



Radiance Solar.



Rob Felt/ Georgia Institute of Technology



Tom Raftery



MAGE-SOLAR

Clean Economy Rising

Georgia solar energy looks bright

NREL
11.18.2014



Agenda

- **Pew's Research: *Clean Economy Rising***
 - **Phyllis Cuttino**, *director, clean energy*, The Pew Charitable Trusts
- **Solar Power in Georgia**
 - **James Marlow**, *CEO*, Radiance Solar
- **Energy Efficiency in Georgia**
 - **Mandy Mahoney**, *executive director*, Southeastern Energy Efficiency Alliance



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The Pew Clean Energy Initiative



The goal is to accelerate the clean energy economy for its national security, economic and environmental benefits.

The program promotes the adoption of key changes to U.S. energy policy in four sectors:

- Industry
- Utilities
- Transportation
- Research and Development



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Clean Economy Rising Project Overview

State	SECTORS	EMERGING OPPORTUNITIES
GA	Solar, Biomass	Offshore Wind, EVs
ME	Wind, Biomass	Marine Hydrokinetic
MI	Wind, Biofuels	Cleantech Incubator
NC	Solar, Smart Grids	EVs, Biofuels
ND	Wind, Industrial Energy Efficiency	Solar, Biomass
OH	Wind, Solar, Industrial Energy Efficiency	Storage, Advanced Vehicles
PA	Industrial Energy Efficiency, Solar	Advanced Hydro
TX	Wind, Solar, Industrial Energy Efficiency	Clean Energy Manufacturing



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Highlights of Georgia's Clean Energy Economy

National Rankings

Rank	
9th	in new renewable capacity installations, 2013 (192 MW)
10th	in private investment, 2013 (\$477 million)
13th	in energy- and environment-related jobs, 2011 (64,205)

- 3% of U.S. additions of clean energy capacity, 2013
- 3rd nationwide in biomass electricity generated in 2013

Sources: Navigant Research, Bureau of Labor Statistics

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Highlights of Georgia's Clean Energy Economy

National Rankings

Rank	
9th	in new renewable capacity installations, 2013 (192 MW)
10th	in private investment, 2013 (\$477 million)
13th	in energy- and environment-related jobs, 2011 (64,205)

- 225% increase in **solar** jobs, 2012 to 2013 – largest gain of any state
- 10th nationwide in private investment, 2013 (\$477 million)

Sources: Navigant Research, Bureau of Labor Statistics

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Drivers of Georgia's Clean Energy Economy

1. Policy

- Public Service Commission requirement (2013): Georgia Power must add 525 MW solar power by 2016
- Federal and state incentives

Key State Policies					
<input type="radio"/>	Renewable portfolio standard	<input checked="" type="checkbox"/>	Tax incentives	<input type="radio"/>	Green power purchasing
<input checked="" type="checkbox"/>	Net metering and interconnection standards	<input checked="" type="checkbox"/>	Bonds/loans/rebates/other financing	<input type="radio"/>	Nonutility sales of renewable electricity allowed

Source: North Carolina State University, Database of State Incentives for Renewables and Efficiency

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2. Innovative Research Institutions

- Georgia Institute of Technology: solar, smart grids, wind
- University of Georgia and Georgia Southern University: biomass and biofuels



Rooftop solar at Georgia Tech's campus recreation center



Former ARPA-E Director Cheryl Martin tours Georgia Tech

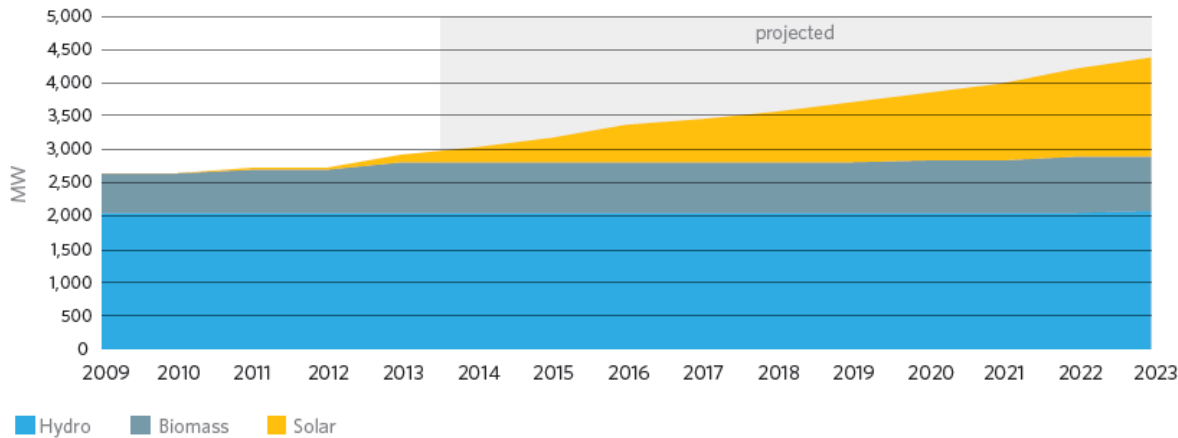


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Clean Energy Capacity, by Sector and Year

