



EFFICIENCY CITIES NETWORK

## Year in Review

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Tuesday, January 29, 2013  
3pm Eastern

### **Moderators:**

Joel Rogers, Center on Wisconsin Strategy (COWS)

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# ECN Year in Review

Scott Bernstein, Center for Neighborhood Technology

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# Outline

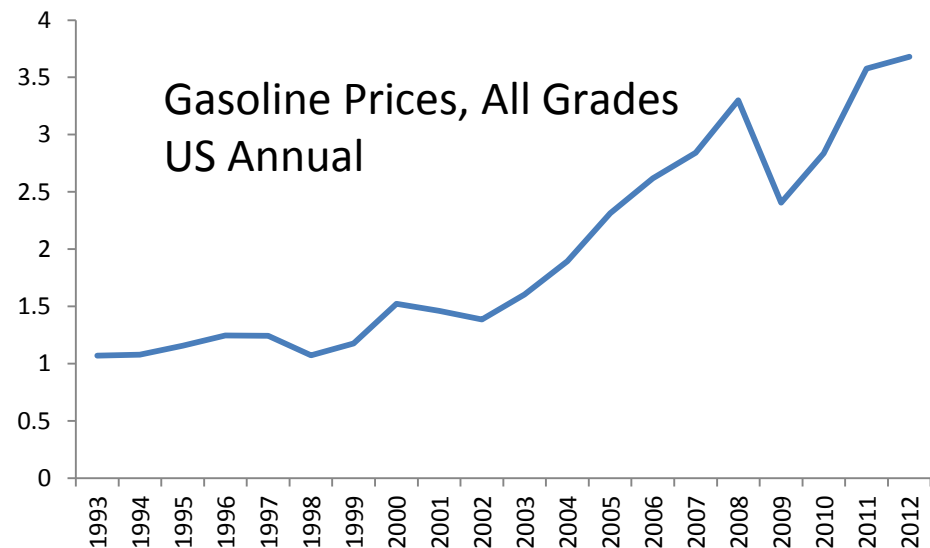
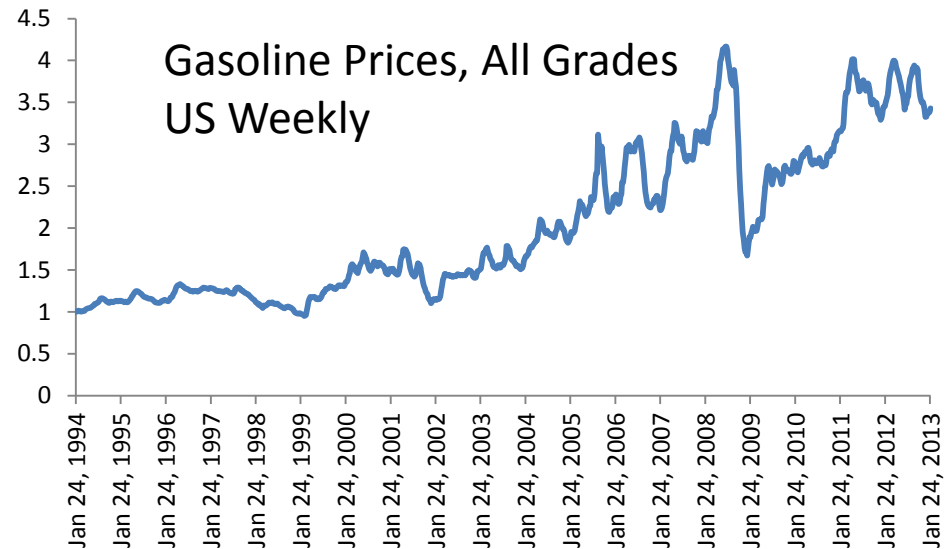
- Energy prices
- Climate impacts
- Energy efficiency
- Resilience

# Significant Milestones

- 2013 is the 40<sup>th</sup> Anniversary of the Oil Embargo
- US Climate Assessment 5-Year Update Released for Review 2012
- Kyoto Agreement Expiring
- Mayor's Climate Protection Agreement Expiring
- 3 Years of Funding Since ARRA Funded EECBG
- 3 Decades of Ratepayer Funded Energy Efficiency
- 2d Full Year of the USDOE Better Buildings Initiative

# Energy Prices--Gasoline

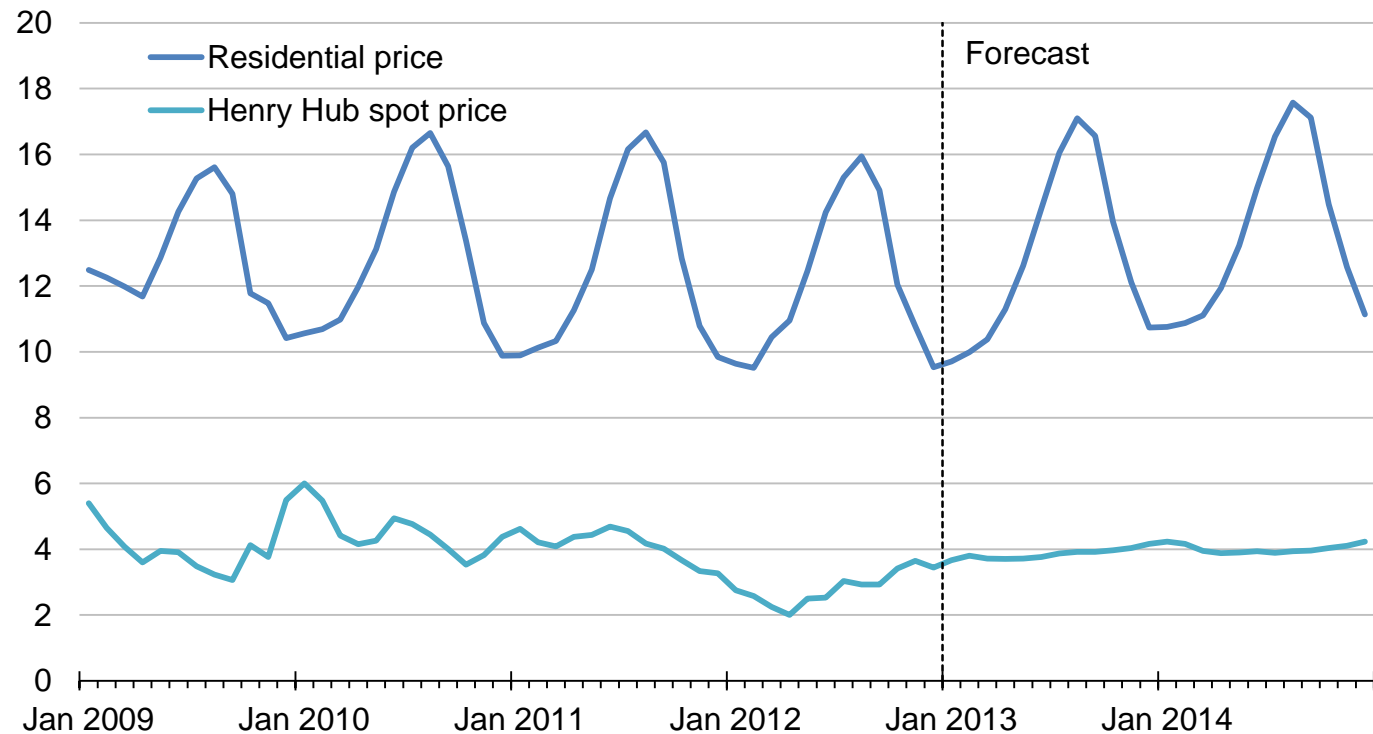
- Showing annual and weekly, 1993-present
- 2012 set a new record
- Included spikes in March and August
- Slight uptick last week



# Natural Gas Prices—Despite Significant Domestic Production, Consumer Prices Still High

## U.S. Natural Gas Prices

dollars per thousand cubic feet

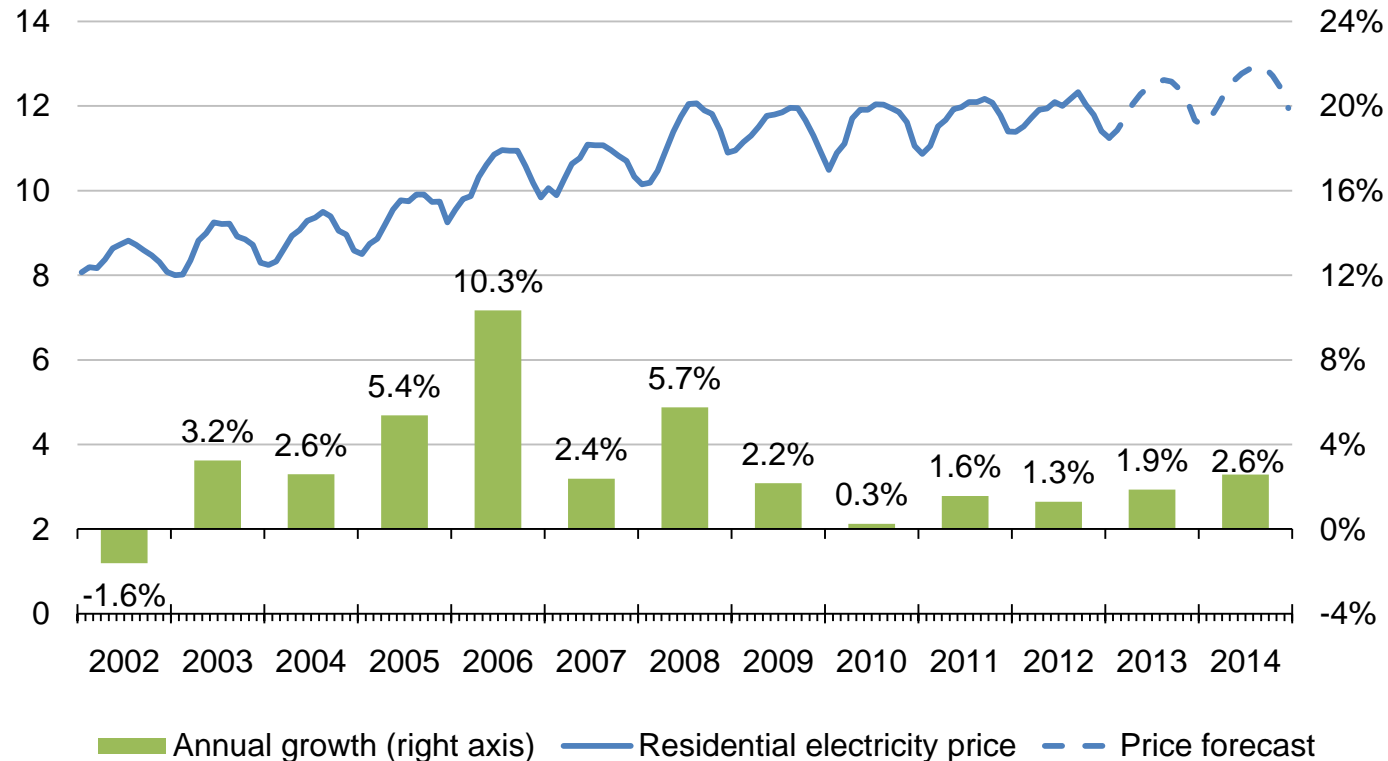


Source: Short-Term Energy Outlook, January 2013

# Electricity Prices—Utilities Benefitting from Natural Gas, Barely Affects Prices

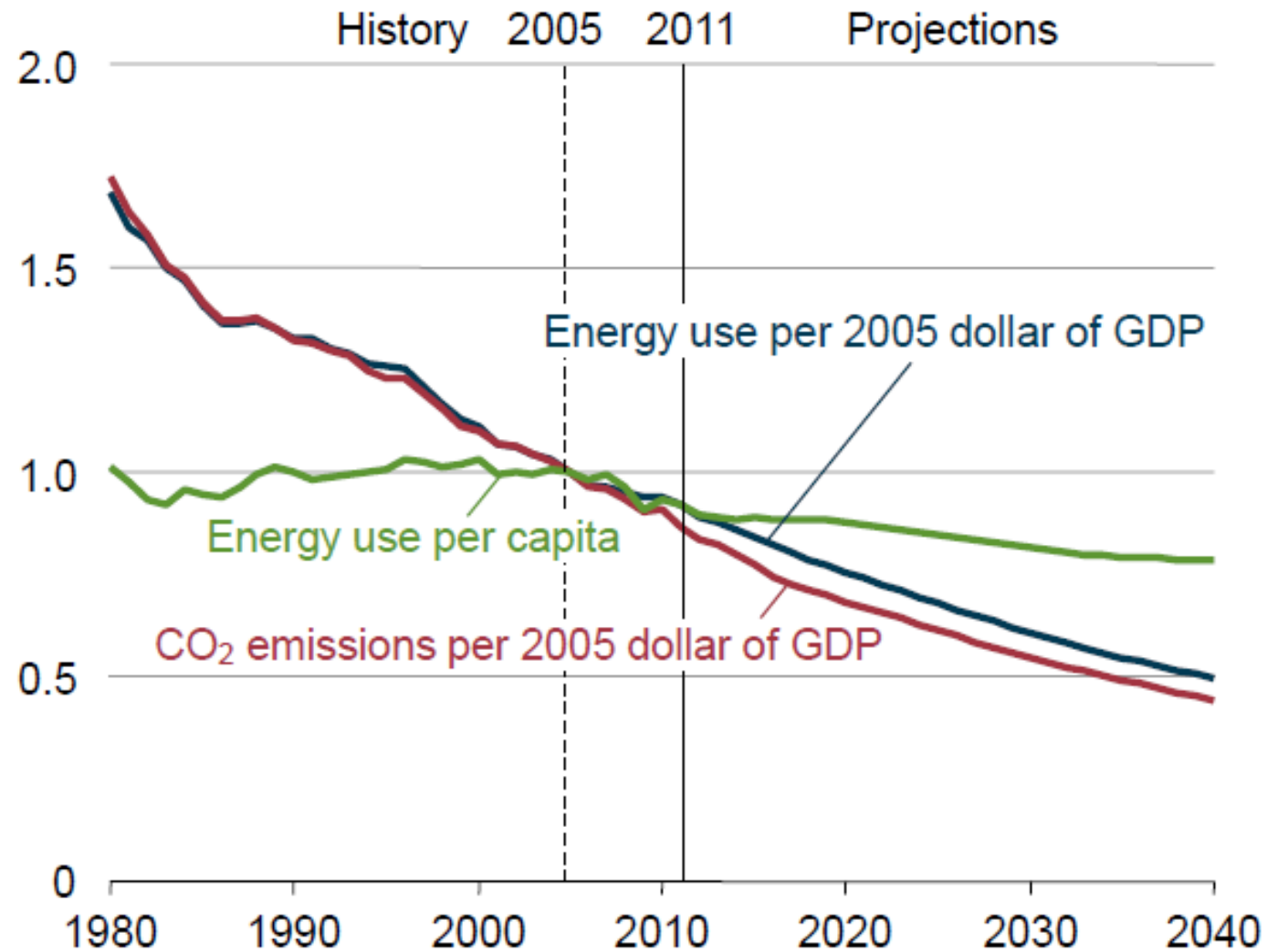
## U.S. Residential Electricity Price

cents per kilowatthour



Source: Short-Term Energy Outlook, January 2013

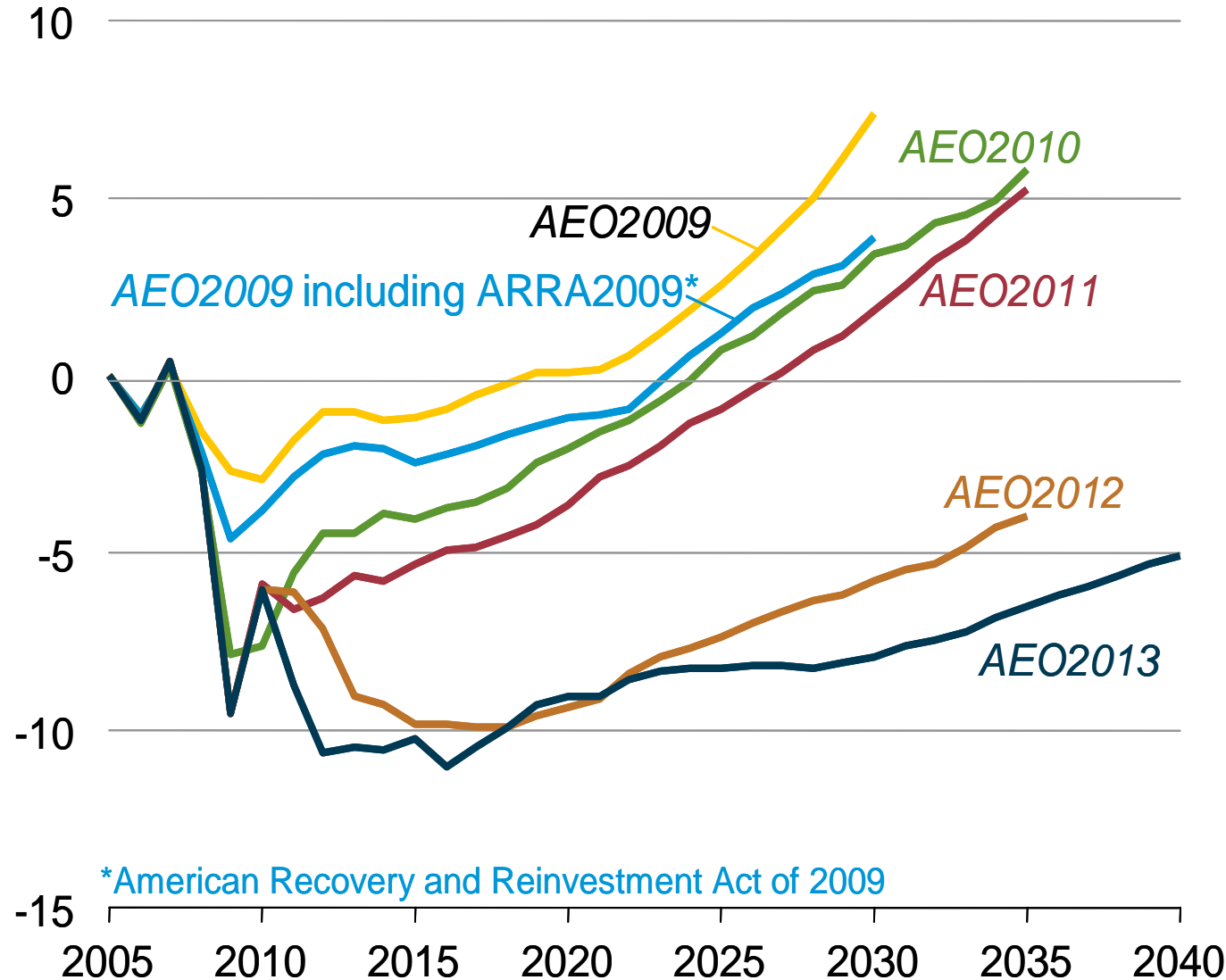
# Energy and CO2 Emissions Intensities Are Dropping...





