NC Clean Energy Plan – One Year Later

September 23, 2020

NCMA 2020 Air Quality Compliance and Permitting Workshop

Lori Collins, NC DEQ

Topics Covered

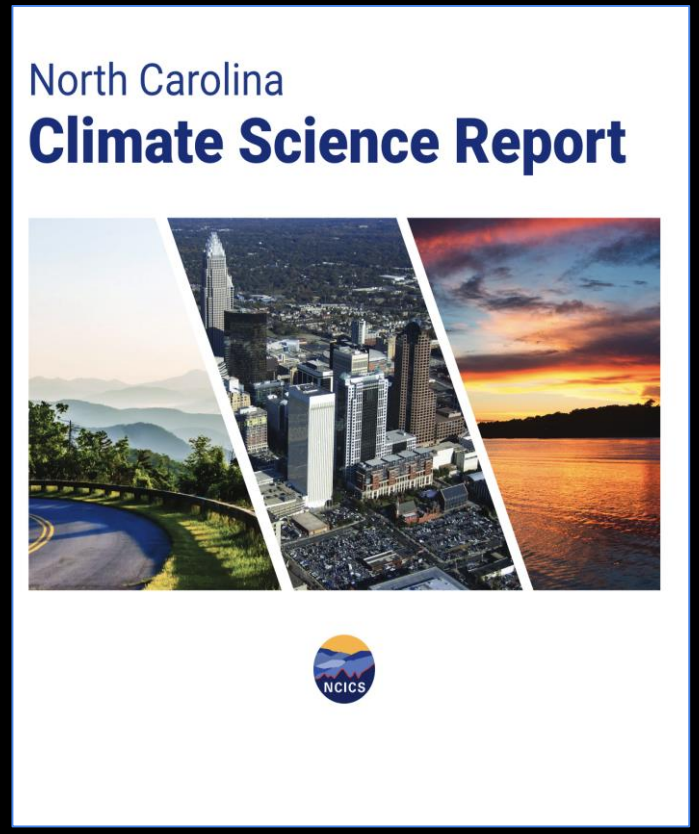
1. Overview of the Clean Energy Plan recommendations
2. Update on Carbon and Clean Energy Policy Design recommendation
3. Update on Energy Regulatory Process recommendation
4. Update on Energy Resiliency recommendation

Executive Order No. 80
North Carolina's Commitment to Address Climate Change and Transition to a Clean Energy Economy

Goals for NC to accomplish by 2025

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

NC Climate Science Report



- ☑ Global State of the Science
- ☑ Historical Changes in NC
- ☑ Projections for NC