Actual (2009-13) and projected (2014-23) growth in cumulative capacity



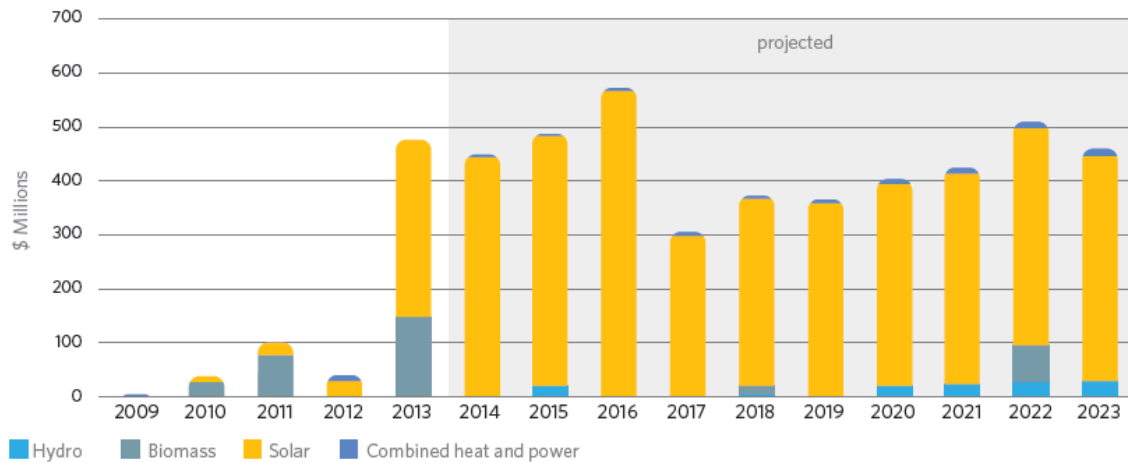
Clean Energy Installations & Investment

- 290 MW, \$666M over past 5 years

- 1.5 GW, \$4.4B over next 10 years

Clean Energy Investment, by Sector and Year

Actual (2009-13) and projected (2014-23) annual investment



Sources: Navigant Research, Energy Information Administration

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Solar

Georgia Solar National rankings and statistics, 2013

Rank	
7th	in new capacity (91 MW)
7th	in private investment (\$326.2 million)
15th	in total capacity (129 MW)
16th	in jobs (2,600)
21st	in homes powered by solar (3,255)

- Georgia Power's Advanced Solar Initiative
- U.S. Army & Georgia Power's 3x30 Project

Sources: Navigant Research, Solar Energy Industries Association, and Solar Foundation

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Biomass

- 3rd nationwide in biomass electricity generation, 2013
- \$150 million in private investment, 2013

New Clean Energy Capacity Installed in 2013 (MW)

Biomass and solar accounted for all new projects

	Biomass	100.5
	Solar	91

Source: Navigant Research

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Emerging Opportunities

- Energy efficiency:
 - Currently 1.2 GW of combined heat and power
 - Further opportunities to reduce costs in manufacturing sector and avoid power outages
- Electric vehicles
 - Zero Emissions Vehicle tax credit: 20%, or up \$5,000
 - 1st in nation for electric vehicle sales
- Offshore wind



Summary

- One of fastest-growing solar economies in nation
- One of largest biomass economies in nation
- Policy and innovation are drivers



Photovoltaic project built by Inman Solar.



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solar

HIGH PERFORMANCE SOLAR POWER SYSTEMS


DESIGN • ENGINEERING • CONSTRUCTION





Radiance Solar is a leading Engineering Procurement Construction (“EPC”) contractor specializing in the Design, engineering, installation and Operations and Maintenance of solar energy systems.





Our Mission is to bring reliable solar energy within the reach of every electricity user through a relentless commitment to efficient design, aggressive procurement, and innovative construction techniques.



Proven Leadership

155+ completed projects

45+ utilities interconnections

Awarded \$2.8 million grant from DOE (with Suniva and GA Tech) to develop new balance of systems products.

