



NASEO 2019 Energy Policy Outlook Conference
Climate Change: State, Local, and Private Sector Energy Adaptation and
Mitigation Actions and Options

February 6, 2019

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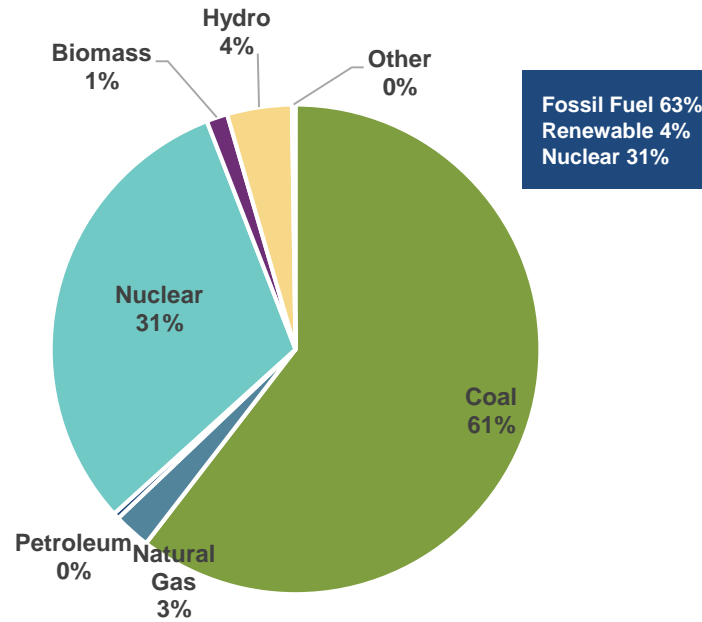
North Carolina Energy and Climate Related Plans and Activities Topics Covered

1. Power Generation Profile
2. GHG Emissions Profile
3. Emission Reduction Activities
4. Resiliency Building

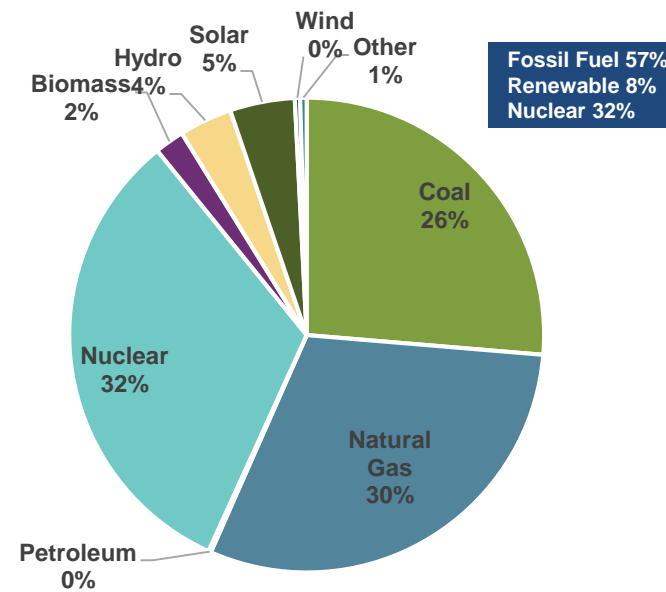


NC's Electricity Generation By Source Type (2005 & 2017)