Source: North Carolina Climate Science Report, https://ncics.org/nccsr

Report Findings

"Large changes in **North Carolina's climate**

— much larger than at any time in the state's history —

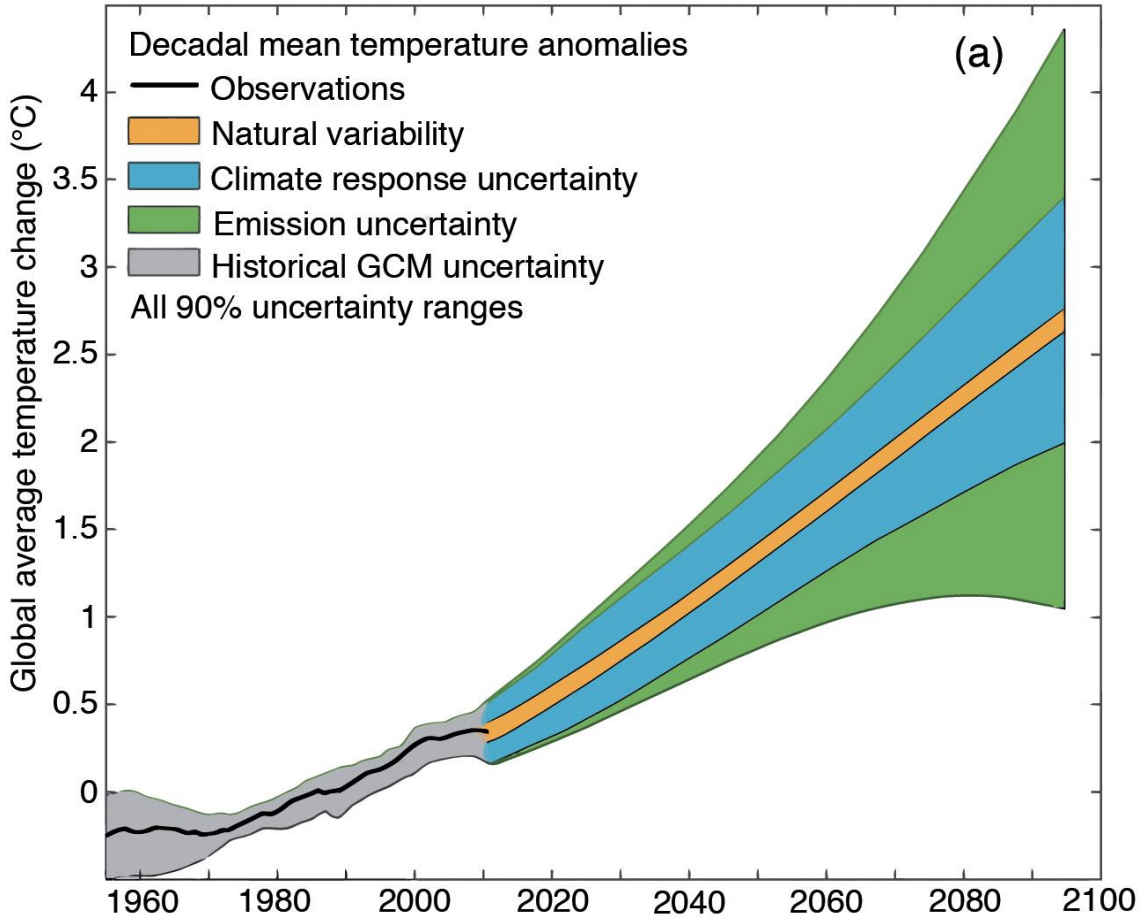
are ***very likely*** by the end of this century under both the lower and higher scenarios."

Definitions for Upcoming Slides

Virtually certain	99–100% probability of outcome
Very likely	90–100% probability of outcome
Likely	66–100% probability of outcome
Low confidence	inconclusive evidence, disagreement, or lack of expert opinions