Key partnerships with recognized industry leaders

Expertise across all aspects of evolving solar industry

Multiple repeat customers



Our Partners



Customers

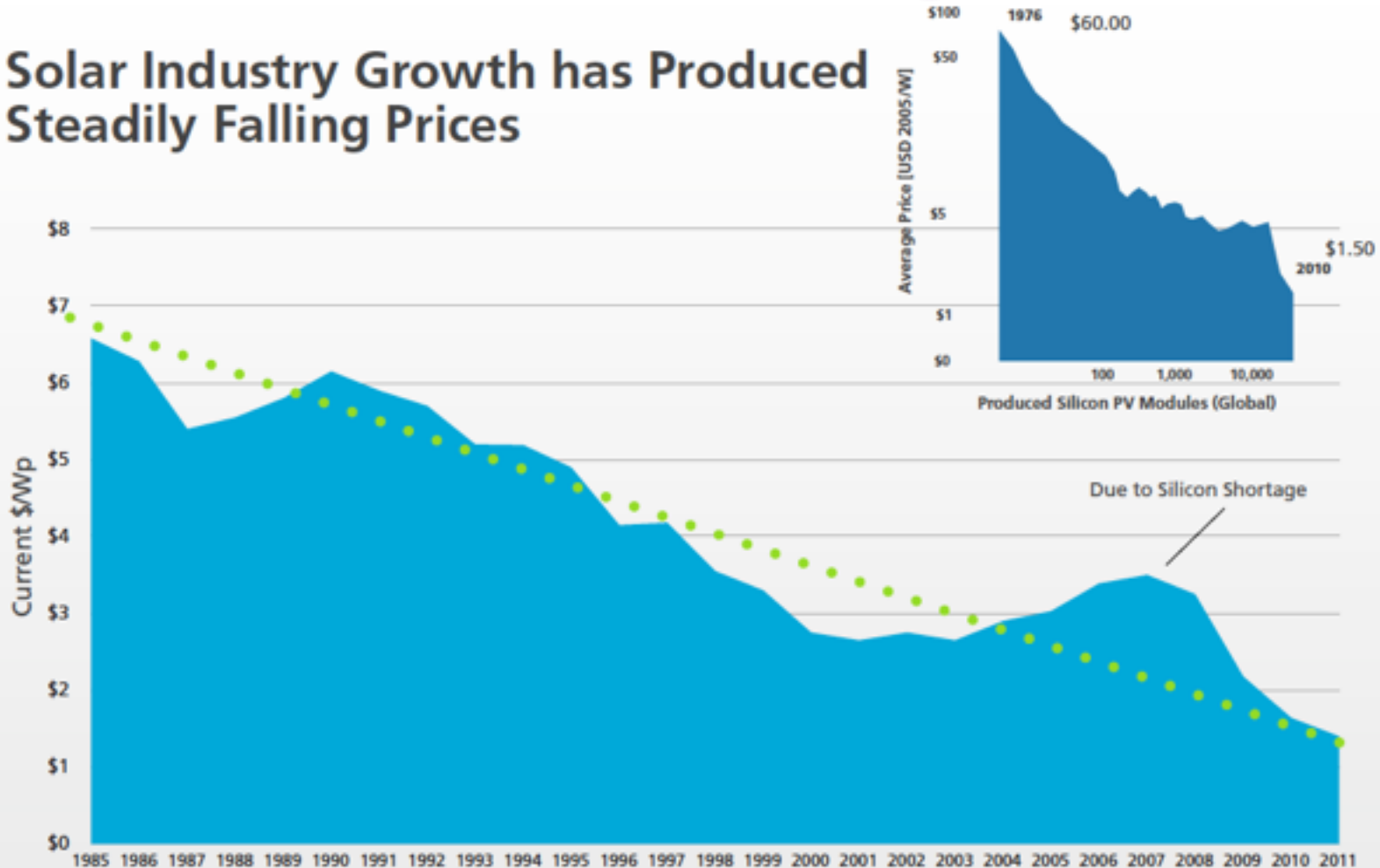


CONSTRUCTION SERVICES LLC



Ferocious Price Drops

Solar Industry Growth has Produced Steadily Falling Prices



Module Pricing Trends 1985-2011



Camilla Solar Plant

South Georgia's First Utility Scale Solar Project • Camilla, GA

20 MW FACILITY

- Design, engineering and DC construction provided by Radiance Solar
- 68,542 Trina Solar Modules
- 314 SMA Tri-power Inverters
- 260 Shoals Technology Combiner Boxes
- 286,436 Helical Piles, manufactured and installed by Cantsink Atlanta
- 26.5 MWh annual production
- Feeds into Georgia Power's grid at 12 KV
- Project developed by Origis Energy and awarded through the Georgia Power's Advanced Solar Initiative





Woodland Solar Power Plant

1 Mw Solar Power Plant • Woodland, GA

1 MW FACILITY

- Design, engineering and DC construction provided by Radiance Solar
- 3,542 Renesola Solar Modules
- 24 SolarMax Inverters
- Shoals Technology Combiner Boxes
- Helical Piles, installed by Cantsink Manufacturing
- 1.325 MWh Annual Production
- Developed by Hecate Energy for Georgia Power Advanced Solar Initiative





