



Advanced Energy Presentation to North Carolina Utilities Commission

December 7, 2022



2022 Annual Report

Brian Coble
Chief Operating Officer

Bold Ideas to Big Impacts

- Help industry and stakeholders meet decarbonization goals cost-effectively
- Ensure the reliable integration of distributed energy resources into the electrical system
- Protect energy affordability through innovative energy efficiency and demand flexibility



Researching Emerging Technologies

- Manufactured Homes Winter Peak Study
- Residential Battery Storage Study
- Smart Thermostat Performance Analysis
- Program Design and Metering Strategies for EV Households
- Researching the Impacts of Transient Voltage Events for Utilities and Manufacturers

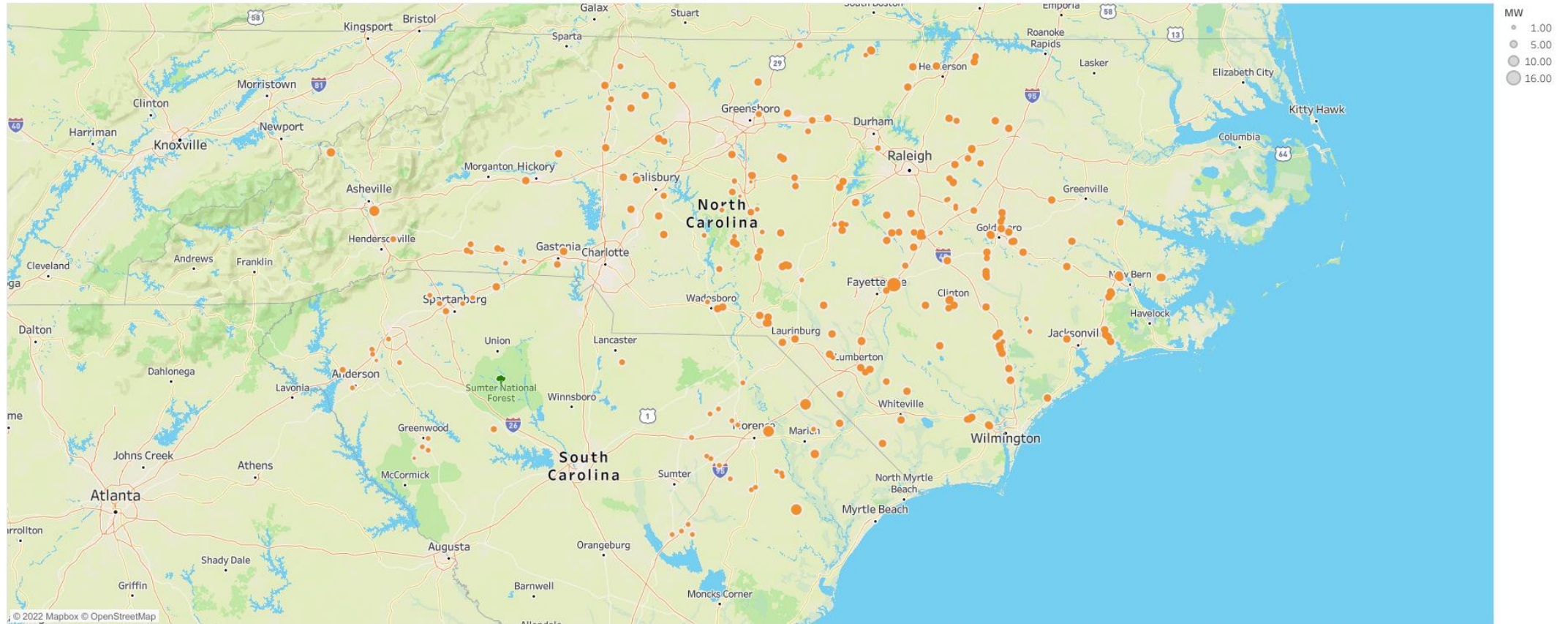


Improving Electric Motor Efficiency

- Certification Body Expansion
- Quality Repair Support for Motor Service Centers
- Testing and Evaluation for California Utilities



