



30 Years of Energizing Efficiency

North Carolina's Energy Future Electricity, Water, and Transportation Efficiency

Presented to the Energy Policy Council

Raleigh, NC

March 18, 2010

American Council for an Energy-Efficient Economy

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

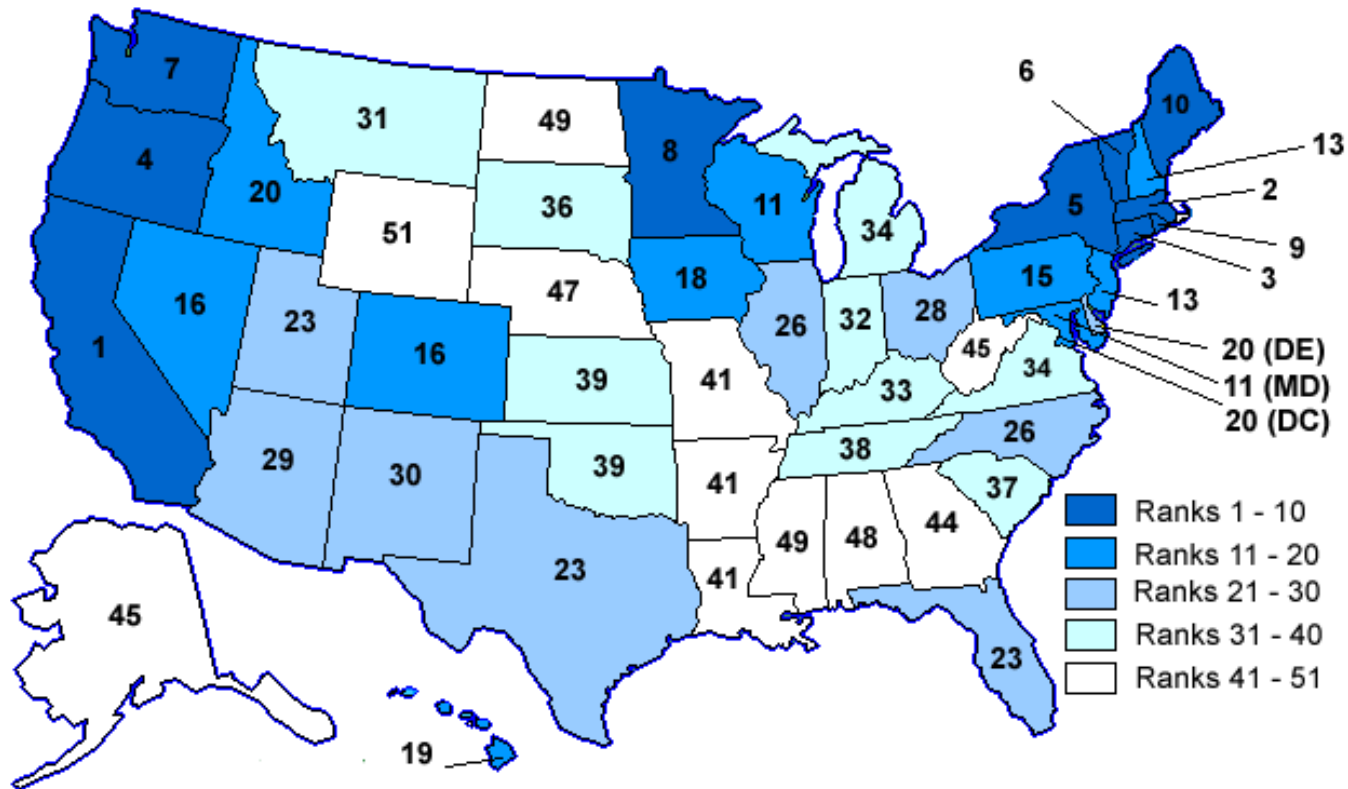
Prepare state energy efficiency potential assessments for 3-4 “transitional states” per year

