



Energy Efficiency Opportunities in North Carolina: Draft Report Findings

Presented to North Carolina Energy Policy Council

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American Council for an Energy-Efficient Economy

Washington, D.C.

The American Council for an Energy-Efficient Economy (ACEEE)

Nonprofit 501(c)(3) dedicated to advancing energy efficiency through research and dissemination.

40 staff in Washington, D.C., Delaware, Michigan, and Wisconsin

Focus on End-Use Efficiency in Industry, Buildings, Utilities, Transportation, & National Policy

Offer Conferences and Publications

Funding:

- Foundation and Federal grants (40%)
- Specific Contract work (20%)
- Conferences and Publications (35%)

Project Overview: ACEEE's State Clean Energy Resource Project

Overall project funding by Energy Foundation, U.S. DOE, & U.S. EPA

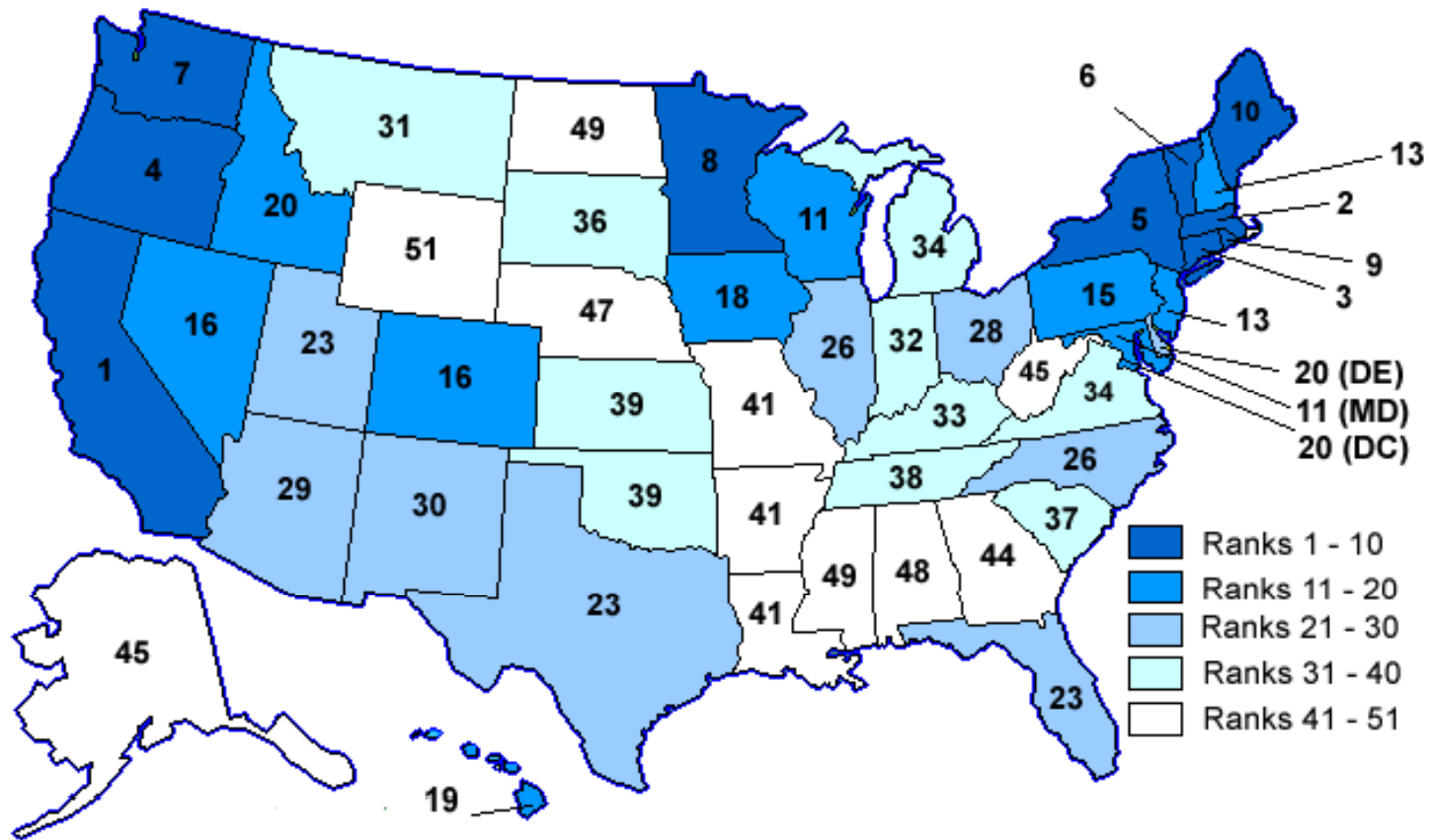
Prepare state energy efficiency potential assessments for 3-4 “transitional states” per year

- Completed studies for Texas, Florida, Maryland, Virginia, Pennsylvania, Ohio, and South Carolina
- Ongoing studies for North Carolina and Arkansas
- Studies co-funded by in-state groups – e.g., Z. Smith Reynolds Foundation in North Carolina
- Analysis targeted to meet state’s policy needs – e.g., electricity, transportation, and water in North Carolina

Assist states with ongoing energy policy implementation

Why North Carolina?

