



North Carolina Energy Efficiency Roadmap

Stakeholder Workshop #1

October 26, 2018



Today's Objectives

- Foster a community of energy efficiency stakeholders in North Carolina
- Create a shared understanding of energy efficiency landscape
- Establish consensus on a set of shared goals and objectives
- Collectively work to implement these goals

Today's Agenda

- Current energy efficiency landscape in North Carolina
- National trends in energy efficiency
- North Carolina's shared goals and objectives
- Consensus on 2-3 shared goals
- Sector breakouts
- Concluding remarks

Ground Rules

- All ideas are great ideas
- Stay open and willing to learn / engage with differing opinions
- Help the group stay on track
- Keep time in mind
- Place items in parking lot to discuss later

Jennifer Mundt

Energy Director

NC Department of Environmental
Quality

North Carolina's Energy Efficiency Landscape

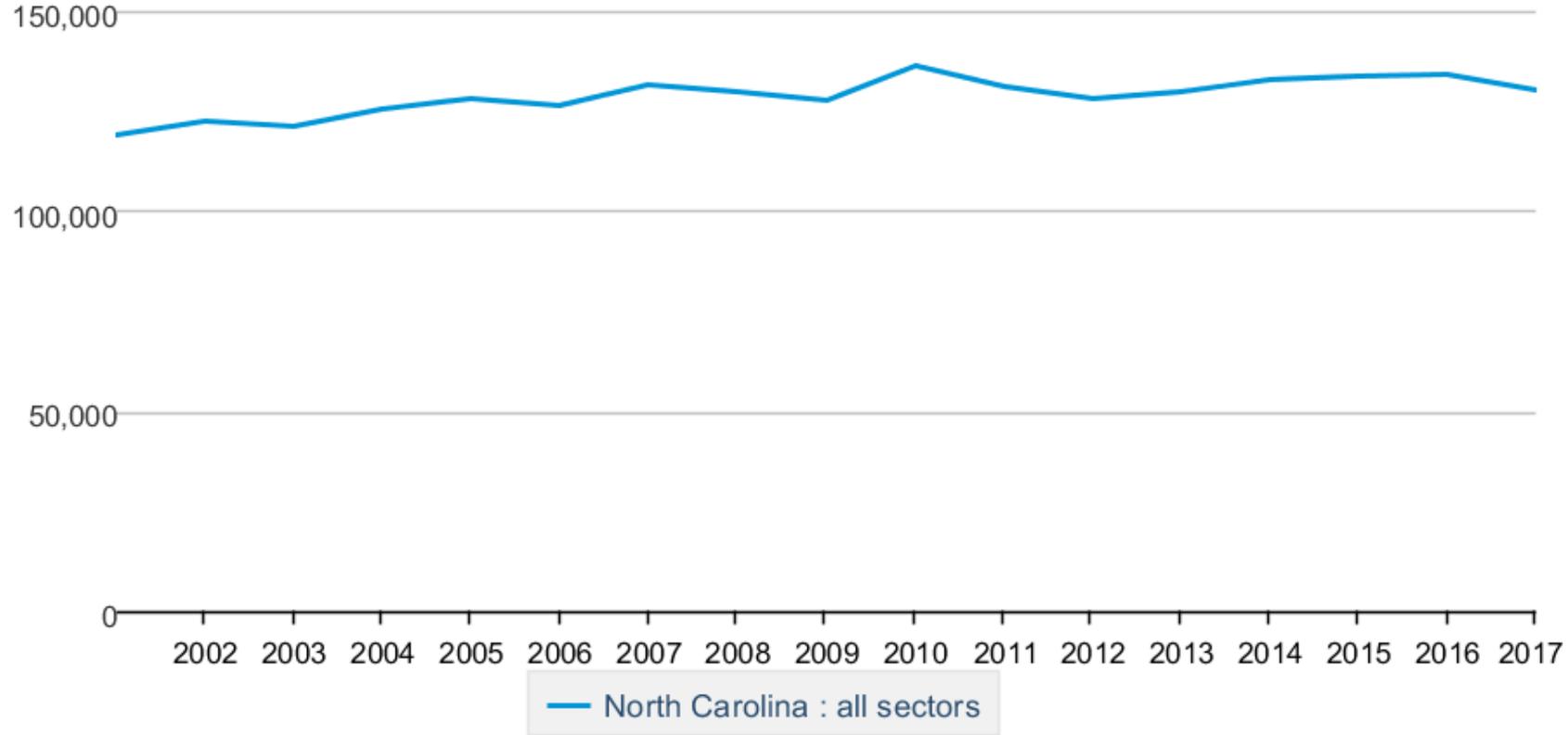
Where are we now?