- 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

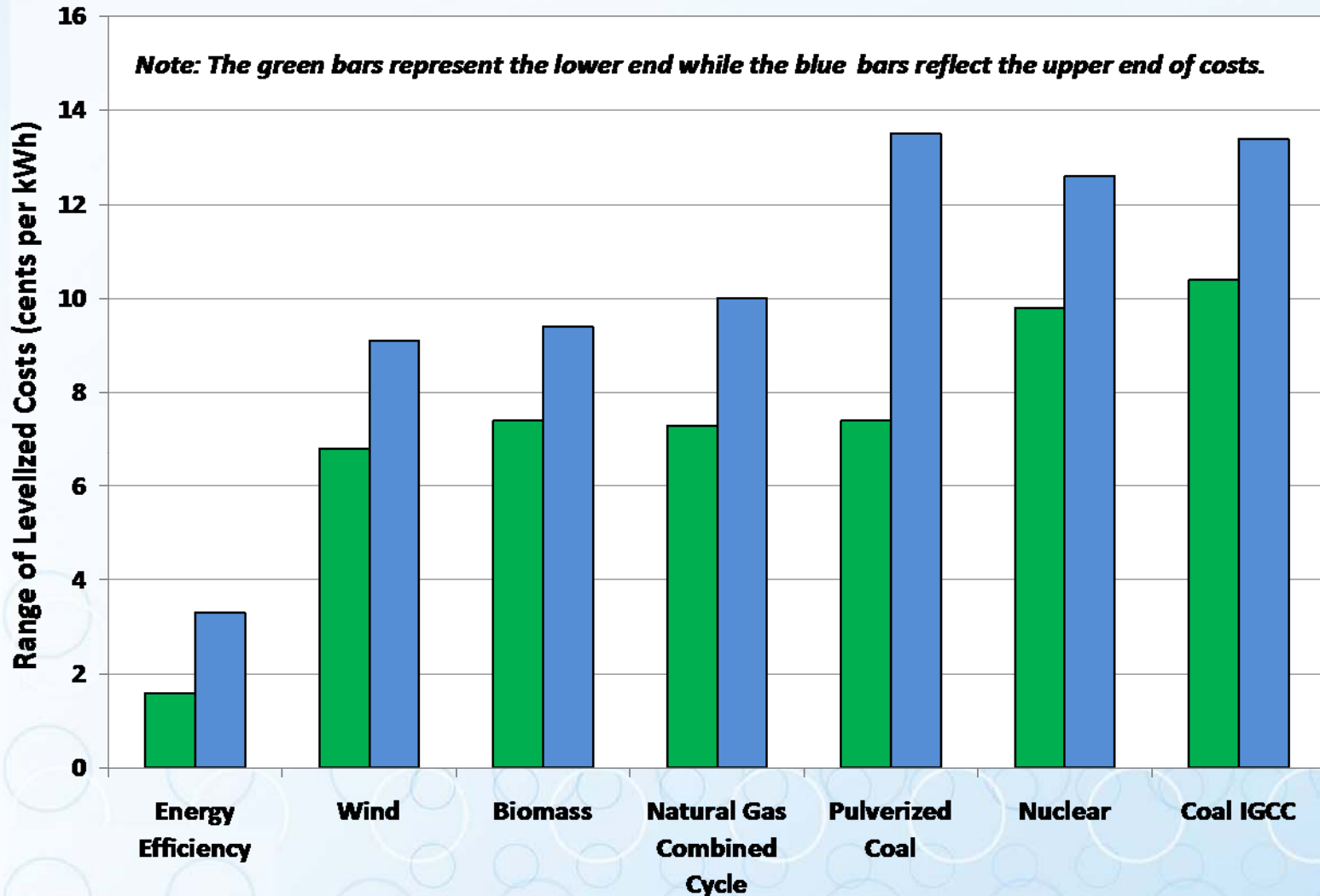
Assist states with ongoing energy policy implementation

Why North Carolina?

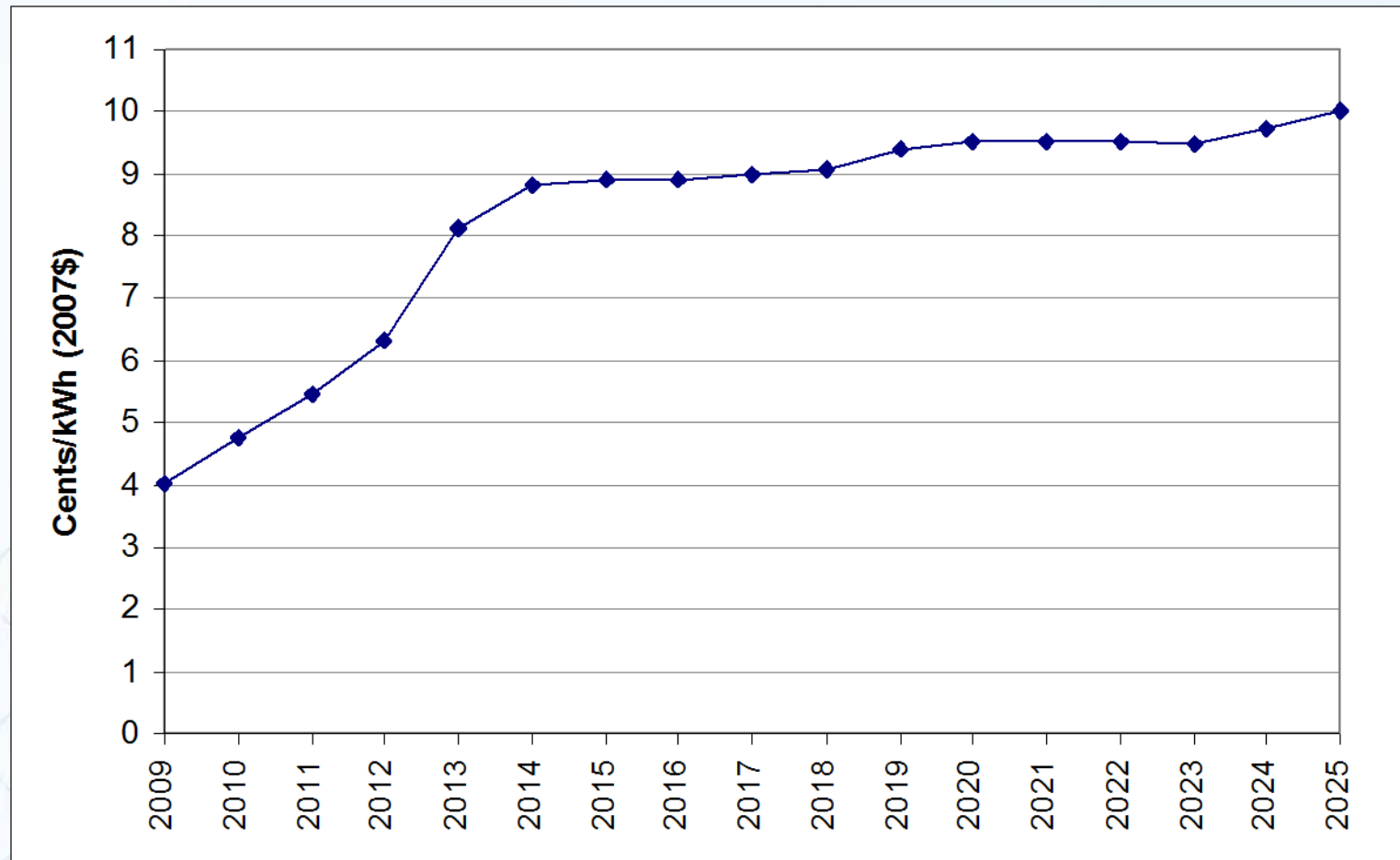
ACEEE's 2009 State Energy Efficiency Scorecard