2005
Electricity Generation



2017
Electricity Generation



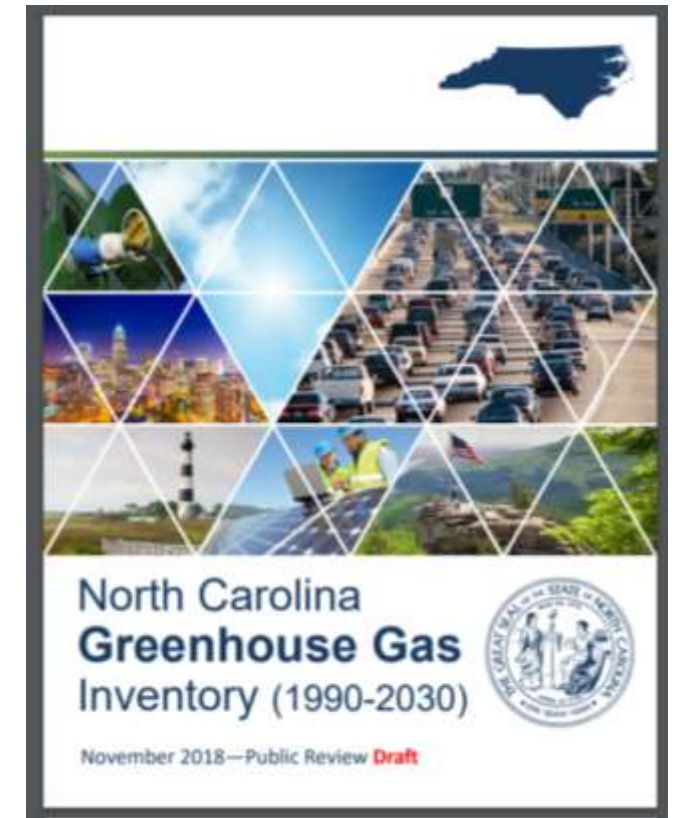
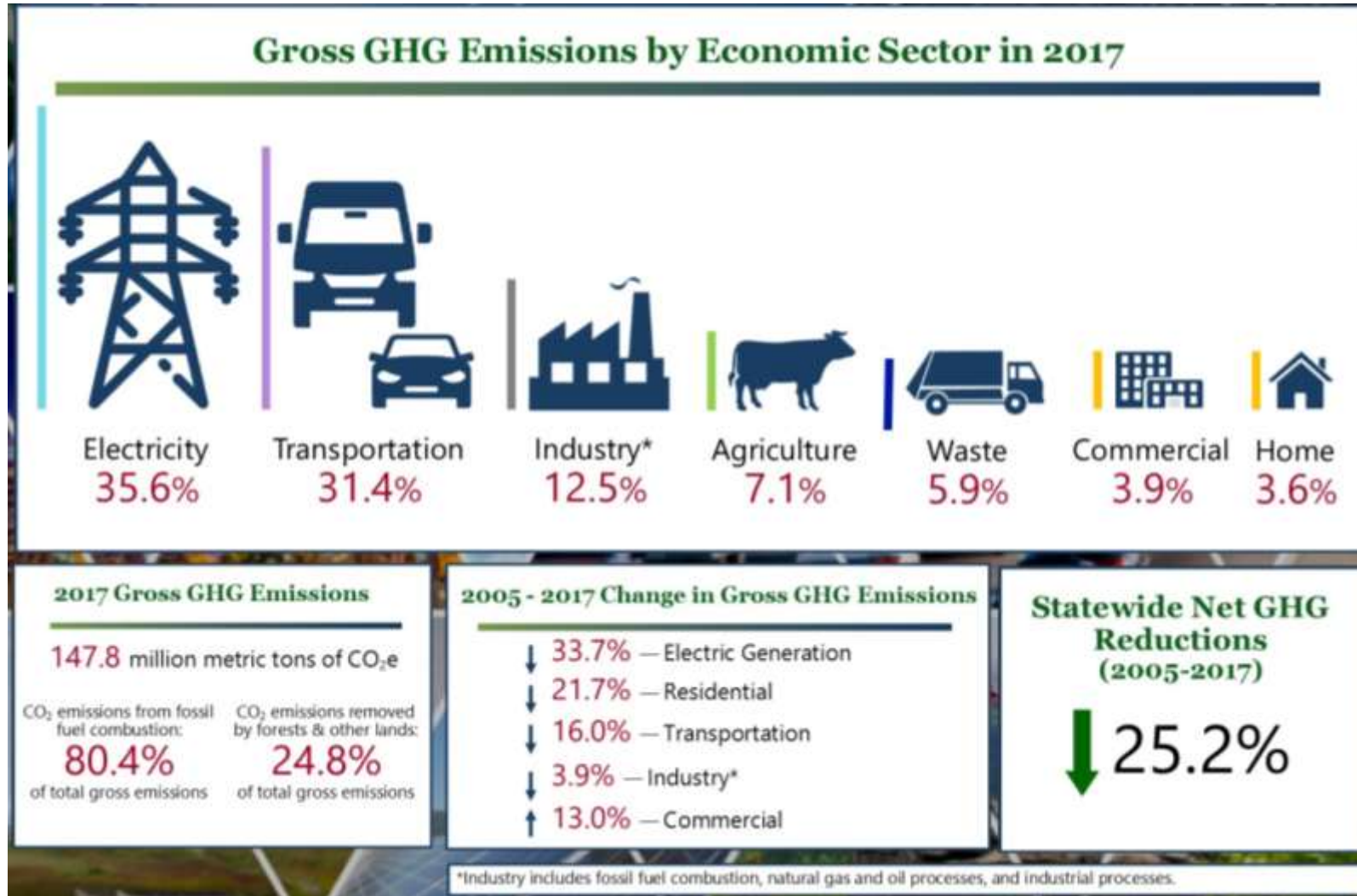
Key Drivers

- NC power plant environmental legislation
 - EPA regulations
- NC Renewable Energy Portfolio Standard
 - Market forces



