

# The Price of Business-as-Usual: The Impacts of Energy Efficiency Beyond Generation Capacity

Presented at the 2013  
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on Energy Efficiency as a  
Resource

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$$E = mc^2$$

Mathis Consulting Company

# What is utility-scale energy efficiency?

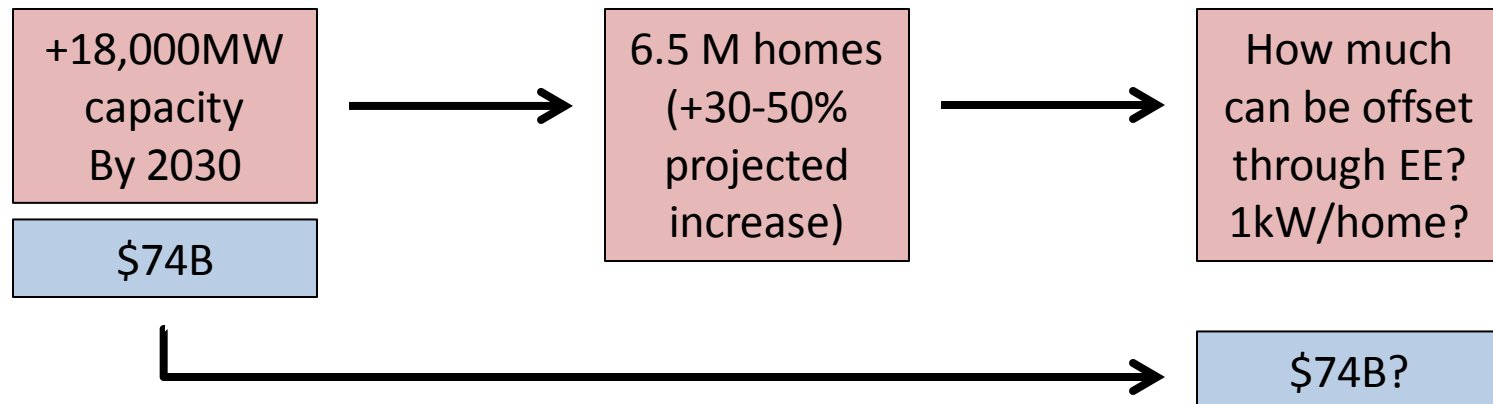


$$E = mc^2$$

# What is utility-scale energy efficiency?

## The Price of Business-as-Usual: Two Energy Futures for the Carolinas

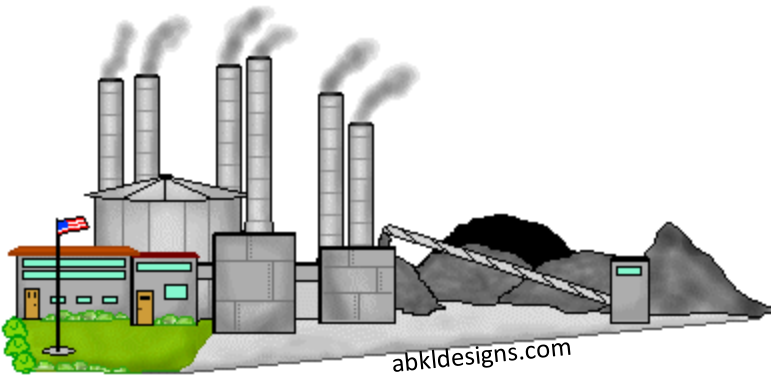
*Jonathan H.C. Kelman, E. Benjamin Edwards, Rachel P. Larson, Bridget Herring and  
R. Christopher Mathis, Mathis Consulting Company*



- Builders and weatherization crews
  - Materials manufacturers
    - Energy auditors
    - Design professionals