Our Energy Efficiency Definition

Reducing the energy used by equipment and/or processes while maintaining or improving the user's level of comfort and end-use functionality at a lower customer cost. Reduction in the rate of energy used may be achieved by substituting more advanced technology or by reorganizing the process to reduce waste heat, waste cooling, or energy. Demand response is a form of energy efficiency. Conservation as a result of a user reaction to a price increase is not considered energy efficiency.

Retail sales of electricity, annual

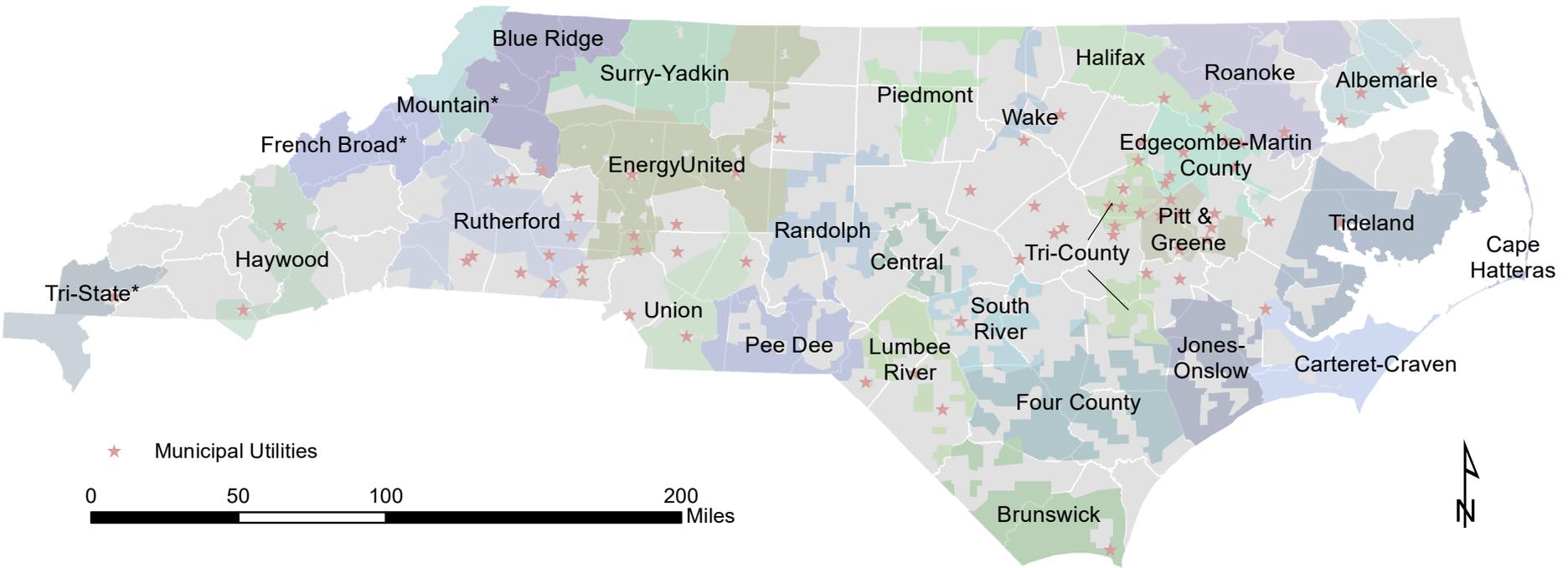
million kilowatthours



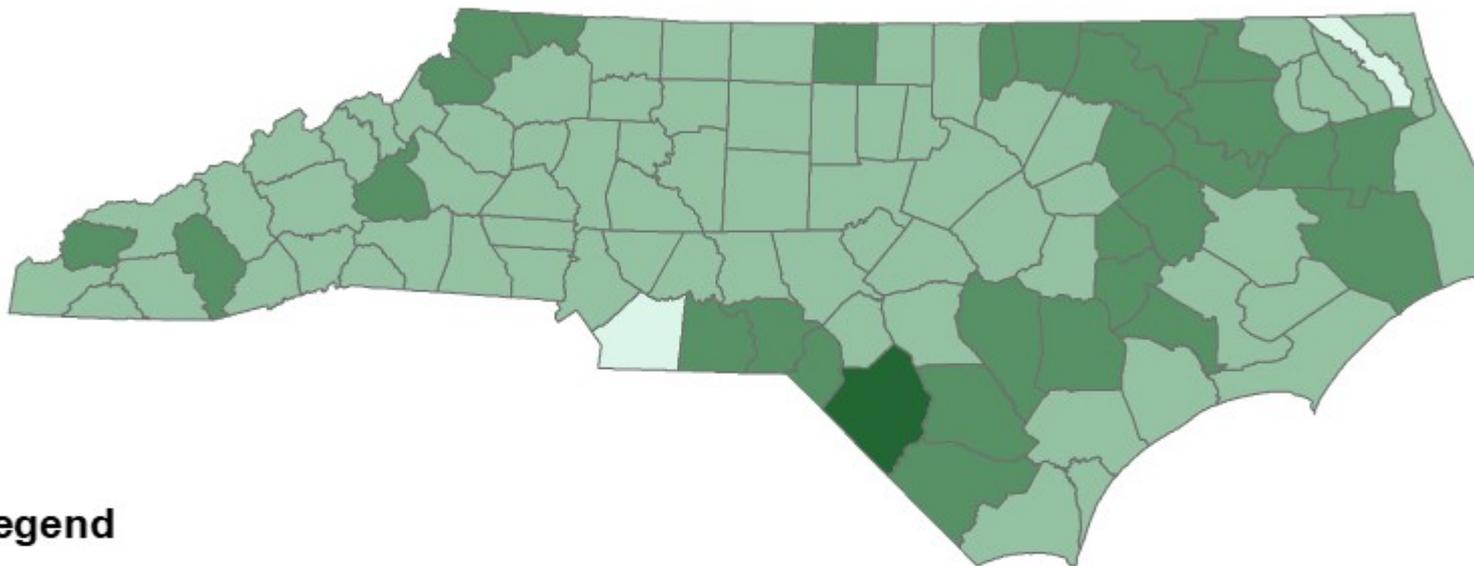
Source: U.S. Energy Information Administration



North Carolina Electric Cooperatives and Municipal Utilities

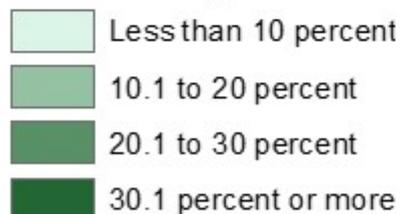


30 Counties had Poverty Rates Above 20 Percent



Legend

2015 Poverty Rate



A snapshot of the NC electricity sector

2016 Electricity Landscape	Investor Owned	Municipal (Public)	Electric Cooperative	Total
Number of entities	3	72	31	106
2016 Number of retail customers	3,433,458	600,689	1,072,046	5,106,193
Percentage of customers	67%	12%	21%	
2016 Retail Sales (GWh)	99,610	16,263	18,525	134,399
Percentage of retail sales	74%	12%	14%	
2016 EE Savings (GWh)	1,061	4	81	1,146
EE Savings as % of Sales	1.06%	0%	0.06%	0.85%

Source: Energy Information Administration, Form EIA-861