ACEEE's 2009 State Energy Efficiency Scorecard



Project Approach

Data collection

Stakeholder outreach:

- State Government (Energy Office, NCUC)
- Electric utilities
- Environmental organizations
- Academic institutions
- Manufacturing community
- Low-income advocates

Analysis and report preparation: mid-case and high-case scenarios

Report release and media

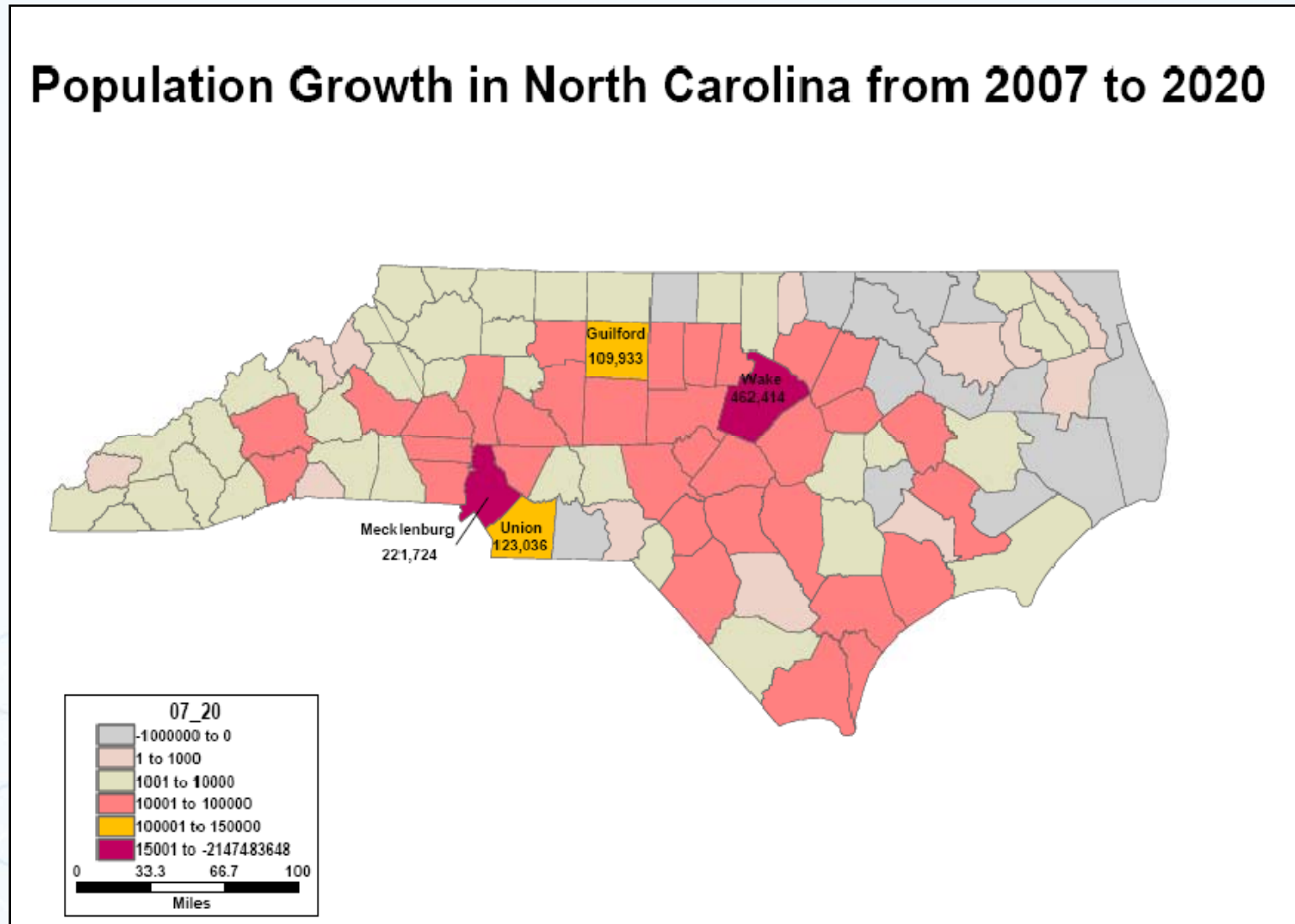
Policy implementation assistance

North Carolina poised to be leader in energy efficiency

- Fast growing state
 - Population increasing 1.5% per year
- Re-energized political landscape
 - Newly appointed Energy Policy Council
 - Consolidation of energy office and weatherization in Department of Commerce
 - 'Green Economy' Part of Governor's initiatives
- Opportunity to leverage Federal stimulus funding for energy efficiency and clean energy

