Overview of Governor Cooper's Executive Order No. 80:
NC's Commitment to Address Climate Change and Transition to a Clean Energy Economy

2019 NC Environmental Stewardship Conference

May 14-15, 2019 - Raleigh

Sushma Masemore, P.E.

Topics Covered

- EO80 Directives
- NC Greenhouse Gas (GHG) Emissions
- Energy Sector Forecast
- Emission Reduction Efforts
- NC Clean Energy Plan
  - Process
  - Current Status
  - ESI member input

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.
- Recognizes that we must take an active role in combatting climate change and make our state more resilient to its impacts.
- 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.
- Recognizes that we can protect our communities, grow our economy, and ensure a healthy environment at the same time.

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State Goals

The State of North Carolina will <u>strive</u> to accomplish the following by 2025:

a. Reduce statewide greenhouse gas emissions to 40% below 2005 levels
b. Increase the number of registered, zero-emission vehicles (ZEVs) to at least 80,000
c. Reduce energy consumption per square foot in state-owned buildings by at least 40% from fiscal year 2002-2003 levels

N.C. Climate Change Interagency Council

Composition: The secretary or designee of each cabinet agency and a representative of the Governor's Office

Council Chair: Secretary Regan, N.C. Department of Environmental Quality

Council Duties:

- Recommend new and updated goals and actions to meaningfully address climate change
- Develop and implement programs and activities that support climate mitigation and adaptation
- Consider stakeholder input when developing recommendations, programs, and activities
- Schedule, monitor, and provide input on the preparation and development of the plans and assessments required by EO 80
- Review and submit to the Governor EO 80 plans and assessments

Status Update on Implementation: To Governor by Oct. 15, 2019.

Inaugural Meeting: December 19, 2018

https://deq.nc.gov/energy-climate/climate-change/nc-climate-change-interagency-council

Specific Directives

Department of Environmental Quality

- **N.C. Clean Energy Plan -** encourage the increased utilization of clean energy technologies in the public and private sectors. Due Oct. 1, 2019
- **Comprehensive Energy, Water, and Utility Use Conservation Program** – update best practices and guidance to achieve 40% state buildings efficiency goal. Due Feb. 1, 2019 and Dec. 1, 2019
- **N.C. Climate Risk Assessment and Resiliency Plan -** provide a scientific assessment of current and projected climate impacts on North Carolina and prioritize effective resiliency strategies. Due Mar. 1, 2020
- **Greenhouse Gas Inventory** – prepare estimates of North Carolina's statewide net GHG footprint.

Department of Transportation

- **N.C. Zero-Emission Vehicle Plan** – develop a strategy to achieve the ZEV target and address topics such as ZEV corridors and ZEV infrastructure. Due Oct. 1, 2019

Specific Directives

Department of Commerce

- **Clean energy and clean transportation workforce assessments -** evaluate current and future workforce needs, assess the skills and education required for employment, and recommend actions to help North Carolinians develop such skills and education. Due Oct 1, 2019

Department of Administration

- **N.C. Motor Fleet Zero-Emission Vehicle Plan** - identify feasible trips for a ZEV, recommend needed infrastructure, address ZEV procurement options, and include other key strategies for increasing ZEV use. Due Oct. 1, 2019
- Report accounting of each agency's number of ZEVs and miles driven by vehicle type. Due Oct. 1, 2019

General Directives to All Cabinet Agencies

Assess and Address Climate Change

- Evaluate the impacts of climate change on agency programs and operations
- Integrate climate change mitigation and adaptation practices into agency programs and operations
- Support communities and sectors vulnerable to climate change impacts

Support Clean Energy Businesses

- Take actions that support the expansion of clean energy businesses and service providers, clean technology investment, and companies committed to procuring renewable energy.

Procure and Use Zero-Emission Vehicles

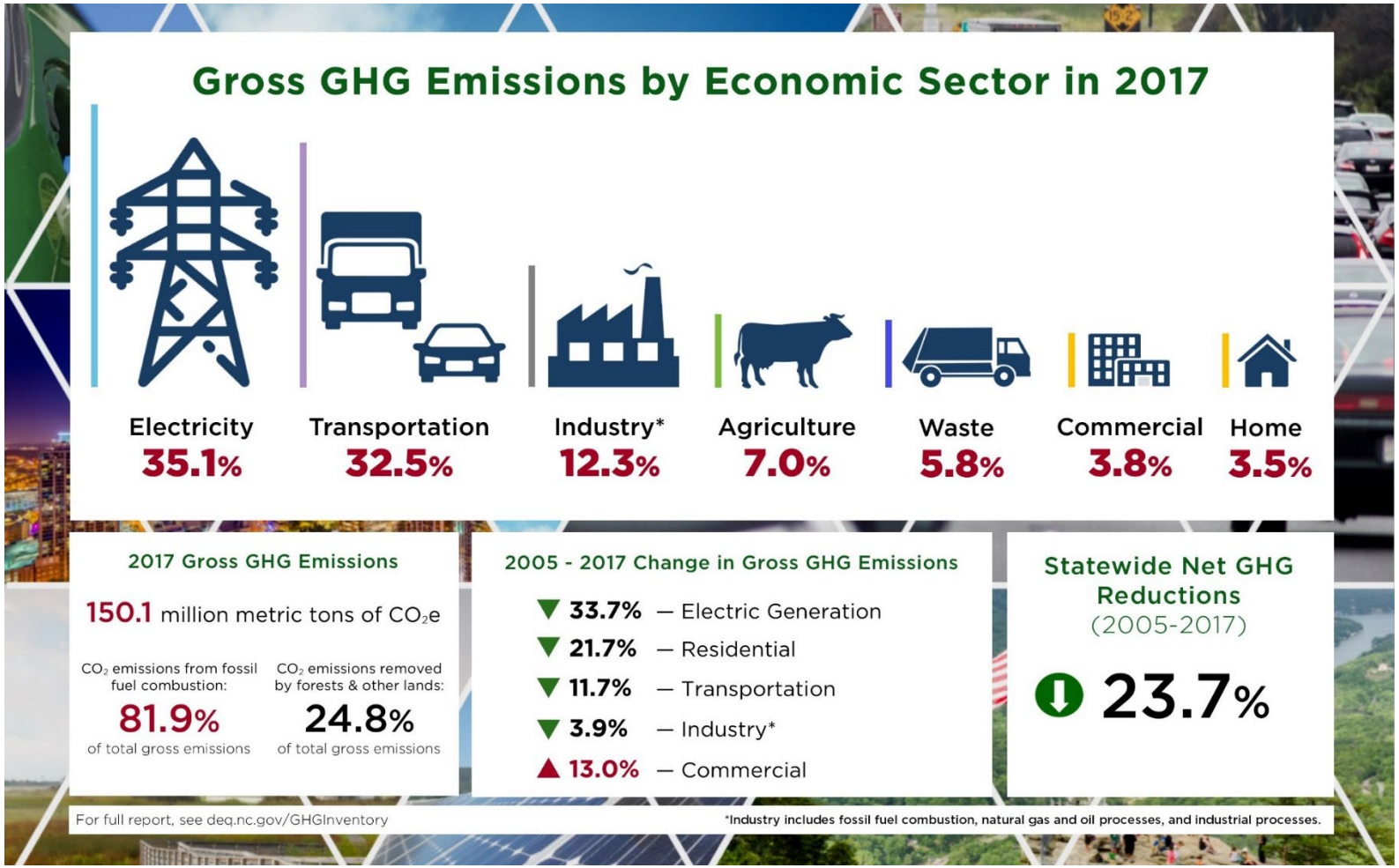
- Prioritize ZEVs in the purchase or lease of new vehicles and use ZEVs for agency business travel when feasible. When ZEV use is not feasible, prioritize cost-effective, low emission alternatives.