1 GW of Utility-Scale Solar Commissioned

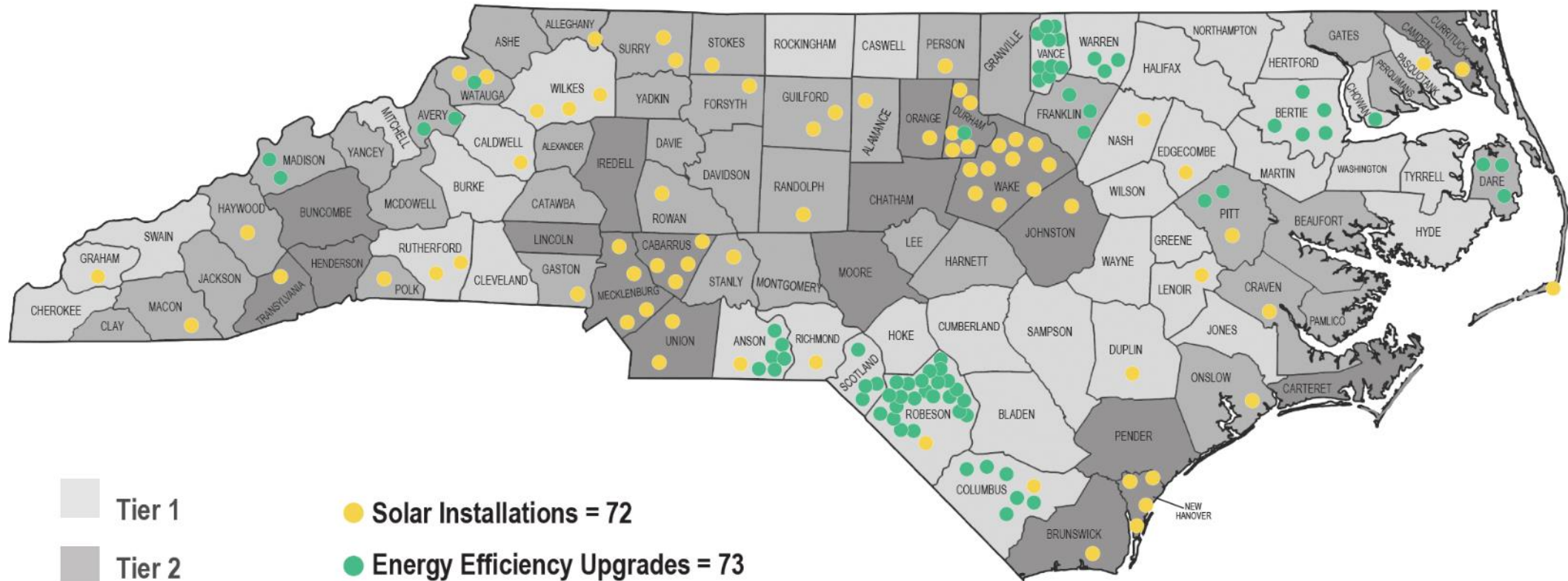


Helping Businesses Improve Efficiency

- Energy Assessments for North Carolina Businesses
- ISO 50001 and Strategic Energy Management Growth