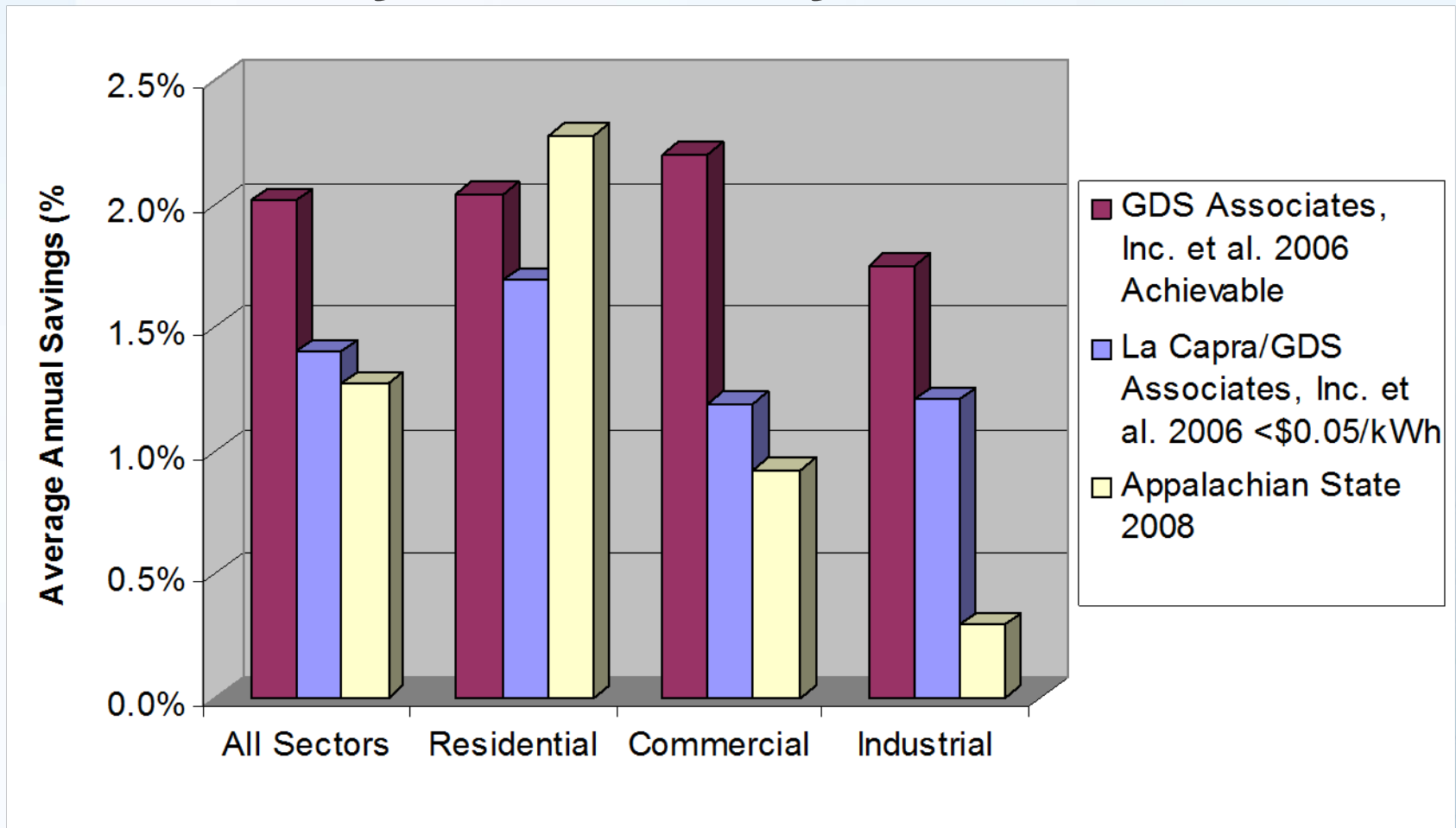
Why Energy Efficiency?