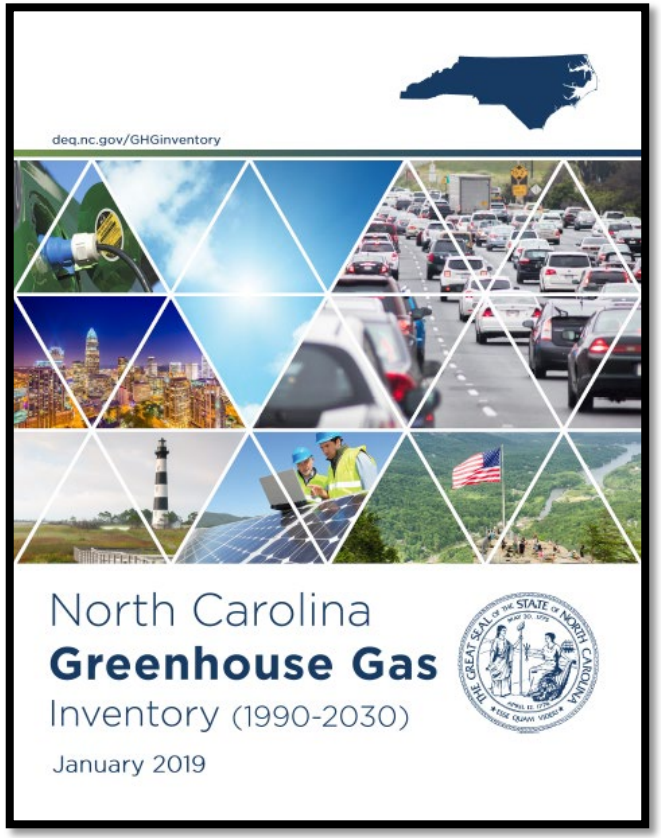
Improve State Building Energy Consumption

North Carolina's Greenhouse Gas Emissions

GHG Inventory Overview

Quick Facts: 2005 - 2017





Full Report

https://files.nc.gov/ncdeq/climate-change/ghg-inventory/GHG-Inventory-Report-FINAL.pdf

North Carolina's GHG Emissions

million metric tons carbon dioxide equivalent ($MMTCO_2e$)

Sector	2005	2017	2025
Electricity Use	79.37	52.60	40.59
Transportation	55.19	48.72	41.00
Residential/Commercial/Industrial Combustion*	26.02	20.92	23.26
Agriculture	10.65	10.53	10.47
Waste Management	8.52	8.77	10.17
Industrial Processes	3.83	7.18	11.31
Natural Gas and Oil Systems	1.17	1.35	1.47
Gross Emissions	**184.74**	**150.08**	**138.28**
Net Carbon Sinks - LULUCF**	-32.66	-34.03	-34.03
Net Emissions	**152.08**	**116.06**	**104.25**
Estimated Reduction in Net Emissions from 2005		23.7%	31.4%

Note: Totals may not equal exact sum of subtotals shown in this table due to independent rounding.
* Emissions associated with on-site fuel combustion activities in the Residential, Commercial, and Industrial sectors.
** Land Use, Land Use Changes and Forestry

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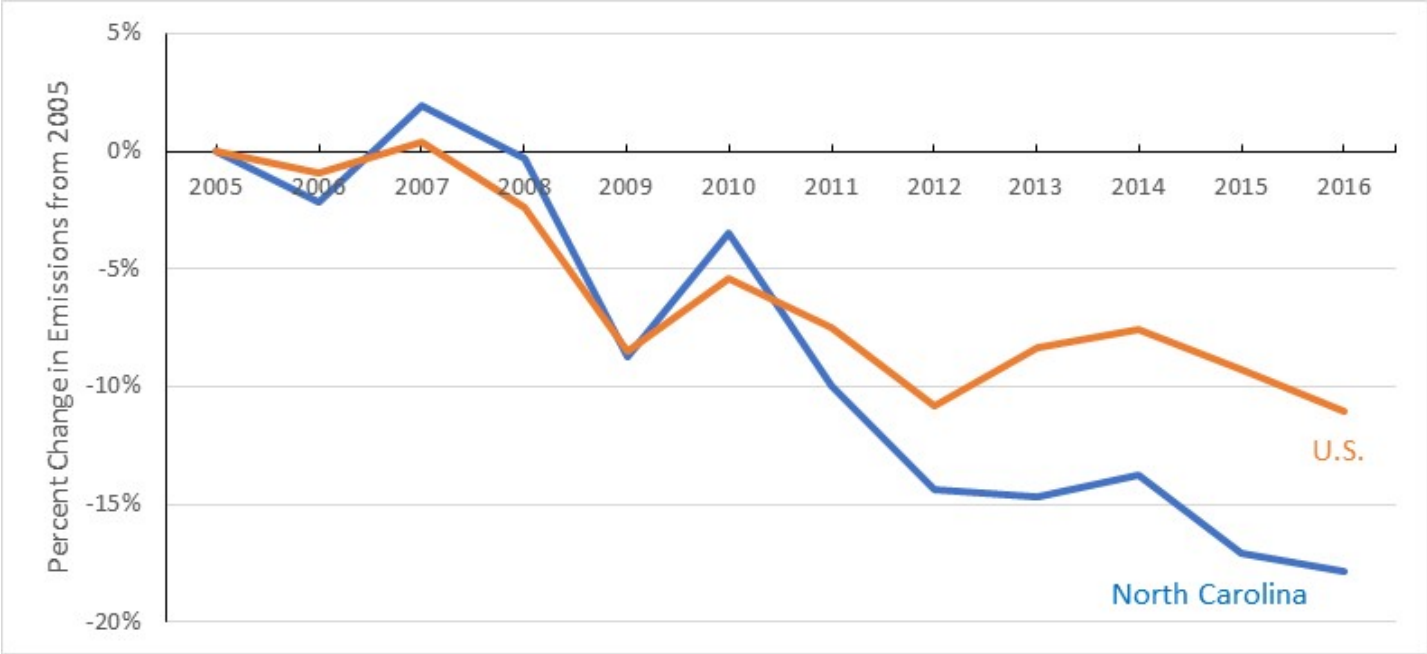
Trends in GHG Emissions Decrease (% Relative to 2005)