# Generation Additions

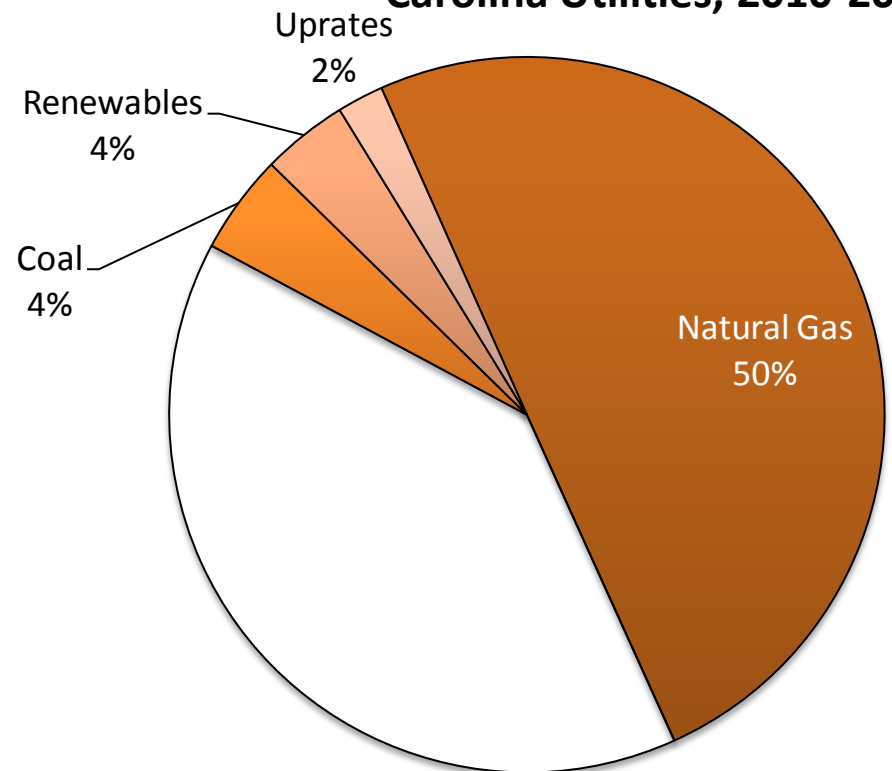
- Last 15 years = \$4.5B on new plant construction
- Next 15 years = \$29.8B projected (IRPs/EIA)



“We will have to retire and replace virtually every plant by 2050.”

- Jim Rogers, Former CEO, Duke Energy

**Fuel Mix for Planned Capacity Additions by North and South Carolina Utilities, 2010-2030**



$$E = mc^2$$

# Changes since PBAU 1

## **The Price of Business-as-Usual: Two Energy Futures for the Carolinas**

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- Effect of hydraulic fracturing on gas market
- Rollout of new energy codes
- Duke Power + Progress Energy
- Continuing population growth and construction