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



Meta-Analysis Results: Average Annual Efficiency Potential by Sector

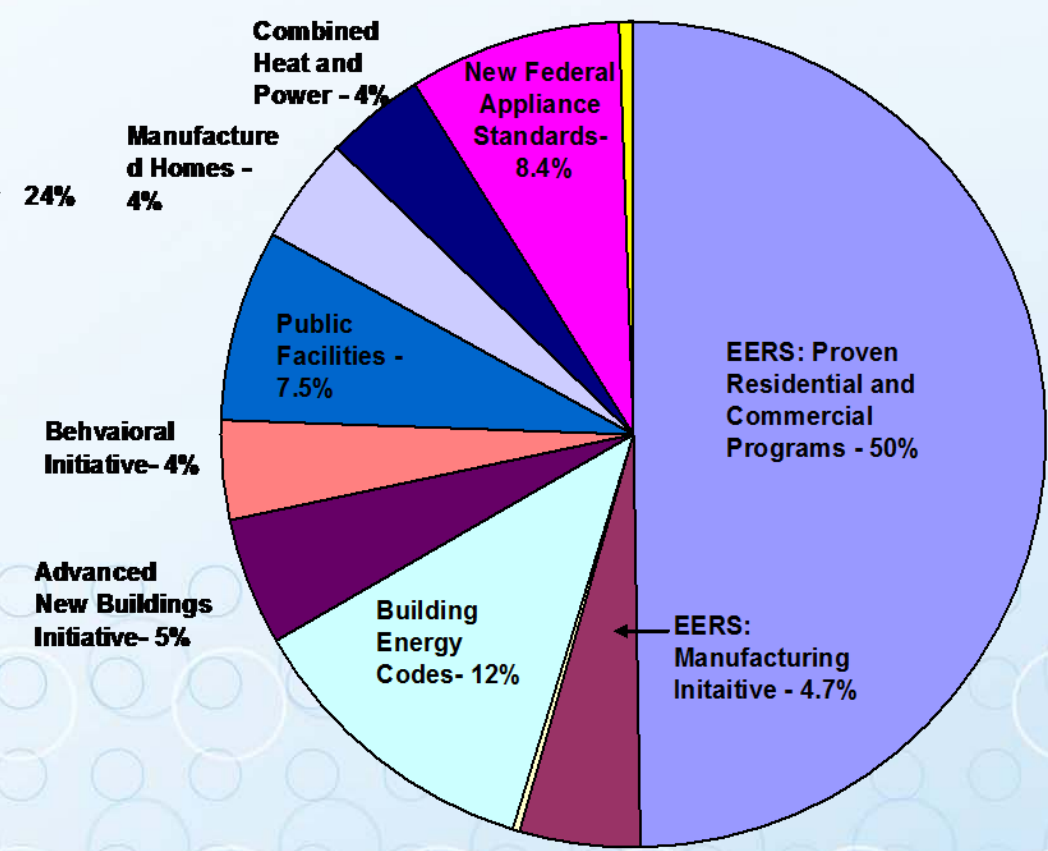
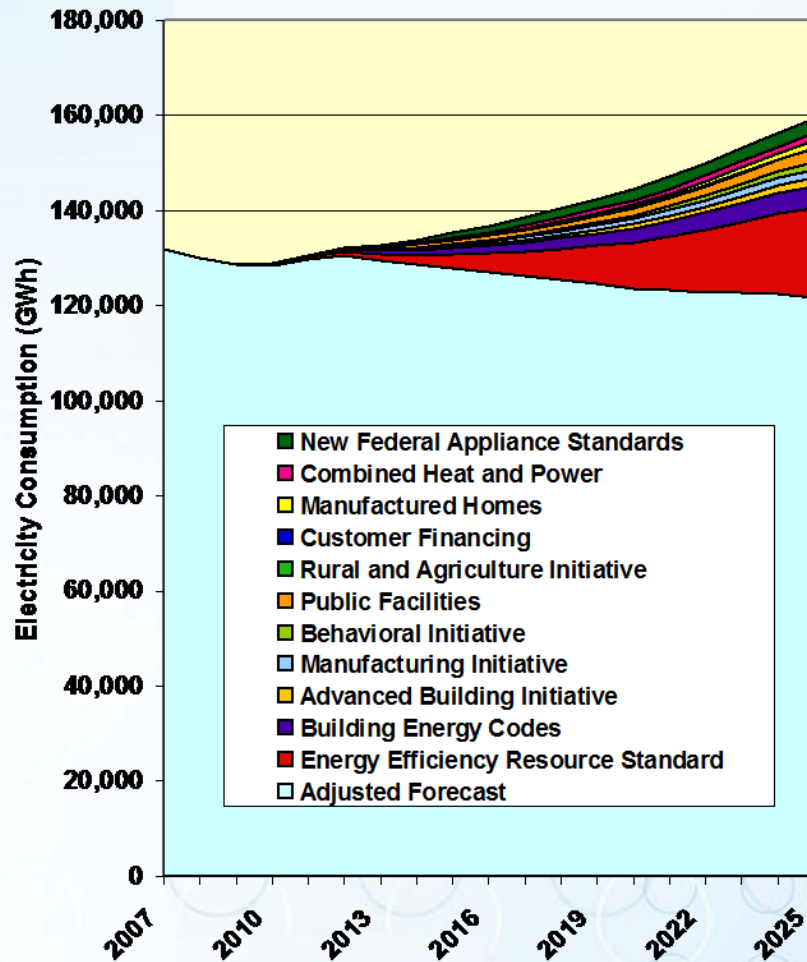


Electricity Policy Matrix:

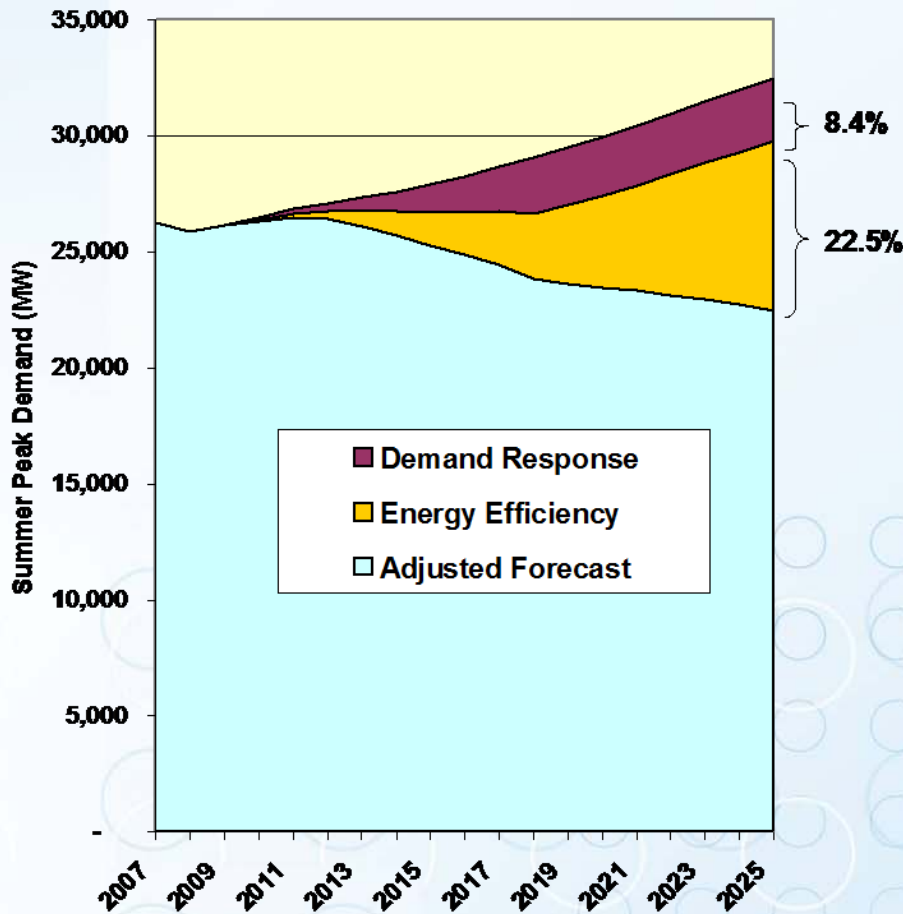
Results from Medium Case Energy Efficiency Scenario

	2015		2020		2025		Cost
	GWh	%	GWh	%	GWh	%	\$ per kWh
Energy Efficiency Resource Standard	3507	2.6%	10,847	7.5%	20,741	13%	
<i>Res. and Commercial Programs</i>	3,007	2.2%	9,626	6.7%	18,803	11.8%	\$0.02-\$0.033
<i>Manufacturing Initiative</i>	439	0.3%	1,114	0.8%	1,789	1.1%	\$0.027
<i>Rural & Ag Initiative</i>	61	0%	107	0.1%	150	0.1%	\$0.025
Building Energy Codes and Advanced New Buildings	1,624	1.2%	3,849	2.7%	6,324	4.0%	\$0.04-\$0.09
Behavioral Initiative	107	0.1%	699	0.5%	1,570	1.0%	\$0.03
Public Facilities ESPC	733	0.5%	1,587	1.1%	2,835	1.8%	\$0.025
Manufactured Homes	120	0.1%	516	0.4%	1,545	1.0%	\$0.03
Combined Heat & Power	334	0.2%	1,045	0.7%	1,455	0.9%	\$0.06
New Federal Appliance Standards	942	0.7%	2,295	1.6%	3,184	2.0%	
Water Efficiency Policies	42	0%	114	0.1%	184	0.1%	N/A
TOTAL			21,059	15%	37,988	24%	
Remaining Electricity Needs	127,894		123,683		121,745		

Electricity Savings from Policies



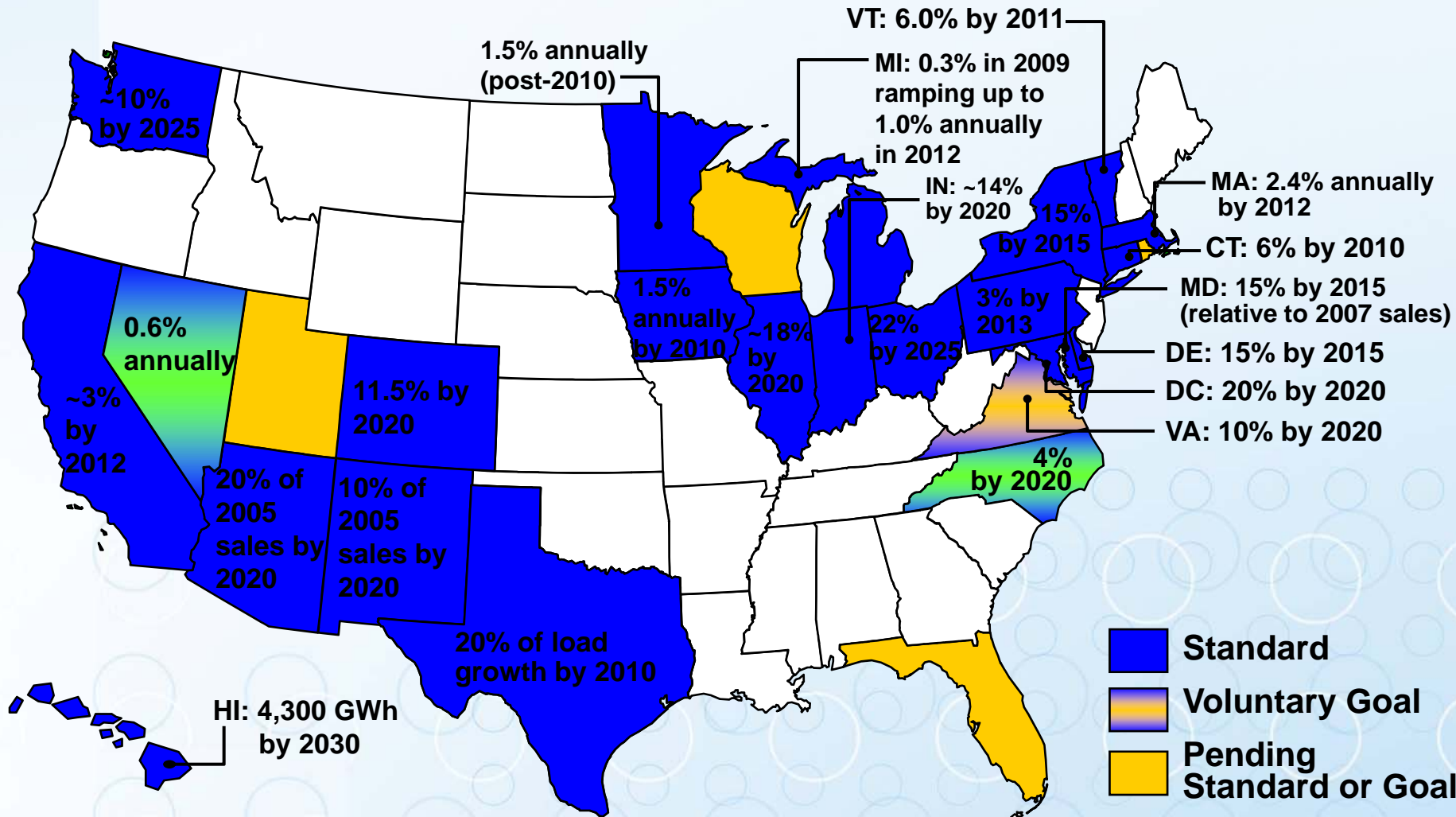
Demand Response Initiatives and Summer Peak Demand Impacts