North Carolina's Greenhouse Gas (GHG) Inventory

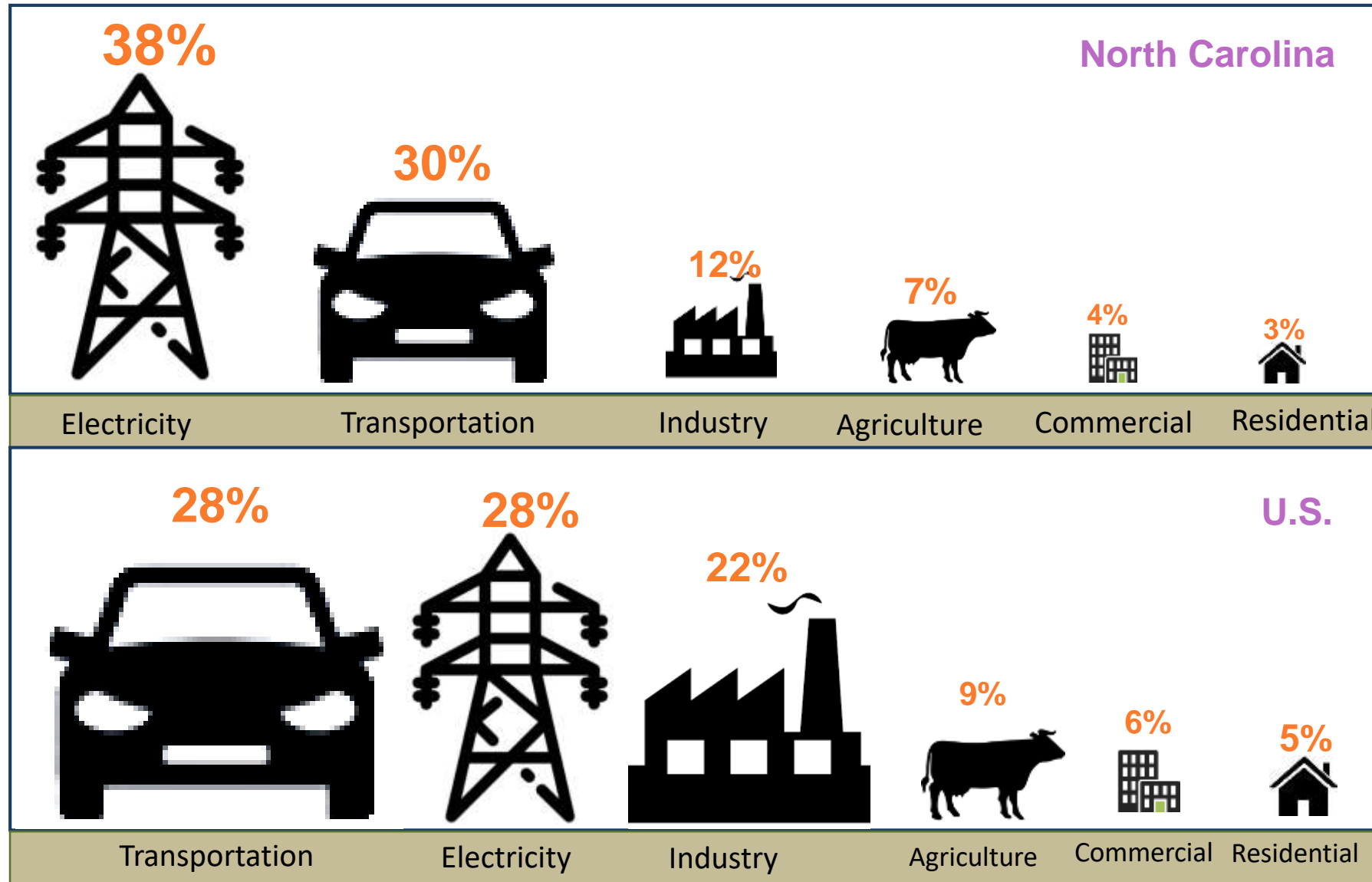
Quick Facts: 2005 - 2017