Projected Population Growth by 2020

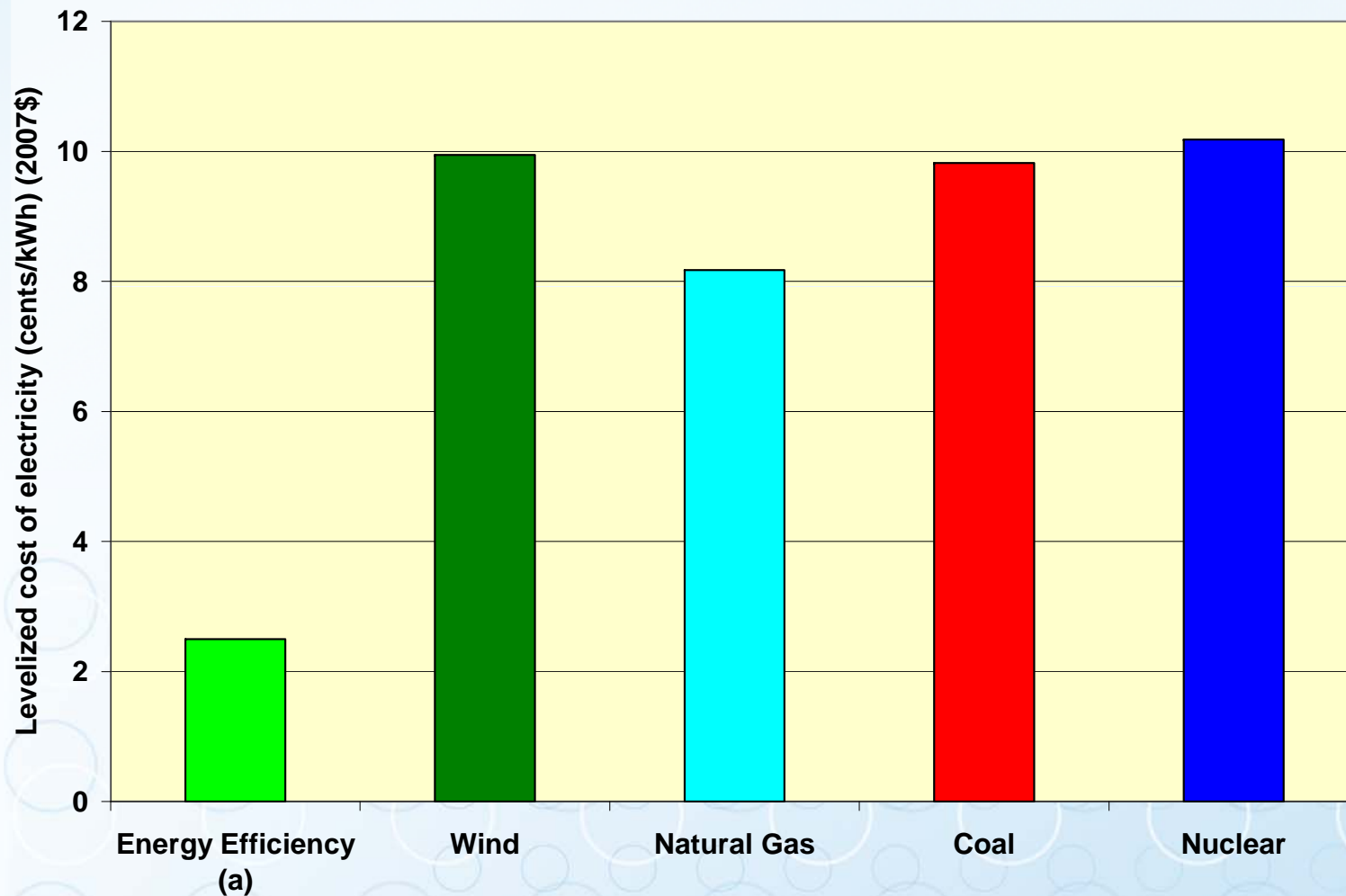
Population Growth in North Carolina from 2007 to 2020



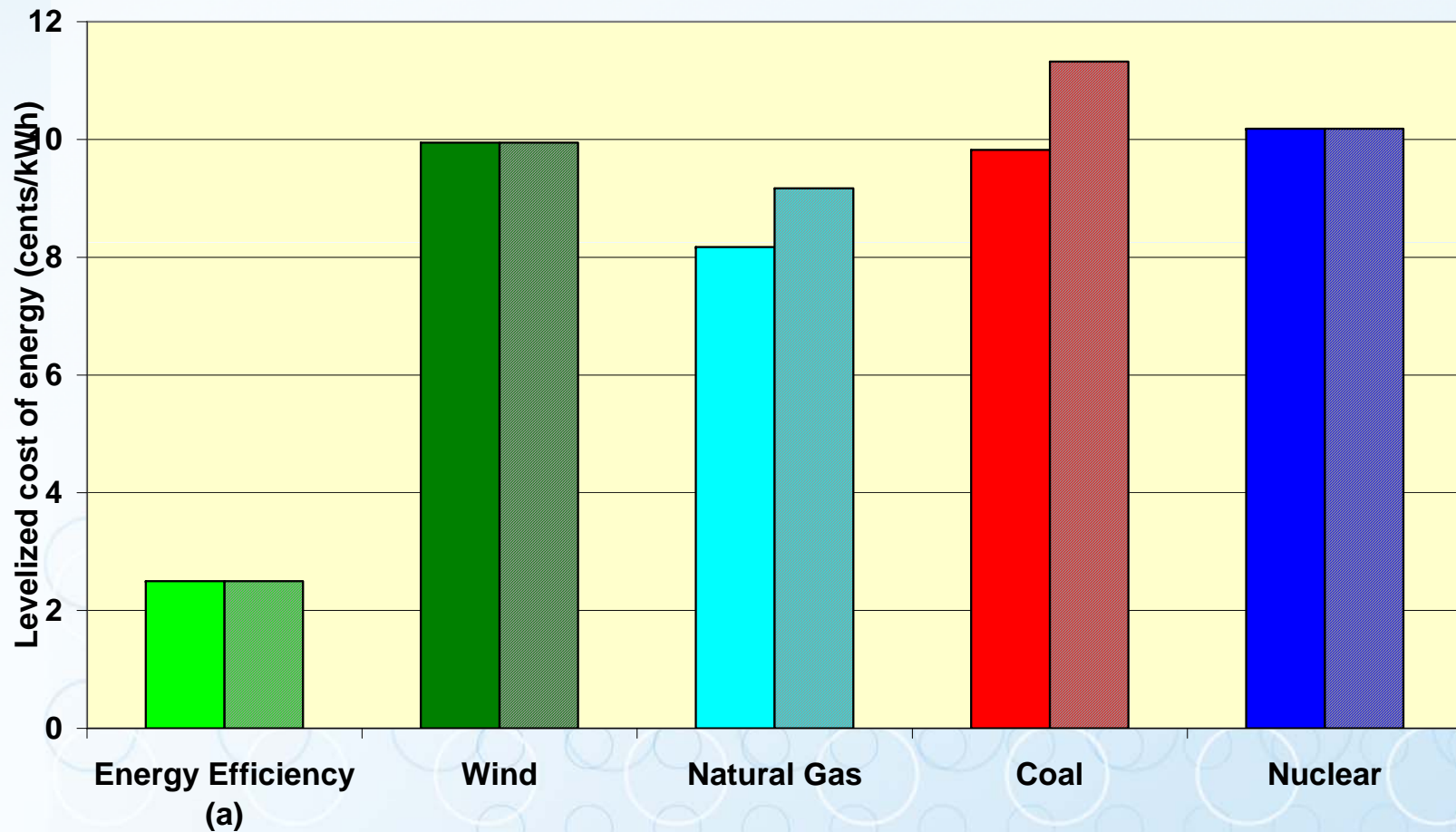
Electricity, Water, and Transportation Nexus