- Load-curtailement activities
- Price-based incentives
- Integrate/Cross-market EE and DR programs
 - Building Energy management systems

Energy Efficiency Resource Standards

22 States – February 2010



Energy Efficiency Resource Standard

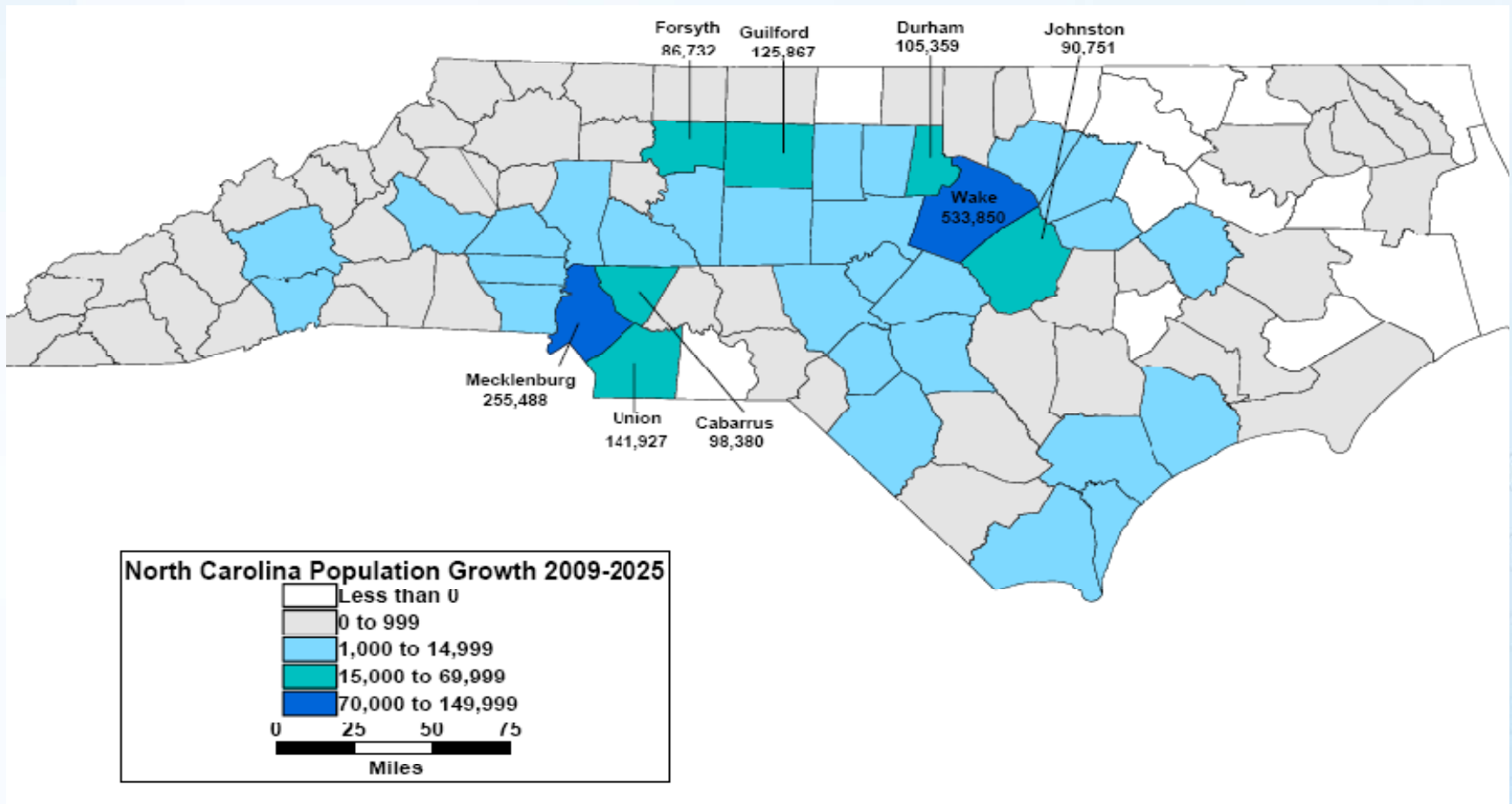
ACEEE suggests:

- Enact a stand-alone EERS (separate from REPS) requiring utilities to meet long-term savings targets
- Analysis medium case: 1.0% incremental electricity savings per year by 2015; 1.5% per year by 2019; 1.75% by 2022; and 2% per year by 2025
- Peak demand reduction targets: 3% by 2012; 9% by 2015
- Proven Residential and Commercial Building Programs: National Action Plan for Energy Efficiency's Rapid Deployment Energy Efficiency (RDEE)

Manufacturing Initiative

- 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

Population Growth in North Carolina—2009-2025



Building Energy Codes & Advanced New Buildings Initiatives

- 1.6%/year increase in homes by 2025, or 1.2 mil. units
- Residential and Commercial Codes
 - Pending update to state building code; Codes Council approved amendments to 2012 code (30% savings beyond 2006 IECC)
 - National effort to reach 50% savings by 2018
- Voluntary advanced new buildings initiatives could enable these target
 - Tax deductions available for commercial building owners: \$1.80/sq. ft. with 50% savings

Water—Electricity Nexus

Growth competes for water:

- Treating water electric intensive
- Electricity generation requires cooling water

Efficiency manages growth:

- Water efficiency frees up water—76 mgd in 2025 & save 176 GWh electricity
- Electric efficiency frees up cooling water—saves 3,000 mgd in 2025

Water Efficiency Policy Matrix

	2015	2025
Annual Water Savings by Policy	Million gallons per day (mgd)	Million gallons per day (mgd)
Statewide Plumbing Efficiency Standards	4	15
Inefficient Plumbing Replacement	3.8	9
Utility Water Loss Reduction	0.7	7.0
Water Efficient Landscape Irrigation	4.6	13.2
Water Conserving Rate Structures	--	--
Electric Utility Clothes Washer Incentives	1.4	4.2
Clothes Washer Federal Standards	1.3	28
TOTAL	15.9	76.1

Total water withdrawals for public water supplies in 2005 = 921 mgd. Water savings represent ~8% of 2005 usage

Water Efficiency Policies

- Statewide plumbing efficiency standards
 - Effective 2012
 - Federal standards nearly two decades old
 - Tank-type toilets, showerheads, lavatory faucets
- Replacement of inefficient plumbing
 - Pre-1995 housing only
- Clothes washer incentives
 - electric utility programs
- Efficient landscape ordinance
 - New residences and buildings
- Conservation Pricing of water and sewer

Efficiency Implementation & Financing

Challenges:

- Tight state budgets
- Tight lending markets

Opportunities:

- Leverage federal stimulus funding
- Alternative financing
 - Tax bill (PACE) financing
 - Utility on-bill financing
 - EE mortgages
 - Clean development bonds

Transportation Policy Matrix:

Results from Medium Case Energy Efficiency Scenario

	2015		2020		2025		Cost
	Barrels (1000s)	%	Barrels (1000s)	%	Barrels (1000s)	%	
<u>Gasoline</u>							
Clean Car Standard	0	0%	1,814	1.4%	8,417	6.7%	\$1.80
Pay-as-you-drive insurance	1,567	1.2%	3,228	2.6%	3,412	2.7%	\$0.38
Transit Expansion/Concentration of Urban Development	609	0.5%	2,140	1.7%	3,693	2.9%	-
<i>Total -- Gasoline</i>	<i>2,217</i>	<i>1.7%</i>	<i>7,051</i>	<i>5.6%</i>	<i>14,954</i>	<i>11.9%</i>	
<u>Diesel</u>							
Heavy Truck Efficiency Package	396	1.4%	444	1.5%	485	1.5%	\$1.15
Truck Stop Electrification	486	1.8%	545	1.8%	595	1.9%	\$0.34
Freight Intermodal Investments	366	1.3%	790	2.7%	1,278	4.0%	-
<i>Total -- Diesel</i>	<i>1,229</i>	<i>4.5%</i>	<i>1,744</i>	<i>5.9%</i>	<i>2,307</i>	<i>7.2%</i>	

Reducing Vehicle Miles Traveled (VMT)

- ACEEE estimated the impact of the following policies to reduce growth in VMT:
 - Pricing measures (PAYD insurance)
 - Transit-oriented development/Transit expansion
- Policies focus on 23 high growth counties located in 6 urban areas across the state, (Charlotte, Raleigh/Durham, Greensboro, Asheville, Wilmington, Greenville) with the option to apply statewide under an aggressive scenario
- We use NC transportation investment and policies to achieve a robust multi-modal system in support of sustainable development patterns

Estimated gasoline savings from VMT package in 2025

Scenario	Thousand Barrels Saved in 2025	Percentage of Total Gasoline Use in 2025
Mid-case	7,104	6%
High-case	10,701	8%

Freight System Efficiency

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

Expected Diesel Savings from Freight Efficiency Package in 2025:

Scenario	Thousand Barrels Saved in 2025	Percentage of Total Diesel Use in 2025
Mid-case	1,278	4%
High-case	1,278	4%