$$E_0 = mc^2$$

# Why utility-scale energy efficiency?

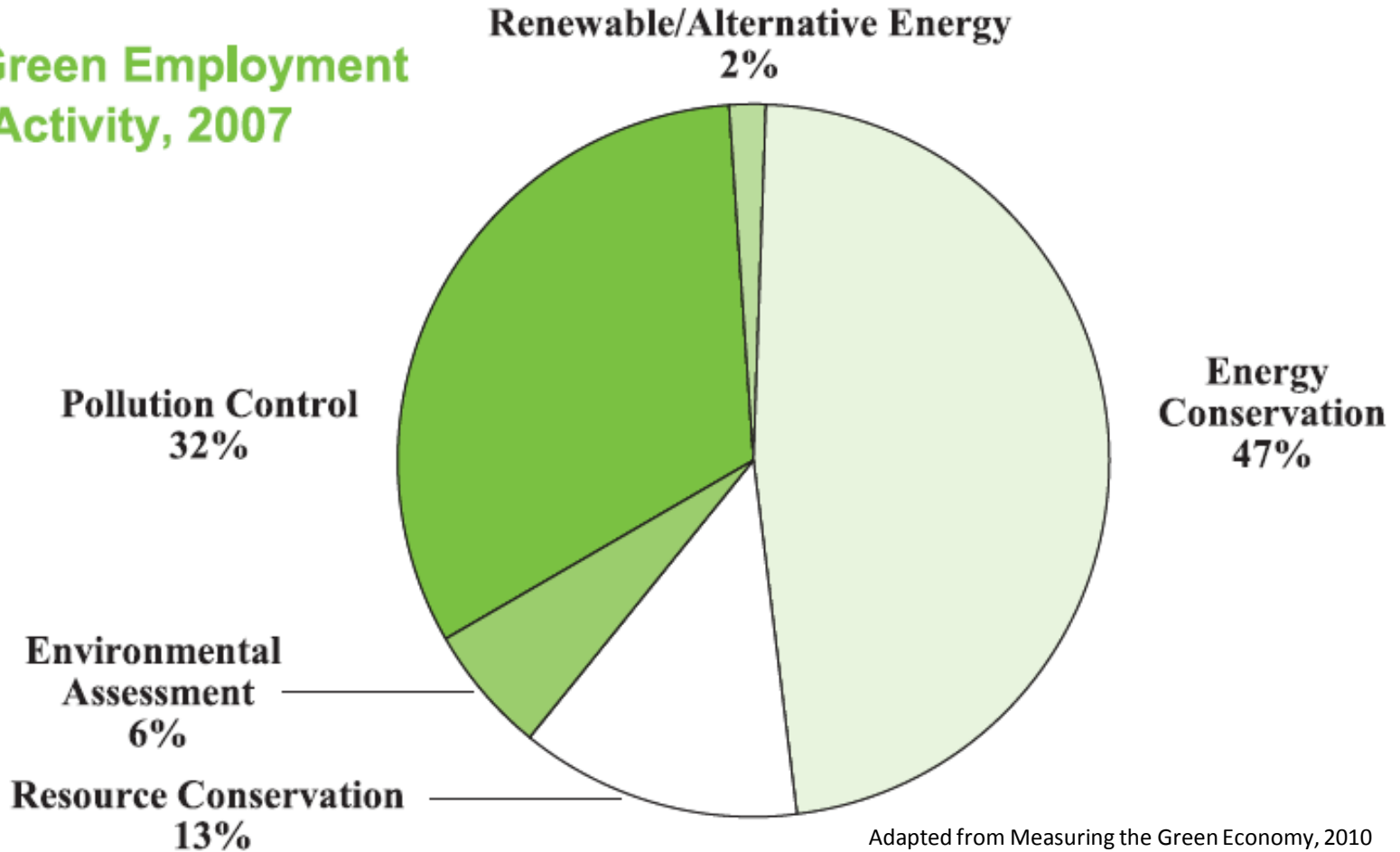
- Reduce cost of additional generation, transmission
- Reduce cost of fuel for non-renewables
- Reduce cost of water used for generation
- Add flexibility to load management
- Add resilience to electric infrastructure
- Add jobs in the energy sector



$$E = mc^2$$

# National conservation and pollution reduction economy (“green jobs”)

**Figure 5**  
**Share of Green Employment**  
**by Green Activity, 2007**



Adapted from Measuring the Green Economy, 2010  
esa.doc.gov

$$E = mc^2$$

# National conservation and pollution reduction economy (“green jobs”)

## Distribution of Green Employment across Industry Sectors, 2007



Source: ESA estimates based on U.S. Census Bureau, 2007 Economic Census data and supplemental information.

Adapted from Measuring the Green Economy, 2010  
esa.doc.gov

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# Where are clean energy jobs created?