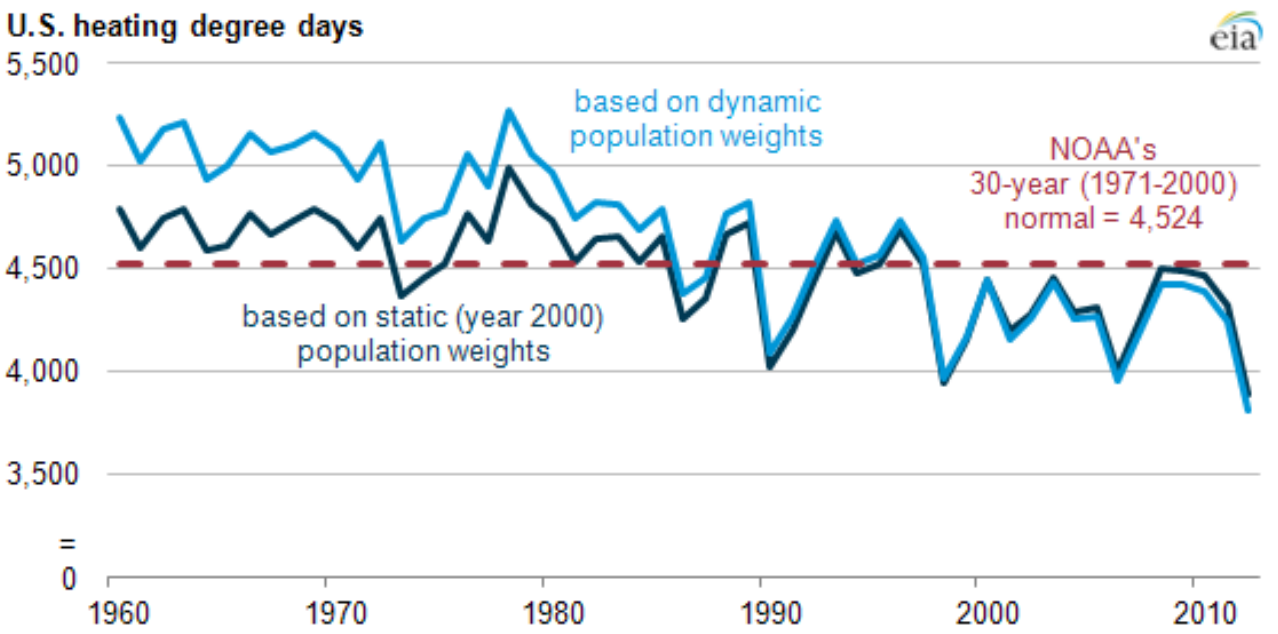
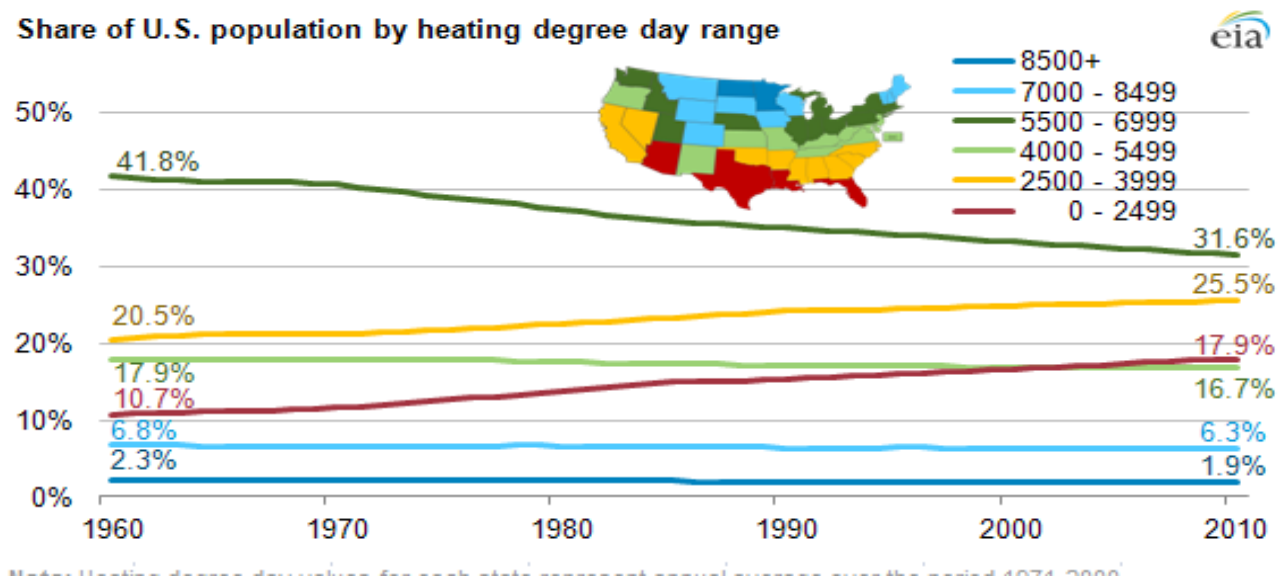
# But Aggregate Consumption Keeps Increasing-- Energy-Related CO2 Emissions

- The year 2005 is the base year for the Obama Administration's goal for emission reductions of 17 percent by 2020.
- In 2020, energy-related CO2 emissions in the AEO2013 Reference case are 9 percent below their 2005 level.



# Warming + migration = Less exposure to heating prices and more to electricity

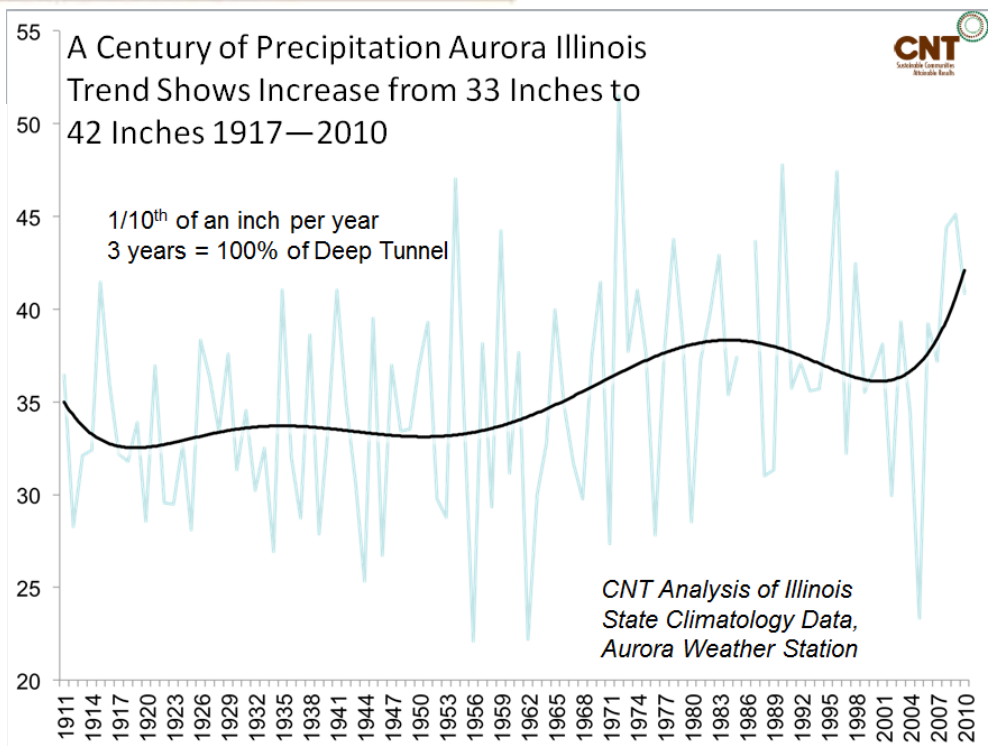
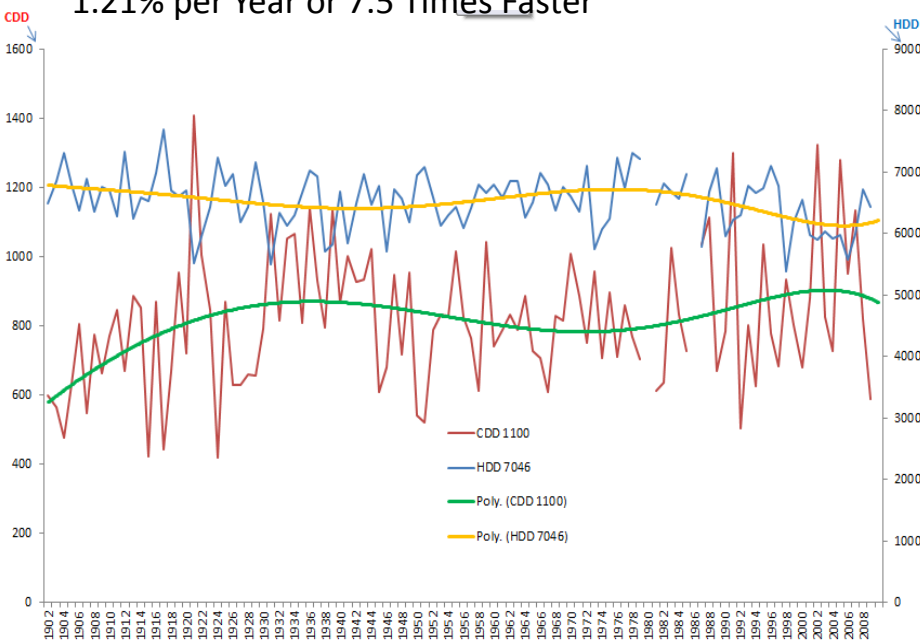
- In 1960, 31.2% of the U.S. population lived in the warmest states, where annual heating degree days (HDD) averaged less than 4,000, as indicated by the red and yellow lines in the figure.
- By 2010, this share of the population rose to 43.4%. In contrast, the share of the population living in cooler states, with HDD ranging from 4,000 to 6,999, declined from 59.7% of the population in 1960 to 48.3% in 2010, as indicated by the two green lines in the figure.
- The share of the U.S. population living in the coldest regions, where HDD average more than 7,000, has also declined slightly from 9.1% in 1960 to 8.2% in 2010, as shown by the two blue lines in the figure.



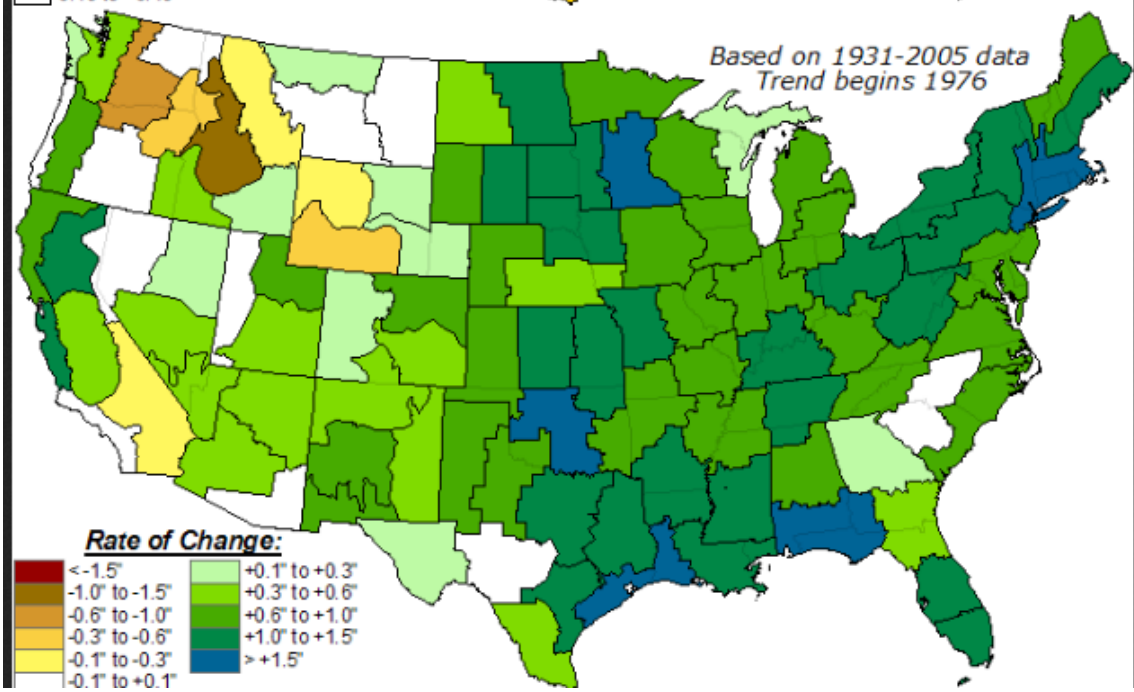
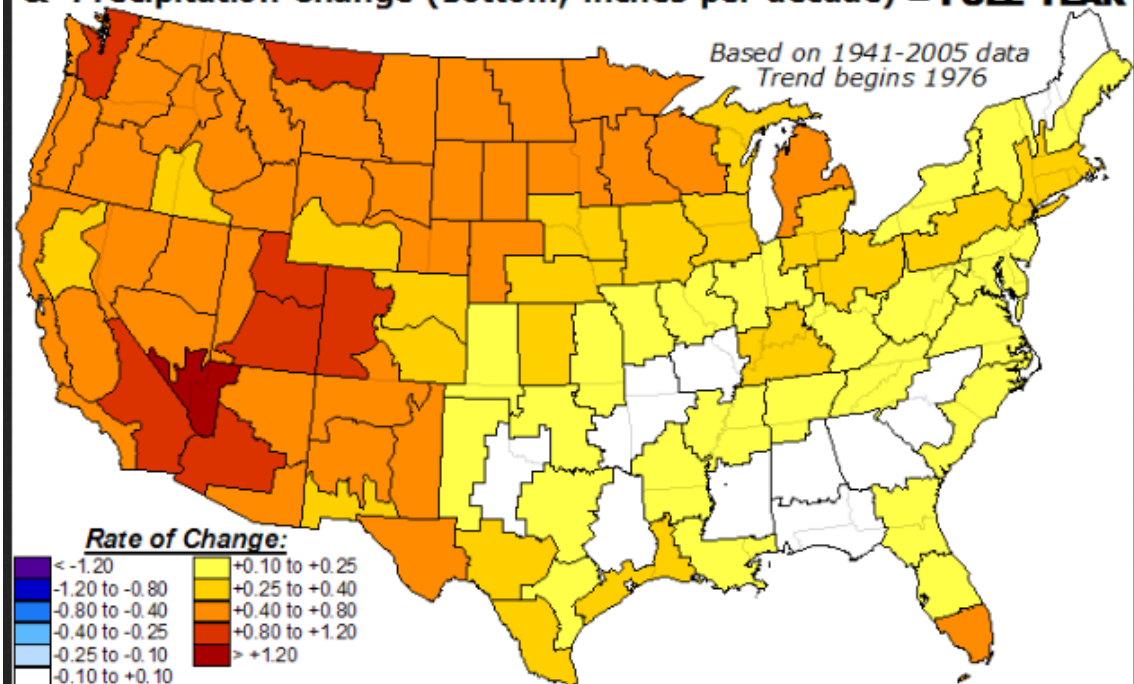
Sources: U.S. Energy Information Administration, derived from the National Oceanic and Atmospheric Administration