Rocky Creek Solar Farm

One of Georgia's First Solar Power Plants • Upson County, GA



1 MW FACILITY

- Design, engineering and DC construction by Radiance Solar
- 3,542 Talesun 285 W Modules
- 161 22-Panel Arrays on Solar Flexrack Mounting
- 483 Cantsink Helical Piles
- 2 Satcon 500 480V Inverters
- 13 Shoals Technology Combiner Boxes
- 1.325 MWh Annual Production
- Feeds into Georgia Power transformer and distributed via their grid at 12kV
- Project developed by:





Shaw Industries

Carpet Manufacturing Facility • Cartersville, GA



1 MW PV SYSTEM

- One of the largest commercial/manufacturing solar projects in the Southeast.
- Roof mounted system: Arrays installed on a one degree standing seam roof at a five degree tilt.
- 3,700, 270 watt Solar World Panels (US Made)
- SMA TriPower, Three-Phase Inverters
- Annual power production of 1.4 million kWh
- Participating in Georgia Power's Advanced Solar Initiative.





Anheuser - Busch Companies

Brewing Facility • Cartersville, GA



500 kW PV SYSTEM

- Designed, engineering and procurement services provided by Radiance Solar.
- 1,672 Suniva 295 watt modules.
- Advanced Energy Inverter with Shoals Technologies Combiner Boxes .
- Part of the Anheuser-Busch "Our World Responsibility Program."

"Integrating solar would make a big contribution to our environmental goals and would bring additional long-term benefits to the bottom line,"

Al Greenwood,
Facility Engineer, Anheuser-Busch.



IKEA International

One of the Largest Commercial Installations in the Southeast • Atlanta, GA



1 MW PV SYSTEM

- Contracted by Strata Solar and Gehrlicher Solar to oversee and install electrical, including AC/DC, inverter, monitoring and interconnection to GA Power.
- 4,312 Yingli 240 W Modules
- 500 and 333 Advanced Energy Solar Inverter
- Solar Magic Revenue Grade Monitoring system and weather station





The City of Ashburn

Largest Municipal Installation in the State • Turner County, GA



300 kW / 4 PV Systems

- Design, engineering and DC construction provided by Radiance Solar
- 227 kW with three ground mounted systems
- 73 kW Roof mounted System
- Suniva Modules
- Solectria Inverters
- Renusol Roof Racking System
- 413,700 kWh annually
- Powers municipal water pump stations and buildings
- Interconnected to Georgia Power.





Providence Hill Farm

Poultry Growing Operation • Jasper, GA



100 kW FACILITY

- Radiance Solar delivered turnkey installation for the roof mounted system.
- Will supply nearly all of the poultry farm's electricity needs.
- 333 Suniva Modules
- 8 SMA Transformerless Inverters
- Will generate 135,000 kWh of power annually.
- Interconnected to Amicalola EMC, and is the largest solar power system in the utility's service area.





GA Tech Clough Student Center

\$90 Million Sustainable Facility • Atlanta, GA



86 kW PV SYSTEM 30 COLLECTOR TH. SYSTEM

- Design, engineering, and construction provided by Radiance Solar
- 358 Suniva 240 W modules on proprietary mounting system
- 14 SMA Sunny boy 6,000 W Inverters
- 30 AET solar hot water collectors with 3,500 gallon storage tanks
- LEED certified building, used as educational tool for students



Persimmon Creek Vineyard

Winery Operation • Clayton, Georgia



• 8 kW PV System

- 30 Sunpower 335 watt panels
- Power One 8,000 watt inverter
- Roof mounted system
- 11,600 kWh/year Produced
- Interconnected to Habersham EMC power grid



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HIGH PERFORMANCE SOLAR POWER SYSTEMS