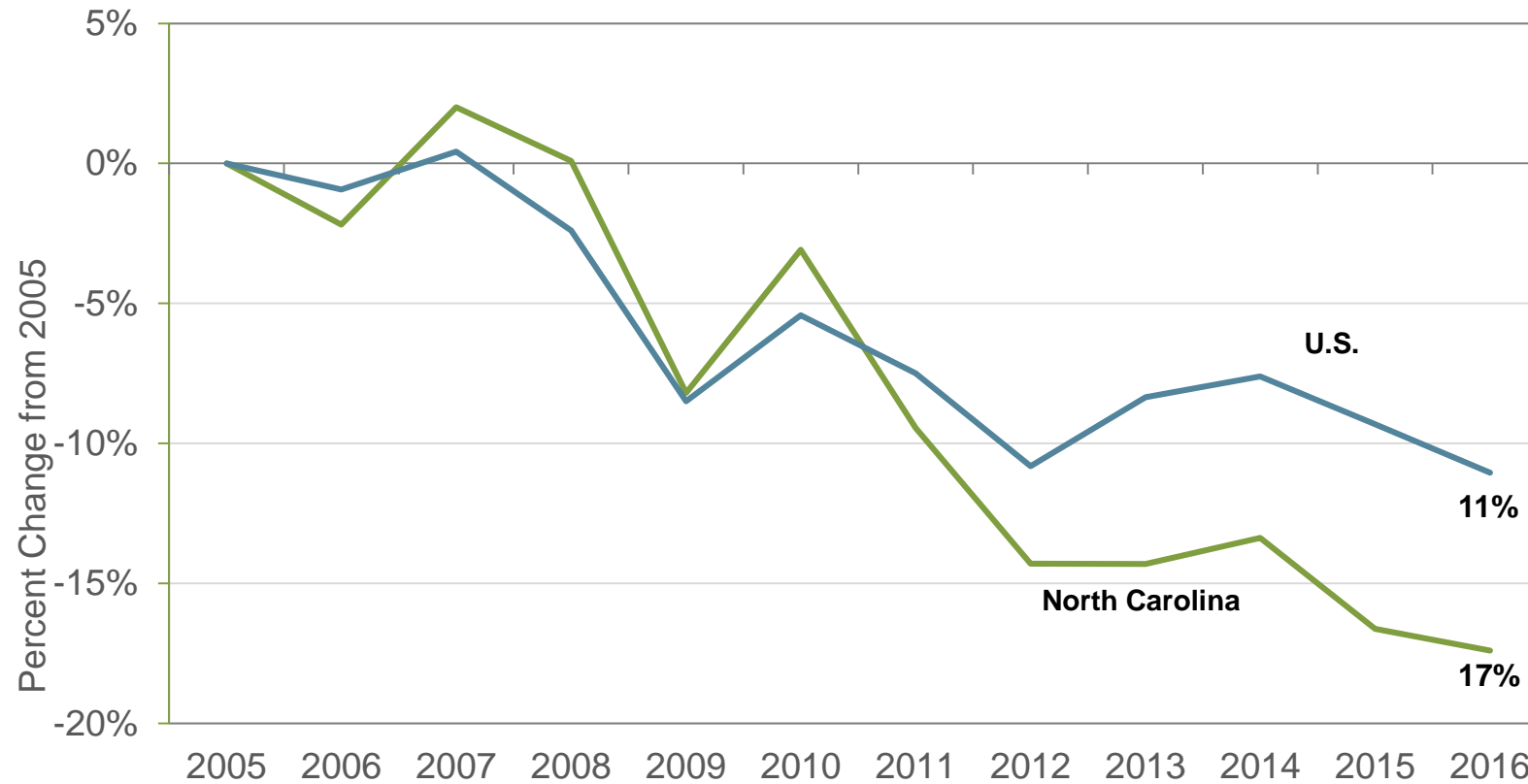
Full Report

<https://deq.nc.gov/energy-climate/climate-change/greenhouse-gas-inventory>

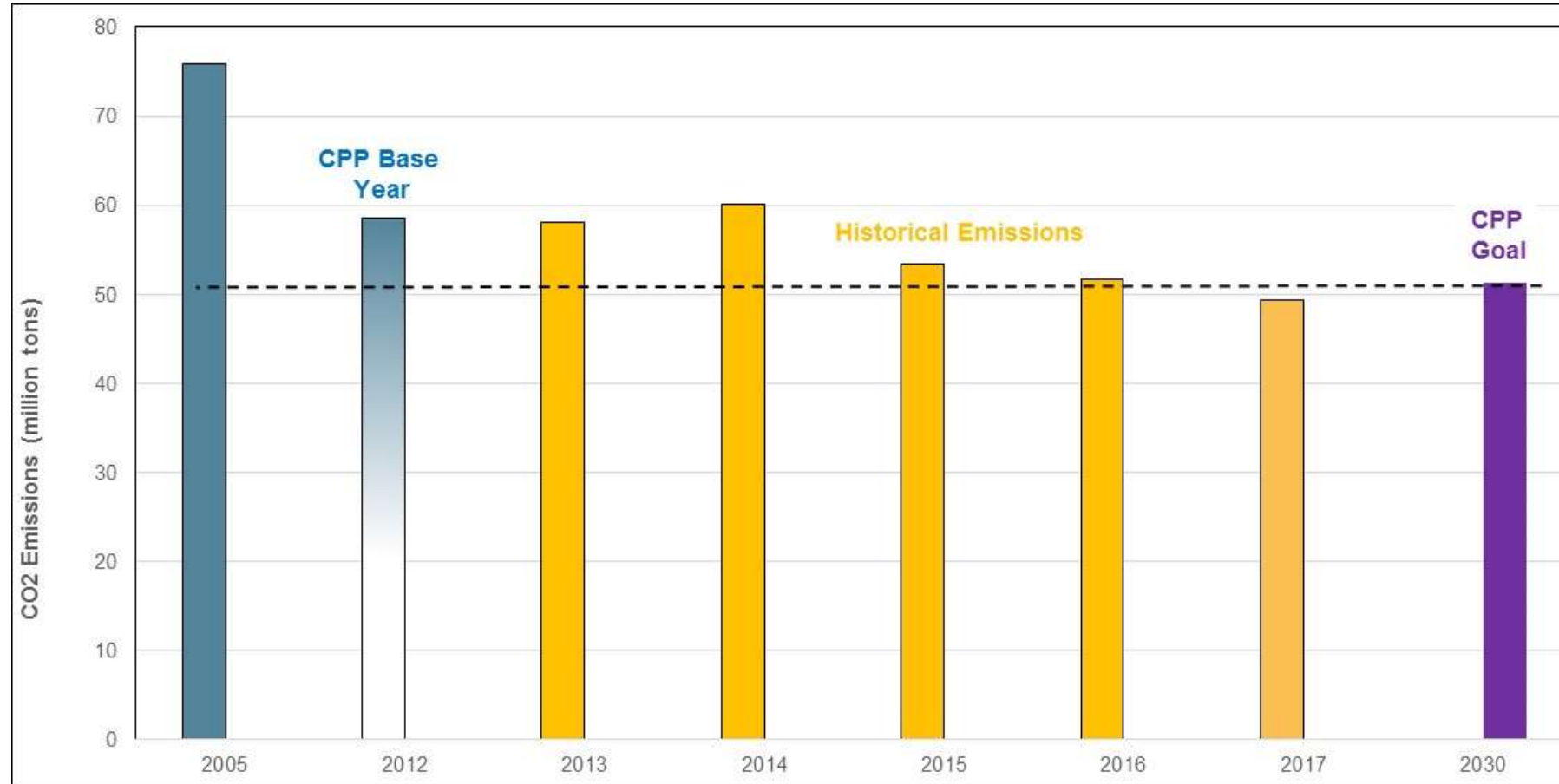
2016 GHG Emissions By Sector for NC and the U.S.



Trends in Gross GHG Emissions Decrease (% Relative to 2005)