HDD Dropped 0.16% Per Year While CDD Rose 1.21% per Year or 7.5 Times Faster

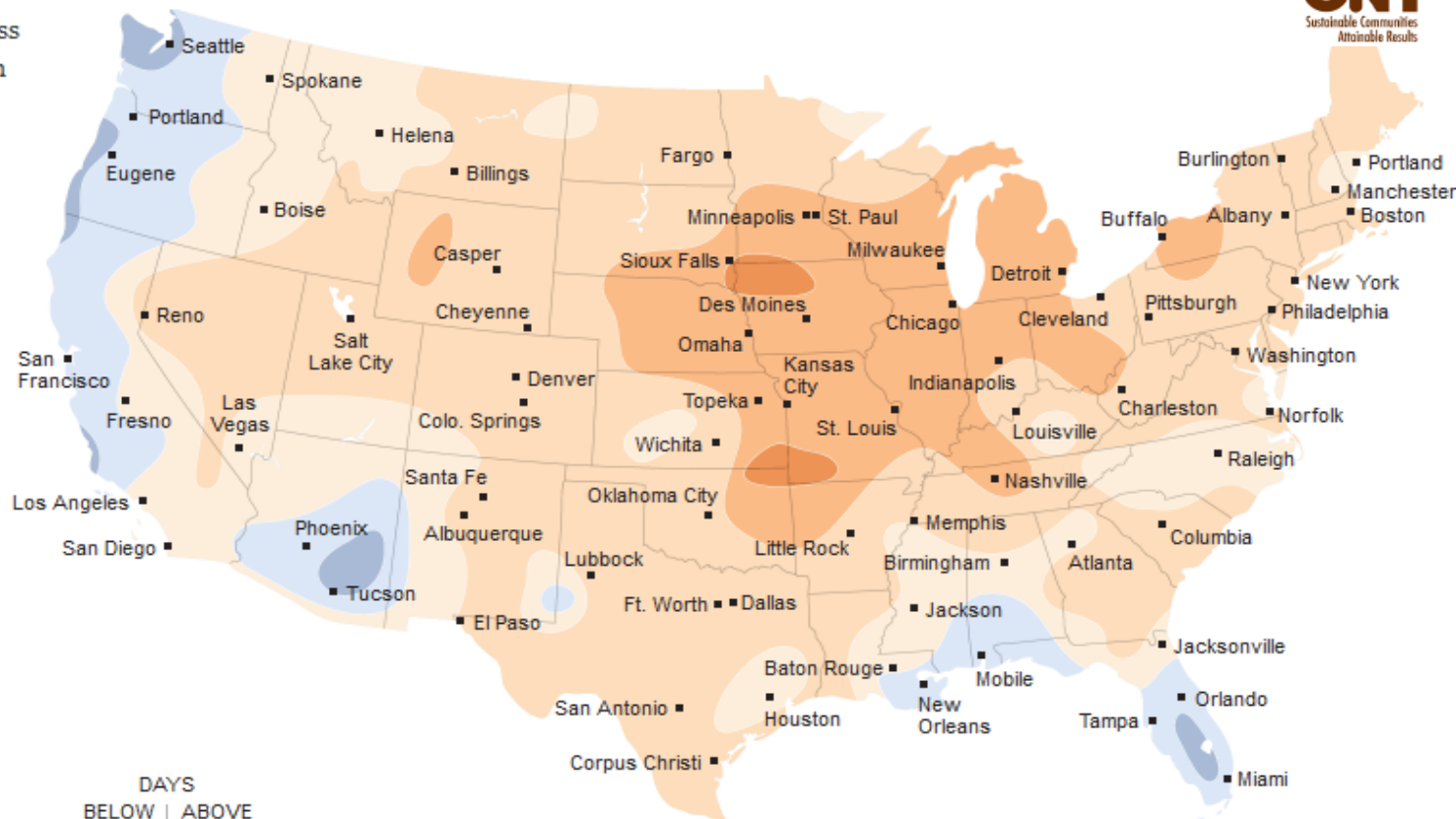
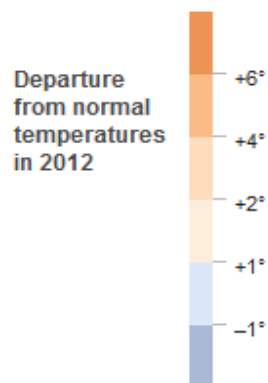


# Rate of Long-Term Trend Temperature Change (top; °F per decade) & Precipitation Change (bottom; inches per decade) – FULL YEAR



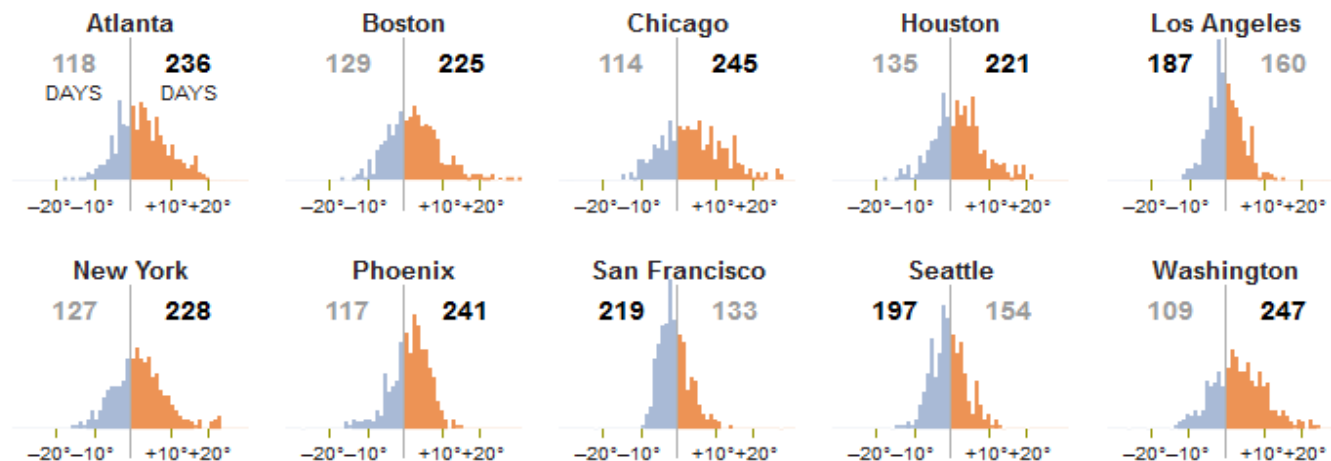
# Record-Setting Heat Across the U.S. in 2012

The average temperature across the contiguous United States in 2012 was 55.3° (3.2° above normal). This ranks as the warmest year since records began in 1895. [Related Article »](#)



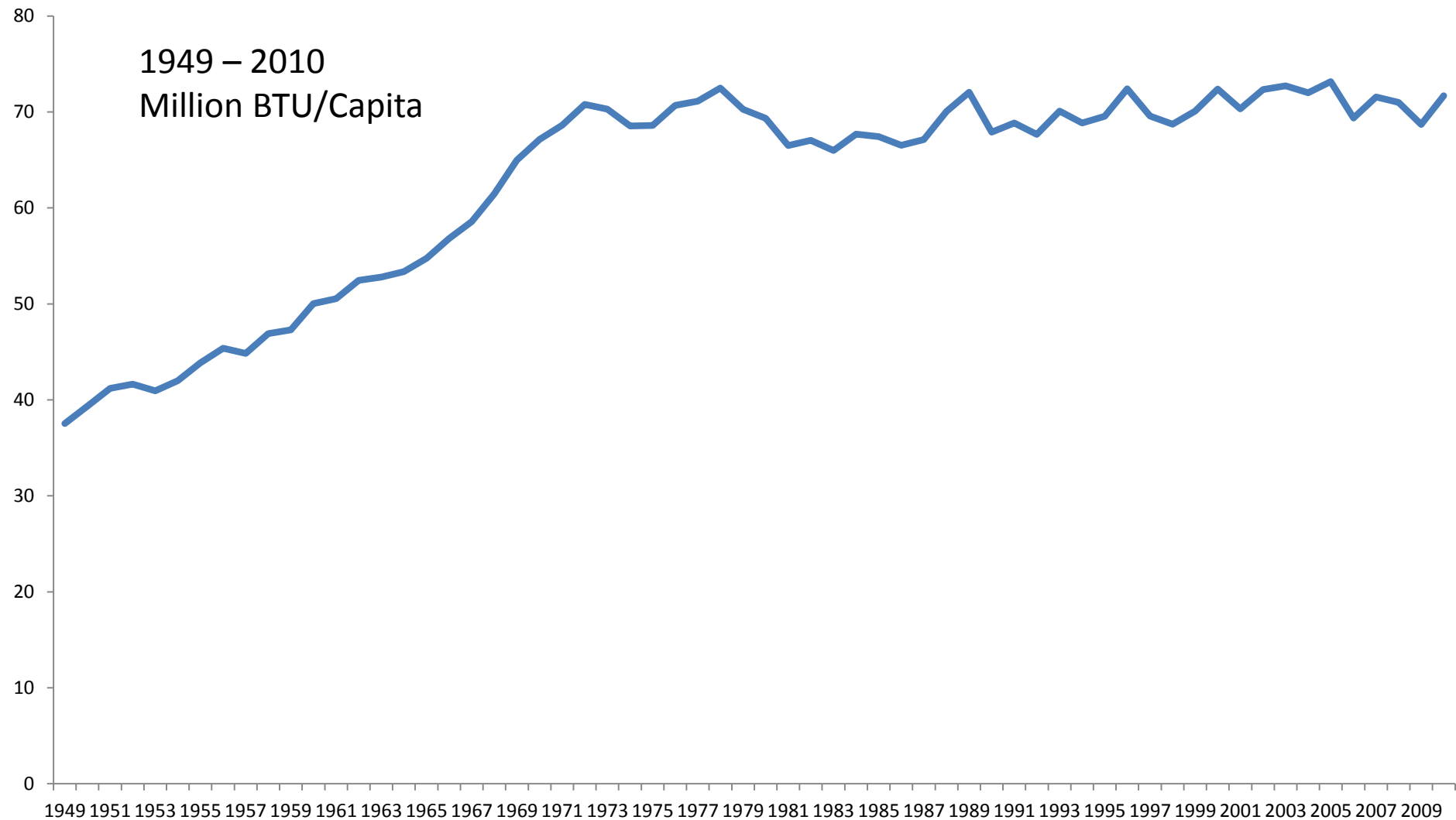
Number of days above and below normal temperatures for a selection of cities