FIGURE 1. CLEAN ENERGY JOBS ANNOUNCED BY STATE IN SECOND QUARTER OF 2013

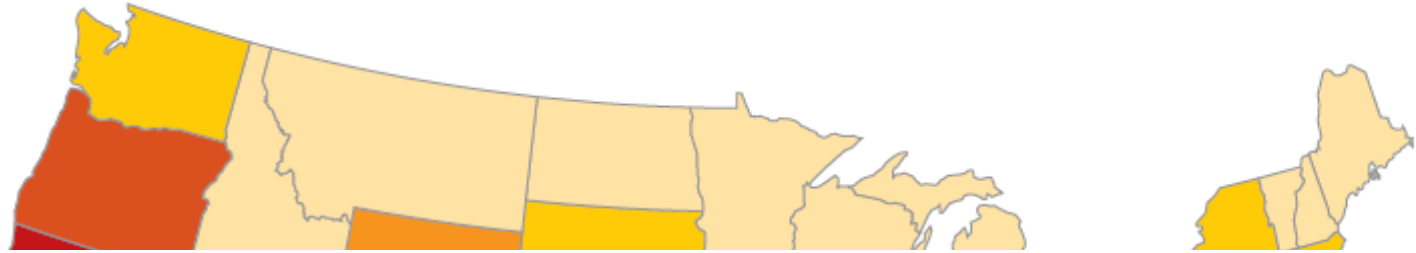
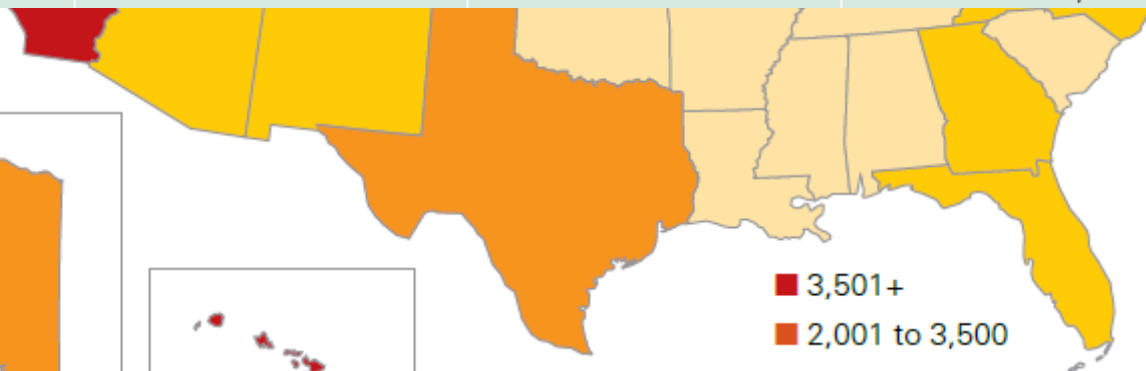


TABLE 2. CLEAN ENERGY JOBS ANNOUNCED IN SECOND QUARTER OF 2013 FROM:

SECTOR	PROJECTS TALLIED	TABLE 2. CLEAN ENERGY JOBS ANNOUNCED IN SECOND QUARTER OF 2013 FROM:			TOTAL
		PROJECTS IN OPERATION	PROJECTS IN PROGRESS	PROJECTS ANNOUNCED	
<b>Manufacturing</b>	15	414	636	495	<b>1,545</b>
Energy Efficiency	1	-	-	288	288
<b>Energy Efficiency</b>	4	778	-	5,000	<b>5,778</b>



- 3,501+
- 2,001 to 3,500
- 501 to 2,000
- 101 to 500
- 100 and fewer

e2.org

These data cover job announcements from April 2013 through June 2013 media reports, official announcements, and other sources and are not an exhaustive tally of job creation in the clean economy.

# Green Technologies and Practices

Industry	Industry GTP employment as % of total GTP employment	Industry GTP employment as % of total industry employment	Industry GTP employment
Total GTP employment, all industries	100.00%	0.70%	854,700
Administrative and Waste Services	17.80%	2.00%	← 151,900
Construction	15.70%	2.30%	← 134,100
Professional, Scientific, and Technical Services	11.70%	1.30%	99,800
Health Care and Social Assistance	7.50%	0.40%	63,900
Accommodation and Food Services	6.90%	0.50%	58,800
Public Administration	6.80%	0.80%	57,800
Manufacturing	6.70%	0.50%	57,600
Retail Trade	4.60%	0.30%	39,700
Transportation and Warehousing	4.10%	0.70%	35,100
Educational Services	3.60%	0.30%	30,800
Other Services (except Public Administration)	3.20%	0.70%	27,800
Wholesale Trade	2.70%	0.40%	22,900
Agriculture, Forestry, Fishing and Hunting	2.20%	1.50%	18,900
Utilities	2.00%	2.10%	← 16,800

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Industries <2% total GTP truncated, BLS.gov

# Regional Green Technologies and Practices

Employment for workers spending more than half their time involved in green technologies and practices (GTP employment), United States and census regions, August 2011

Area	GTP employment (1)	GTP employment in area as a percent of U.S. GTP employment	GTP employment as a percent of total area employment
United States	854,700	100.0%	0.7%
Northeast(2)	168,500	19.7%	0.7%
Midwest(3)	198,200	23.2%	0.7%
South(4)	267,600	31.3%	0.6%
West(5)	220,300	25.8%	0.8%

**Footnotes**

(1) Defined as employees who spend more than half of their time involved in green technologies and practices.