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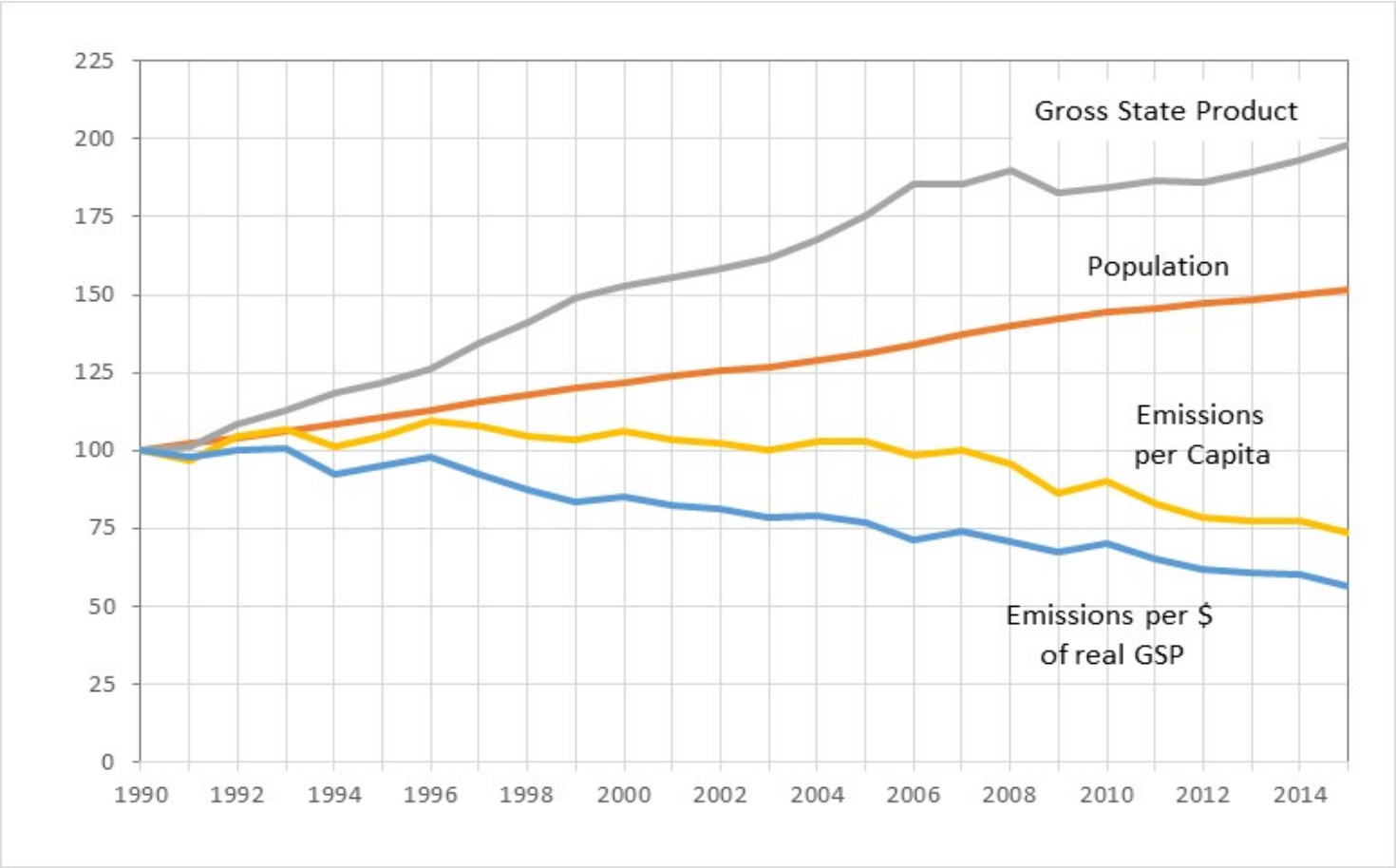
NC's Change in Total GHG Emissions Per Capita and Per Dollar of State Gross Product



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U.S. Non-Federal Entities with GHG Targets

	Number of Entities	Population and Percent of U.S. Population (2016)		GDP and Percent of U.S. GDP (2016)		Global Market Capitalization	Emissions and Percent of U.S. emissions (2016)	
States	20	165 million	51%	$10 trillion	54%	-	2.3 Gt CO_2e	35%
Cities	110	51 million	16%	$3.6 trillion	19%	-	0.59 Gt CO_2e	9%
Businesses	1361	-	-	-	-	$25 trillion	1.0 Gt CO_2e	14%
Universities	587	5.1 million	-	-	-	-	27 million tCO_2e	-
Total States & Cities	130	182 million	56%	$11.2 trillion	60%	-	2.6 Gt	39%

America's Pledge, Phase 1 Report, States, Cities, and Businesses in the United States Are Stepping Up on Climate Action, Bloomberg Philanthropies, November 2017, www.americaspledge.com https://www.bbhub.io/dotorg/sites/28/2017/11/AmericasPledgePhaseOneReportWeb.pdf

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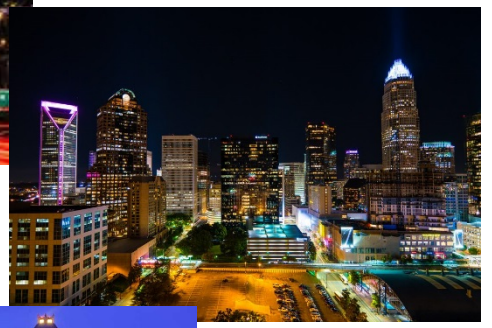
Example NC Cities with GHG Reduction Plans

- Asheville*
- Charlotte*
- Durham*
- Winston-Salem*
- Raleigh
- Greensboro
- Winston-Salem
- Fayetteville
- Cary
- Wilmington
- High Point
- Burlington
- Chapel Hill
- Davidson
- New Bern
- Greenville
- Concord
- Boone
- Kinston

- Beaufort
- Black Mountain
- Brevard
- Carrboro
- Cherryville
- Chimney Rock
- Clyde
- Dunn
- Flat Rock
- Gastonia
- Highlands
- Indian Trail
- Kings Mountain
- Lewisville
- Lincolnton
- Oak City
- Pilot Mountain
- Pleasant Garden



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Example NC Universities with GHG Reduction Plans