NC Power Plants CO₂ Emissions Relative to the Clean Power Plan (CPP) Mass Goal



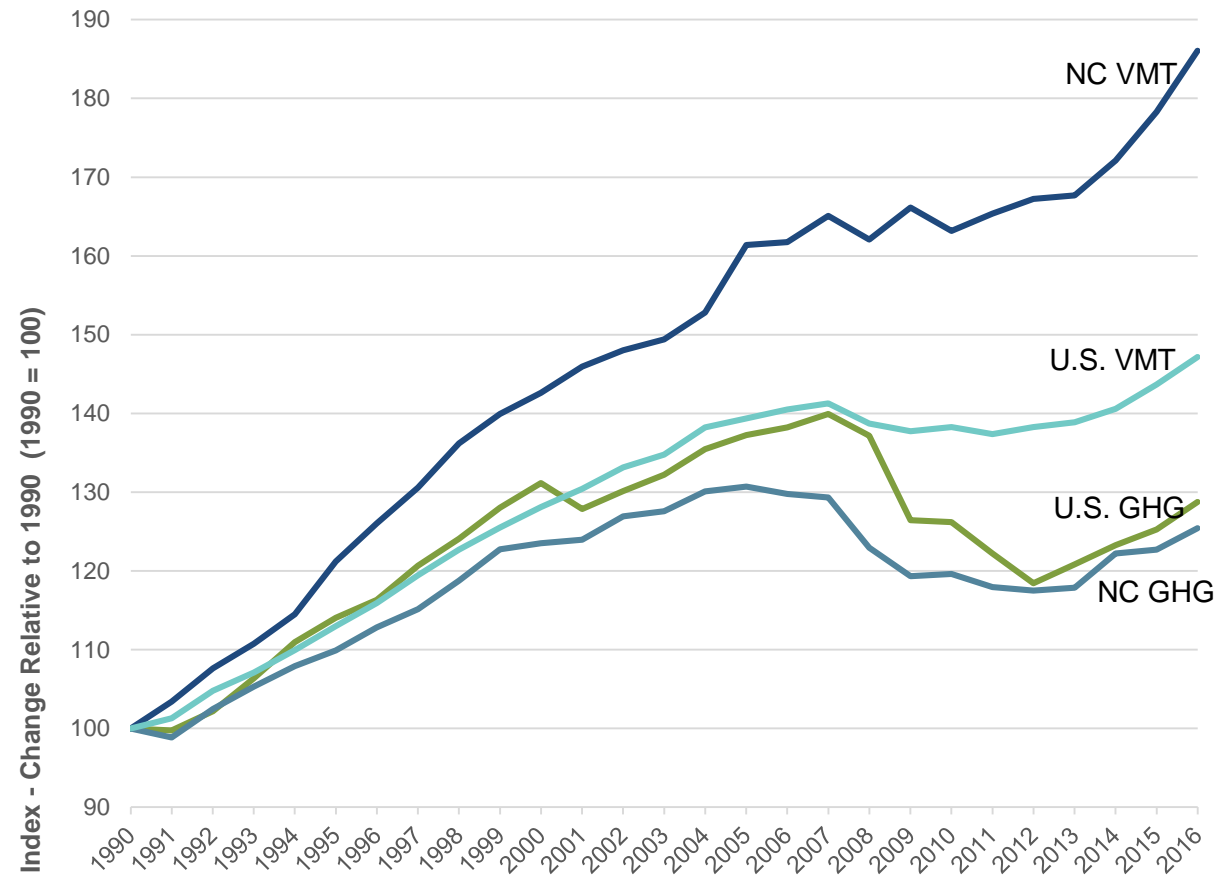
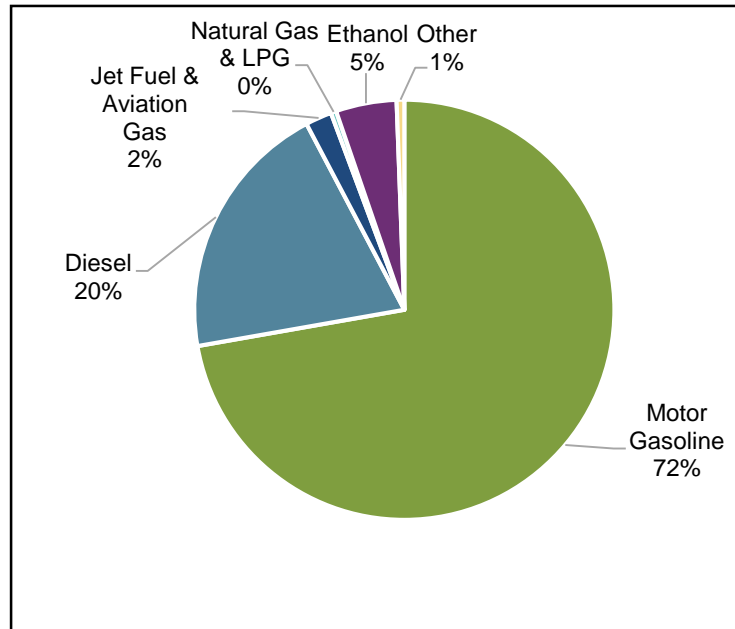
Avoided GHG Emissions Due to Use of Renewable Generation

	2005	2016	2017
RE Net Generation (thousand MWh)	5,554	7,890	10,970
Emission Factor (pound/MWh)	1,225.2	810.1	810.1
Avoided Emissions (MMT CO₂e) *	3.09	2.90	4.03

*Calculated using EPA eGRID GHG Emissions Factor for SRVC Subregion and EIA Form 923 Net Generation in MWh.