Supporting North Carolina's Schools





Thank You

www.advancedenergy.org
919-857-9000

Brian Coble

919-857-9051

bcoble@advancedenergy.org



Low- to Moderate- Income Projects

Lisa Manuel
Project Manager

Overview

- SystemVision Single Family New Construction



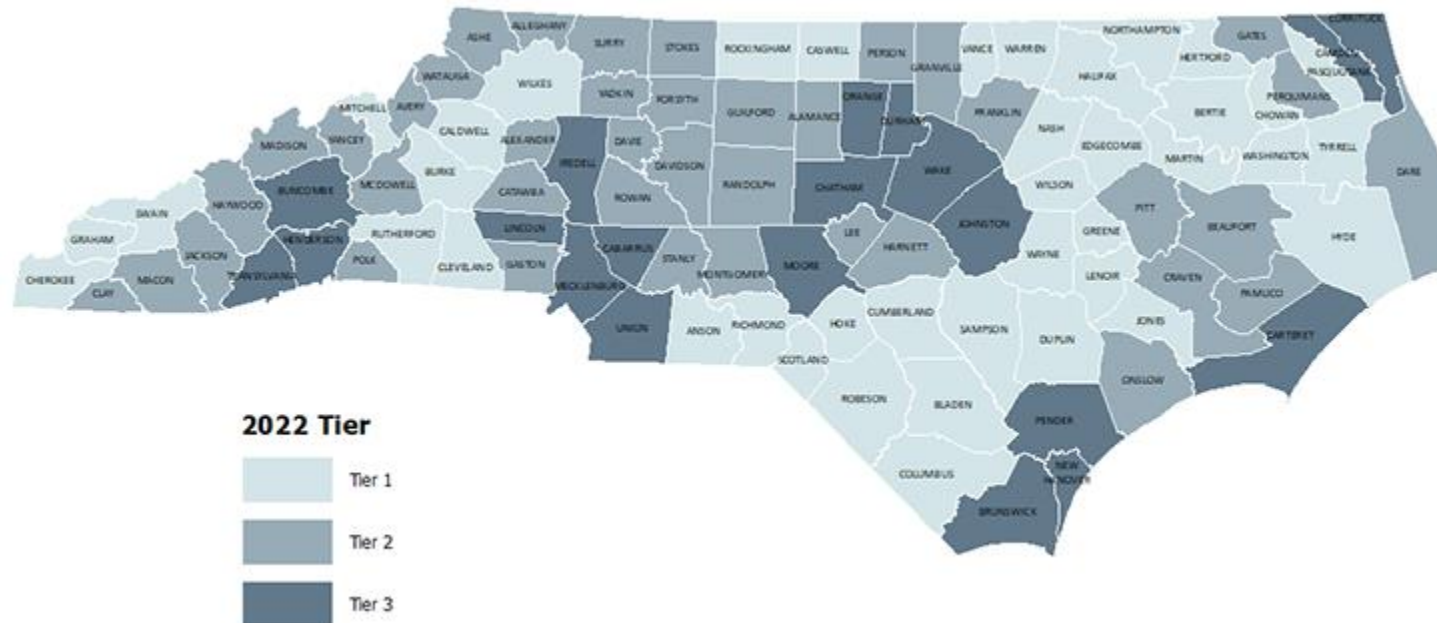
Projects

1. SystemVision New Construction/Affordable Housing
2. Enhancing Electric Cooperative Rebate Program
3. Supportive Housing Mechanical Equipment Upgrades
4. Solar Photovoltaic (PV) for Affordable Housing



Enhancing Electric Cooperative Rebate Programs

- Piedmont EMC, Randolph EMC, Brunswick EMC, South River EMC, and Pee Dee Electric
- Elderly, minority, disadvantaged, low to moderate income



Pre-Install Visits



Before



Before



Before



After



After



After



High Efficiency Heat Pump Installations & Weatherization Repairs



Impact: Predicted Energy Savings

- Annual Predicted Energy Savings

Predicted Annual Electric Savings (30 Homes)	Predicted Annual Fuel Savings (2 of 30 Homes with Fuel)	Predicted Total Annual Savings (30 Homes)
\$18,870	\$1,650	\$20,520

Supportive Housing Mechanical Equipment Upgrades

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Overview

- Overview
- Objectives



Impact: Predicated Energy Savings

- Annual Predicted Energy Savings

Predicted Annual Water Heater Savings (40 systems)	Predicted Annual Air-Source Heat Pump (HVAC) Savings (73 systems)	Predicted Total Annual Savings (113 systems)
\$3,543	\$26,818.08	\$30,361.08

Solar Photovoltaic (PV) for Affordable Housing



NORTH CAROLINA
HOUSING
FINANCE
AGENCY

Overview

- Objectives
- Strategies
- Criteria
- Process



Roof-top Solar



Impact: Annual and Lifetime Predicted Energy Savings

Property Location	Predicted Annual kWh Production	Predicted Lifetime kWh Production	Predicted Average Monthly Savings	Predicted Annual Savings	Predicted Lifetime Savings (25 years)
Hickory, NC #122	7,320	200,299	\$87	\$1,047	\$31,404
Winston-Salem, NC #4563	7,349	197,200	\$73	\$881	\$22,025
Winston-Salem, NC #1045	7,888	183,725	\$79	\$946	\$23,650
Hillsborough, NC #210	6,866	188,057	\$82	\$982	\$29,456
Hillsborough, NC #216	6,488	177,714	\$77	\$928	\$27,835
Hillsborough, NC #306	8,144	223,051	\$97	\$1,165	\$34,937
Hillsborough, NC #323	8,572	234,790	\$102	\$1,226	\$36,775