NC Renewable Energy and Portfolio Standard (REPS)

- Established by Senate Bill 3 in 2007
- Investor-owned utilities: 12.5% by 2021
 - Up to 25% of the requirement may be met through energy efficiency technologies, including CHP systems powered by non-renewable fuels
 - After 2021, up to 40% of the standard may be met through energy efficiency.
- Electric cooperatives, municipal utilities: 10% by 2018
 - No limitation on energy efficiency

Tracking EE as part of REPS

Year	NC RETS EE Certificates (MWh)	DEC	DEP	Dominion	NCEMC	Munis	Energy United and Halifax
2008	22,907	-	7,645	-	14,510	523	229
2009	80,008	10,189	29,233	-	38,414	710	1,462
2010	504,289	233,775	185,020	-	74,343	5,789	5,362
2011	1,134,040	643,112	377,808	417	100,932	51	11,720
2012	1,288,141	1,120,265	14,186	3,039	135,261	31	15,359
2013	2,119,916	1,530,891	392,996	3,291	175,513	743	16,482
2014	2,722,860	2,011,451	479,942	5,285	202,461	-	23,721
2015	6,218,251	2,310,608	3,653,746	9,403	211,868	1,148	31,478
2016	4,067,413	2,152,597	1,647,371	13,794	216,833	418	36,400
2017	4,806,169	2,531,009	1,965,009	18,432	253,251	-	38,468
Total	22,963,994	12,543,897	8,752,956	53,661	1,423,386	9,413	180,681
		54.6%	38.1%	0.2%	6.2%	0.0%	0.8%

Source: North Carolina Renewable Energy Tracking System (NC-RETS)



1 EEC – 1 MWh of Energy Saved

Estimates of EE Potential

Where can we go from here?