- Need electricity to source, treat, distribute, and dispose of potable water/wastewater
- Need cooling water for electric power generation
- Land-use planning affects transportation use and home electricity use (e.g. mixed use, multi-family buildings)
- Growth creates **competition** for resources and **opportunities** for savings

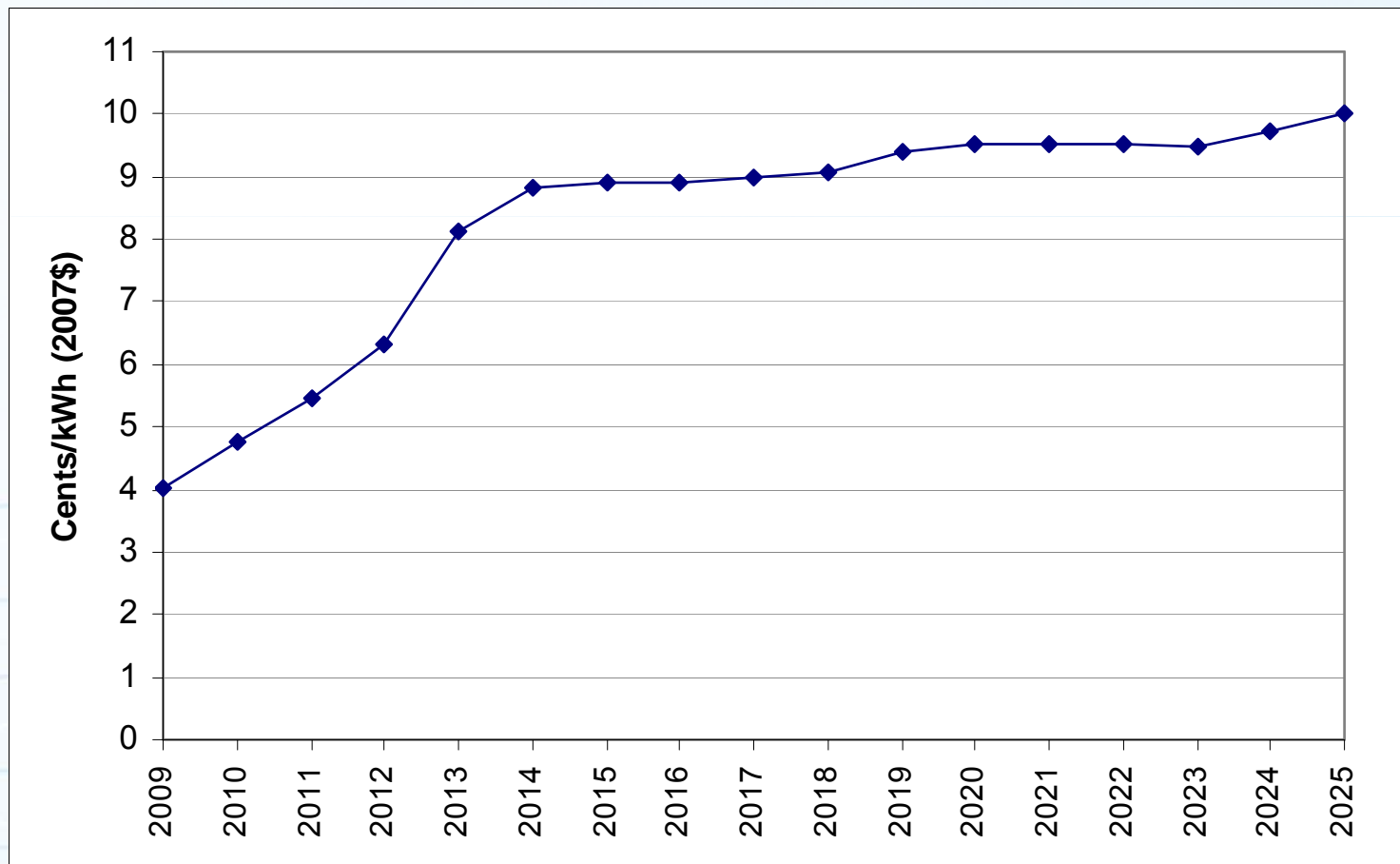
Energy Efficiency as a Resource: Average Cost of New Electricity Supply in 2020