Example NC Businesses with GHG Commitments

- Adam Shay, CPA
- Adzerk
- Appalachian Ski Mtn. Inc.
- Arjuna Capital
- AstraPoint Enterprises
- Atlas Principals LLC
- Big Path Capital
- Carolina Biodiesel, LLC
- Earth Equity Advisors
- Epic Capital Wealth Management
- Fiberactive Organics, LLC
- Gaia Herbs
- HydroCycle Engineering
- Ingersoll Rand
- Innovative Solar Systems
- JB Adams Jr. and Associates
- Jeremy Dean Lambert Photography
- JouleBug
- Kate Stockman Designs
- Law++
- Naughton Braun
- PLC Repair
- Sealed Air Corporation
- SJF Ventures
- Southern Energy Management
- Spotlight Solar
- Sustainable Furnishings Council
- The Change Creation
- The Leland Group
- Unity Digital Agency
- Urban Offsets
- Urban Offsets
- VF Corporation
- Vital Plans
- Volvo Group North America
- Wrangler
- Sealed Air Corp.
- Seventh Generation, Inc.
- Level 3 Communications

THE COLLIDER
Market-Driven Climate Solutions

Google

Bank of America

amazon

Walmart

FIFTH THIRD BANK

Schneider Electric

TARGET

IKEA

EATON
Powering Business Worldwide

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Few Global Businesses with GHG Commitments

240 companies in the 2016 *Fortune* 500 had climate-related goals

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.

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Example NC Businesses with GHG Commitments

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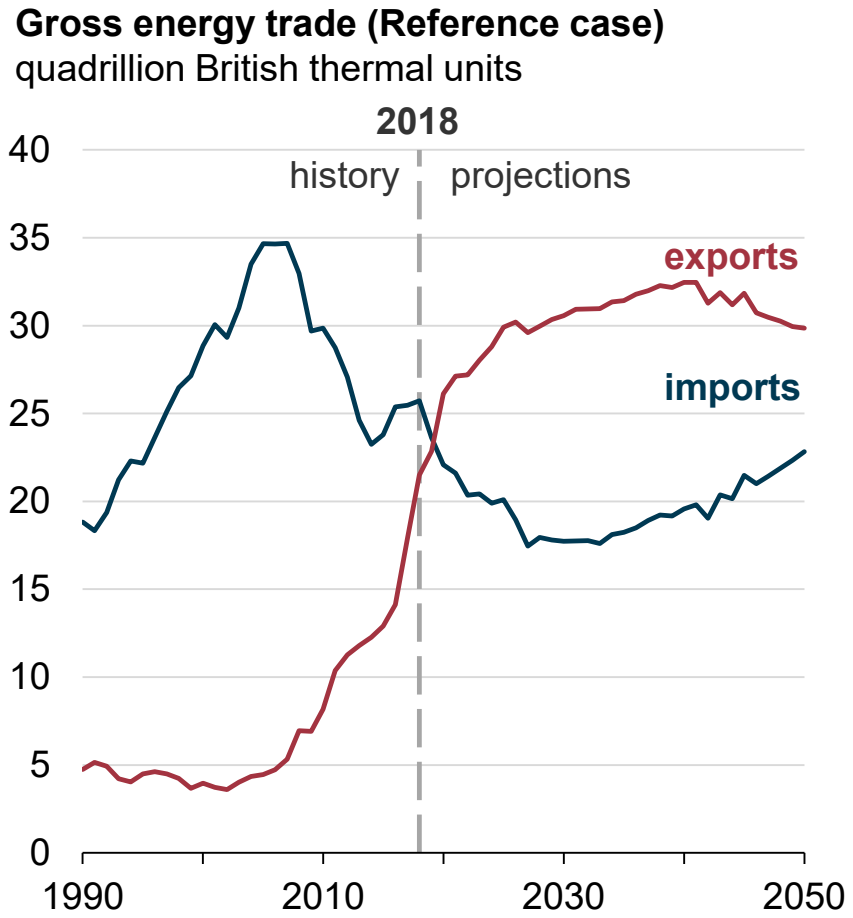
Electricity Sector Profile

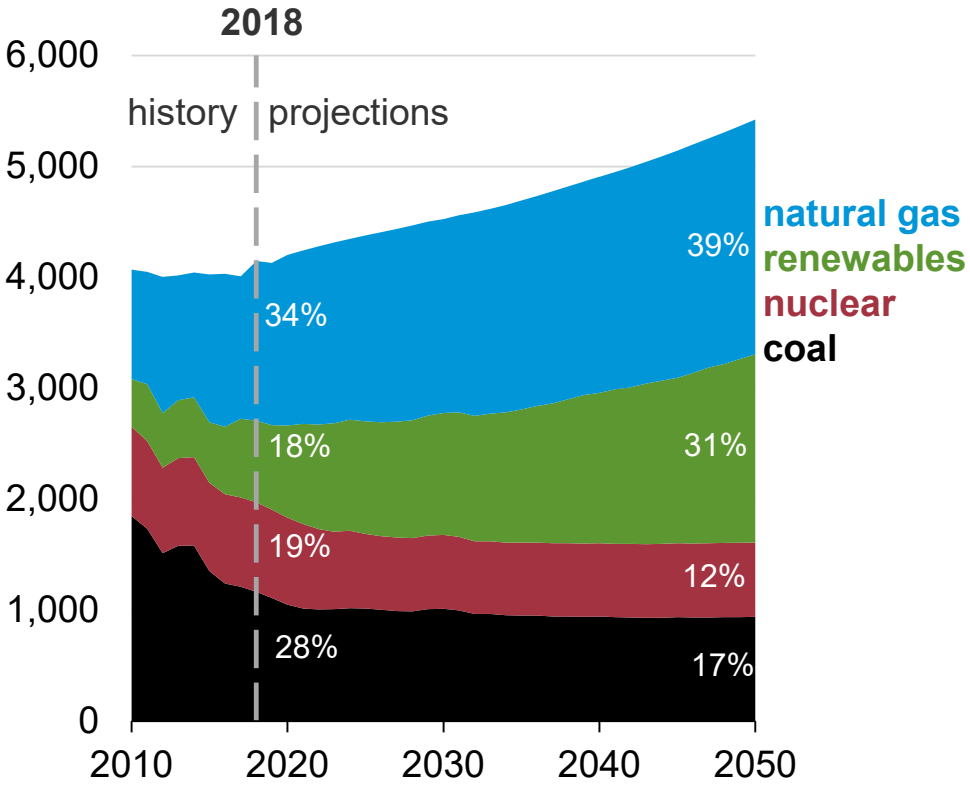
The United States becomes a net energy exporter after 2020 in the Reference case—