Energy Savings Potential Studies

- ORNL and NCCETC (2003)
 - 6% electricity savings at \$400M per year
- GDS and NCUC (2006)
 - 14% electricity savings potential by 2017
- DOE and EPRI (2014)
 - 18.4% electric savings from 2016 - 2035

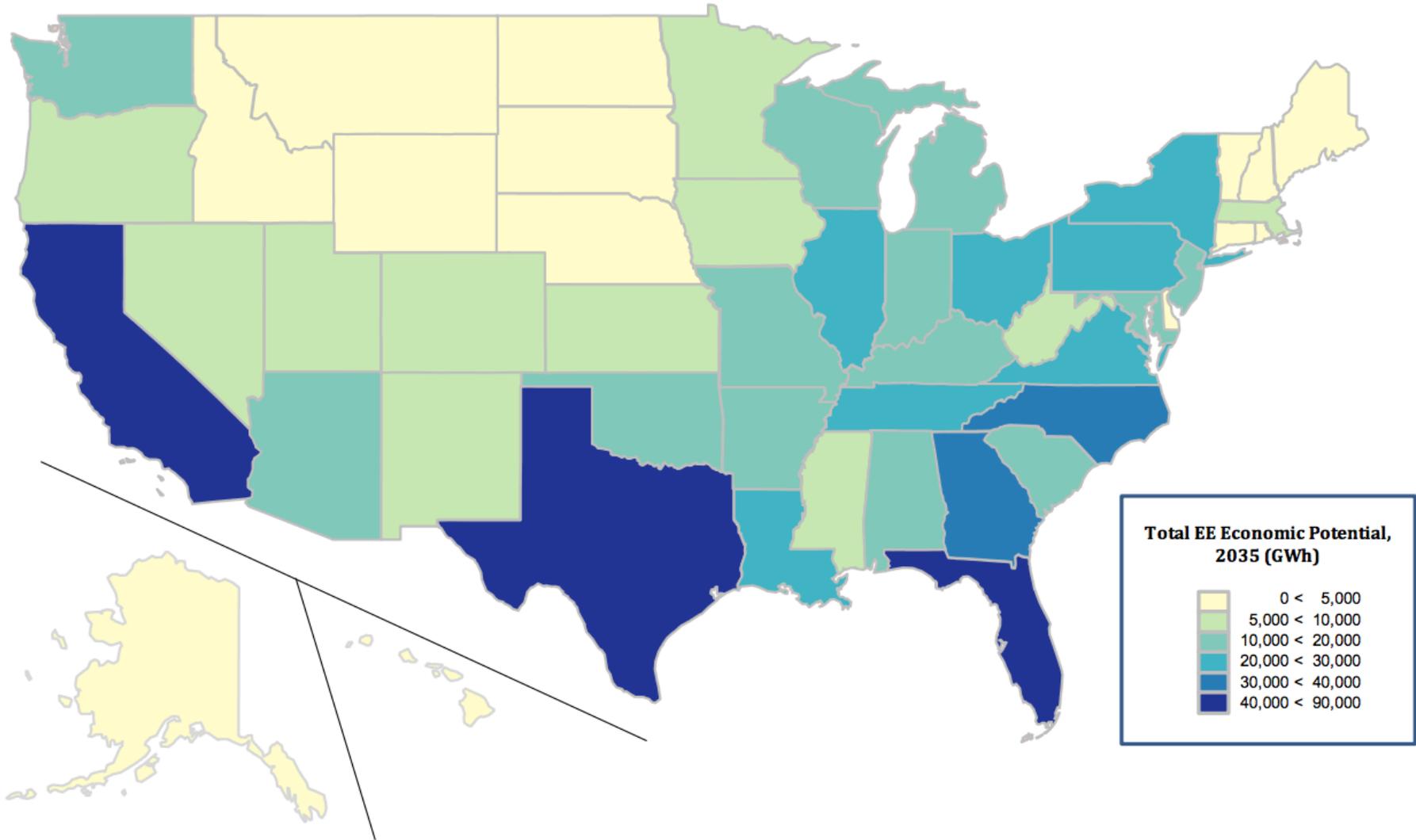


Figure 4-1
Total Energy Efficiency Economic Potential (EP) by State in 2035, in GWh

Duke Energy Estimates: 2017-2041

Duke Energy Carolinas (2016)

	Energy (Gwh)	Demand	Levelized Cost (\$/kWh)
Technical Potential	19,495	6,041	\$0.436
Economic Potential	12,107	4,285	\$0.035
Achievable Potential	6,024	1,723	\$0.055

Duke Energy Progress (2016)

	Energy (Gwh)	Demand	Levelized Cost (\$/kWh)
Technical Potential	11,453	3,710	\$0.499
Economic Potential	6,566	2,385	\$0.036
Achievable Potential	3,199	874	\$0.061

RESIDENTIAL
RETROFITS
ANNUAL SAVINGS

\$1.8 BILLION

COMMERCIAL &
INDUSTRIAL RETROFITS
ANNUAL SAVINGS

\$1.7 BILLION

Energy Efficiency Sector in NC

HOW MUCH

is **72.9 MILLION**
METRIC TONS OF CO₂?