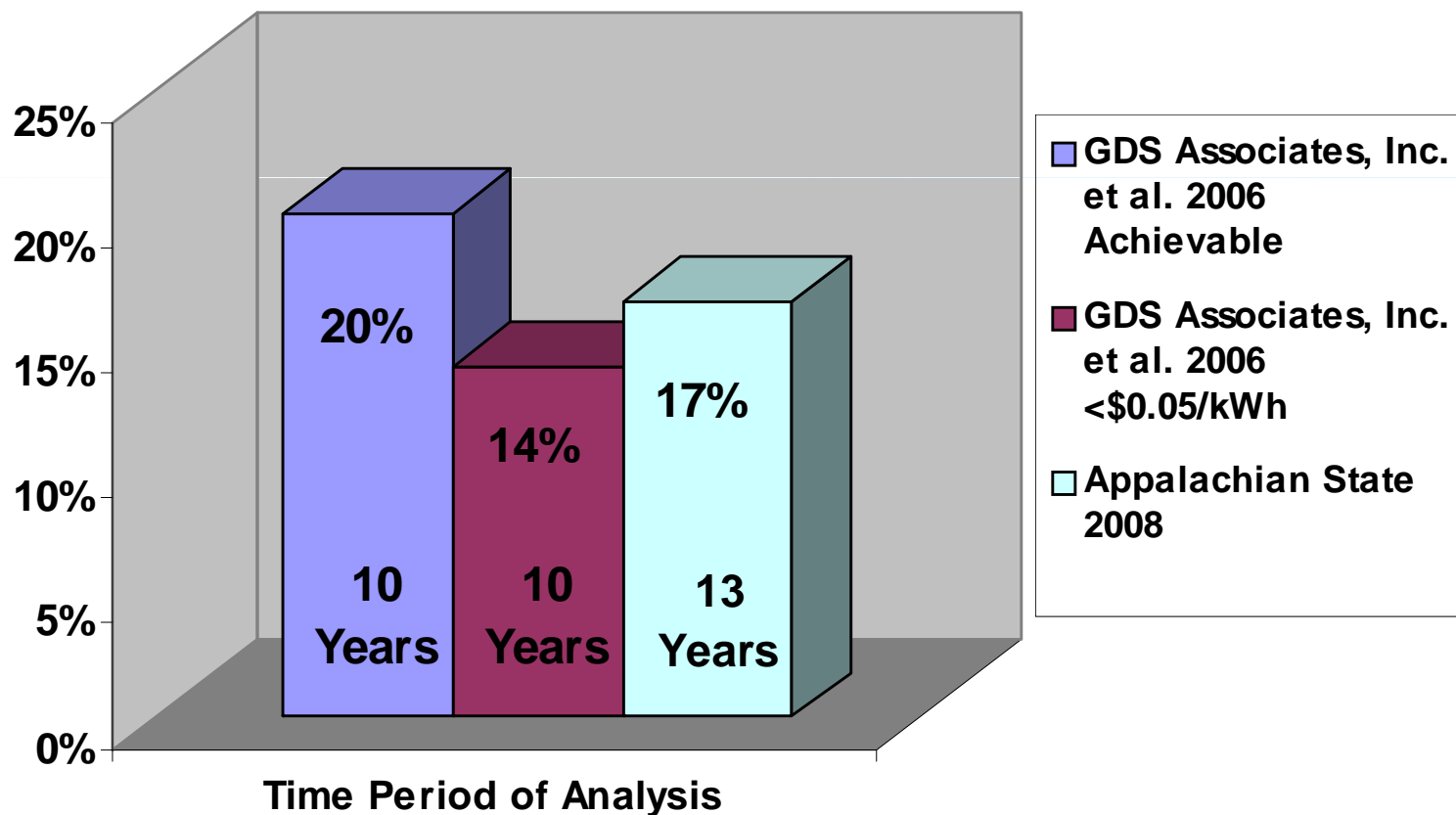
Climate Policy Can Increase Risk: Average Electricity Resource Costs w/ Carbon Cost