Thank You

www.advancedenergy.org
919-857-9000

Lisa Manuel

919.857.9018

Imanuel@advancedenergy.org



Electric Transportation Program Updates

Jacob Bolin

Electric Transportation Specialist



State of the State

Vehicle Registrations

August 2022: 47,839

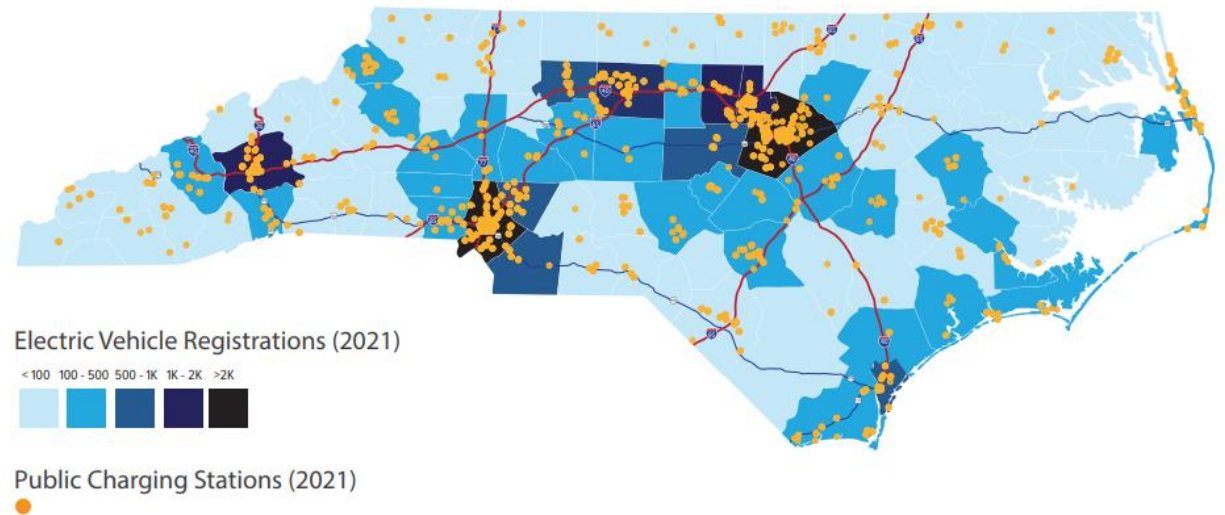
August 2021: 32,257

Charging Infrastructure

657 DCFC ports

1,916 Level 2 ports

North Carolina Electric Vehicles & Charging Stations: 2021



Plug-in NC: Program Highlights

- 20+ in-person events
- 3 webinars
- 72 public consulting inquiries
 - EV purchasing questions
 - Residential and public charging support
 - Media requests
- Increased stakeholder engagement: state agencies, private industry, utilities and policy-based organizations



Bidirectional Charging Demonstration

15-kW bidirectional charger

Partnership with REC, Clean Energy Works, Fermata Energy, NC Clean Energy Technology Center, Enpira and Environmental Defense Fund

Analysis of three use cases:

- **Facility demand reduction**

*Reduce monthly demand charge at the cooperative facility.
Charge set by maximum demand each month.*

- **Systemwide demand event**

Reduce REC's purchased power during peak hours set by NCEMC.

- **Grid resiliency with islanding event**

Support an existing diesel backup generator with reliable transition to/from grid-connected operations.

Roanoke Electric Cooperative, Fermata Energy Show Promise of Vehicle-to-Everything Technology

By Jonathan Susser, PhD and Daniel Real, PhD | October 5, 2021

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In late 2020, Roanoke Electric Cooperative, energy technology company Fermata Energy and a team of clean energy organizations, including Advanced Energy, [launched a pilot project](#) to explore the potential of electric vehicle (EV) "vehicle-to-everything" (V2X) applications.



Bidirectional Charging Demonstration – Results

Facility demand reduction

- Lowered demand charges in 8 of 12 months
- Four months saw increased demand charges or missed opportunities
- Average demand reduction: 6.73 kW
- Successful event averages: 11.4 kW

Systemwide demand reduction

- 52 total events (142 hours total)
- 47 event responses (128 hours total)
- 13 kW of demand reduction

Monthly Savings	All Events	Successful Events
Peak Load Reduction	\$63.97	\$107.94
Demand Reduction Calls	\$203.57	\$223.93
Total	\$267.54	\$331.87

Additional Opportunities for V2X

- Rural Access and Equity
 - Utilities could consider incentive payments for customers and members
 - Particularly effective in low- and moderate-income areas
 - Help customers overcome the upfront cost barriers to purchasing an EV
- Light-duty Fleet Operations
 - Schools
 - Worship centers
 - Local government centers and operations
- Opportunities with Other Vehicle Types

Looking Ahead to 2023

- REC project has helped inform the use-case design for school bus V2G evaluations, but application will present new challenges and findings
- Managed charging will be critical for utilities and customers across the state
- Local governments, businesses, tourism centers, developers and other commercial sites need support understanding charging ecosystem and technologies
- Grant programs and utility-based incentives are major enablers for deployment
- Supply constraints for both vehicles and charging-related equipment may be the determining factor for adoption and deployment



Thank You

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919-857-9000

Jacob Bolin

919-857-9048

jbolin@advancedenergy.org

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