DESIGN • ENGINEERING • CONSTRUCTION



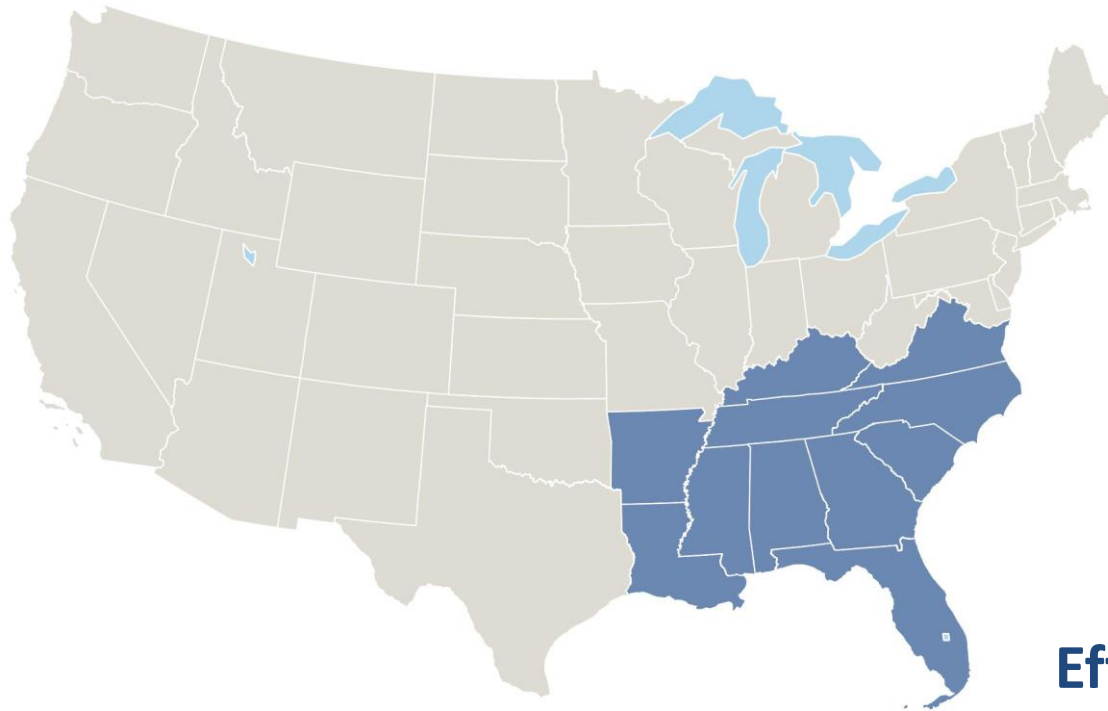
Commercial Construction Trends in the Southeast