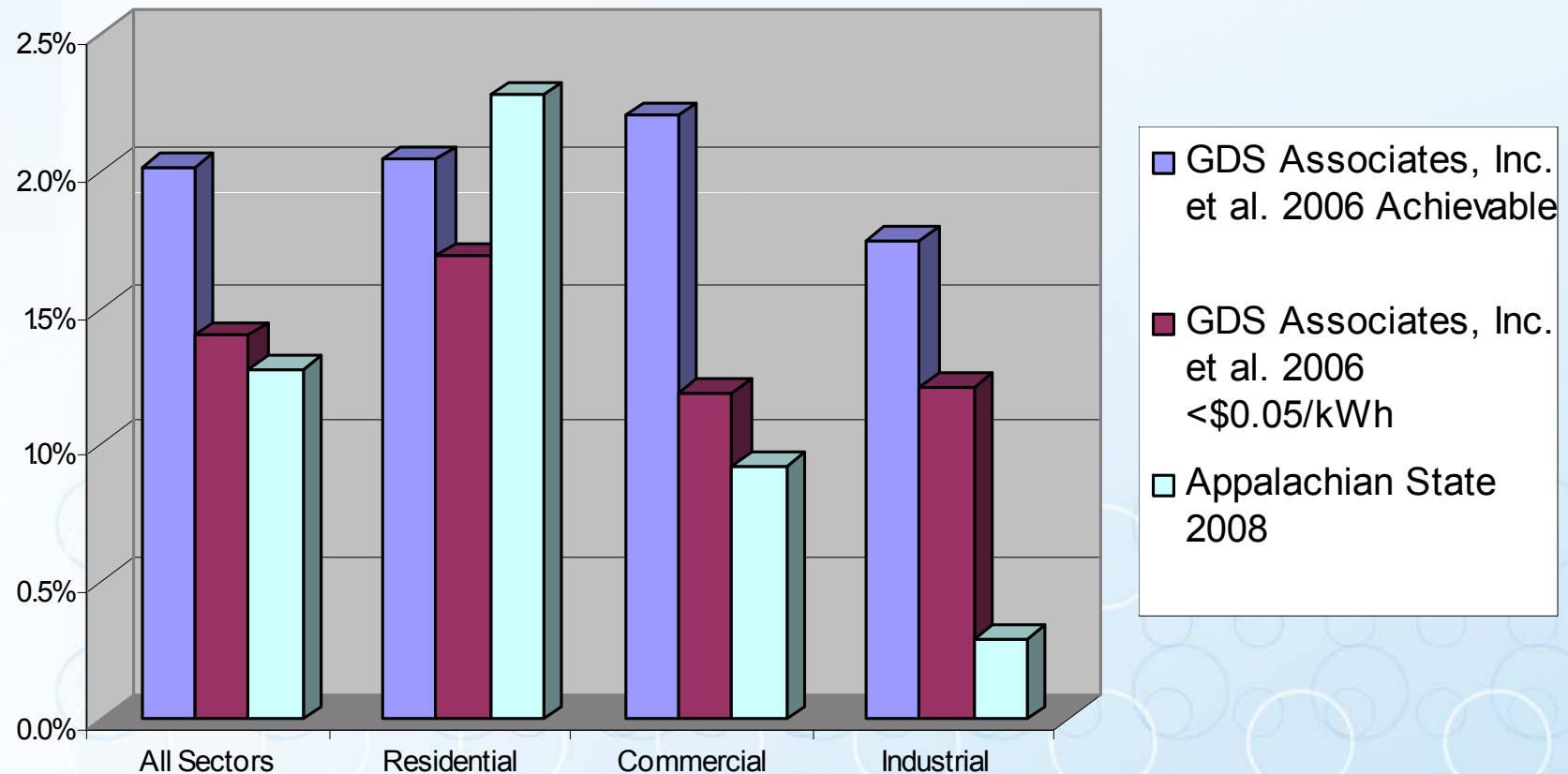
North Carolina Avoided Electricity Resource Costs (\$/kWh)



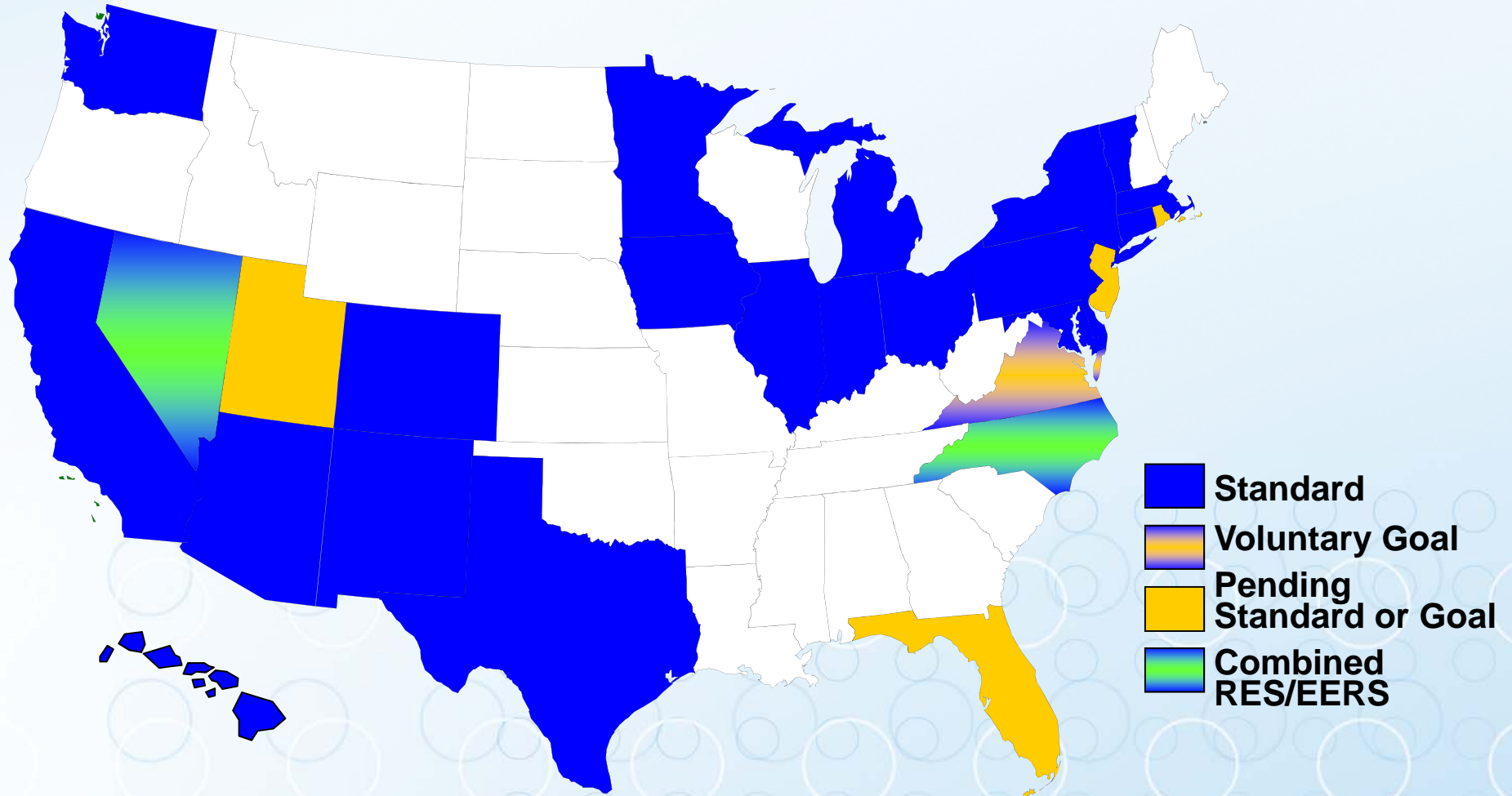
Meta-Analysis Results: Cost-Effective Energy Efficiency Potential for North Carolina



