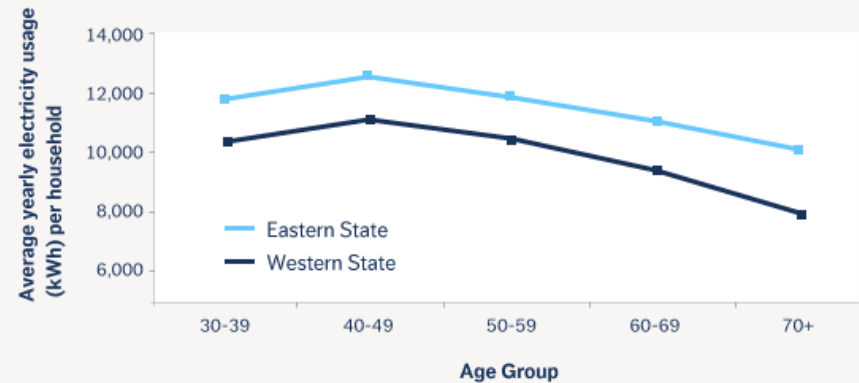
Do Americans who vote more also use less energy?

Older Americans have **higher voter turnout** than any other age group



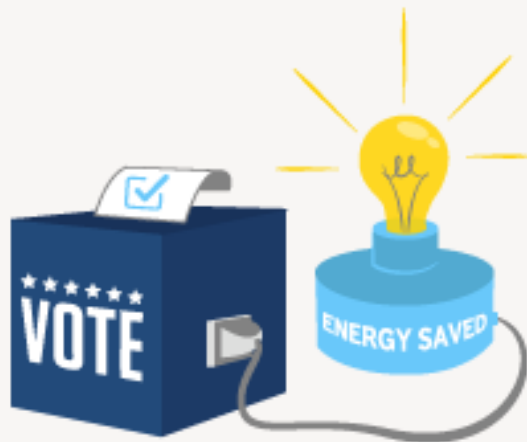
Source: United States Census Bureau

Older households use less electricity



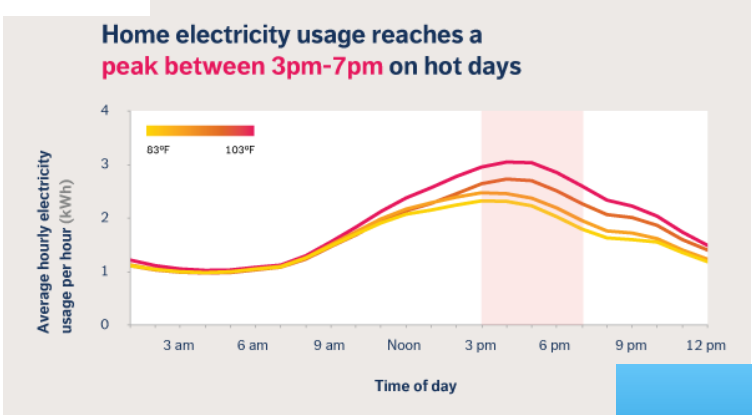
Corresponds to householders' age in 2010; excludes "18-29" group because many were not old enough to vote during the 2004-10 time period analyzed

Do Americans who vote more also use less energy?



Each time an American votes in an election...it's statistically equivalent to a **66 kilowatt-hour reduction (~\$8) in their yearly home electricity bill.**

Some other analyses we've done



How to keep up with Opower Outlier

- Visit blog.opower.com
- Follow [@OpowerOutlier](https://twitter.com/OpowerOutlier)
- Comment
- Get in touch (barry@opower.com)



Thank you!