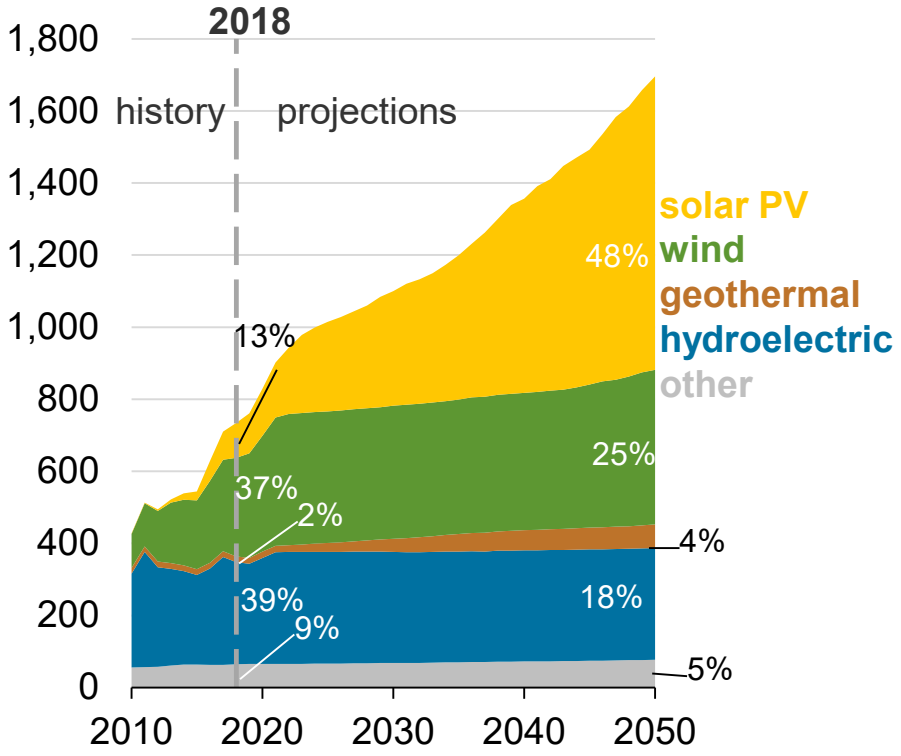
AEO (Annual Energy Outlook) 2019
www.eia.gov/aeo

Electricity generation from natural gas and renewables increases, and the shares of nuclear and coal generation decrease—

Electricity generation from selected fuels (Reference case)
billion kilowatthours



Renewable electricity generation, including end-use (Reference case)
billion kilowatthours



AEO 2019
www.eia.gov/aeo

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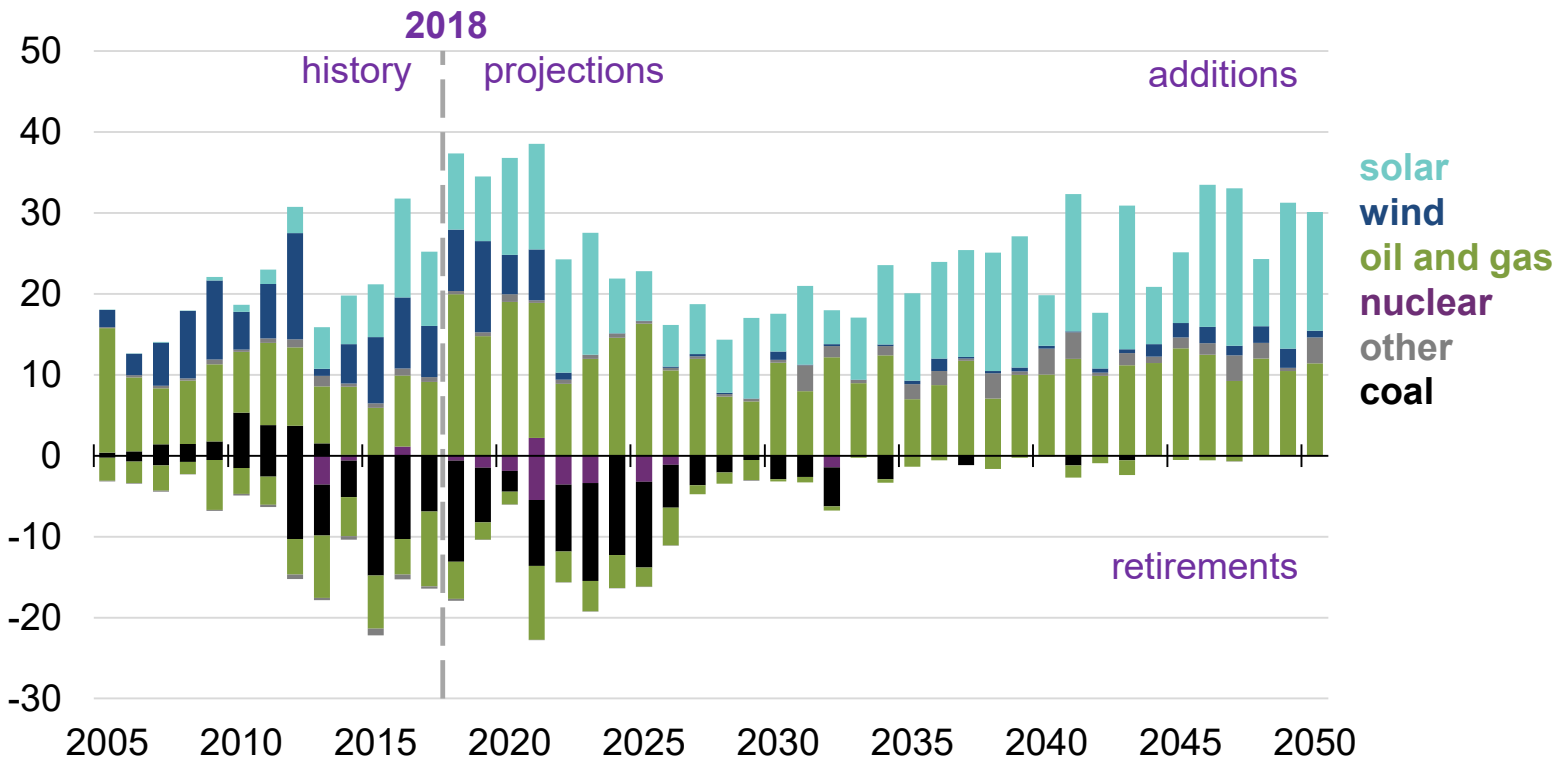
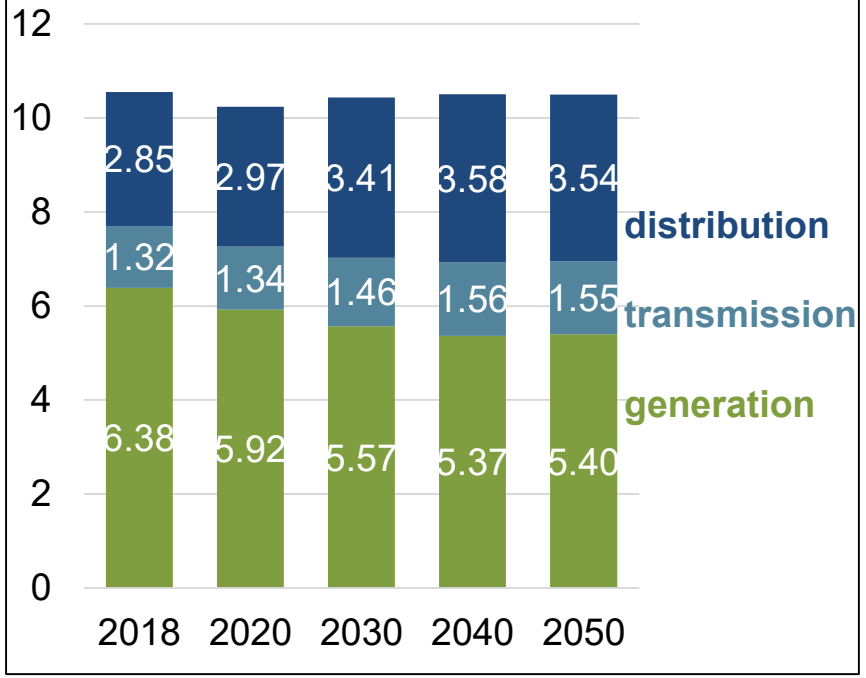
Expected new generating capacity will be met by renewables and natural gas—