Meta-Analysis Results: Average Annual Efficiency Potential by Sector



22 States Established Energy Efficiency Resource Standards (EERS) in Past Decade



Energy Efficiency Resource Standard in NC—Clear Guidance

ACEEE suggests:

- A separate, statewide efficiency standard:
 - 1%/yr by 2013; 1.5%/yr by 2016; 2%/yr by 2020
- Summer peak demand goal:
 - Demand response & EERS: 2%/yr by 2013; 3%/yr by 2016

Estimated statewide electricity savings from EERS, residential and commercial programs: 12-16% in 2025

Building Codes and Advanced New Buildings Initiative

- 1.6%/year increase in homes by 2025, or 1.2 mil. units
- Residential and Commercial Codes
 - Pending update to state building code, 2006 IECC
 - National effort to reach 50% savings by 2018
- Voluntary advanced new buildings initiatives could help reach that target
 - Tax deductions available for commercial building owners: \$1.80/sq. ft. with 50% savings

Estimated statewide electricity savings from codes and advanced new residential and commercial buildings: 4-6% in 2025

Consumer Financing of Efficiency

- Upfront costs are a major hurdle to consumer investments in efficiency projects
- Several opportunities for consumer financing:
 - Utility on-bill financing
 - Property tax financing (PACE)
 - Revolving loan funds (local governments authorized by H 1389)
 - Energy efficiency mortgages for efficient homes and manufactured housing

Manufactured & Affordable Housing

- Energy bills can be greater than rent or mortgage payment
- 600,000 mobile homes 14% of housing stock – national average is 7%
 - 55,000 new mobile homes by 2025
 - ‘Upgrade and Save’ from SEO
 - Provides financial incentives to manufactured home retailers to install heat pumps in ENERGY STAR qualified homes
 - Average homeowner realizes \$600 savings in winter bills
 - How to address existing stock?
Nationally, 35% built pre-1980
- Weatherization Assistance Program (WAP)
 - Provides assistance to homeowners making below 200% of the Federal poverty guidelines
 - Funding typically in the range in \$3000 per home

State and Local Public Facilities

- ‘Lead by Example’ - substantial savings opportunities:
 - Public buildings = 30% of comm. building electricity consumption in Southeast
 - e.g. Leg. Bldg and Office Bldg achieved 11-19% energy bill savings
 - Marketing to draw public attention/ education campaign
- Energy Savings Performance Contracts (ESPC)
 - Ongoing state program
 - Extend to local governments!

Estimated statewide electricity savings from state and local ESPC program: 2-3% in 2025

Performance Contracting Policies in North Carolina

- Budget cap for performance contracting projects increased to \$500 million
- Projects funded through loans with 10-15 year terms
 - To meet terms of loans, measures require quick payback periods
- 3 projects completed, 1 in construction, and a dozen in application process
- Preliminary results show energy savings exceeding expectations—savings tax dollars

Combined Heat & Power

- CHP systems capture both useful electricity and wasted heat
- Many barriers that could be reduced with good policies, including:
 - CHP-friendly standby tariffs
 - CHP-directed financial incentives
 - Output-based air regulations
- North Carolina Market:
 - 59 operating plants in state - 1500 MW
 - Additional 1025 MW cost-effective w/ \$1000/kW in cost reductions