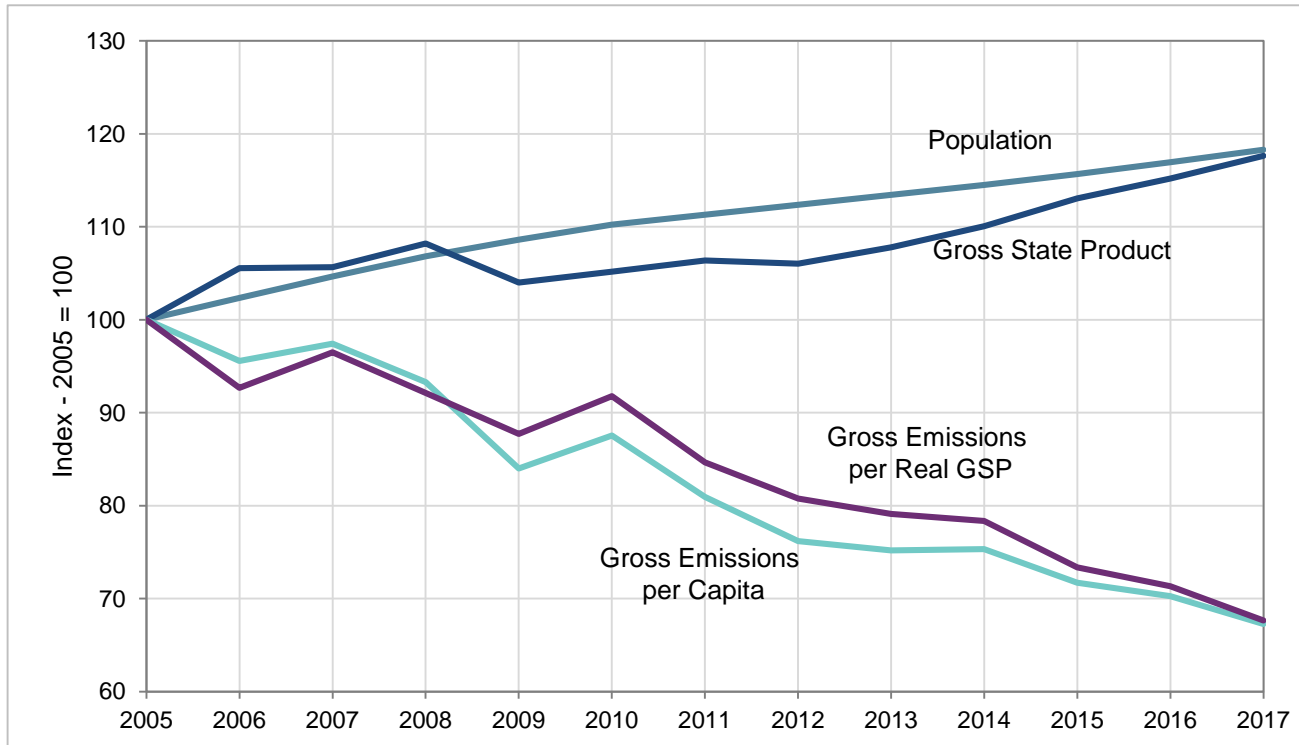
2016 Fossil Fuel Use in the Transportation Sector



Gas/Diesel Vehicle GHG & VMT in U.S. and NC, 1990-2016



NC's GHG Trends Per Economic Indicators

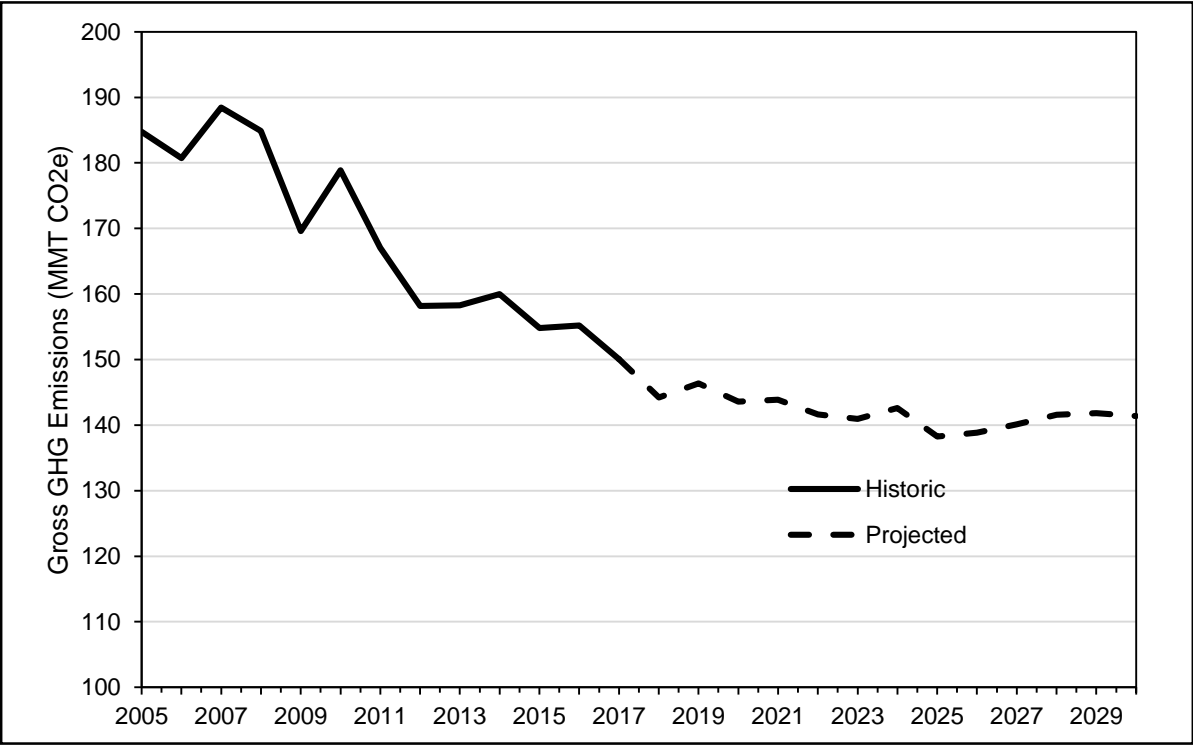


North Carolina's Ranking

	Ranking
Total Energy Production	29 th
Total Net Electricity Generation	8 th
Total Carbon Dioxide Emissions	14 th
Total Energy Consumed per Capita	38 th
Total Energy Expenditures per Capita	45 th
Average Retail Price of Electricity to Residential Sector	31 st