Annual electricity generating capacity additions and retirements (Reference case)
gigawatts



AEO 2019
www.eia.gov/aeo

Electricity prices by service category (Reference case)
2018 cents per kilowatthours



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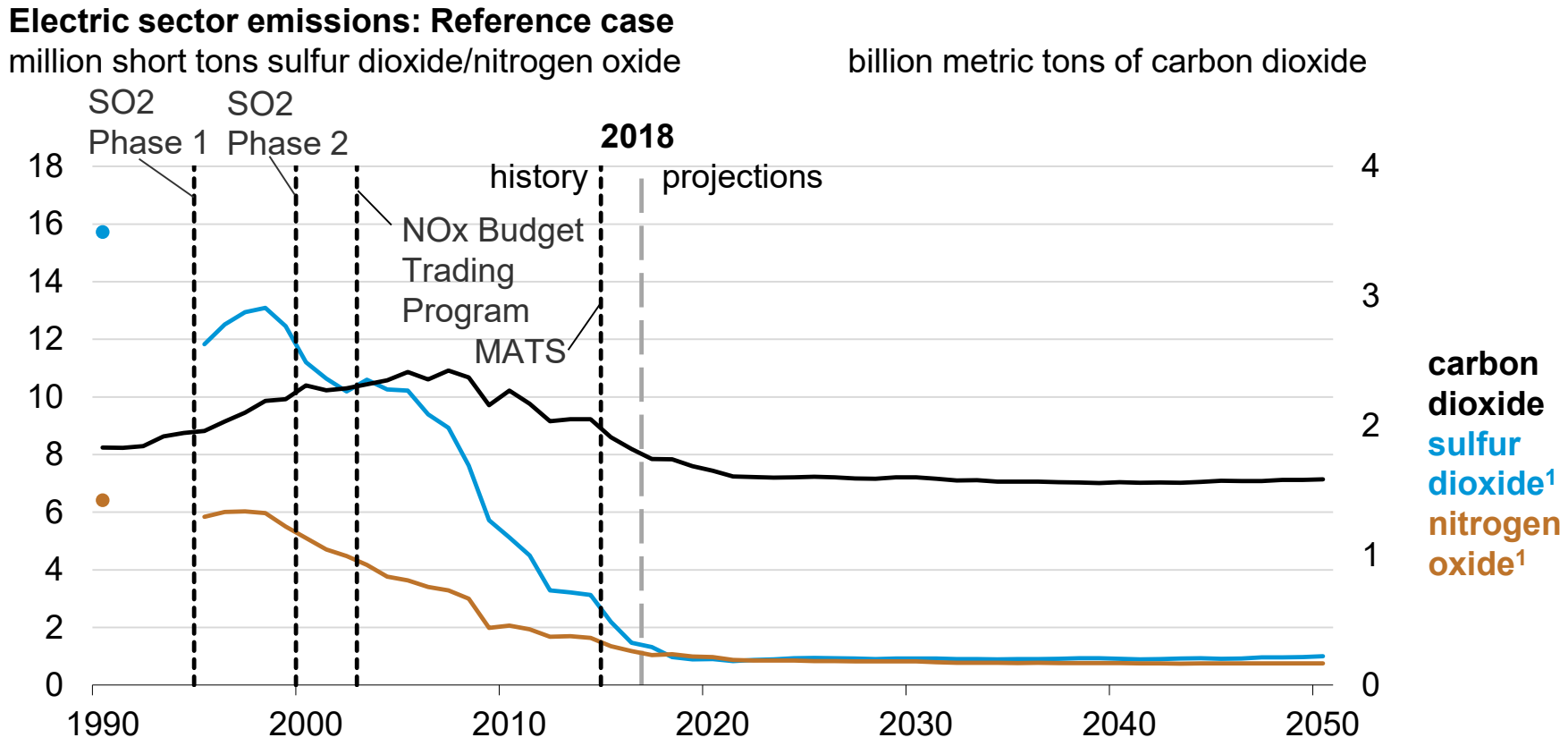
Electric sector emissions in the United States closely track decreasing dependence on coal—



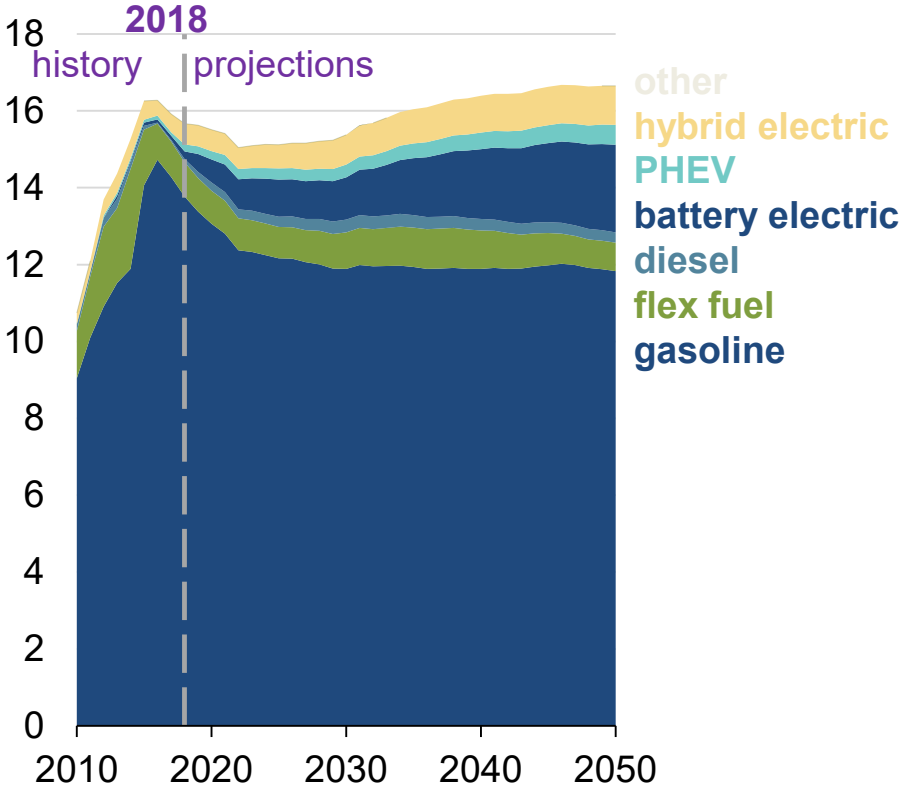
[1]Annual sulfur dioxide and nitrogen oxide data unavailable prior to 1995