(2) Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

(3) Indiana, Illinois, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

(4) Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

(5) Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

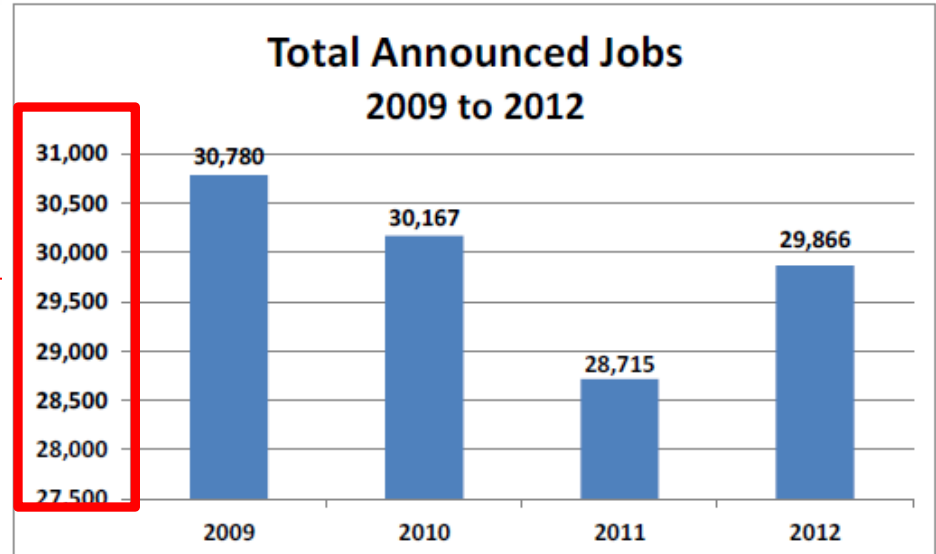
NOTE: Detail may not sum to total due to rounding.

- South has the lowest % of total employment, yet the greatest absolute number.