**Estimated statewide electricity savings from CHP:
1-4% in 2025**

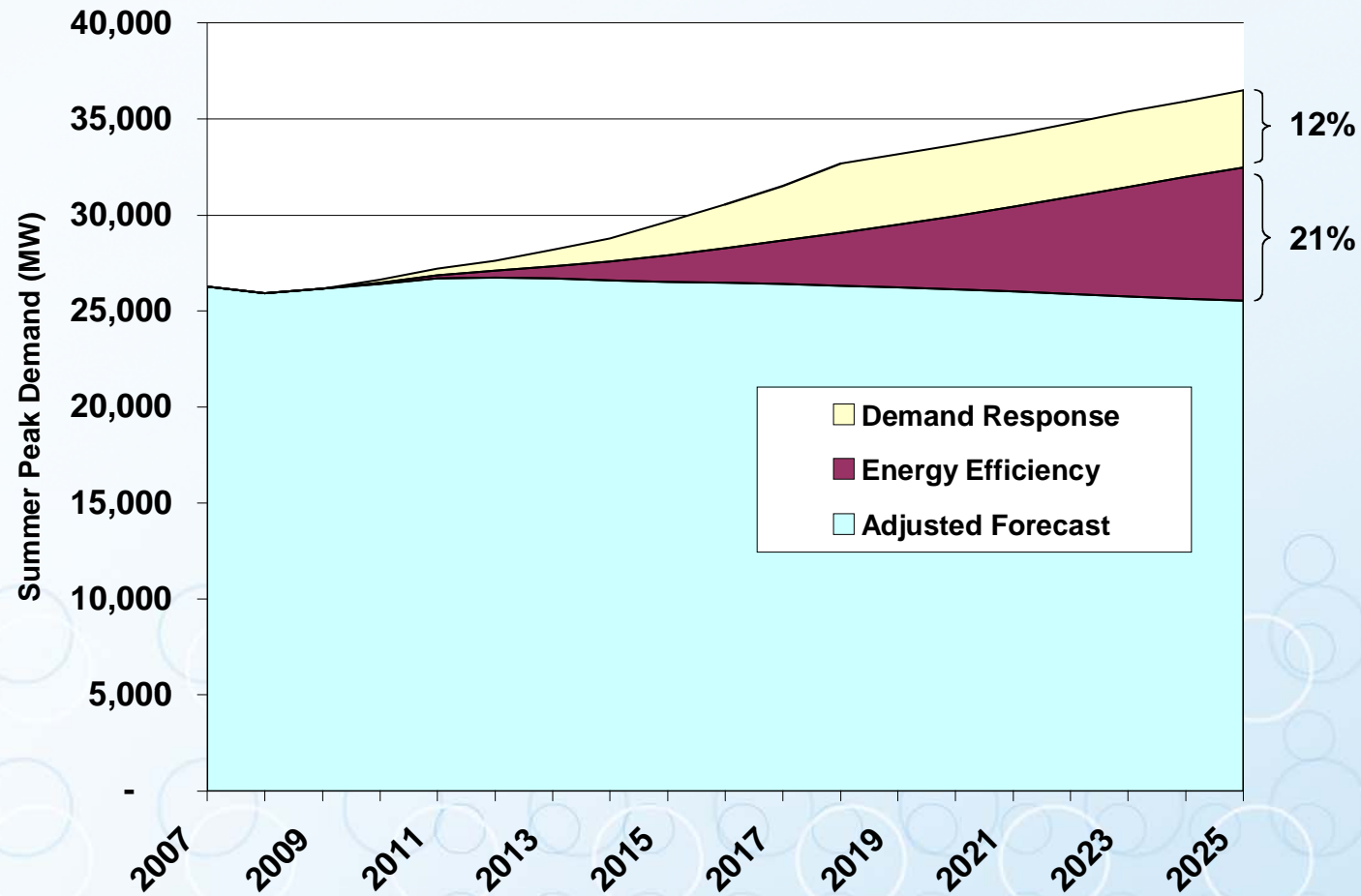
NC Industry

- Manufacturing is the largest economic sector
 - over 20% of GSP and 10% of employment (2008)
 - Chemicals (pharmaceuticals), Tobacco, Primary Metals
- Cost-Effective Resource Potential → 20-25% by 2025, at 2.3 ¢/kWh
 - Motors and Insulation
 - Smart manufacturing
- NC Efficient Manufacturing Initiative
 - Train new efficiency engineers and provide audit services to manufacturers – key barriers to industrial efficiency.
 - Based off in-state programs like IAC and IES at NC State
 - Could meet **9%** of industrial electricity use by 2025

Expanded Demand Response Initiatives—Complement EE policies

- Load-curtailement activities
 - C&I load control of space conditioning equipment
 - Self-activated load reductions for larger customers
 - Residential direct load control (DLC) of air conditioners and appliances
- Price-based incentives
 - Increase pricing programs and participation
- Integrate/Cross-market EE and DR programs
 - Building Energy management systems

DRAFT: Summer Peak Impacts from Energy Efficiency and Demand Response



Water Efficiency Policies

- Statewide plumbing efficiency standards
 - Toilets, Showers, Lavatory Faucets
- Replacement of Inefficient Plumbing in Existing Residences
- Efficient Clothes washer incentives
- Reduction of Water Losses from Utility Distribution Systems
- Conservation Pricing of Water & Sewer

**Estimated statewide water savings from policies:
equivalent to 5-7% in 2025 (of baseline water usage)**

Transportation Efficiency Priorities

Reducing Vehicle Miles Traveled (VMT)

- ACEEE estimating impact of following policies to reduce VMT growth:
 - Pricing measures (PAYD insurance)
 - Improved alternative transit modes
 - Transit-oriented development
- Policies initially focused in high population-growth areas (Raleigh-Durham, Charlotte, Greensboro), with the option to apply statewide under an aggressive scenario
- Use NC transportation investment and policies to achieve a robust multi-modal system in support of sustainable development patterns

Expected estimated gasoline savings from VMT package: 10-15%

Transportation Efficiency Priorities

Freight system efficiency

- Evaluating the potential to reduce truck miles through strategic freight rail and intermodal investments
- Projects/strategies consistent with 21st Century Transportation Committee findings & recommendations
- Success will depend on participation of private sector, other states
- Ancillary benefit in reduced congestion and freight logistics that support economic activity

**Expected diesel savings, freight efficiency package:
up to 10% of long-distance freight fuel**

South Carolina Study: Net Impacts of Energy Efficiency Policies on Economy

Net Macroeconomic Impacts	2015	2025
Jobs	18,900	21,900
Wages (Million \$2007)	550	410

Carbon Emissions Reductions

- Annual reduction of 12.5 million tons CO₂ in 2025
- Cumulative reduction of 74 million tons CO₂ through 2025

North Carolina as Clean Energy Innovation Hub

- State has history as innovation hub—e.g. RTP, SAS
 - Research centers and universities
 - Skilled workforce
 - Progressive business environment
- Already attracting clean energy companies:
 - Established: GE, IBM, ABB, Eaton, Rockwell Automation, Siemens, Johnson Controls
 - Startups: CREE, Concert, Breeze Play, Southern Energy Management
- Potential to be leader in “smart efficiency” and clean energy resources
 - Create jobs with clean energy in NC
 - Create more jobs with national clean energy policy

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