**Mandy Mahoney, President
Southeast Energy Efficiency Alliance**



SEEA
SOUTHEAST ENERGY EFFICIENCY ALLIANCE

SEEA FOCUSES ON THE SOUTHEAST



**Eleven-state
footprint**

**Non-profit,
non-partisan**

**Regional Energy
Efficiency Organization**

SEEA'S APPROACH: TAILORING TO THE NEEDS OF THE REGION



**Actively
listening**



**Surveying
the
landscape**



**Identifying
relevant
resources**



**Empowering
stakeholders**

ASSUMPTION: STRONGER CODE BAD FOR BUSINESS

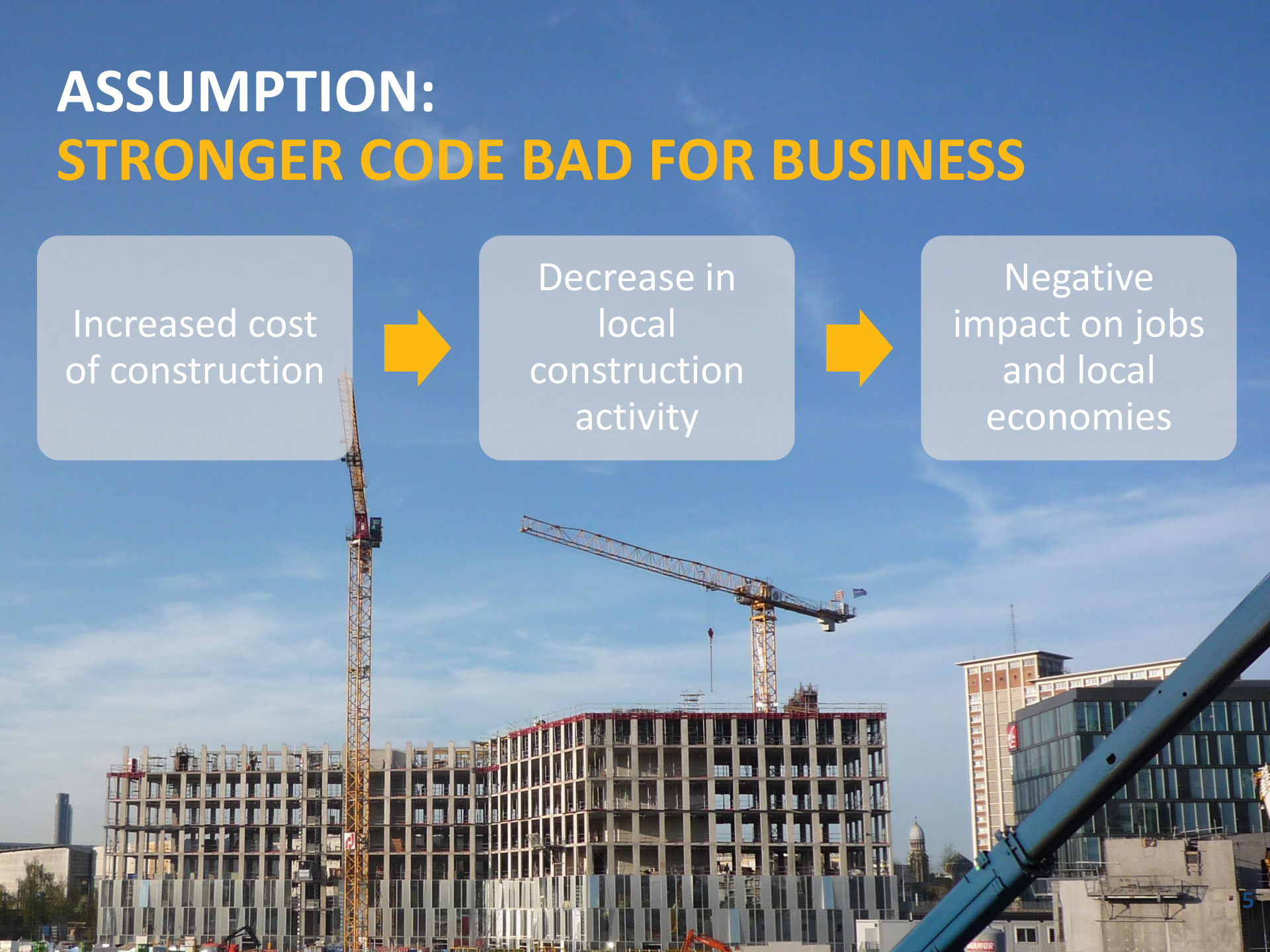
Increased cost
of construction



Decrease in
local
construction
activity



Negative
impact on jobs
and local
economies



THE QUESTION:

Do commercial energy codes suppress local construction activity?