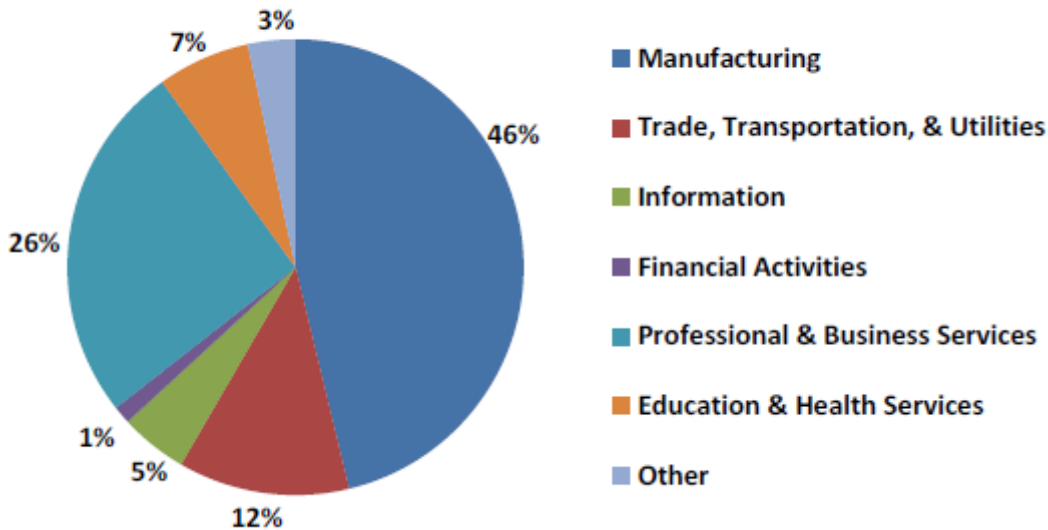
$$E = mc^2$$

# NC's business landscape

Note: Scale

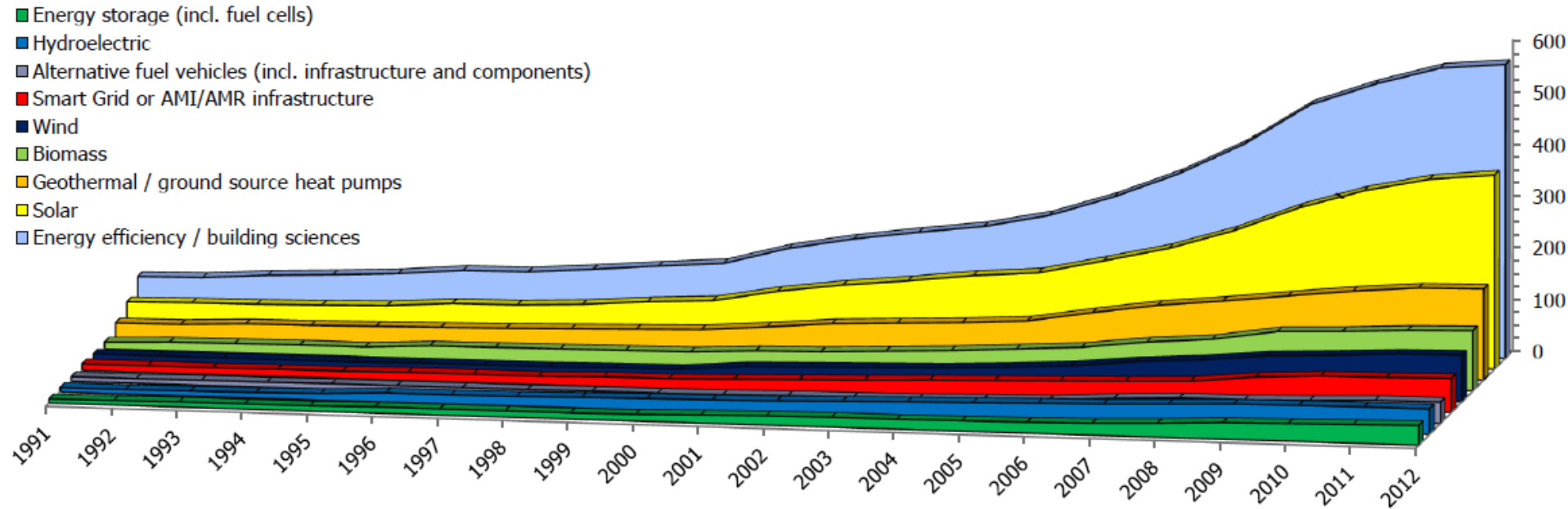


### Job Creation by Industry



# NC renewable and efficiency jobs

Exhibit 3: Aggregate number of companies active in each business focus based on reported year each company entered the clean energy sector, 2012.



- Energy efficient design, construction, and retrofitting account for 7,218 FTE, or 47% of the “clean energy” jobs in the state.

$$E = mc^2$$

# National model, state investment

Activity	Person-Years Of Employment (PYE*) per \$1 million	2008 Spending (in \$B)
Ratepayer-funded Efficiency Activity	6.2	\$5.2
Low Income Weatherization	8.9	\$0.53
Energy Service Companies (ESCOs)	2.5	\$4.9
Insulation	8.9	\$7.1
Federal and State Govt EERE Offices	6.5	\$0.24

- \$1M spent on EE → 2.5 to 8.9 person-years of employment
- What might \$74B spent in the Carolinas over a decade do?

$$E = mc^2$$

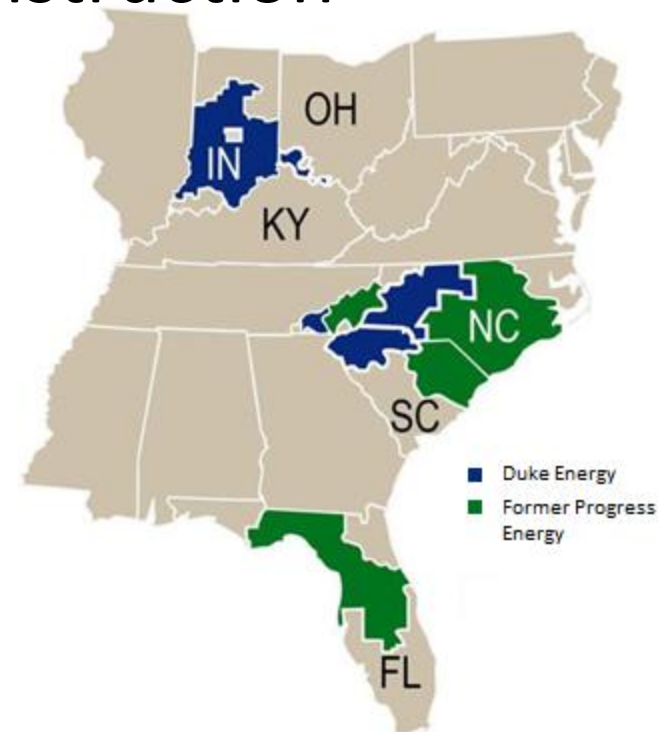
# Energy Efficiency Instead?