Future global warming

- Most uncertainty comes from future greenhouse gas emissions

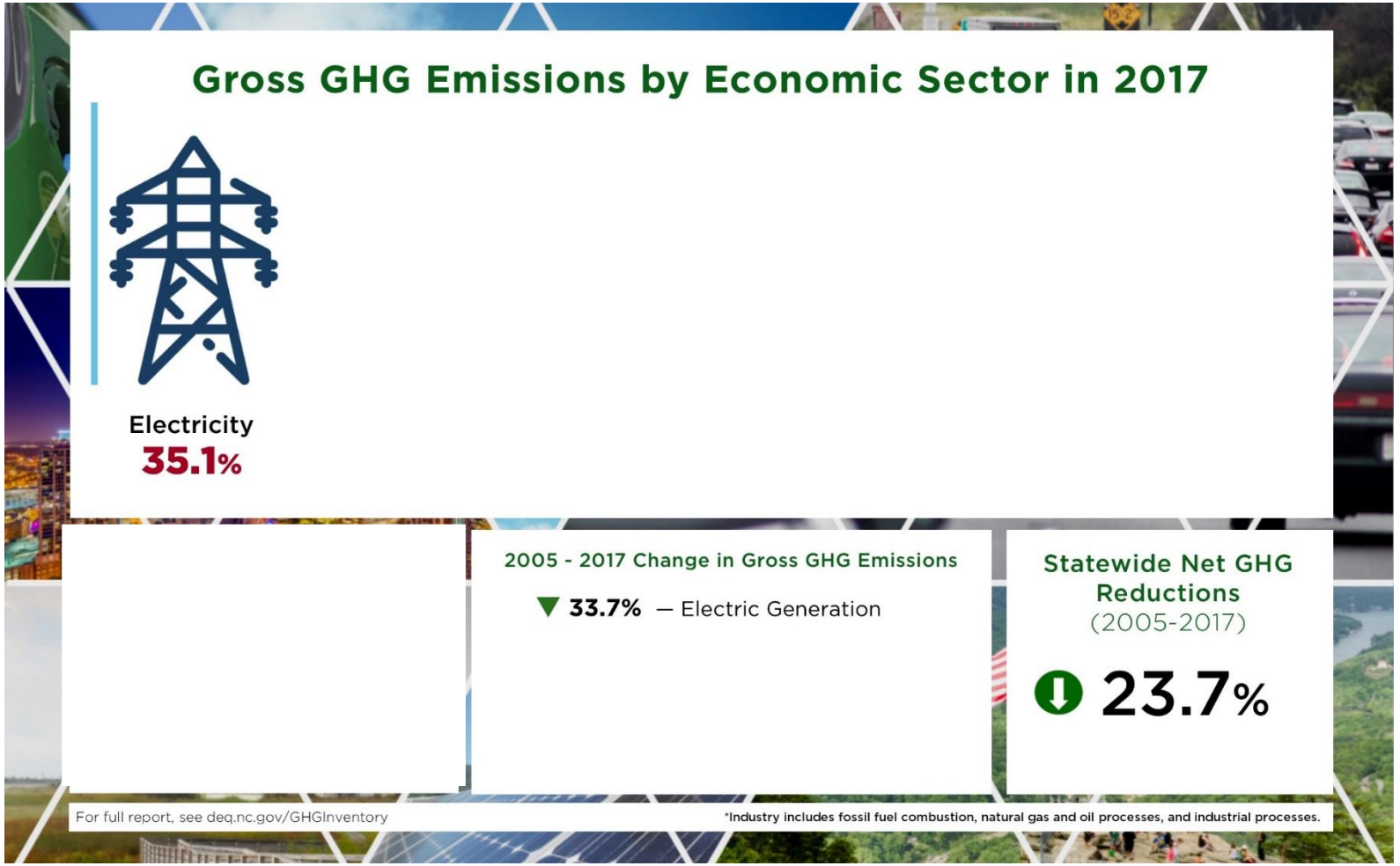


https://www.ipcc.ch/report/ar5/wg1/

Courtesy Dr. Walter Robinson, NCSU

Quick Facts

2005- 2017
North Carolina Greenhouse Gas (GHG) Inventory



Avoided Generation & Emissions from NC REPS

Parameter	2017	with HB 589*
RE Net Generation (MWh)	10,970,000	15,500,000
EE Avoided Generation (MWh)	4,797,944	4,797,944
Avoided GHGs (MMT CO2e)	5.79	7.47

10% of Electricity Sector GHG

* Estimate of generation and avoided emissions resulting from full implementation of HB 589

7

NC Clean Energy Plan - Process and Outcome

Stakeholder Process

Method 1. Six Facilitated Workshops, Raleigh
Method 2. Nine Regional Listening Sessions

Charlotte	Asheville
Rocky Mount	Wilmington
Hickory	Fayetteville
Elizabeth City	Wilmington
Greensboro	

Method 3. Outreach through other events
Method 4. Online input

800+ participants

Stakeholder's Vision for NC's Energy Future

A system that is clean, affordable, equitable, reliable, resilient, and efficient.