DAYS  
BELOW NORMAL | ABOVE NORMAL



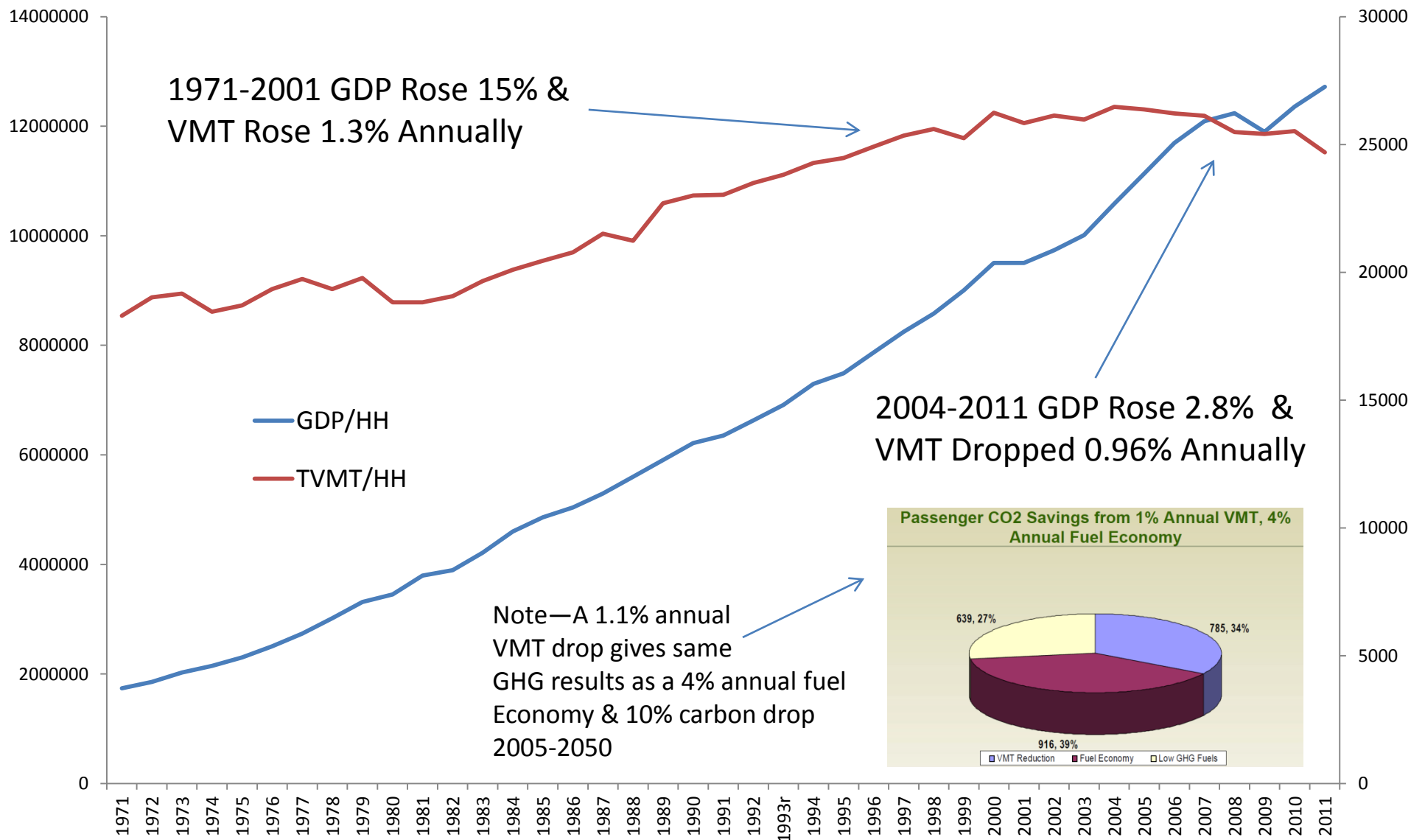
Nytimes.com  
Jan. 8 2013

# Total Residential Energy Intensity Flattened by Weather...VMT and Heating Down, Electricity Demand is UP

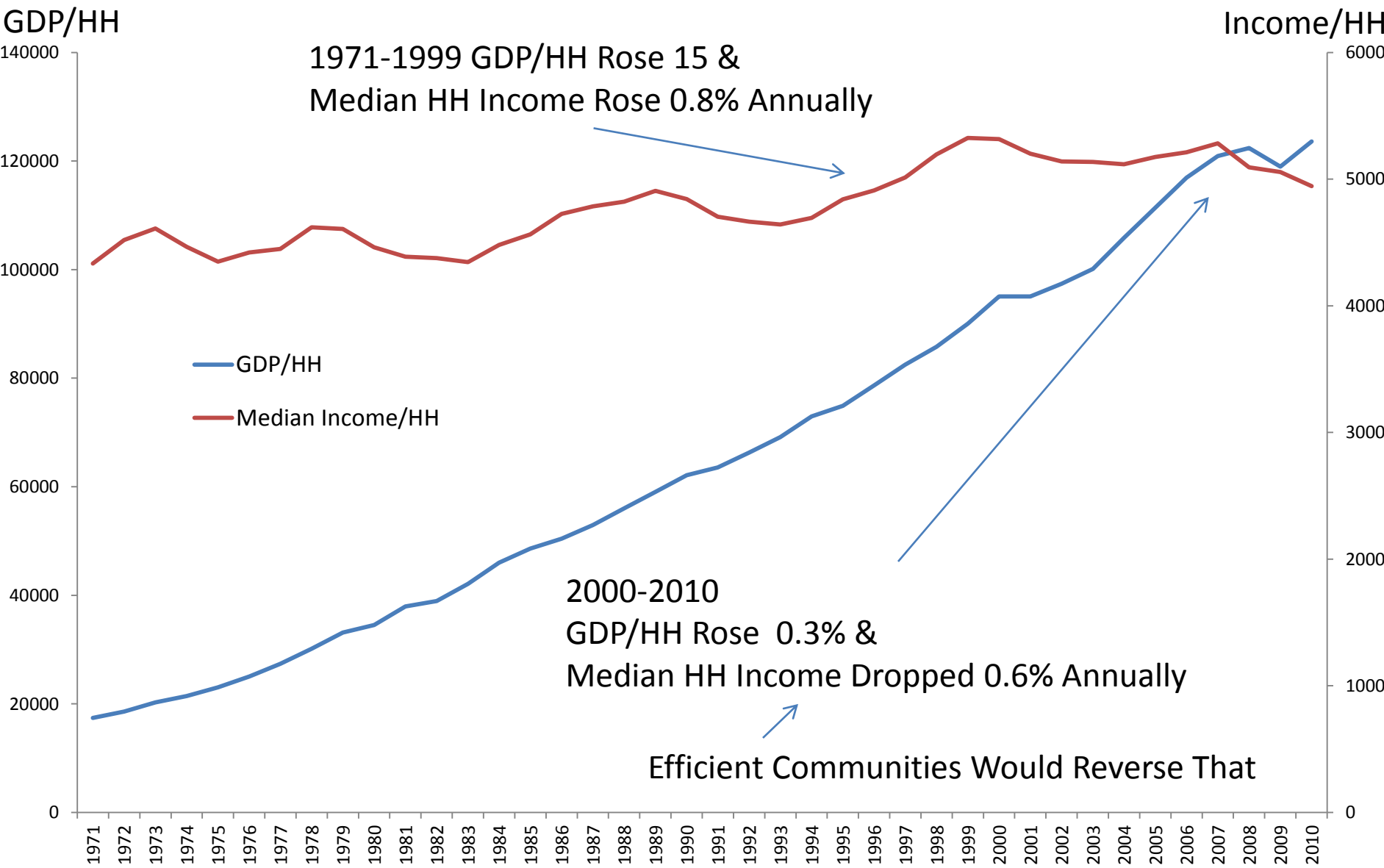




# Good Decoupling—Growth in Total Vehicle-Miles Traveled Per HH per Year Decoupled from GDP/HH from 2004-2011



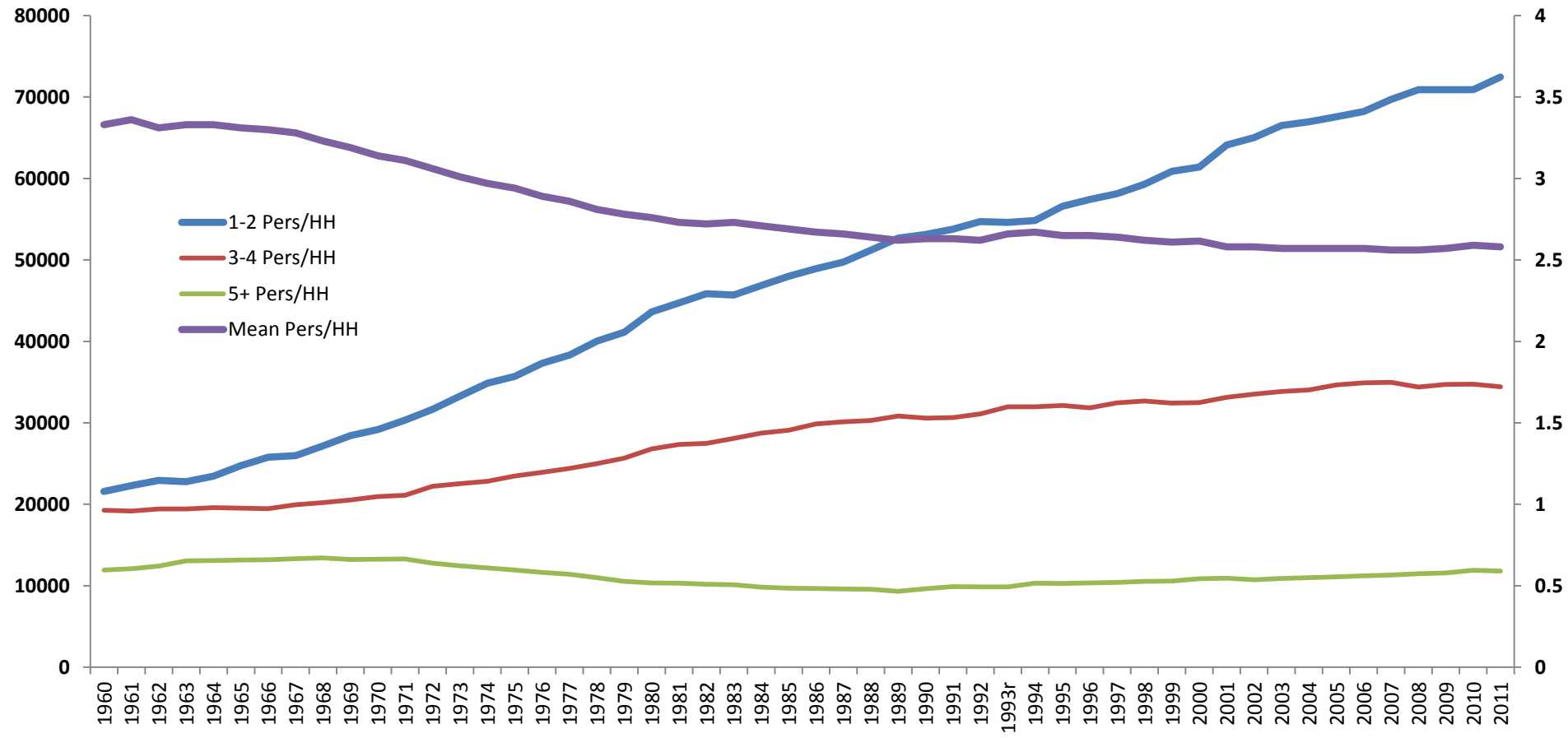
# Bad Decoupling—GDP Goes Up While Median HH Income Goes Down



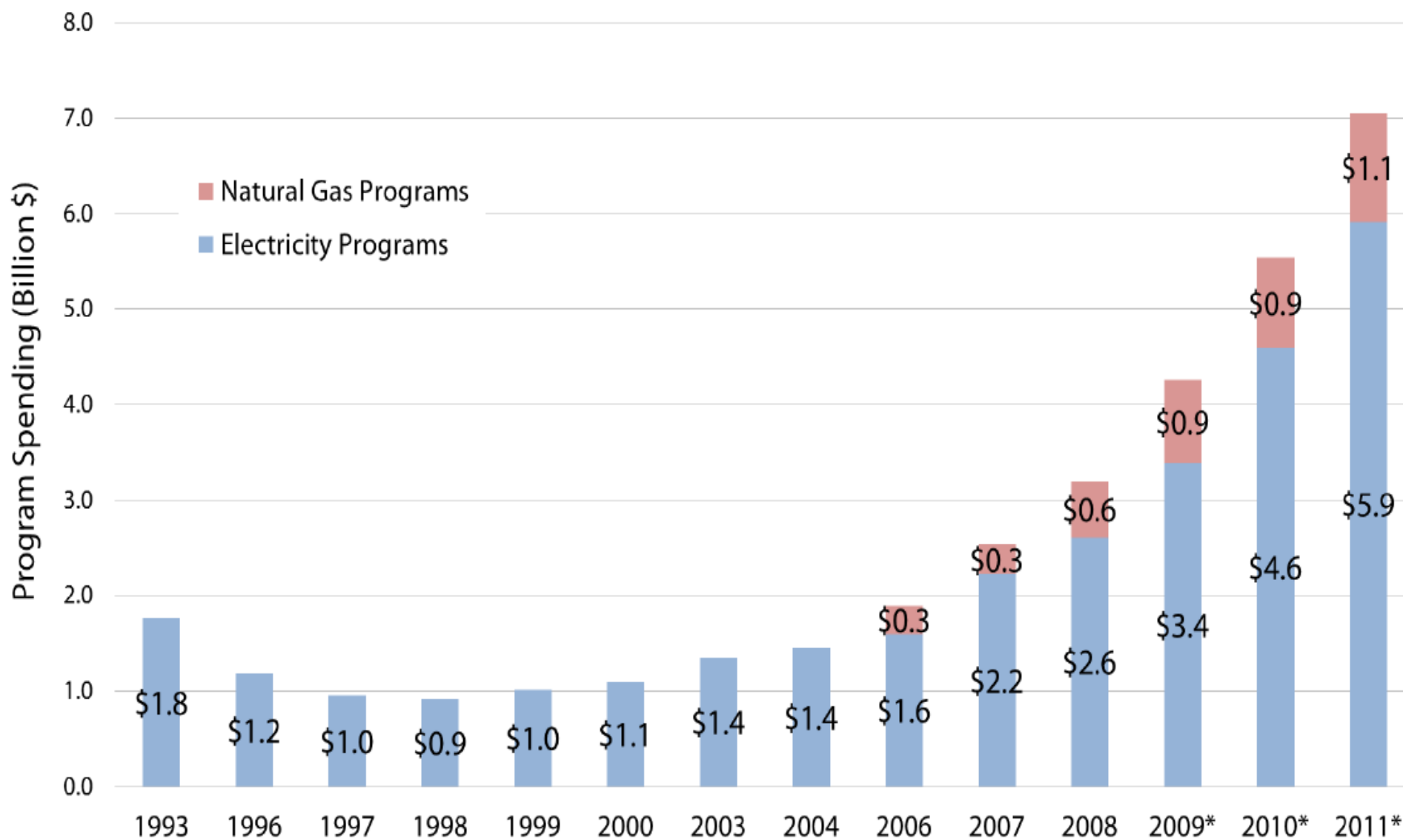


# Why We Need to Pay Attention to Rental and Multi-Family Trends

Avg. HH Size Dropped from 3.3-2.6 1960-2011  
 1-2 Person HHs Jumped from 41 to 61% of Total  
 3-4 Person HHs Dropped from 37 to 29% of Total  
 5+ Person HHs Dropped from 23% to 10% of Total  
 Demographers are Projecting Typical New HH =1 Post 2030



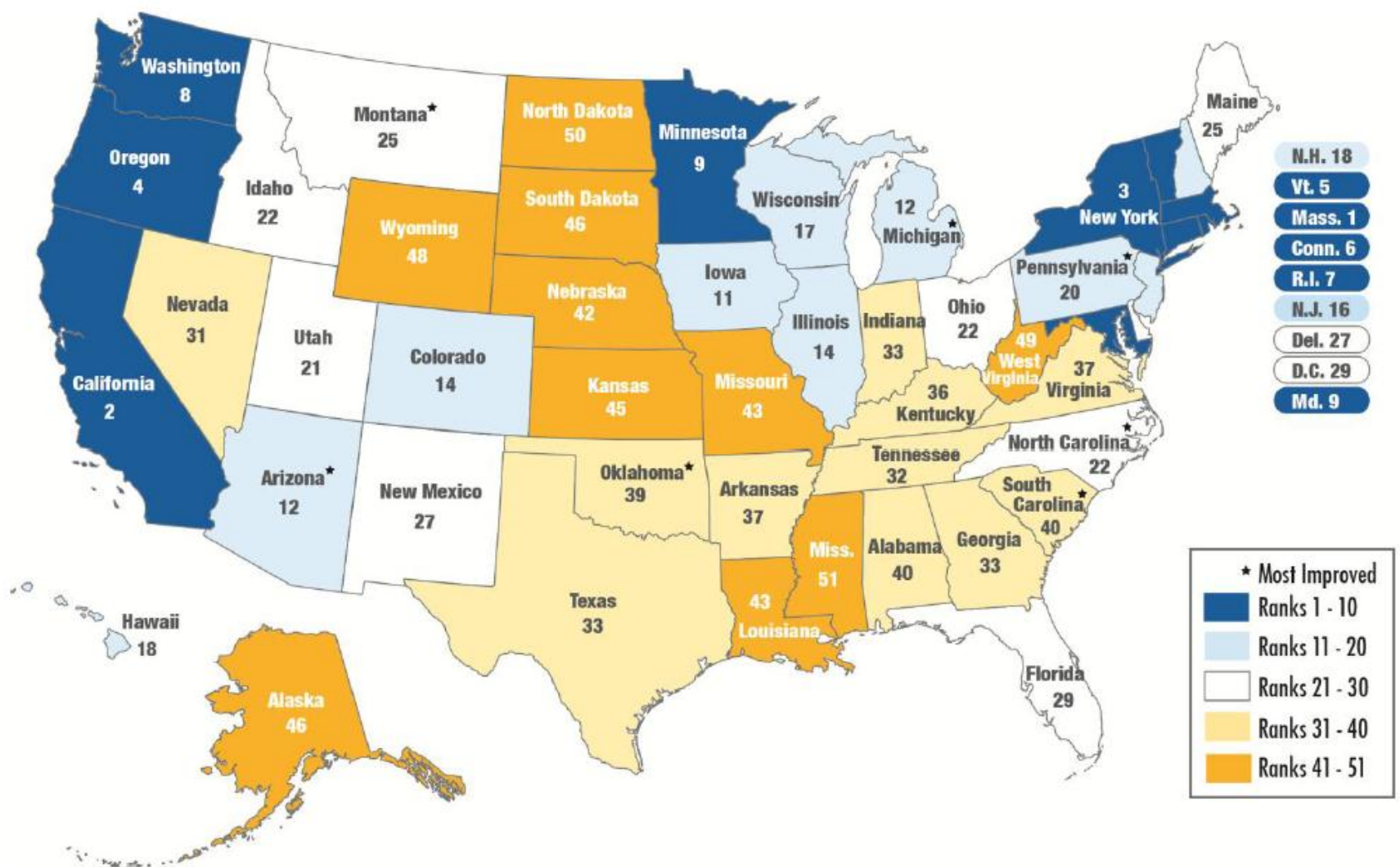
**Figure 2. Annual Electric and Natural Gas Energy Efficiency Program Spending or Budgets**



# ACEEE 2012 State Energy Efficiency Rankings

<http://aceee.org/files/pdf/fact-sheet/e12c-es.pdf>

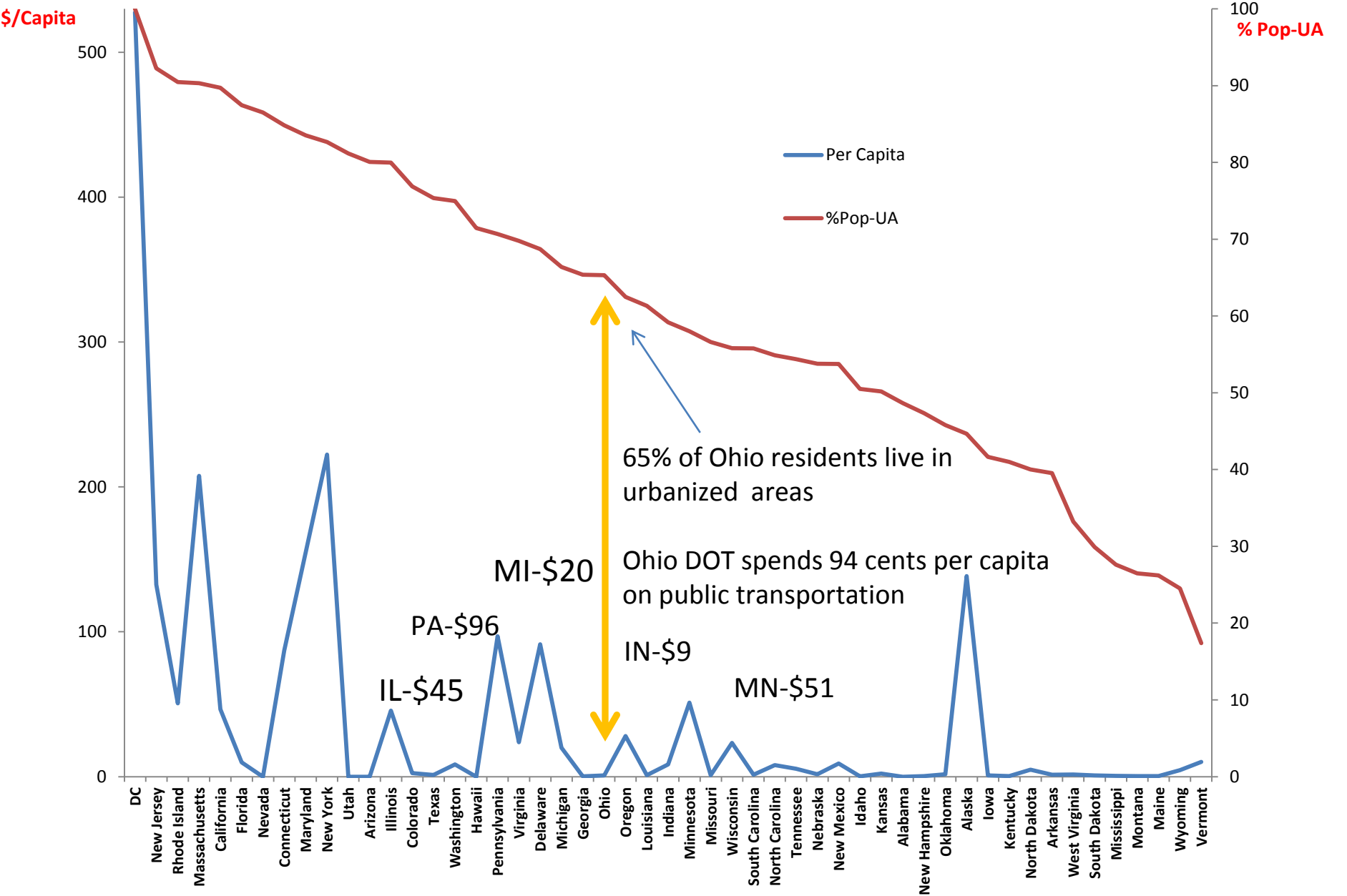
Figure ES-2: 2012 State Scorecard Rankings Map



| State                   | 2011<br>Budgets<br>(\$million) | \$ Per<br>Capita |
|-------------------------|--------------------------------|------------------|
| Massachusetts           | 453.0                          | 68.77            |
| Vermont                 | 40.7                           | 64.97            |
| New York                | 1,073.2                        | 55.13            |
| Rhode Island            | 54.2                           | 51.53            |
| Oregon                  | 171.8                          | 44.37            |
| Washington              | 274.9                          | 40.24            |
| Connecticut             | 138.3                          | 38.61            |
| Minnesota               | 191.2                          | 35.77            |
| California              | 1,162.5                        | 30.84            |
| Iowa                    | 88.8                           | 28.99            |
| Maryland                | 156.4                          | 26.83            |
| Hawaii                  | 35.6                           | 25.86            |
| New Jersey              | 225.0                          | 25.51            |
| Idaho                   | 39.9                           | 25.15            |
| Montana                 | 21.1                           | 21.14            |
| Arizona                 | 126.1                          | 19.45            |
| New Hampshire           | 25.6                           | 19.45            |
| Pennsylvania            | 225.0                          | 17.65            |
| Utah                    | 49.2                           | 17.46            |
| Nevada                  | 47.2                           | 17.33            |
| Maine                   | 22.8                           | 17.18            |
| Wisconsin               | 92.3                           | 16.16            |
| Michigan                | 127.6                          | 12.92            |
| New Mexico              | 26.2                           | 12.60            |
| Colorado                | 64.1                           | 12.53            |
| District of<br>Columbia | 7.7                            | 12.40            |

| State          | 2011<br>Budgets<br>(\$million) | \$ Per<br>Capita |
|----------------|--------------------------------|------------------|
| Ohio           | 134.4                          | 11.64            |
| Oklahoma       | 39.6                           | 10.44            |
| Florida        | 188.5                          | 9.89             |
| Wyoming        | 5.4                            | 9.50             |
| Illinois       | 115.7                          | 8.99             |
| Nebraska       | 16.5                           | 8.95             |
| Indiana        | 58.2                           | 8.93             |
| Arkansas       | 25.2                           | 8.58             |
| Missouri       | 47.2                           | 7.86             |
| Kentucky       | 28.2                           | 6.46             |
| North Carolina | 57.4                           | 5.94             |
| Tennessee      | 36.7                           | 5.74             |
| Texas          | 144.1                          | 5.61             |
| South Dakota   | 4.3                            | 5.23             |
| Delaware       | 3.3                            | 3.64             |
| South Carolina | 16.3                           | 3.48             |
| Kansas         | 9.1                            | 3.15             |
| Alabama        | 10.7                           | 2.23             |
| Georgia        | 21.7                           | 2.21             |
| Louisiana      | 9.0                            | 1.96             |
| Mississippi    | 4.9                            | 1.63             |
| Virginia       | 0.1                            | 0.02             |
| Alaska         | 0.0                            | 0.00             |
| North Dakota   | 0.0                            | 0.00             |
| West Virginia  | 0.0                            | 0.00             |
| U.S. Total     | 5,916.8                        | 18.99            |
| Median         | 40.7                           | 12.40            |