IT IS EQUIVALENT TO:



15.5 MILLION
CARS DRIVEN IN ONE YEAR

ENERGY
EFFICIENCY
16.8%
REDUCTION
POTENTIAL



101,029
RELATED JOBS

\$17.5B
OF NORTH
CAROLINA'S
CLEAN ENERGY
REVENUE



8.1 BILLION
GALLONS OF GASOLINE CONSUMED



1,750
FIRMS
IN NC



18,286
WIND TURBINES
RUNNING FOR
ONE YEAR

\$420 MILLION

PUBLIC BUILDING
RETROFITS
ANNUAL SAVINGS

\$10.0 BILLION

BUILDING CODE
UPDATES
ANNUAL SAVINGS

\$13.9 BILLION

STATEWIDE
ENERGY
SAVINGS



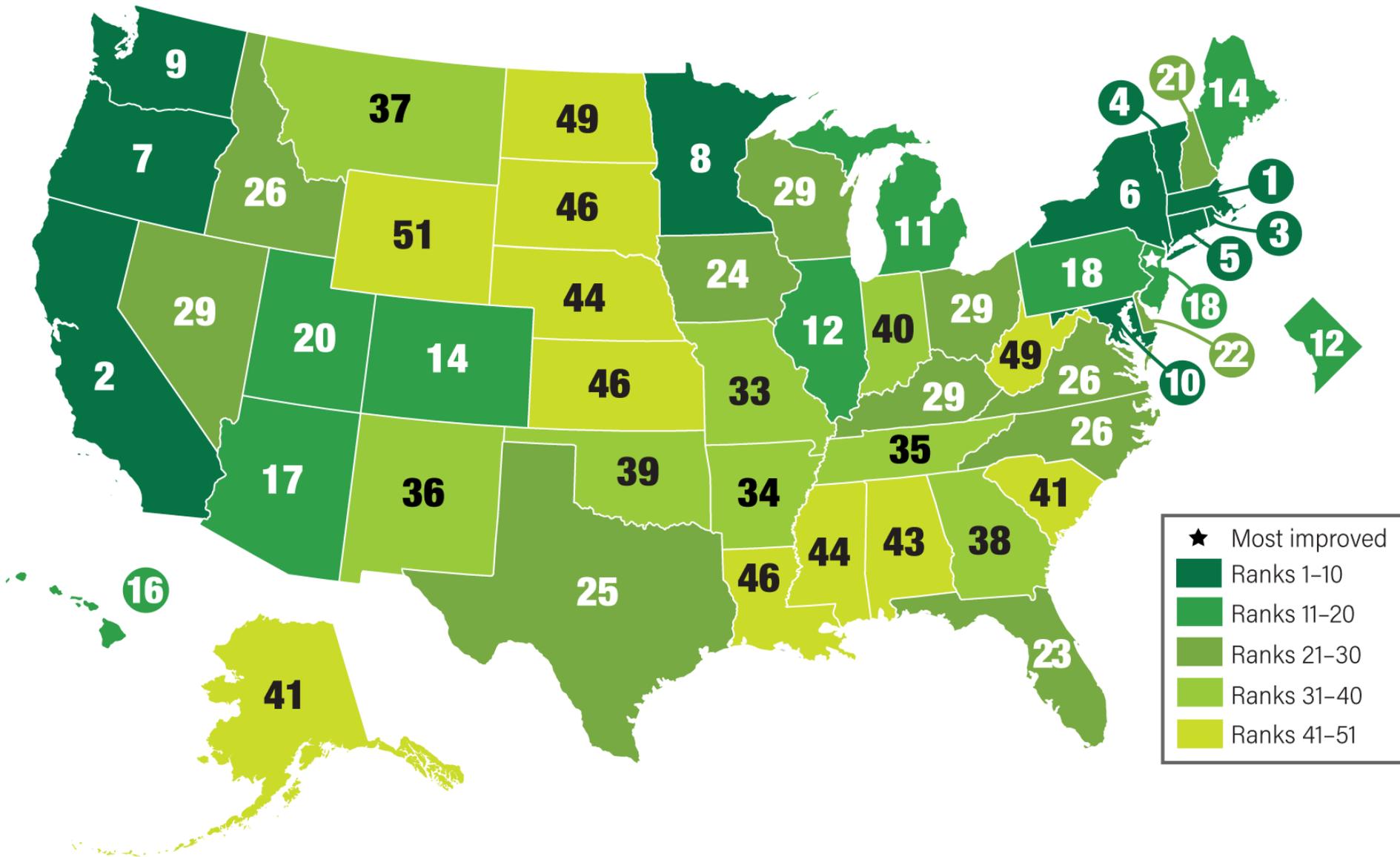
85 MILLION
ACRES OF US FOREST

A National Perspective



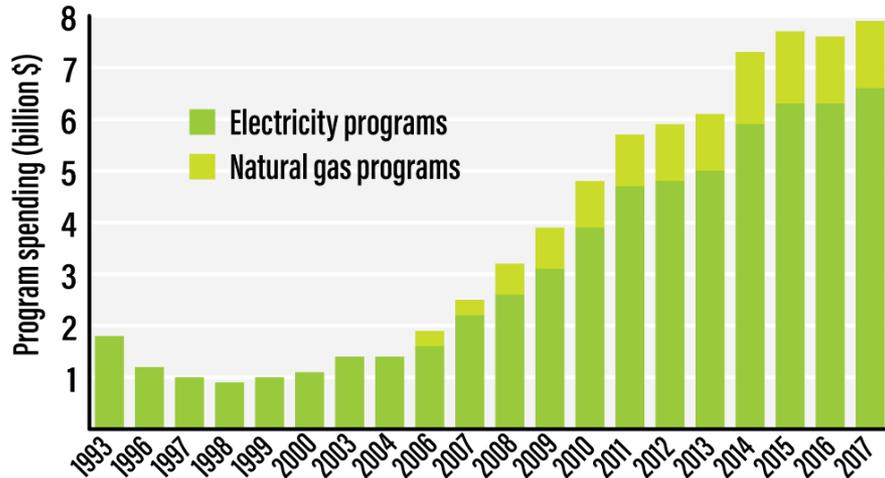
2018 State Energy Efficiency Scorecard

October 4, 2018

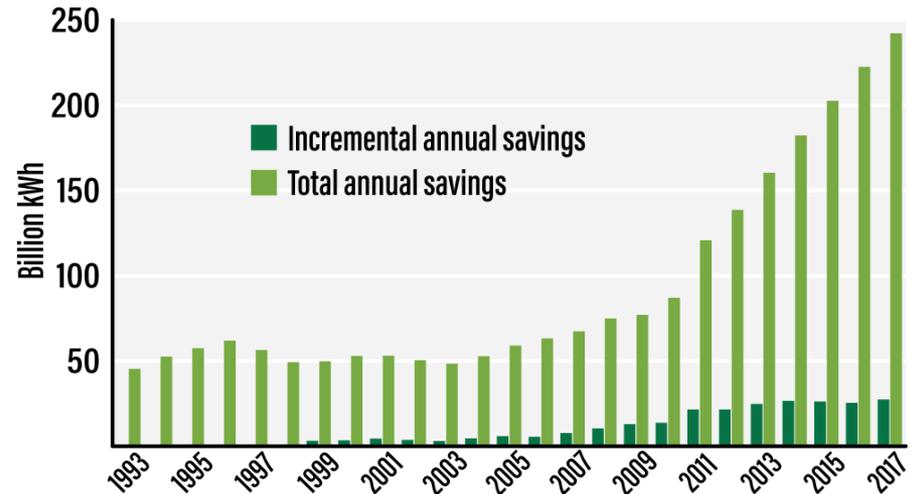


Key Findings

States are spending more on energy efficiency in the utility sector...



...and saving more



- 2017 State Spending on Energy Efficiency: \$7.9 billion (+4.7%)
- 2017 State Electric Savings: 27.3 million MWh (+7.3%)

Enough to power ~2.5 million homes

Key Findings

- Most improved state: **New Jersey**
- Largest loss in points: **Iowa**

- States ramped up efforts to promote **zero-emission vehicles (ZEV)**, mostly electric, as the federal government sought to freeze fuel economy standards for cars and SUVs.
 - CA recommitted to enforcing federal vehicle emissions standards for 2017-2025
 - Update to ZEV Action Plan and goal to put 5 million ZEVs on road by 2030

- Push for **zero-energy construction** through stronger building energy codes
 - California 2019 Building Energy Efficiency Standards (take effect Jan 2020)