Core Values to Uphold

- Significant and timely decline in greenhouse gas emissions
- Affordable electricity rates
- Grid reliability
- Expanded clean energy resources and job growth
- Equity and environmental justice considerations

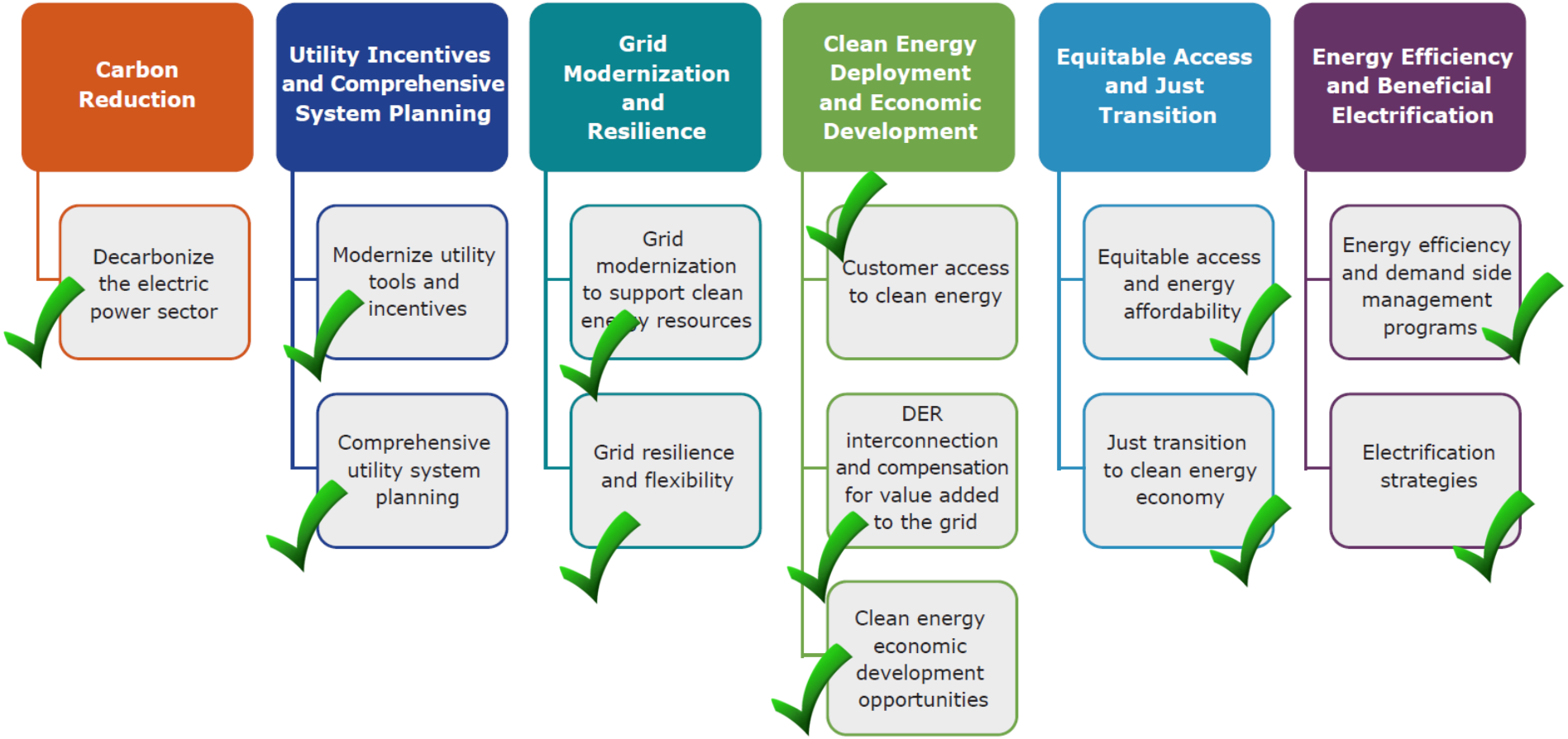
NC Clean Energy Plan - Recommendations

Goals:

48% of Fortune 500 companies set carbon reduction targets and energy efficiency goals.