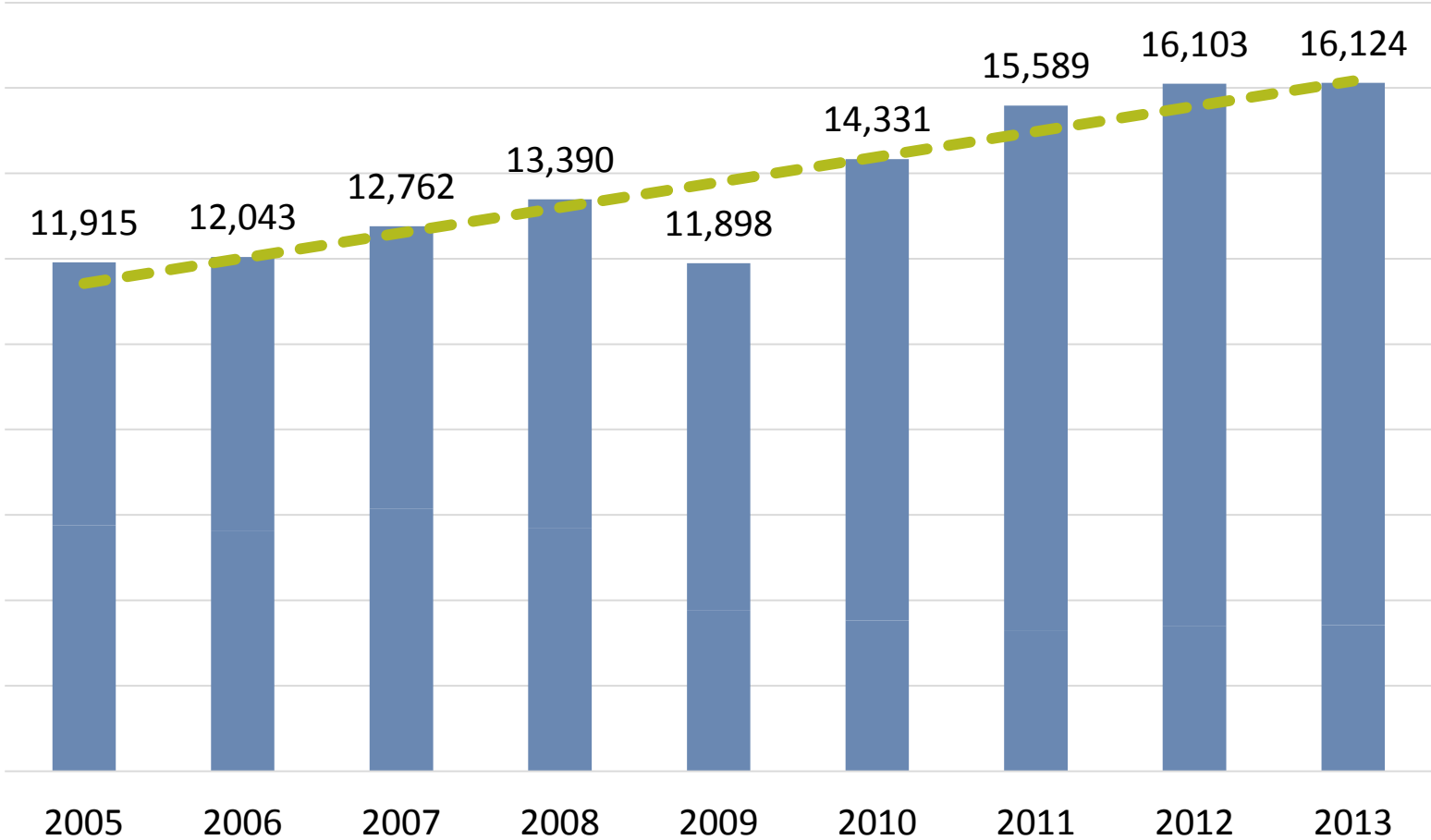


COMMERCIAL CONSTRUCTION TRENDS

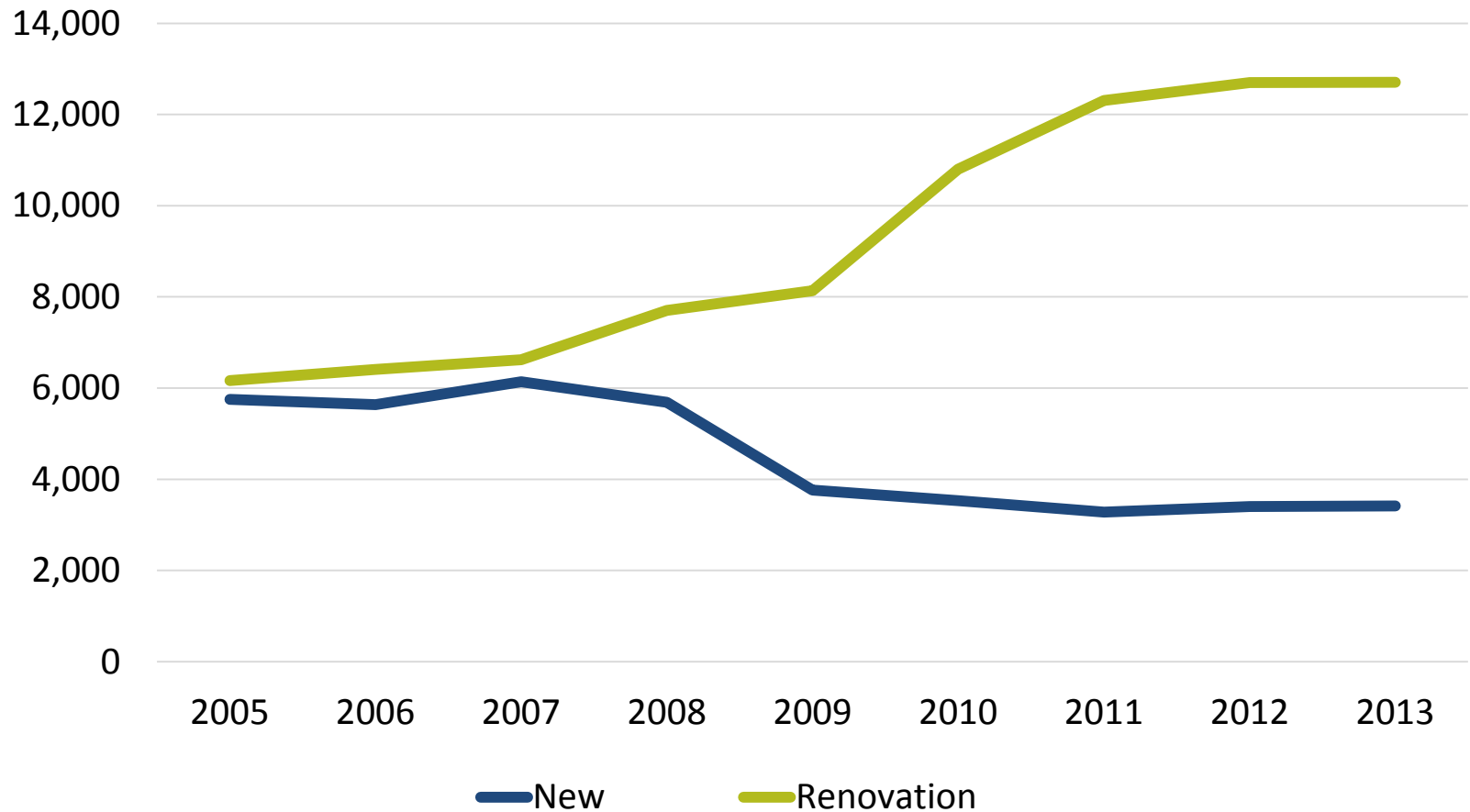
- Data for 11 states from 2005 through 2013
 - Number of “pulled permits” or construction starts
 - Construction project expenditures
- Analyzed data based on state, county, building type
- Benchmarked against each state’s energy code