# State DOT Per-Capita Transit Outlays in 2010 Versus % of Population Living in Census Urbanized Areas



# Encouraging Signs

- Urban Sustainability Directors Network—over 300 members, over a third have made their offices and/or positions permanent post-EECBG funding
- Very large growth in local demand management through smart metering and real time pricing—potential pathway to resilience
- Growth in total available resource
- Continued flattening of VMT and record-setting utilization in mass transit
- Dots are starting to get connected between energy, water, transportation, land use, and local economic benefits
- 24 States with EERE Portfolio Standards
- Coordinated one stop programs (e.g. Better Buildings programs) showing the value of aiming for deeper savings and community benefits

# Real Challenges Remain

- Too much attention focused on price, not enough on consumption
- Fascination with domestic production
- Consumer choice aggregation keeps focus on short-term price savings
- No long-term funding solution yet in sight for supporting mass transit or transportation choice
- Incomes are stagnant or dropping while the cost of living for energy, transportation and utilities is rising
- Financing—No solution to residential PACE rulings
- Fannie and Freddie still effectively frozen
- FHA conducting experiments, but EEMs still largely not available
- No replacement funds for one-time ARRA support (e.g. HUD, EECBG, Weatherization)
- Utility funds still largely focused on individual widgets (5-12% savings) rather than on deeper comprehensive retrofits (20-50% savings)
- Market demand favors rental and multi-family sector, but residential programs largely focused on homeowner and single-family sectors

# Possible Plays to Watch For in 2013

- GSE Reform & FHA Recapitalization-Congress
- Working with State housing finance agencies to expand capital access in local initiatives
- Further settlements with banks on foreclosure practices could represent a source of capital
- Long-term transportation reauthorization-Congress
- Emergence of State and local “infrastructure banks”—Chicago, LA, Oregon, CA, WA, NY
- Efforts to renew the Mayors Climate Protection Agreement
- Further Investment in Wake of Hurricane Sandy

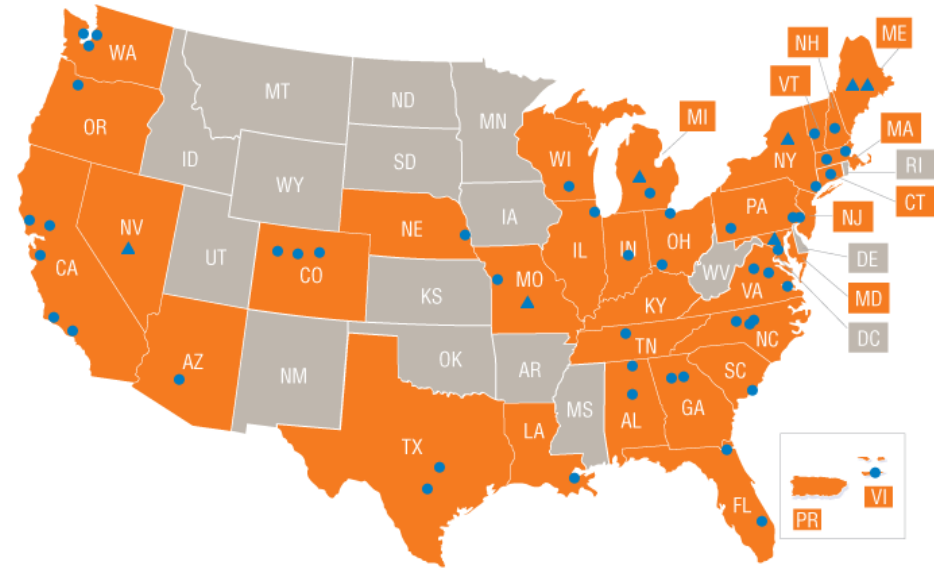


# 41 DOE-Funded Better Buildings Programs

More than 26,500 homes and 22 million square feet of commercial building space were upgraded through June 2012.

By the end of 2013, Better Buildings Neighborhood Program partners are working to:

- Develop sustainable energy efficiency upgrade programs
- Upgrade more than 100,000 residential and commercial buildings to be more energy efficient
- Save consumers approximately \$65 million annually on their energy bills
- Achieve 15% to 30% energy savings from energy efficiency upgrades
- Reduce the cost of energy efficiency program delivery by 20% or more
- Engage 10,000 to 30,000 contractors in work on energy efficiency upgrades
- Leverage \$1 to \$3 billion in additional resources.



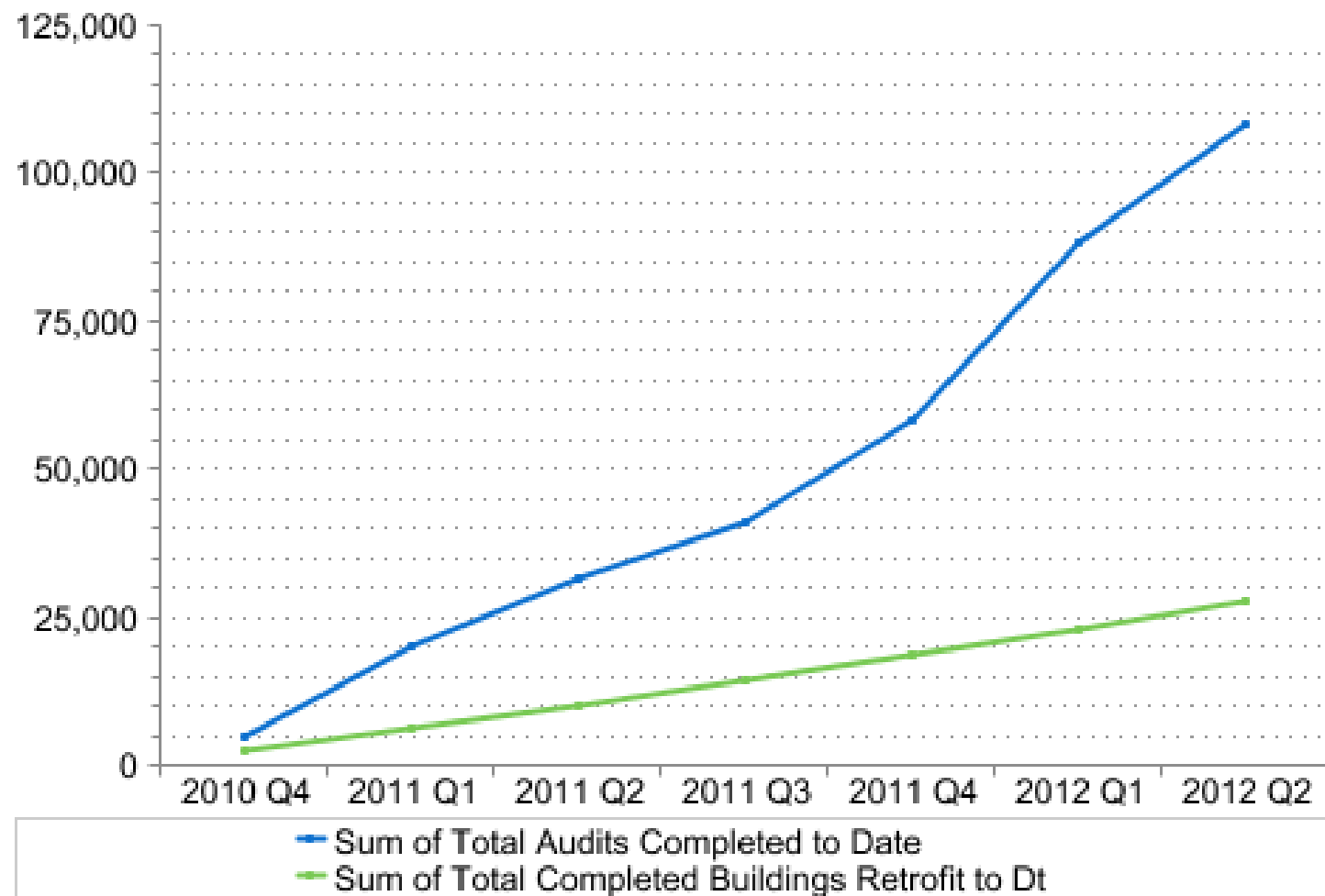
### Residential Building Upgrades Performed Since Program Launch



### Commercial Building Space Upgraded Since Program Launch (sq. ft.)



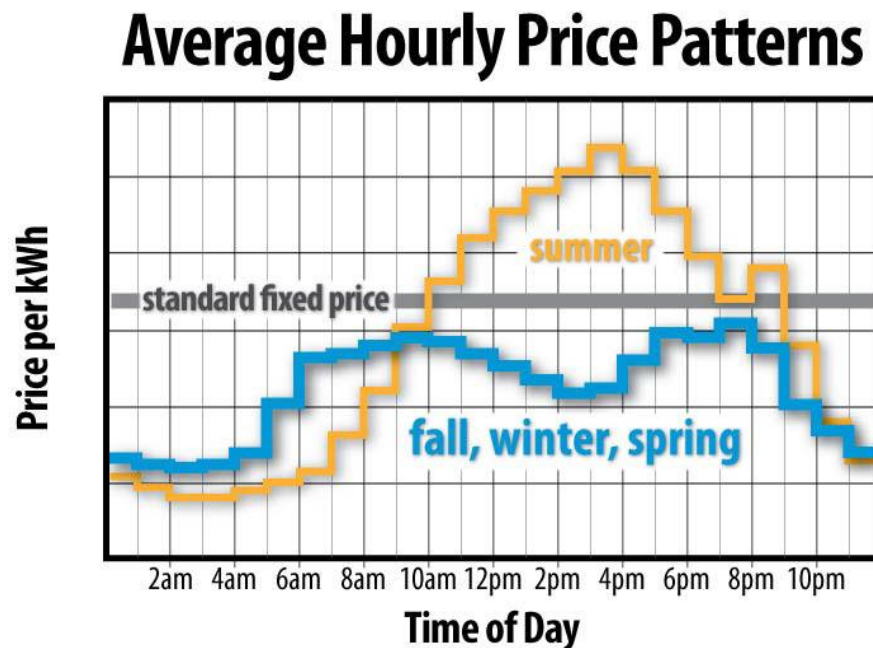
## Program Cumulative Audits and Retrofits



# Future Play—Collective Action Turns Electricity Consumers into “Negawatt” Producers

# How It Works in Illinois

- Hourly, market-based electricity prices are driven largely by demand and tend to follow predictable, season patterns.
- Most residential customers save because they use most of their energy off peak.



**Your neighbors in Galesburg saved 20% on electricity last year with Power Smart Pricing.**



# Overview of Current Program

Hourly pricing programs use market-based hourly electricity prices to encourage residential customers to shift load to off-peak times to save money on their electric bills and reduce need for additional power plants.

## Power Smart Pricing

### **Ameren Illinois Power Smart Pricing (PSP): 2007-Present**

Role: **Program Administrator**

Total Participants: **12,000**

Total Customer Savings: **\$5 million (15%)**

Peak Demand Reduction: **20%**

Staff: **4 FTE**



### **ComEd Residential Real-Time Pricing (RRTP): 2007-Present**

Role: **Assistant Administrator**

Total Participants: **10,000**

Total Customer Savings: **\$5 million (15%)**

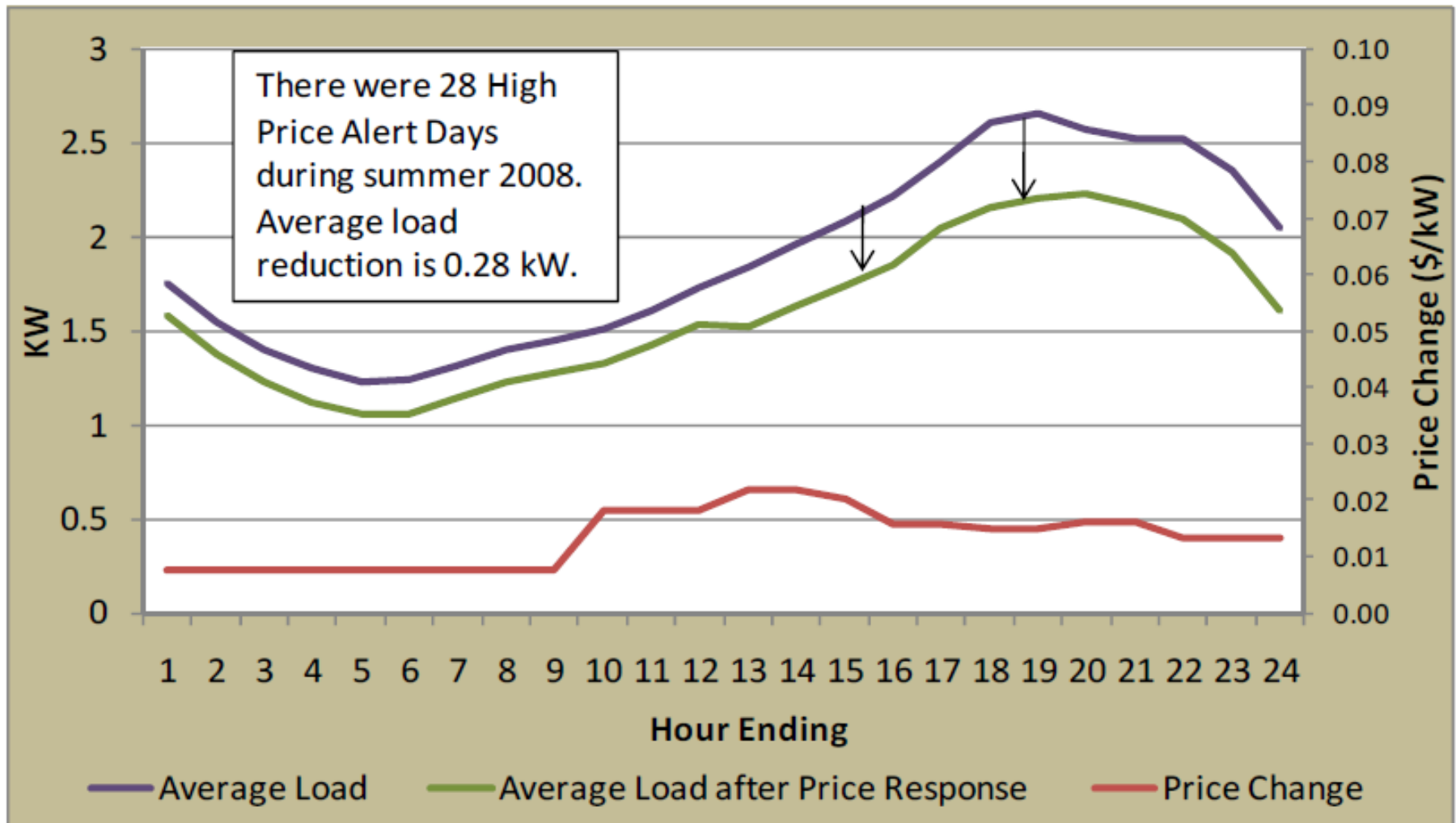
Peak Demand Reduction: **20%**

Staff: **2 FTE**

Both programs are under review by the Illinois Commerce Commission with potential for administration contracts extending through 2017.