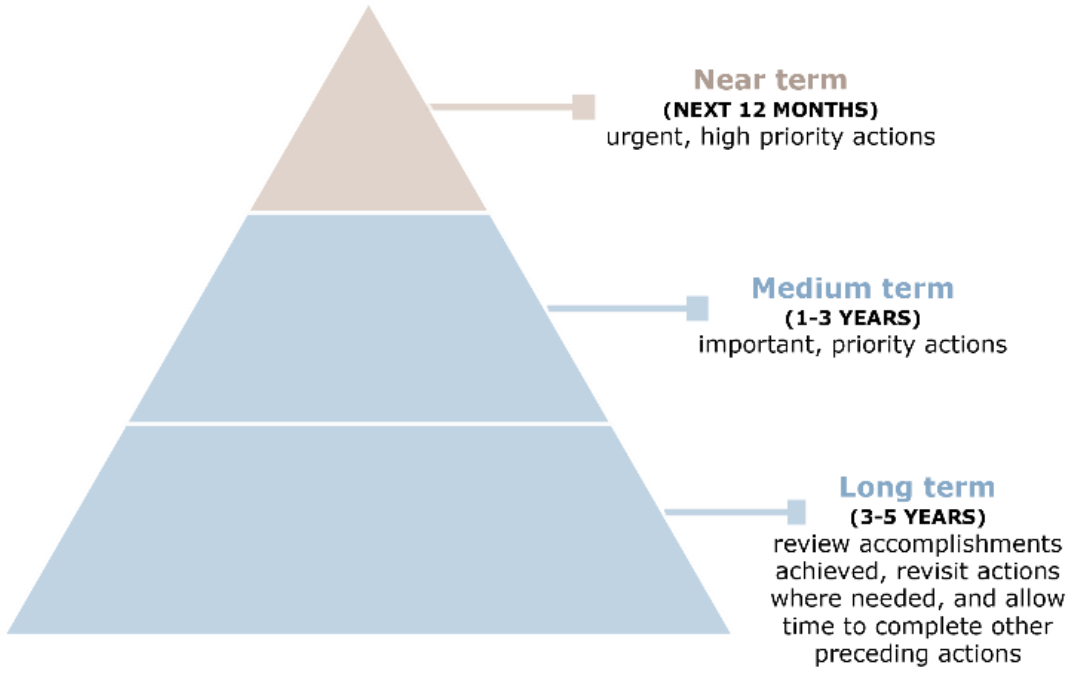
23% of Fortune 500 companies have made a public commitment that they will be carbon neutral by 2030.

Clean Energy Plan Recommendation Areas



NC Clean Energy Plan - Implementation

Action Schedule



Action Takers

Governor's Office	NC Utilities Commission	Legislature
State Agencies	Investor-owned utilities	Co-ops and Public Utilities
Local Governments	Private business and industry	Academia and non-profits

NC Clean Energy Plan - Key Recommendations

Establish a 21st century regulatory model that incentivizes business decisions that benefit both the utilities and the public in creating an energy system that is **clean, affordable, reliable, and equitable**.

1. Develop carbon reduction policy designs for accelerated retirement of uneconomic coal assets and other market-based and clean energy policy options.
2. Develop and implement policies and tools such as performance-based mechanisms, multiyear rate planning, and revenue decoupling, that better align utility incentives with public interest, grid needs, and state policy.
3. Modernize the grid to support clean energy resource adoption, resilience, and other public interest outcomes.

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A-1: Carbon and Clean Energy Policy Designs

- **Goal**
  - Deliver a carbon and clean energy policy design report to the Governor by December 31, 2020
  - Achieve 70% GHG reductions by 2030 and carbon neutrality by 2050 for the electric power sector.
- **Carbon Policy Pathways**
  1. Coal Retirements/Alternative Base Case
     - Subcritical and Supercritical units
  2. Market Based: Carbon Market
     - Carbon cap, allowances, trading
  3. Market Based: Carbon Price Adder
     - Shadow price used in utility planning and/or dispatch
  4. Clean Energy Standard
     - Technology-neutral target and timeline
- **CEP Core Values and the Role of Modeling**
  - GHG reductions
  - Affordability
  - Grid reliability
  - Expanded clean energy resources
  - Compliance flexibility
  - Equity
- **Engagement Types**
  - Stakeholder meetings (12/9, 2/19, 5/28, 8/26)
  - Policy Workgroups (8+ mtgs)
  - Technical Modeling Workgroup (3+ mtgs)