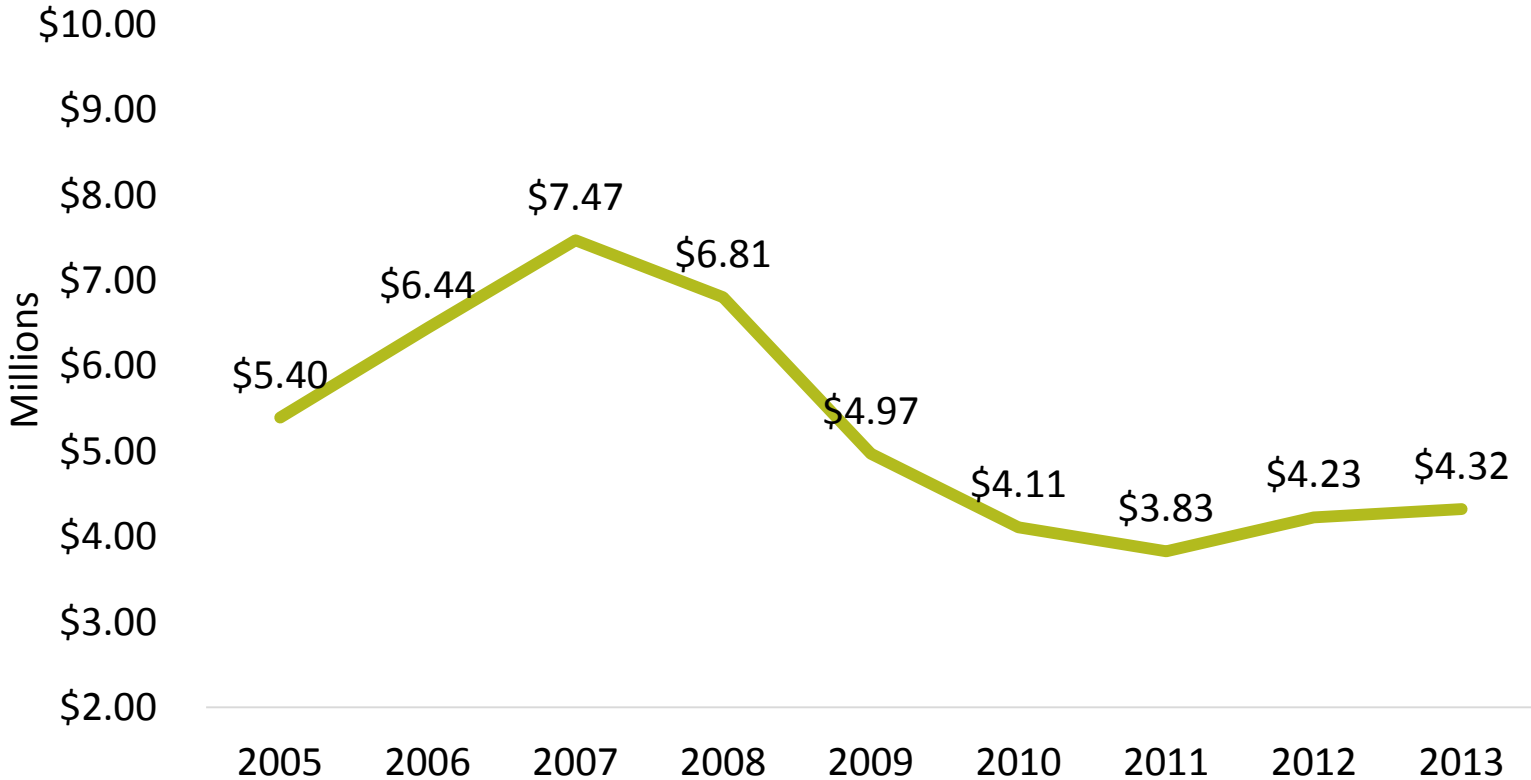
COMMERCIAL PERMITS IN THE SOUTHEAST 2005-2013



PERMITTING LEVELS FOR NEW CONSTRUCTION VS. RENOVATION



AVERAGE CONSTRUCTION EXPENDITURES PER PROJECT IN SOUTHEAST



HIGH LEVEL CONCLUSIONS



Commercial permit numbers are **on the rise** in the Southeast



Renovation activity has **grown**, new construction has **declined**



Construction expenditures have **decreased**



No evidence that energy codes suppress construction starts

NEXT STEPS

- Visit SEAlliance.org for the full paper and in depth state by state information



THANK YOU!

Mandy Mahoney

President

Southeast Energy Efficiency Alliance

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www.SEEALLIANCE.org

For More Information

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www.pewtrusts.org/cleanenergy

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