# Collective Efficacy in Action—Give People an Early Warning and They Do Respond

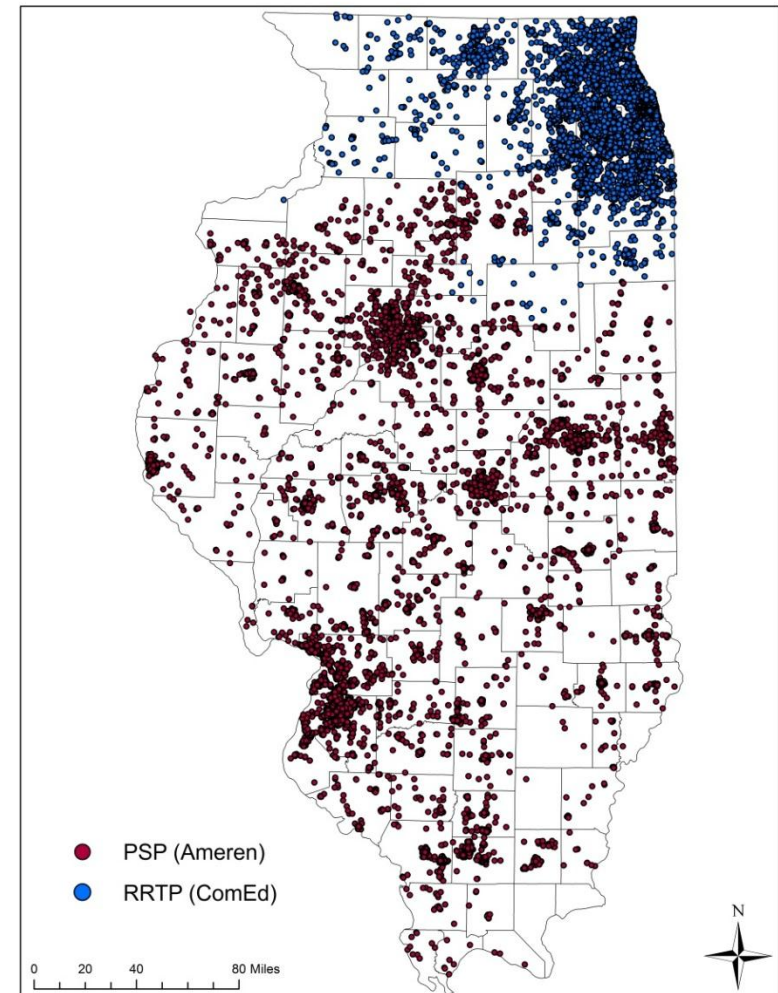
**Figure 8. Load Reductions Due to a Price Increase of One Standard Deviation**



Source: Navigant analysis

# Target Market

- **Current Participants**
  - Retired (2-person) households
  - Educated households
  - Techies/Engineers – data lovers
  - Green/Environmentally-mind
  - Early adopters
  - Low/fixed Income
- **Future Market (new)**
  - EV owners
  - Smart Meter Recipients
  - Electric Heat Customers (PSP)
  - Younger generation



# Current Play—From Chicago Energy Savers to Energy Impact Illinois



# Current Energy Efficiency Landscape is Overly Complex



## Information & Guidance



Home Electricity Use



**Single family  
home owner**



## Finance & Rebates



## Workforce

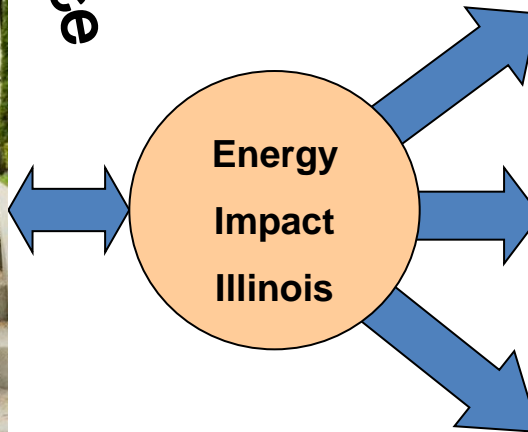


# Simplicity From a Consumer POV

Customer Experience



Single family  
home owner



## Information & Guidance



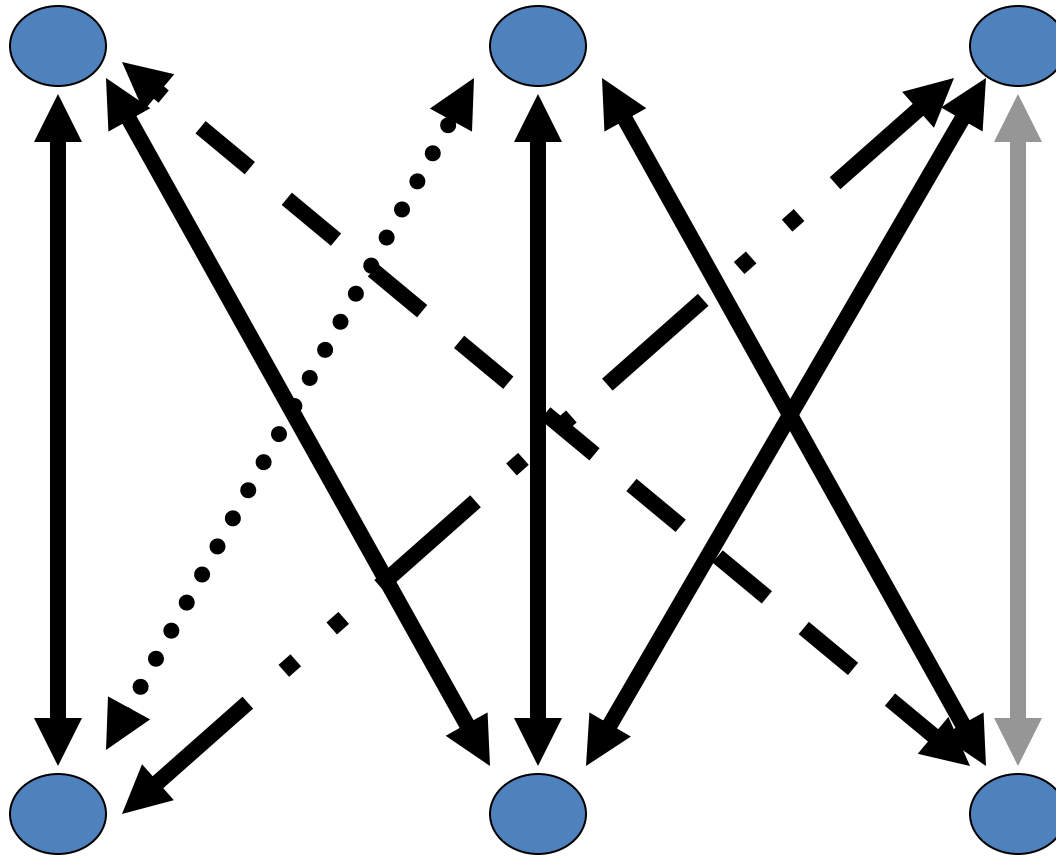
## Finance & Rebates



## Workforce



# The Need for One-Stop Shopping: The Current Unorganized Market

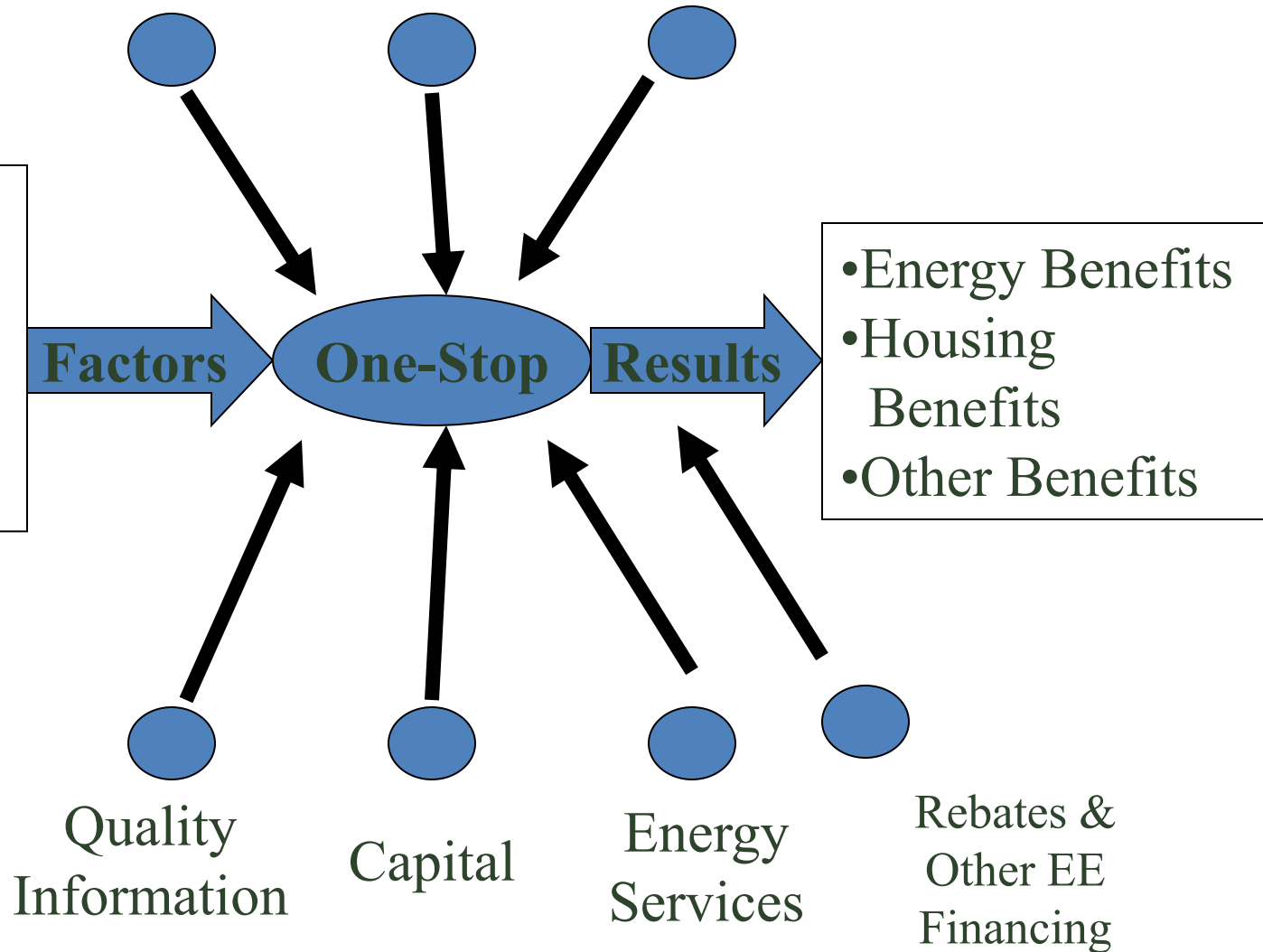


White House Middle Class Task Force report noted need for audits, contractors & services,  
And financing—but didn't call for coordinated one-stop service

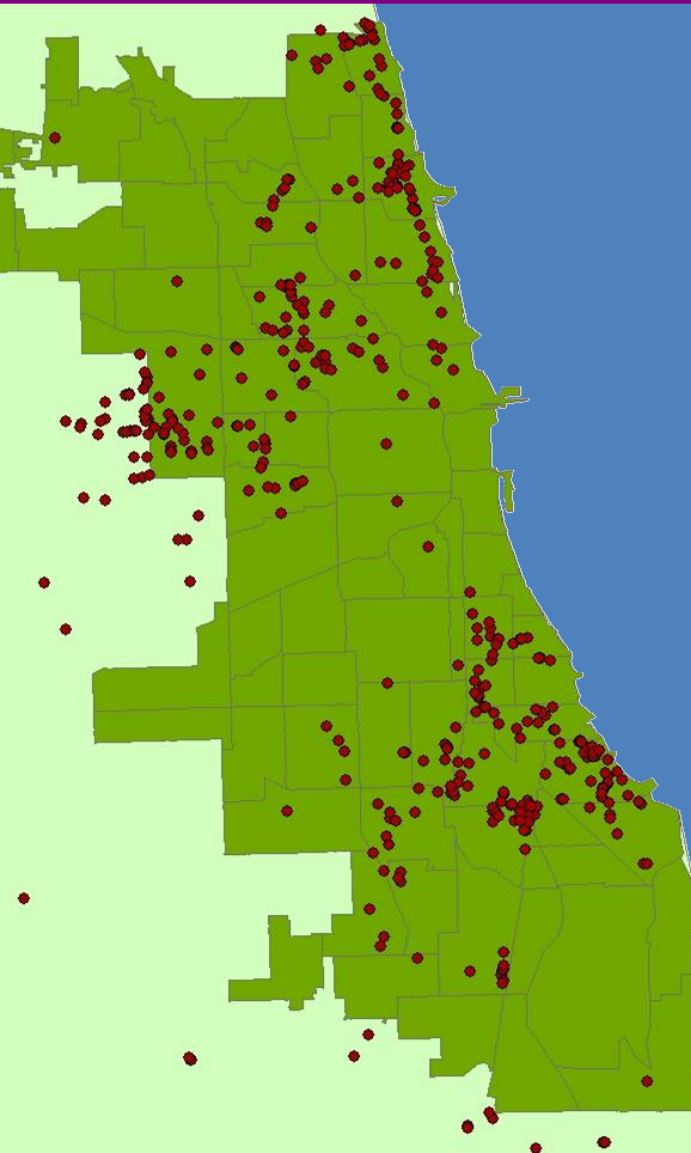
# The Need for One-stop Shopping: A Better Model for the Residential Sector

## Demand

- Sense of Urgency
- Rising Prices
- Cost of Housing
- Changing Policies
- Changing Market Practices



## Supply

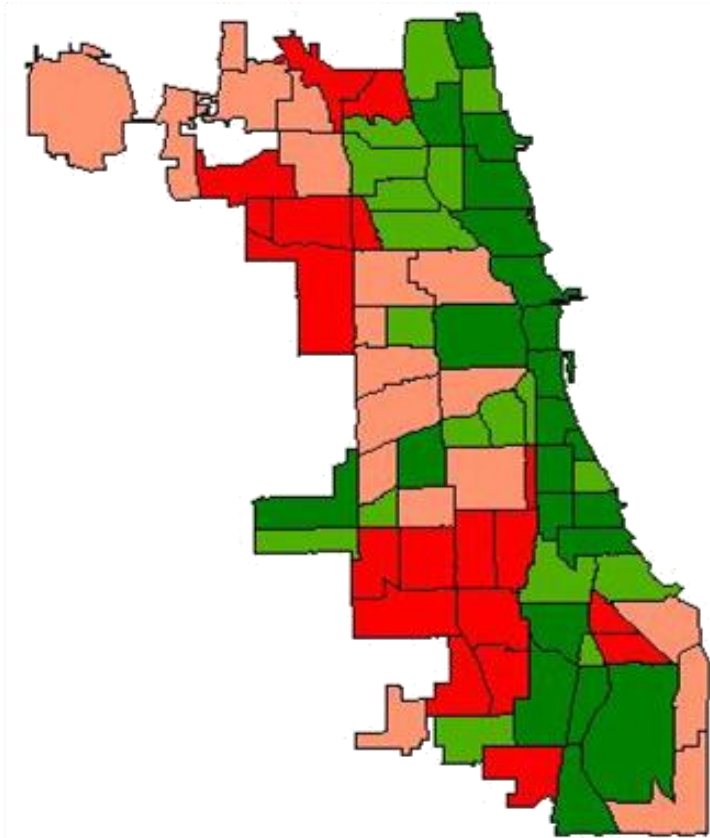


## Energy efficiency solutions for Chicago-area apartment buildings

- 30,000 units audited since 2009, 10,000 completed retrofits, 10,000 in pipeline
- 30% average energy savings
- Part of Preservation Compact devoted to preserving affordable rental housing in northern Illinois—in process of being copied in a dozen other regions