- States strengthening (or establishing new) utility savings targets:
 - **Arkansas, Colorado, New York, New Jersey**

Other State Innovations

- States ramped up efforts to create the utility of the future. Ohio, Rhode Island, New York, California, and Minnesota have major plans in place. They're looking to modernize grid infrastructure, leverage data, and deploy more distributed energy resources.
- California and Vermont led in setting appliance standards. California, which has standards for 100-plus products, set new standards for computers, computer monitors, and portable electric spas in 2017. This year Vermont adopted new standards for 16 products.
- States focused on innovative financing solutions. Six states (California, New York, Connecticut, Hawaii, Nevada, and Rhode Island) have set up green banks, and Washington, DC, passed legislation this year to do the same.

North Carolina's 2018 Scorecard

- The state's levels of electricity savings remain around the national median.
- North Carolina's renewable portfolio standard includes efficiency as an eligible measure but does not create clear guidance for cost-effective energy efficiency investments.
- The state could create a separate, long-term efficiency standard to more directly incentivize investments in electricity and natural gas efficiency.
- Utilities in the state could also work with large industrial customers to design programs that encourage their continued participation, in spite of their option to opt out.
- To further deepen energy and cost savings for consumers, the state could expand energy efficiency financing options and update its residential and commercial building energy codes.

BREAK

Please return by 10:45

North Carolina's Shared Goals and Objectives

A collaborative exercise

NC EE Stakeholder Survey Results

- 30 stakeholders responded
- 50% of organizations are NC-focused, the rest split between National (8) and Southeast (5), Local (1) and International (1)
- Work spans all sectors
 - Residential (18) / New Construction (20)
 - Commercial (22) / Industrial (17)
 - Municipal (17) / Schools (17) / Military (12)
 - Financial (14) / Agriculture (11) / Electric (17)
 - Other: Healthcare, public housing, energy technology

How would you describe the current successes of EE in NC?

- Load growth is flat (EE is working)
- State has a state-wide energy conservation code and a framework to enforce the code
- SB3 (REPS) and regulatory environment promote cost-effective EE and renewables
- Performance contracting has been successful
- Some national programs (Energy Star) has a high degree of visibility and success in NC
- Duke Energy reached 1% energy savings in 2017
- Utility Savings Initiative has been successful in driving energy and water conservation
- Roanoke EMC's successful implementation of Upgrade to Save

How would you describe the current challenges of EE in NC?

- As EE from lighting measures and “low hanging fruit” are achieved, future portfolio savings will be more difficult
- Lack of awareness and understanding of efficiency by media, elected leadership and public
- Clean energy companies and advocates are not focused on EE
- No baseline acceptance of value of EE by appraisers and realtors
- Funding for retrofit programs and large capital investment is limited
- No consistency in benchmarks for measuring success
- Small amounts of EE for co-ops and municipalities
- We don't have an EERS or state EE target
- Lack of consensus amount NC groups around specific EE goals / misalignment of stakeholder goals

Challenges (continued)

- Industrial facilities opt-out of utility programs
- Connectivity must be a priority (especially in rural markets)
- Insufficient support for low-income EE programs (and strategies for renters)
- For existing affordable homes, weatherization needs to be paired with urgent repair subsidy
- Workforce demand for retrofits is inconsistent
- Utility DSM programs can be unwieldy and difficult for building owners and many contractors to navigate
- Few programs to support industrials and large commercial customers

What NC Policy opportunities exist?

- Third party sales
- Higher building code standards for efficiency with less legislative involvement
- An evaluation of the social costs and benefits of EE that are not typically used in the calculation of utility cost-effectiveness tests
- Increase EE goals in REPS and possibly split out EE
- Establish an EE mandate for all regulated utilities
- Overhaul performance contracting program (2007)
- State tax credits and increased Duke Energy incentives
- Give utilities a business model around providing energy efficiency

Opportunities (continued)

- Alternative financing options / green loans
- New rate structures to encourage EE
- Expand NC GS 143-64-17 and SB668 to include community colleges as well as K-12 schools and local government
- Increased customer and member engagement
- Leasing programs for HVAC and water heaters

What are the perceived barriers?

- The utilities (Duke) are the barrier
- Cost per kWh will increase – deciding how these costs will be recovered will not be easy
- EE is often confused with renewable energy
- Other legislative priorities crowd-out discussions on EE / lack of effectiveness of EE advocates that represent both EE and RE
- No plan for EE from industry/state gov't/advocates
- The building code cycle is six years – it will be 2024 before NC sees a new cycle.