NC's GHG Emissions Forecast, 2005-2030



U.S. Climate Alliance

THE ALLIANCE HAS THREE CORE PRINCIPLES:

- States are continuing to lead on climate change
- State-level climate action is benefiting our economies and strengthening our communities
- States are showing the nation and the world that ambitious climate action is achievable

EACH MEMBER STATE COMMITS TO:

1. Implement policies that advance the goals of the Paris Agreement, aiming to reduce greenhouse gas emission by at least 26-28 percent below 2005 levels by 2025
2. Track and report progress to the global community
3. Accelerate new and existing policies to reduce carbon pollution and promote clean energy deployment at the state and federal level.



Jerry Brown, California



John Hickenlooper,
Colorado



Daniel Malloy,
Connecticut



John Carney, Delaware



David Ige, Hawaii



Larry Hogan, Maryland



Charlie Baker,
Massachusetts



Mark Dayton,
Minnesota



Phil Murphy, New Jersey



Andrew Cuomo, New
York



Roy Cooper, North
Carolina



Kate Brown, Oregon



Ricardo Rosselló, Puerto
Rico



Gina Raimondo, Rhode
Island



Phil Scott, Vermont



Ralph Northam, Virginia



Jay Inslee, Washington



Executive Order No. 80

North Carolina's Commitment to Address Climate Change and Transition to a Clean Energy Economy



- Recognizes that climate change is affecting the health and welfare of our residents, economy, environment and our natural and built infrastructure.
- Calls for clean energy technology innovations, workforce development, and a modern, smart electric grid to grow the state's economy while making North Carolina a national leader in clean energy solutions.

The State of North Carolina will strive to accomplish the following by 2025:

- a. Reduce statewide GHGs 40% below 2005 levels
- b. Increase the number of registered ZEVs to at least 80,000
- c. Reduce state building efficiency 40% below FY03 levels.

Directives

Department of Environmental Quality

- **N.C. Clean Energy Plan**
- **State Buildings Utility Savings Program**
- **N.C. Climate Risk Assessment and Resiliency Plan**

Department of Transportation

- **N.C. Zero-Emission Vehicle Plan**

Department of Commerce

- **Clean energy and clean transportation workforce Assessment**

Department of Administration

- **N.C. Motor Fleet Zero-Emission Vehicle Plan**

All Cabinet Agencies

- **Incorporate climate change impacts into programs/operations**



Planning an Affordable, Resilient, and Sustainable Grid, North Carolina

Overview:

DOE Funding: \$300,000
Cost Match: \$60,000

Partners: Duke Energy, University of North Carolina at Charlotte, and North Carolina State University's Solar Energy Center

Project Goals:

- Conduct a power-system analysis to assess storm impacts in each of three (3) scenarios, including a baseline, improved, and advanced scenario for deployment of DER.
- Produce a cost-benefit analysis (CBA) of implementing each of three (3) scenarios.
- Convene a comprehensive stakeholder engagement process to share results of the power system and CBA in order to solicit input on how to improve state energy planning processes.

Impact:

The project will inform the development of new metrics (e.g., economic losses experienced by customers from outages due to hurricanes) to help the state and stakeholders (including utilities) better evaluate proposed grid investments within existing state planning processes, including the integrated resource planning process.



Building Analysis for Resilience and Distributed Energy Resources in North Carolina

Overview:

U.S. Department of Energy's (DOE), Building Technologies Office: Building Analysis for Resilience and Distributed Energy Resources

North Carolina, a DOE Better Buildings Challenge Partner, is being offered assistance through modeling analysis for distributed energy resources (DER) potential at 10 to 15 of its state-owned buildings

Project Goals:

- **Building Technologies R&D and Integration Needs for Increased Load Flexibility**
 - Alter operation using the properties of the materials & electric power drawn while remaining operational
 - Operate on multiple fuels & provide on-site battery or thermal storage
- **Controls and Communication to Enhance Building-to-Grid Interactions**
 - Enable building technologies to provide a greater variety of grid services through ADR technology advancements
- **Building Energy Modeling for Load Flexibility**
 - Calculate thermal loads, building systems interactions, total end-use/fuel-type energy consumption, & major building system impacts
- **The Value of Flexible Building Loads**
 - Allow valuation & measurement of new energy efficiency and demand response technologies

Impact:

The project will allow for a future in which North Carolina buildings play an even greater role in supporting a modern electric grid through efficient and flexible building loads that provide options to increase electricity system reliability and energy affordability, while also supporting a portfolio of generation options in grid modernization.



Thank you.

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