# Understanding the Data – Residential Single Family



Bungalow



Colonial



Frame Cottage



Newer Luxury



Tudor



Ranch

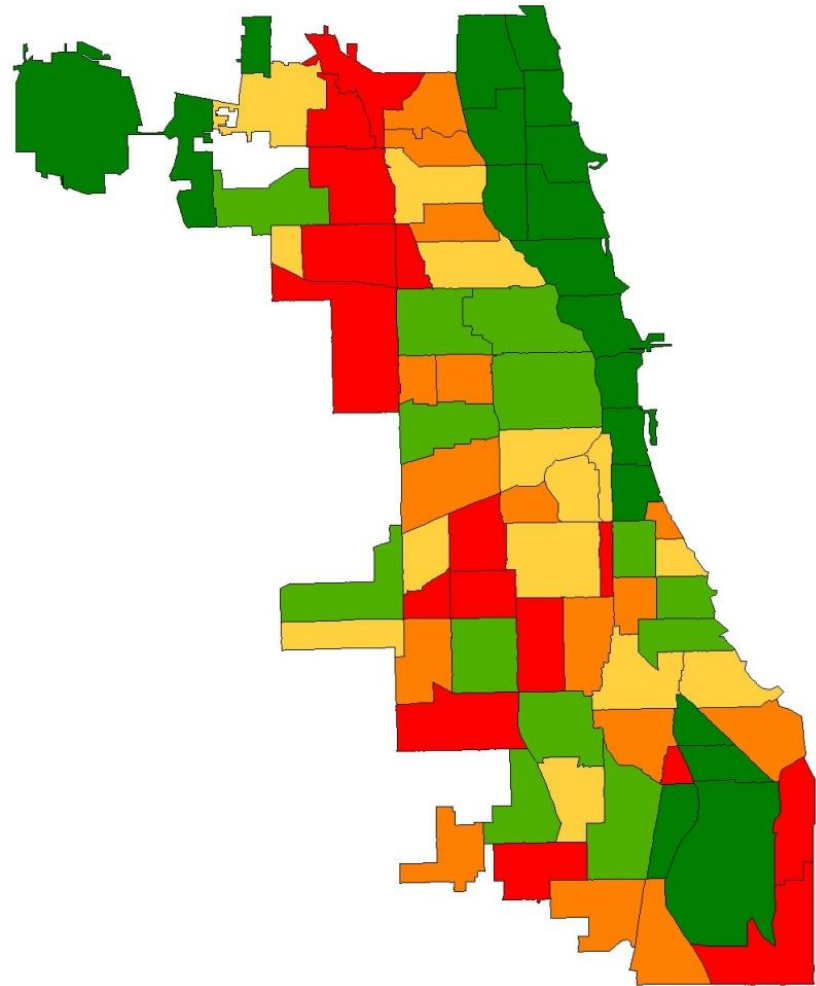


Victorian



Townhome

# Understanding the Data – Commercial and Industrial



# Market Sector Teams

|             | Small<br>Commercial<br>& Industrial | Large<br>Commercial<br>& Industrial | Municipal<br>& Nonprofit | Multifamily<br>Residential | Single<br>Family<br>Residential |
|-------------|-------------------------------------|-------------------------------------|--------------------------|----------------------------|---------------------------------|
| Finance     |                                     |                                     |                          |                            |                                 |
| Workforce   |                                     |                                     |                          |                            |                                 |
| Information |                                     |                                     |                          |                            |                                 |



**A web site that allows homeowners to see their energy usage....**

- **And to compare their performance to the average of their neighbors...**
- **And to compare their performance to the average of other homes like theirs...**
- **And to quickly and easily find out what they can do to compete better...**
- **And it even connects homeowners to the contractors to get the job done!**

## MyHomeEQ uses *actual usage data* from utilities and home area from assessor

- Accurate data on real usage and home characteristics
- Complete dataset for entire region allows for multiple comparisons
- Recommendation engine will learn from actual retrofits and actual savings

**Property Details**



City: Evanston  
Township: Evanston  
NBHD: 80  
Taxcode: 17007  
Class: 2-11  
11191150150000 04/17/2007  
[VIEW LARGER IMAGE](#)

**Assessed Valuation**

|                         | 2010<br>First Pass<br>Assessment | 2009<br>Board of Review<br>Certified |
|-------------------------|----------------------------------|--------------------------------------|
| Land Assessed Value     | 10,187                           | 10,391                               |
| Building Assessed Value | 45,490                           | 51,898                               |
| Total Assessed Value    | 55,677                           | 62,289                               |

**Property Characteristics**

|                               |                                      |
|-------------------------------|--------------------------------------|
| Estimated 2010 Market Value   | 556,770                              |
| Estimated 2009 Market Value   | 622,890                              |
| Description                   | Two to Six Apartments, Over 62 Years |
| Residence Type                | Two Story                            |
| Use                           | Multi Family                         |
| Apartments                    | Two                                  |
| Exterior Construction         | Frame                                |
| Full Baths                    | 2                                    |
| Half Baths                    | 0                                    |
| Basement <sup>1</sup>         | Full and Unfinished                  |
| Attic                         | Full and Unfinished                  |
| Central Air                   | No                                   |
| Number of Fireplaces          | 0                                    |
| Garage Size/Type <sup>2</sup> | 2 car detached                       |
| Age:                          | 120                                  |
| Land Square Footage           | 8,150                                |
| Building Square Footage       | 2,876                                |
| Assessment Date               | First Pass                           |



# Demo

CNT - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://74.208.77.228/development2/

median income Oak Park IL

Most Visited CNT Time Tracker Google Scholar Google Calendar Gmail - Inbox - rscheu... CHIRP Radio • From t... iGoogle

Gmail - Inbox - rscheu@gmail.com Google Calendar Center for Neighborhood Technology CHIRP Radio • From the Chicago Ind... CNT Google Desktop: RE: Nicor's EE Plan

ABOUT THIS SITE

## My Home EQ

Improving the Value, Comfort and Energy Savings of Your Home

[Home](#) Find a Contractor Financing Options Local Information

### How much energy does my home really use?

Enter Your Address

Search

**Save money and live more comfortably by lowering your energy usage**

Understanding your actual energy usage is the first step in making your home more comfortable, efficient, and valuable. We'll recommend home improvements that have both immediate and long lasting impact and then we'll help you with the details of making the change. That's why we're here.

#### Reasons to Search

- > Lower Your Energy Costs
- > Make Your Home More Comfortable
- > Find Out Which Home Improvements are Right for You
- > Make Your Home More Green

| Potential Energy Savings/Year<br>BASED UPON ZIP CODE | Your Home EQ Score | Rebates and Tax Credits |
|--|--------------------|-------------------------|
|--|--------------------|-------------------------|

Done

Start Inbox - Micr... MyHomeEQ ... RE: Nicor's ... CNT - Mozil... Stream CHI... aCS2006-08... Ex. 1.1 EE P... Nicor-Oak P... MyHomeEQ ... 2 Microsof... b\_Work pro... Links » 4:59 PM

## **Conclusions:** Oak Park Single Family Homes

**20%-30% energy savings achievable**

**11k home market**

**Motivated, educated and active community who are passionate about their homes**





# Oak Park Demographics & Energy Use

**45% of homes = 84% of energy**

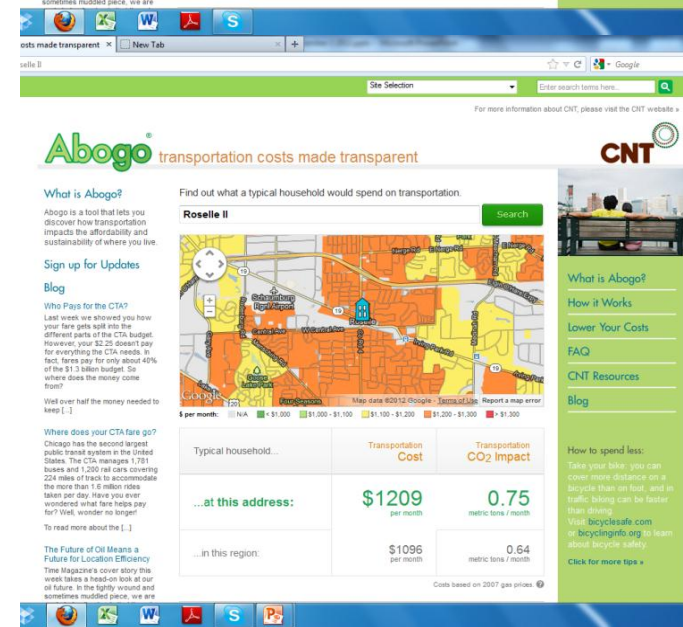
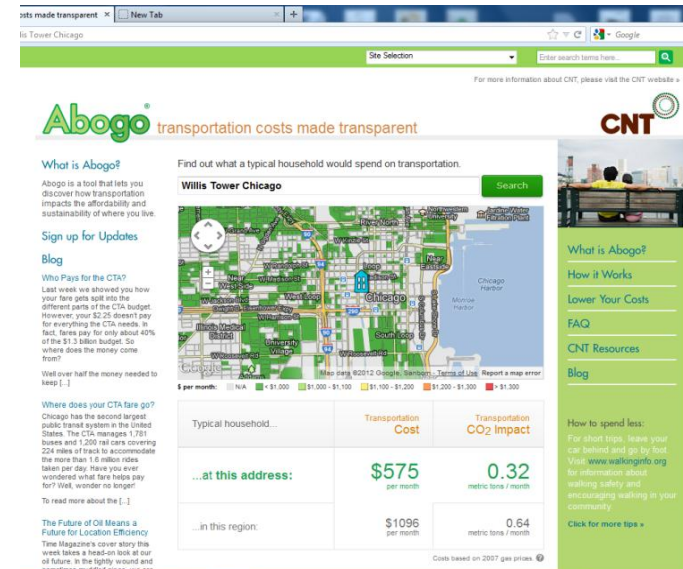
- ***Low Hanging Fruit:*** Target market Nicor Energy Efficiency programs and Services to Oak Park sf homeowners. Get results with minimum spend.
- **Challenge:** How to get them into the program...



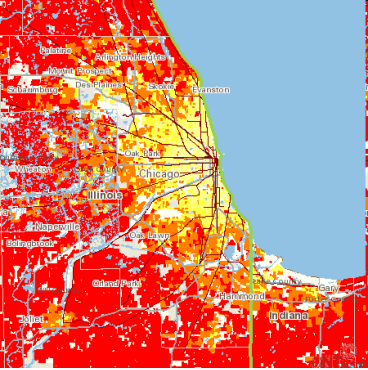
# Systems That Start to Support Collective Efficacy--Disclosure

<http://abogo.cnt.org>

- Much modern community organizing supported by HMDA, TRI, Plan review processes, or investigative journalism (e.g. Jane Jacobs series on Lower Manhattan Expressway)
- Emergent— computer aided small area disclosure related to potential alternatives provides a basis for better decisions (e.g. HT Index)
- Valuation provides a basis for making a switch
- EG, targeted counseling on efficiency increases savings rate from 1% to 5% for households earning \$30k/year







9.7-  
14.6

# Transport Carbon in Tons of CO<sub>2</sub>/HH/Year

5.8-  
10.7

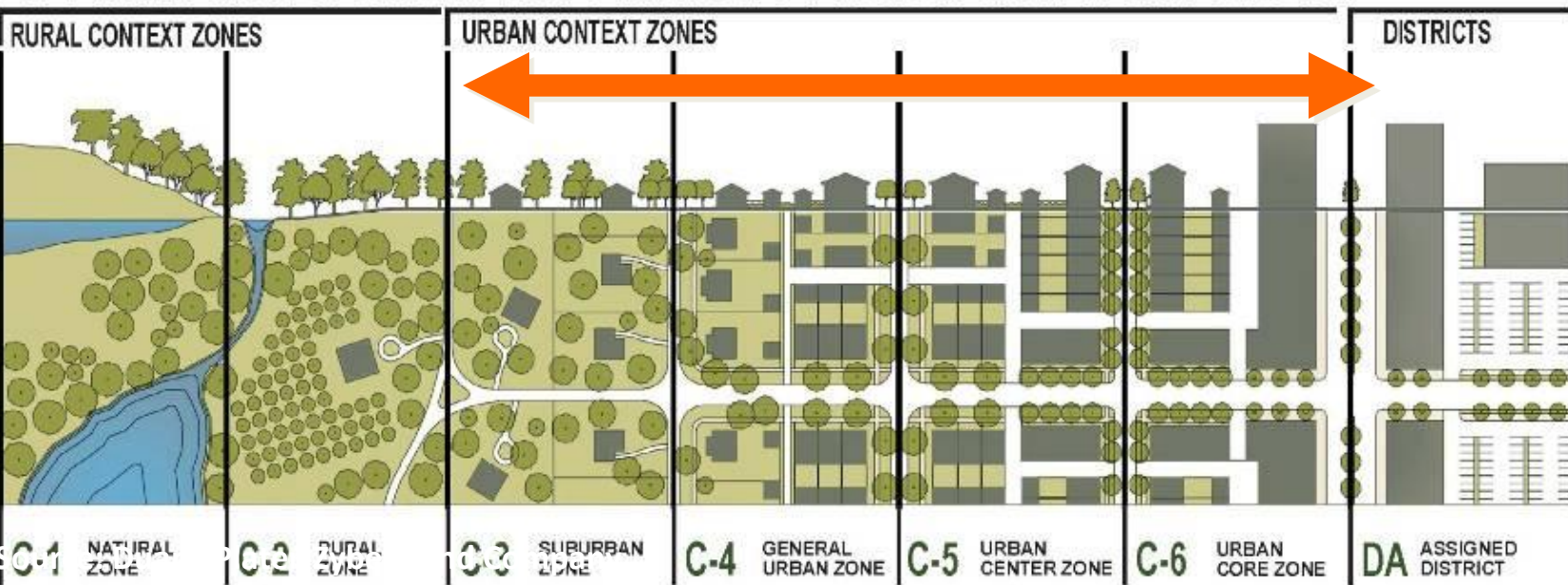
3.9-  
6.1

2.4-  
4.4

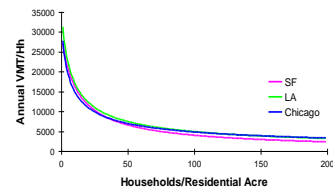
0-  
2.43

This Place Has  
the  
Disappearing  
Carbon  
Blues...♪

RURAL ||||| TRANSECT ||||| URBAN



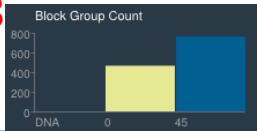
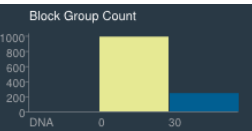
Location Efficiency & the  
Transect Reveals  
Carbon Benefits of Good Urban  
Form



# Putting It All Together—For Households Earning AMI

Average H-Cost = 25.3, Average H+T Cost = 51.9

**Adding T-Costs Shrinks the % of Affordable Block Groups from 80 to 38**  
**Reduces # of HHs in Affordable Places from 503,000 to 180,000**




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TRUE AFFORDABILITY AND LOCATION EFFICIENCY

**H+T<sup>®</sup> Affordability Index**

Share this Map 

Columbus, OH

FIND



MAP VIEW



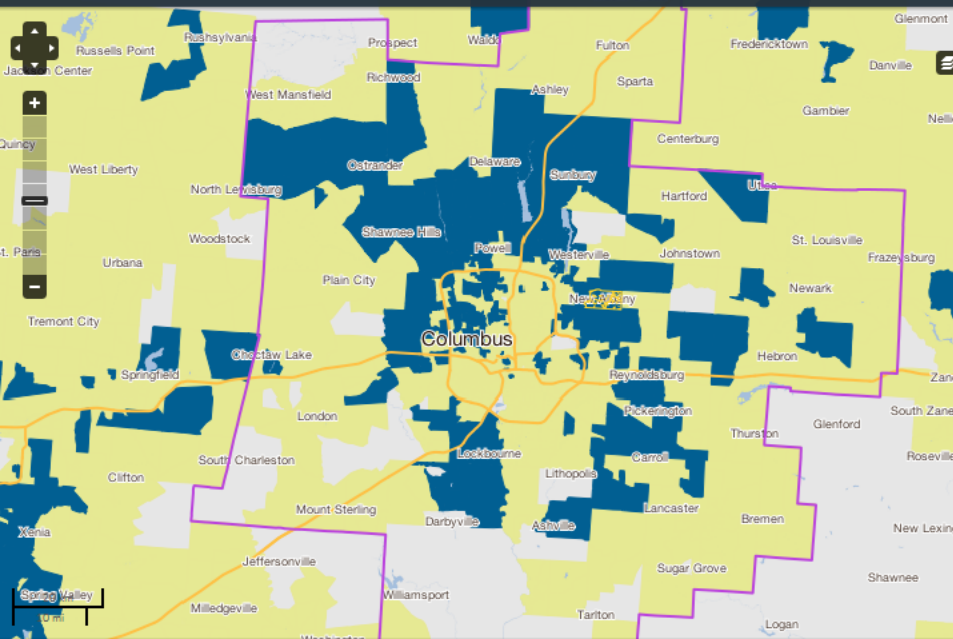
## Housing Costs % Income

Regional Typical Household in Columbus, OH

Income: \$52,766 HH Size: 2.5 People Commuters: 1.17 Workers

Focus: Region

Blockgroups: 1,229 (1,229 with data) No. of Households: 674,599  
 Minimum: 5.20 Average: 25.32 Maximum: 90.99



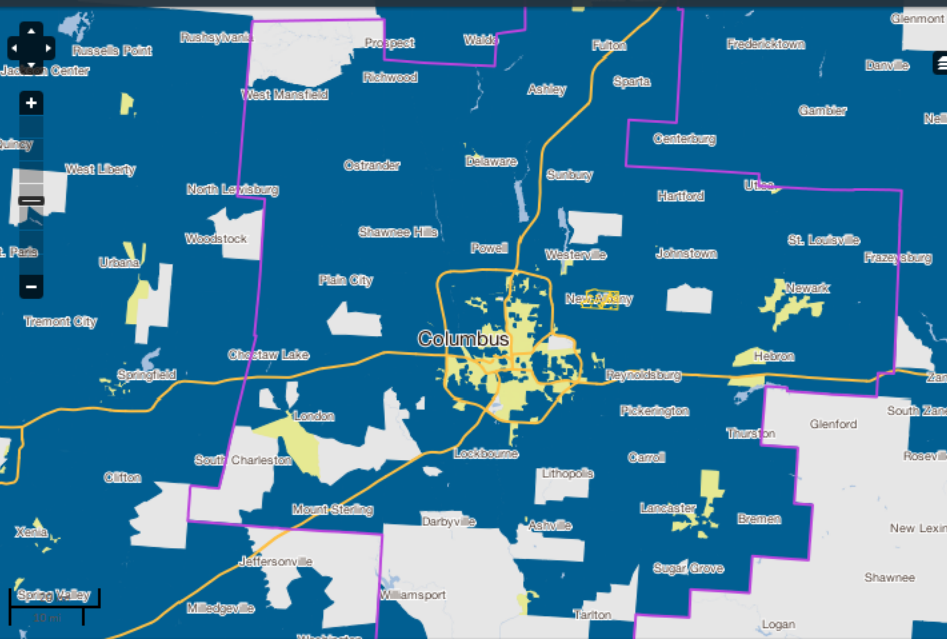
## Housing + Transportation Costs % Income