AEO 2019
www.eia.gov/aeo

Alternative and electric vehicles gain market share in the Reference case—

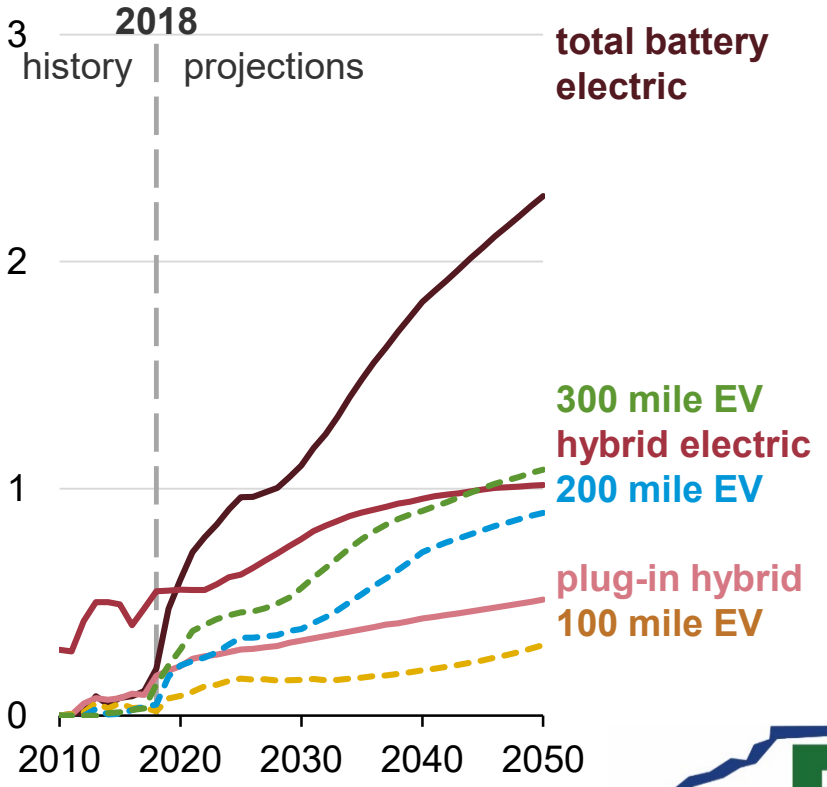
Light-duty vehicle sales by fuel type (Reference case)

millions of vehicles



New vehicle sales of battery powered vehicles (Reference case)