Barriers (continued)

- Better understanding of moisture and humidity is needed
- Weatherization funding is limited (not much WAP funding post-ARRA)
- Limited capital for all sectors
- Limited amount of repair and renovation funds that would allow for installation of new efficient equipment
- Lack of an efficiency mandate applicable to all utilities
- EE is a “big daunting issues” that needs to have its goals and action steps prioritized. Need specific steps.

Barriers (continued)

- Long payback periods for some EE investments
- Lower avoided costs and advancement of codes/standards create barriers to utility efficiency under traditional cost-effectiveness tests
- Lack of energy managers/EE champions in commercial and small businesses
- State EE programs are self-implemented, but are often underfunded and understaffed
- Failure to recognize all energy and non-energy benefits of efficiency.
- EE is not considered part of the IRP planning process
- Uncertainty and complexity of environmental permitting can deter facilities from moving forward with EE

Barriers (continued)

- Industrial opt-outs
- Low-income programs are not eligible for shareholder incentives
- Lack of inclusive financing options
- Lack of reliable information about energy efficiency opportunities (especially in rural and agricultural communities)
- Quantitative analysis (energy audit) of energy opportunities remains expensive

What is needed to catalyze forward movement in EE?

- Need to educate organizations lobbying against EE about the benefits
- Look beyond what can be achieved by utility-sponsored programs
- Create a roadmap by as many public, private and nonprofit / advocacy sectors that can be easily understood and adopted by leaders across the state.
- State Energy Plan that prioritizes EE
- Commitment from clean energy industry companies and advocates to support EE

EE Catalysts (continued)

- Loan loss reserve and fund to spur a statewide residential retrofit loan program
- State support for the development of an EE program administration market
- Increased standards for equipment replacement
- Revamp REPS with criteria for decarbonizing the grid, promoting electric vehicle use, and expanding distributed generation
- Passing an EE Resource Standard (more specific EE goals)
- Develop a better understanding of the impact of various EE strategies
- Support the inclusion of EE in NC Building Code

EE Catalysts (continued)

- Utility-sponsored EE as a resource
- Build trust between trade groups and industry and develop consensus on what to support
- Implement annual reporting for opted-out customers of IOUs.
- Promote annual commissioning for controls and existing building benchmarking
- Continue to raise awareness and improve housing in the state.
- Allow other sources of capital to fund energy retrofits including off balance sheet programs

EE Catalysts (continued)

- State agencies and state institutions that do not demonstrate progress towards energy reduction goals (measured and reported by USI) may have 10% of their annual utility budget withheld by the State Budget Office.
- Establishment of an EERS or a binding savings target.
- Allow third party industry experts to competitively bid programs to capture unrealized energy savings.
- Urgent home repair programs paired with energy efficiency, lead hazard control and other healthy homes angles

EE Catalysts (continued)

- Grants for industrial customers to conduct energy audits and efficiency studies (in partnership with universities)
- Introduce a shared savings program
- Expansion of no-cost programs to serve low-income households.
- A governor's order mandating the use of performance contract process
- An Executive Order instructing all branch agencies, departments and institutions of higher education to proactively pursue energy efficiency measures.

Prioritizing our Shared Goals

Bulls-Eye exercise

Table Priority Discussion

- 30 minutes
- Focus on what NC's priorities and shared goals should be
- Extract as many priorities from the survey that resonate with your table (write each one down on a sticky note)
- Is this set comprehensive? Are there others that were not captured?

Bulls-Eye Poster

- 20 minutes
- To truly hit the bulls-eye with our roadmap, we need to refine our priorities to those that are most critical to the collective group
- By design, a bulls-eye diagram puts a limit on how much you can identify as critical
- As a combined group, carefully consider what is critical (center), important (middle) or peripheral (outer).
- Only 2-3 stickies can end up in the center – you must talk and make trade-offs!

Group Discussion

- What are your groups' top 2-3 priorities?
- During lunch, the steering committee will consolidate and refine the priorities
- We will reconvene after lunch to coalesce around the 2-3 goals that the group feels are most critical.

LUNCH

Please be back by 12:55

Fine-tuning our set of shared goals and objectives

Sector Breakouts

- Residential (single family, multifamily, new construction, low income)
 - Laura Langham, Jacquie Ayala
 - Penn Pavilion Room
- Business (commercial, industrial, agricultural)
 - John Farmer, Caroline Macklin
 - Brodhead 248 (follow Jen)
- Institutional (municipal, schools, military)
 - Bridget Herring, Al Ripley
 - Brodhead 238 (follow Kate)

Concluding Remarks

Thank you for your participation!