Regional Typical Household in Columbus, OH

Income: \$52,766 HH Size: 2.5 People Commuters: 1.17 Workers

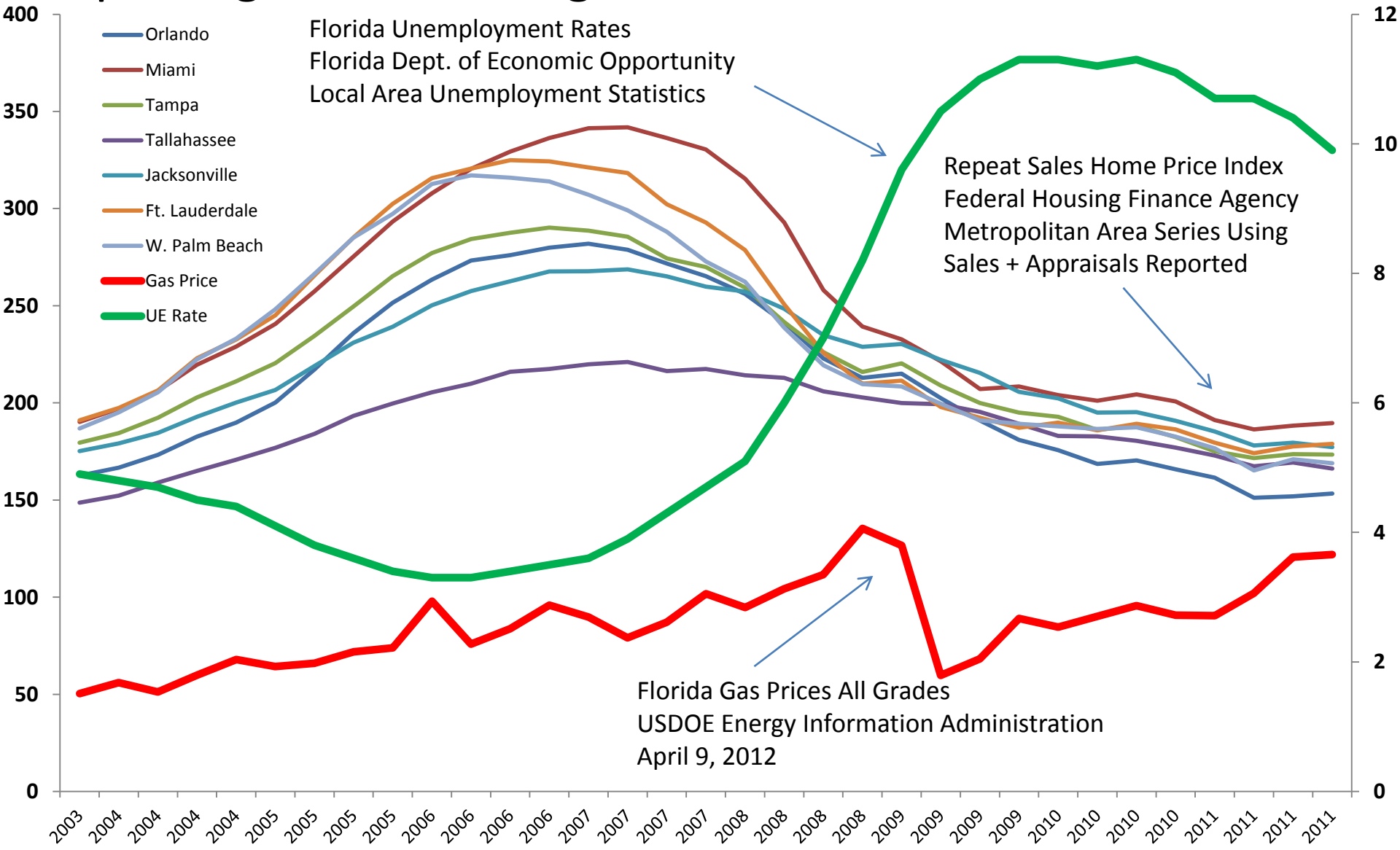
Focus: Region

Blockgroups: 1,229 (1,229 with data) No. of Households: 674,599  
 Minimum: 25.96 Average: 51.90 Maximum: 117.22



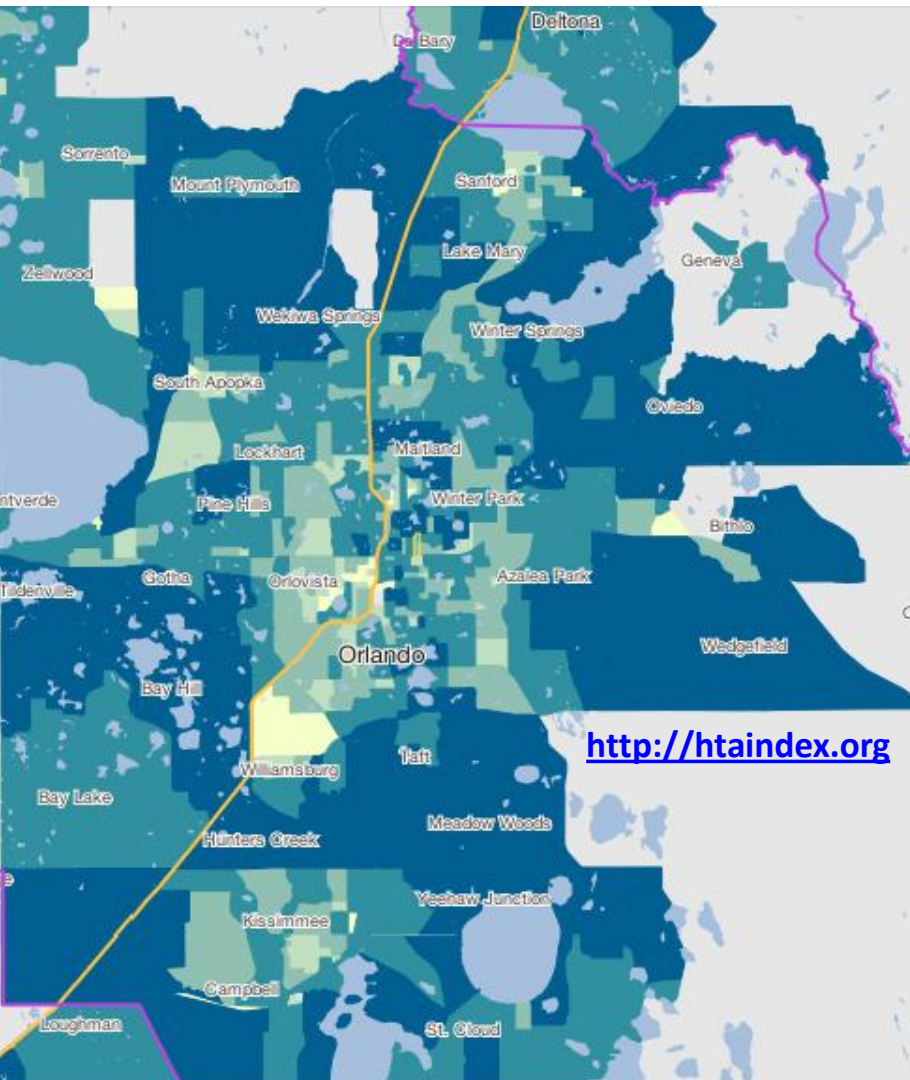


# How unemployment and home price can go down but foreclosures keep happening—transport costs keep rising—2003 through 2011—adds 5-10% to COL

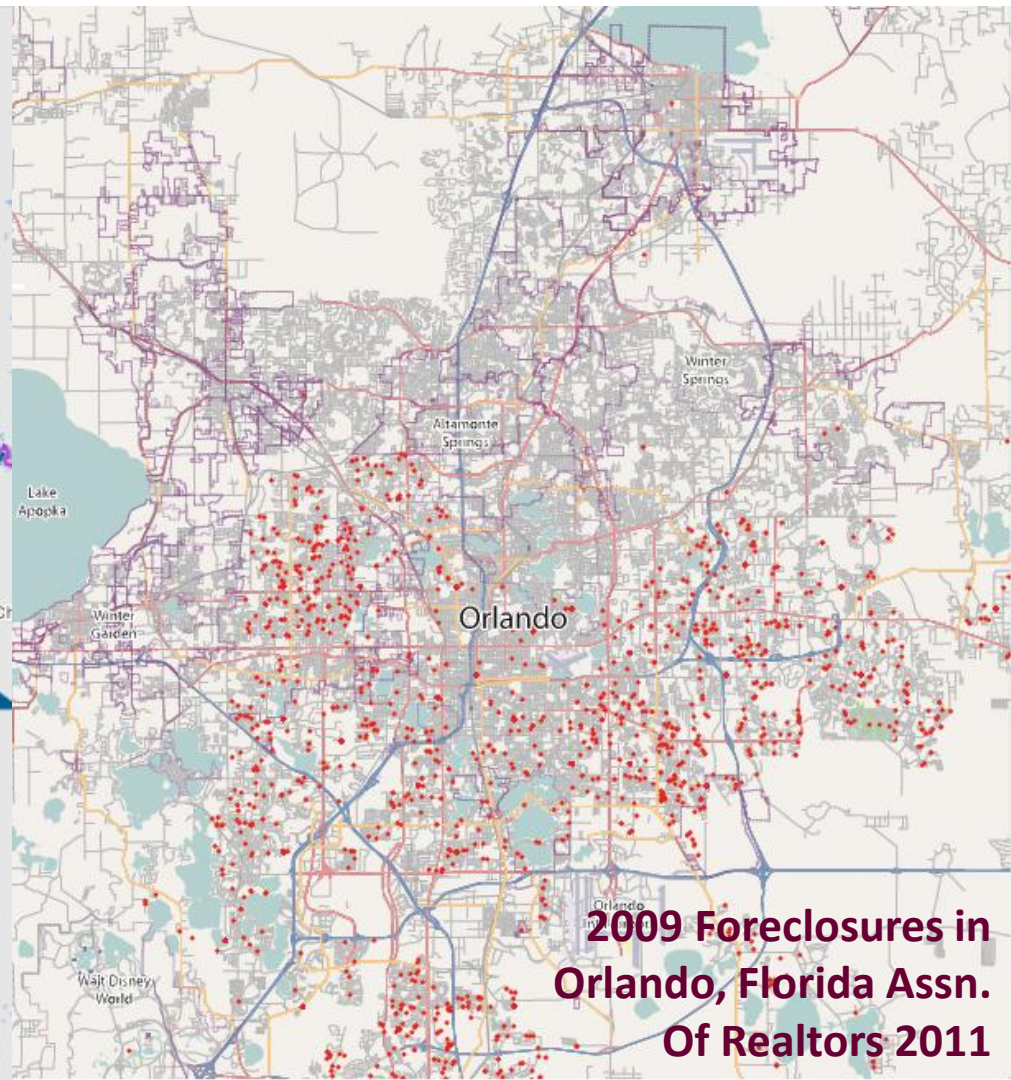


88% of Metro Orlando households live in areas with a combined H+T score  $\geq 45\%$  of household income

Highest foreclosure rates are in places with the highest H+T costs per household



<http://htaindex.org>



**2009 Foreclosures in  
Orlando, Florida Assn.  
Of Realtors 2011**

# Learning Rates

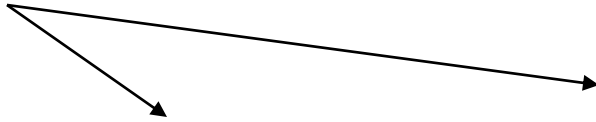
- A good idea, unlike fine wine, doesn't get better the longer it sits on the shelf
- The learning rate = rate at which cost of producing a product or service drops with each doubling of activity
- Slow rates inhibit exponentially
- Leads to a culture of belief that rapid change can't happen
- Some things do happen quickly
- 27,000 miles of urban street railway networks 1885-1902
- Conversion of all buildings using combustion equipment to natural gas in the 1930s, all Chicago in a single year
- Development of franchises for small business development
- Internet broadband services

# Fix It First or Buy Something Better?

- “As governments, we’re on the hook to maintain core legacy infrastructure including roads, bridges, water, and sewers...
- But then there’s the infrastructure we’re turned on about...
- Mass transit, more complete streets, clean energy economy, broadband, smart grid and green infrastructure...”

Oregon Governor John Kitzhaber  
June 2012

# Similar Choices Comprise a Vision:



- Bottling Rainstorms and “Treating” Them
- Streets to Maximize Traffic & Speed
- Bypass Communities with Long-Distance Highways & Aviation
- Expand Electric Utility Capacity
- Expand Car Ownership
- Invest to Promote Consumption

**Catching Raindrops Where They Fall**

**Streets to Connect People and What They Do Routinely**

**Reconnect Communities with Inter-City Rail**

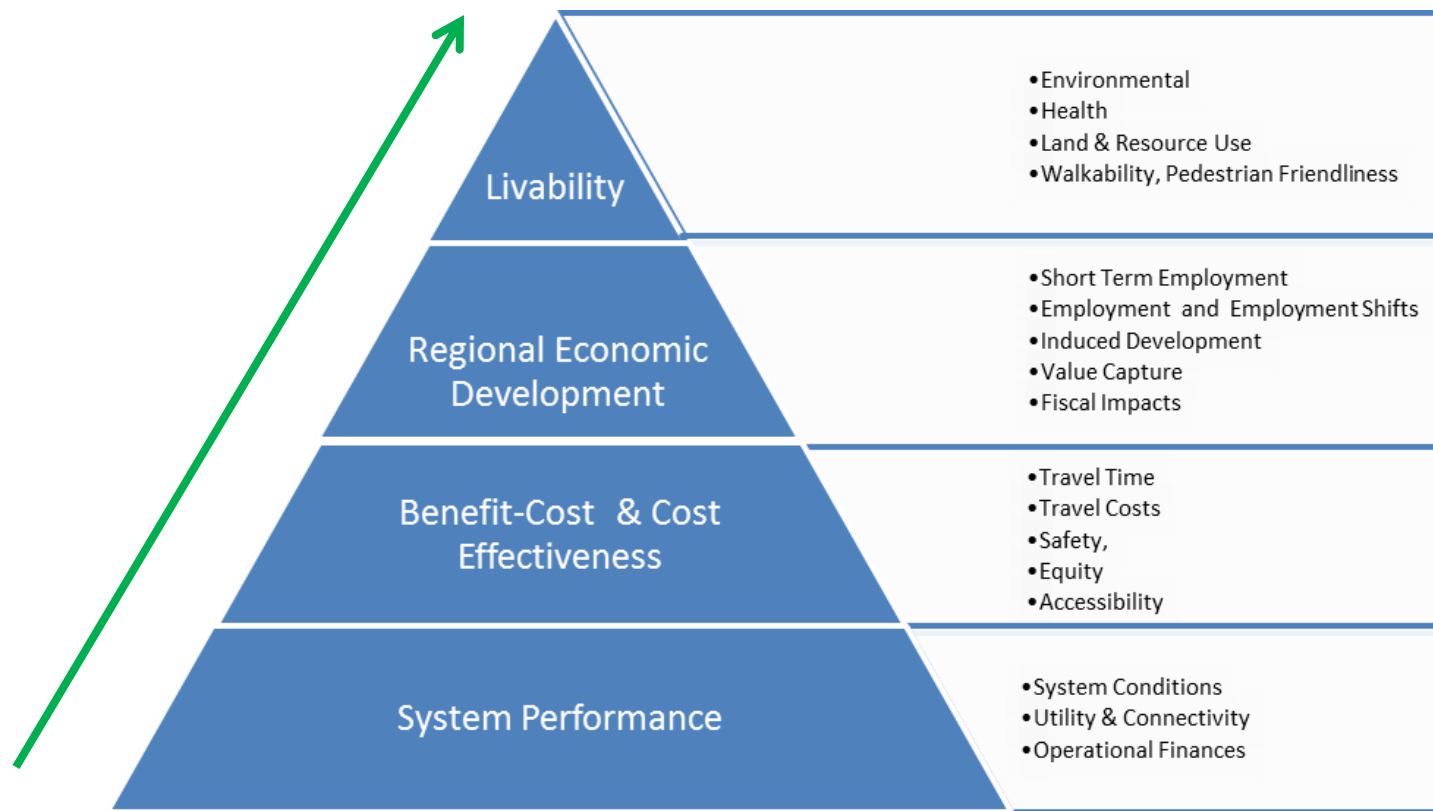
**Increase Buildings & Community Efficiency**

**Communities that Come with Local Amenities and Shared Vehicles**

**Invest to Increase Productivity & Resilience and Reduce Cost of Living**



# Economic Impact Analysis—Moving Up the Ladder from System Benefits to Community Benefits



# Stay tuned and thank you!

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Website - [www.efficiencycities.org](http://www.efficiencycities.org)

To Join - [www.efficiencycities.org/join-us](http://www.efficiencycities.org/join-us)