millions of vehicles



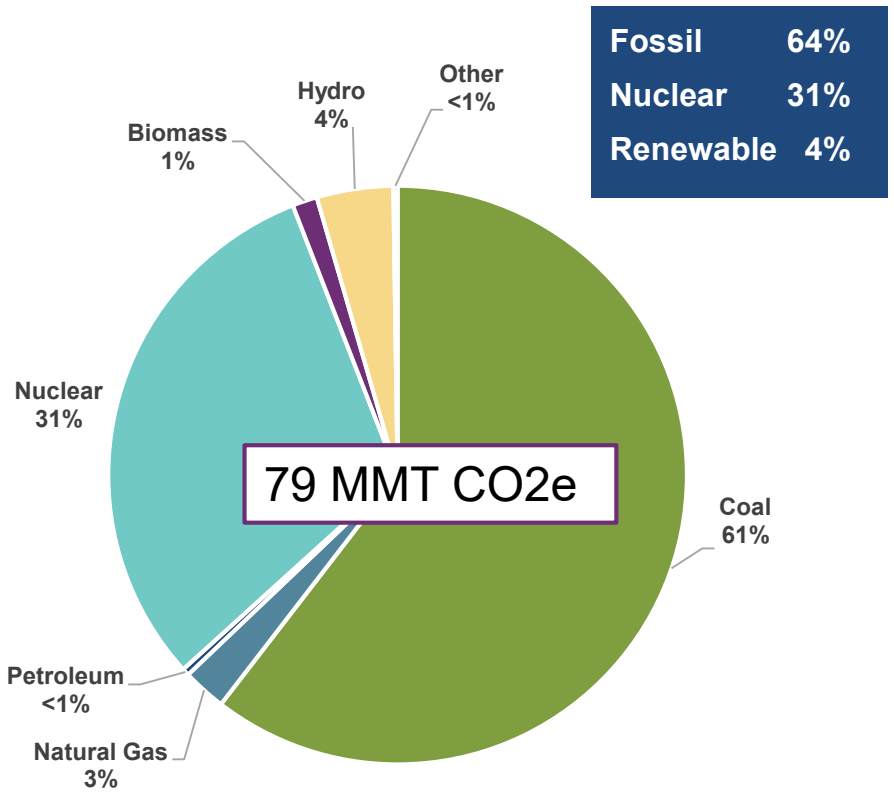
AEO 2019
www.eia.gov/aeo

Electrification of the Transportation Sector

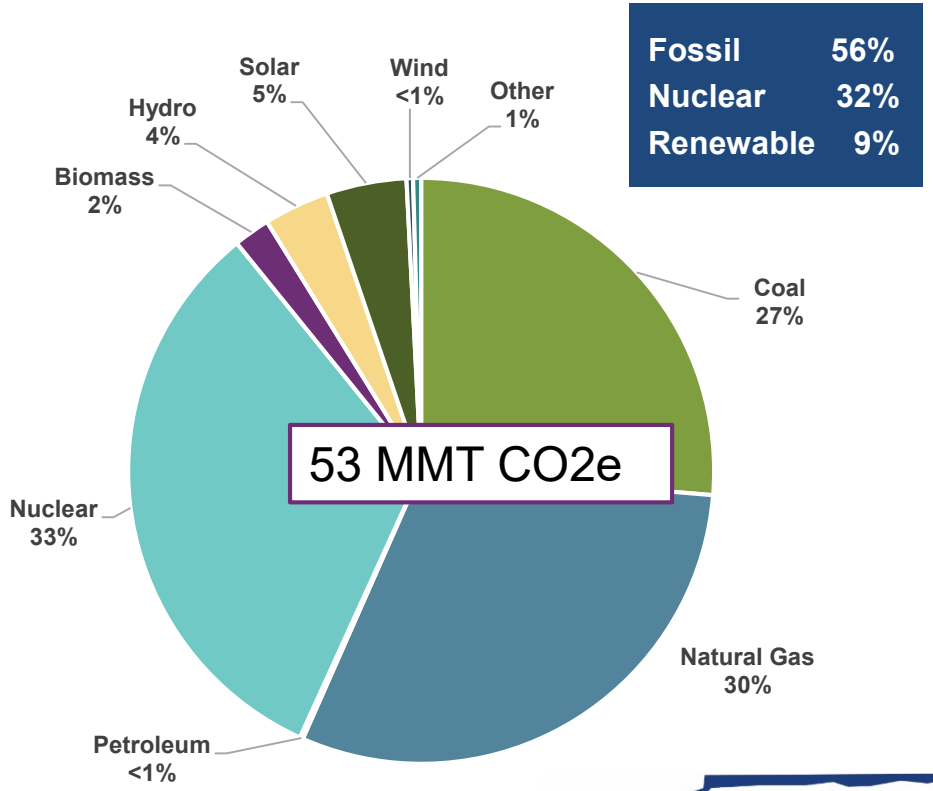
- GM said it plans to phase out gas-powered vehicles for an "all-electric future effort starts with plans for 20 all-electric vehicles by 2023.
- Ford created the EV-dedicated "Team Edison" to focus on the development electric cars. In Jan 2018, the automaker announcement that it will pump $1 into electric vehicles in the next five years, with 24 hybrid and 16 fully electri vehicles to debut by 2022. The company said in 2017 it would spend $4.5 bi EVs by 2020; now it's nearly doubling that commitment."
- Toyota and Mazda recently announced that they're teaming up with auto-parts manufacturer Senso to create a new company to develop basic EV technology for use across multiple vehicle types and models, expanding beyond Toyota's Prius line. The two Japanese carmakers also pledged to build a $1.6 billion U.S.-based plant by 2021, where they'll work on electric and hybrid vehicles.
- Daimler, the parent company of Mercedes-Benz, will invest $1 billion in an Alabama plant to produce all-electric SUVs and build a battery facility, and $10 billion in EV development overall. Mercedes-Benz outlined a plan to electrify its "entire portfolio" by 2022, offering 50 electric and hybrid models.
- The Renault, Nissan, and Mitsubishi alliance will work together to develop new systems to use across their vehicle lines, with a focus on "purely electric" EVs like the Nissan Leaf. The automakers plan to release 12 all-electric models by 2022.
- Jaguar Land Rover (JLR) plans to electrify its entire vehicle lineup by 2020, with new powertrains ranging from mild hybrid vehicles to all-electric systems.
- Volvo will electrify its entire vehicle line by 2019, with five all-electric models slated to roll out from 2019 to 2021. The automaker hopes to sell one million of the electric and hybrid cars by 2025.
- VW Group, parent of European automakers like Volkswagen, Audi, and Porsche, will invest $84 billion in EV development. Roughly $60 billion of the total will be dedicated to battery production, but the company also plans to offer electric and hybrid versions of 300 vehicles by 2030.
- "Nissan, one of the earliest electric proponents, announced Infiniti will launch its first EV in 2021, and says half of the luxury brand's 2025 global sales will be electrified."

North Carolina Electricity Generation By Source Type (2005 & 2017)

2005 Electricity Generation



2017 Electricity Generation



NC Imports about 10% of its electricity each year

Source: NC GHG Inventory, 2019

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North Carolina's Ranking Nationally

	Ranking
Total Energy Production (trillion Btu)	29th
Total Net Electricity Generation (thousand MWh)	6th
Total Carbon Dioxide Emissions (million metric tons)	14th
Total Energy Expenditures per Capita, ($)	45th
Average Retail Price of Electricity to Residential Sector, January 2018 (cents/kWh)	42nd

https://www.eia.gov/state/rankings/?sid= #/series/31

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North Carolina

Clean Energy Plan Development

Process Plan

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EO80 DEQ Directive

- Develop a North Carolina Clean Energy Plan that fosters and encourages:
  - Utilization of clean energy resources and innovative technologies, and
  - Integration of these resources to facilitate the development of a modern and resilient electric grid.
- Collaborate with stakeholders to increase the utilization of clean energy technologies, energy efficiency measures, and clean transportation solutions.
- Submit the plan to the Governor by October 1, 2019.

Clean Energy Plan Development Process

- Open and inclusive stakeholder driven process
- General Description of Approach
  1. Vision building and assessing current landscape for clean energy resources in NC
  2. Examine evolving and changing landscape in the power sector
  3. Develop policy, regulatory, administrative, and program recommendations to achieve the vision

Clean Energy Plan Development Process

- **Stakeholder Process**

Method 1. Six Facilitated Workshops, Raleigh

- Technical guidance and facilitation provided by Regulatory Assistance Project (RAP) and Rocky Mountain Institute (RMI)
- Limited seating to accommodate diverse stakeholder participation
- Request to Participate form required

Method 2. Regional Listening Sessions

Charlotte	Asheville
Rocky Mount	Wilmington
Hickory	Fayetteville
Elizabeth City	Wilmington
Greensboro	

Method 3. Combined with Other Statewide Events

Method 4. Online Input

- **Technical analysis**
  - NC energy landscape (current and future)
  - NC energy resources (current and future)
  - Environmental profile (current and future)
  - Use of predictive energy modeling
    - Natural Resources Defense Council
    - Resources for the Future
    - NCSU
    - EPA
- **Action areas**
  - Recommendations on policies, regulatory changes, administrative actions, incentives, etc.

Dates and locations posted at https://deq.nc.gov/cleanenergy

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Method 1: Facilitated Workshops

Workshop #1 & #2 : Vision Building and Current Landscape

What is NC's vision of a clean energy future, how different is it from the current direction, and how well do current policies, regulatory and business practices help achieve that vision?

- Stakeholders discuss NC's current energy direction and changing landscape; vision for a clean energy future; current policies, regulatory and business practices; and the ability of current policies/laws/practices to achieve the vision.
- Stakeholders share views and prioritize ideas.

Milestones:

- Stakeholders learn and share perspectives on their vision of a clean energy future how well the current system works through facilitated discussion.
- Stakeholders share their positions on issues; elements of agreement and disagreement are identified

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NC CEP - Status

- May 22 - 4th of 6 workshops in Raleigh
- May 12 - Final Regional Listening Session in Greensboro
- Comments received from >400 stakeholders – many common themes

ESI member feedback (forms passed out):

1. What is your level of agreement with statements related to NC's electricity system as it is now?

- 6 questions
- Disagree, Somewhat Agree, Agree or Strongly Agree

2. What do you and/or your organization see as the most important values for the electricity system to uphold and promote going forward? Please select top 3 values from the entire table.

Thank you.

Questions?

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Department of Environmental Quality