Light-Duty Transportation Efficiency Measures

Clean Car Standard

- Harmonized federal fuel economy and greenhouse gas standards between 2012 and 2016
- The harmonization of federal and California standards means this action will have no impact on vehicle efficiency before 2017.
- If adopted, assumes that North Carolina will require new vehicles to achieve greenhouse gas emissions equivalent (for gasoline vehicles) to 42 mpg by 2020.
- Alternative to clean car standard – market based feebates

Scenario	Thousand Barrels Saved in 2025	Percentage of Total Gasoline Use in 2025
Mid-Case	8,417	6.7%
High-Case	13,155	10.4%



Heavy-Duty Transportation Efficiency Measures

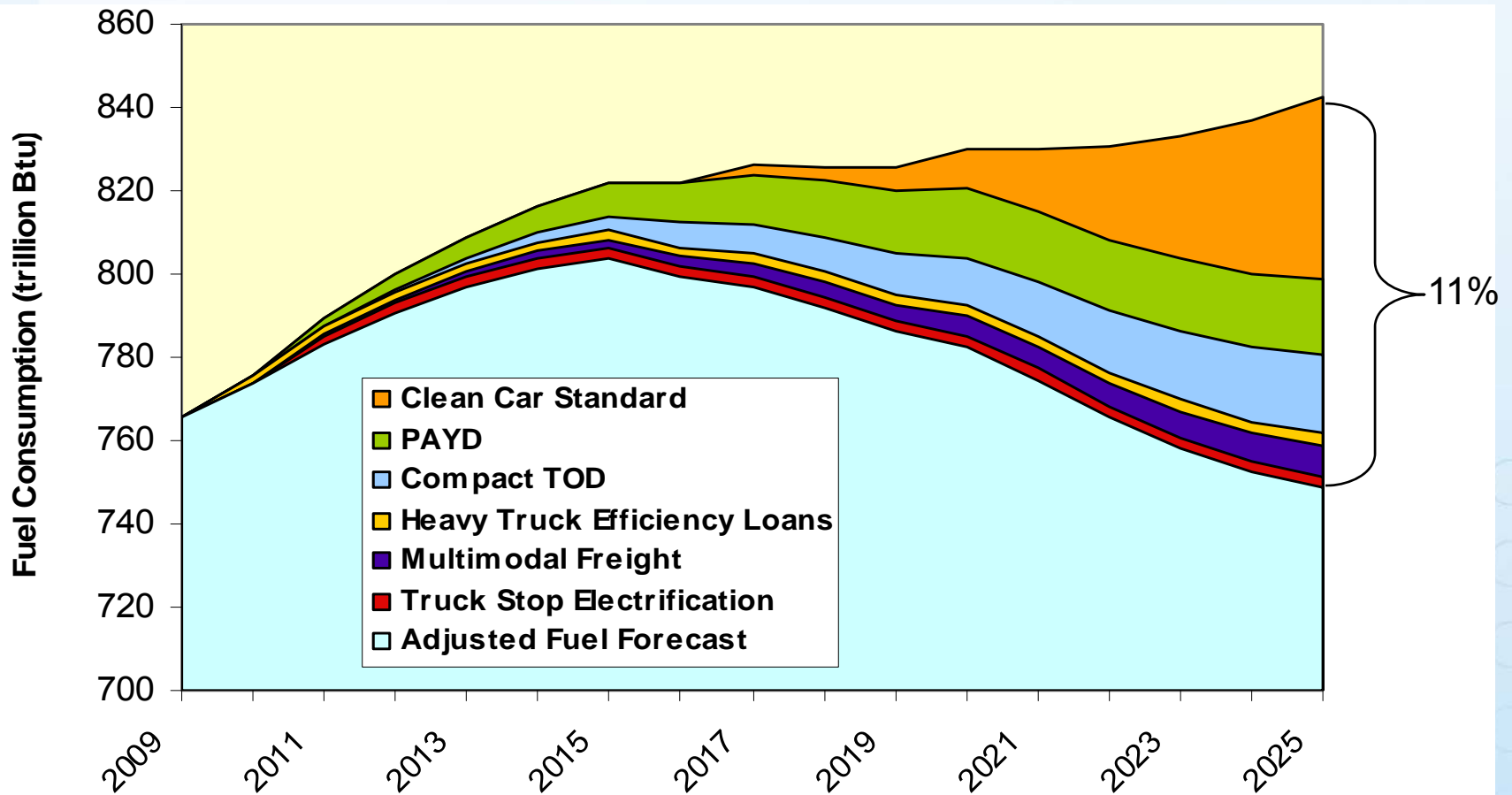
Heavy Truck Efficiency Loan Package

- Diesel fuel consumed by heavy trucks accounts for over 20 percent of all transportation fuel use in North Carolina
- ACEEE suggests a low-interest loan program to promote the purchase of new tractor-trailers or the retrofit of existing tractor-trailers – EPA SmartWay kits
- SmartWay upgrade kit—aerodynamic add-ons for trailers, efficient tires and auxiliary power units (APUs) reduce fuel consumption by 15 percent or more

Truck Stop Electrification

- establish a low-interest loan program to promote electrification of parking spaces at truck stops
- assume off-board systems will be used, since this would place no requirements on the out-of-state trucks that are the primary users of truck stops
- diesel consumption savings will reach 486 thousand barrels in 2015 and 595 thousand barrels in 2025

Total Gasoline and Diesel Savings from Transportation Efficiency Policies: Mid-Case Scenario



Contact Information

Download the Report: www.aceee.org/pubs102.htm

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