- EE more durable than generation, transmission
- No Emissions (SO<sub>x</sub>, NO<sub>x</sub>, CO<sub>2</sub>, particulate)
- No water withdrawals for cooling, steam (500gal/kWh)
- Price stability; no surprises in construction
- No fuel instability, risk



“We are investing in new technologies, expanding our use of energy efficiency as the ‘fifth fuel.’”

- Jim Rogers, Former CEO, Duke Energy



$$E = mc^2$$

# Other benefits

- Mortgages more secure, property value stabilization
- Save non-renewable resources (uranium, soil, fossil fuels)
- Liquidity in the local economy.

$$E = mc^2$$

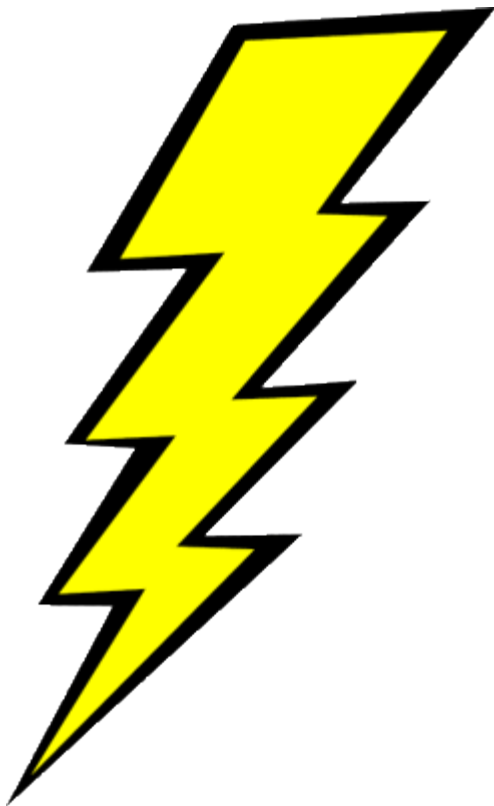




# Current Duke Energy models



- Home Energy House Call
  - energy audit
- Appliance Recycling
  - \$30 for white goods
- Power Manager<sup>®</sup>
  - HVAC DSM
- Smart \$aver<sup>®</sup>
  - mix of other programs



# Current Duke Energy models



Residential Smart Saver®:

Holistic?

Why install another 4 ton HVAC if the windows still are terrible?

## Choose Your Incentive

Looking for ways to save money, improve the comfort of your home and become more energy efficient? Look no further than Duke Energy's Smart Saver® program. You can save up to \$625 with incentives on qualifying high-efficiency equipment and services.

### HVAC Install (\$200)

Get Started

Install a new heat pump or central air conditioner and receive a \$200 incentive.

### Health Check (\$50)

Get Started

Have your heat pump or central air conditioner restored to optimal operating efficiency and receive a \$50 incentive.

### Insulate and Seal (\$75-\$250)

Get Started

Make your home more energy efficient, comfortable and safer, and receive a Duke Energy incentive.

$$E = mc^2$$

# Current Duke Energy models



## Commercial Smart Saver<sup>®</sup>:

- Low-hanging fruit
- More holistic, but results not measured!
- Proposals welcome.



$$E = mc^2$$

# Political Climate

- “A common theme among respondents was the importance of stability and predictability to the clean energy industry.” NCSEA survey respondents, 2012



Wikipedia.com

- "You have that [energy] hub developing here, and one thing that will bring more companies in is certainty - certainty about what the rules are and that they won't change." House Speaker, Thom Tillis, Charlotte Business Journal, 2013

$$E = mc^2$$

# Next steps

- Confirm the energy efficiency / weatherization potential in NC based on usage and construction data.
- Calculate the actual peak load savings
- Demonstrate the job creation and general economic stimulation from the energy upgrade investment
- Get legislative buy-in
- With the PUC develop incentive programs to make money from energy upgrades.

$$E = mc^2$$

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## Questions?

$$E = mc^2$$