Duke NICHOLAS INSTITUTE FOR ENVIRONMENTAL POLICY SOLUTIONS Celebrating 10 Years

UNC CENTER FOR CLIMATE, ENERGY, ENVIRONMENT AND ECONOMICS

Utilities
- Duke Energy
- Dominion Energy
- Fayetteville PWC
- NC Electric Membership Cooperatives
- ElectriCities
- Roanoke Electric Cooperative

Businesses
- Vote Solar
- Ceres
- NCCEBA
- NC Sustainable Energy Association
- Abundant Power
- Southeast Wind Coalition
- Ingersoll Rand/EPC EE Committee Chair
- Research Triangle Cleantech Cluster
- Google
- NC Retail Merchants Association
- SAS

Ratepayer Advocates
- Appalachian Voices
- Carolina Utility Customers Association
- Durham Chamber of Commerce
- Climate Reality Project
- DEQ Environmental Justice Board
- Chambers for Innovation and Clean Energy
- NC Justice Center
- Sol Nation
- Alliance for Climate Education

Industry Groups
- NCMA
- NC Pork Council
- NC Farm Bureau
- CIGFUR
- CUCA

NGOs
- Environmental Defense Fund
- Southern Environmental Law Center
- Natural Resources Defense Council
- North Carolina Conservation Network
- NC WARN
- Sierra Club

University/Institutional
- NC Clean Energy Technology Center
- Advanced Energy
- UNC School of Law
- UNC-Charlotte EPIC
- Appalachian State University
- Duke University

Government
- NC Utilities Commission
- Public Staff - NC Utilities Commission
- County of Durham
- City of Charlotte

Many additional organizations contributing since Jan.

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B-1: NC Energy Regulatory Process (NERP)

Purpose

Produce recommendations for policy and regulatory changes that can be delivered by the participants to the NC General Assembly, NC Governor, NC Utilities Commission, and other entities as appropriate.

Objectives

1. Examine alternatives to the traditional utility regulatory model and incentives, carbon reduction policies, and as needed, energy market reforms identified by stakeholder group
2. Produce specific policy proposals that participants can work to implement

Engagements

Workshops (5 completed)
Educational webinars
Three Study Groups (meetings on going)

Category	Name	Organization
State Government (9)	Sushma Masemore	NC DEQ
	Steve McDowell	NCUC
	Christopher Ayers	NCUC Public Staff
	Dianna Downey (designee)	
	Senator Mike Woodard	NC Legislature
	Carol Resar (designee)	
	Representative John Szoka	NC Legislature
	Marshall Conrad (designee)	
	Represenative Robert Reives	NC Legislature
	Jamar McCarthy (designee)	
	Jeremy Tarr	NC Governor's Office
	Munashe Magarira	NC Attorney General's Office
Regulated Utilities (5)	Peter Toomey	Duke Energy
	Mark McIntire	
	Diane Denton	
	Laura Bateman	
	Sarah Cosby	Dominion North Carolina Power
Other Utilities (3)	Charlie Bayless	North Carolina Electric Cooperatives
	Drew Elliot	ElectriCities of North Carolina
Local Government Representation (3)	Katie Riddle	City of Charlotte
	Sarah Collins	NC League of Municipalities
	Tobin Freid	Durham County
	Peter Daniel, Jr.	NC Chamber of Commerce
	Stewart Leeth	Smithfield Foods
	Elizabeth Robinson	NC Retail Merchants Association
	Rory McIlmoil	Appalachian Voices
	Preston Howard	NC Manufacturers Association
	Kevin Martin	Carolina Utility Customer Association
Clean Energy Industry (3)	Chris Carmody	NC CEBA
	Peter Ledford	NCSEA
	Katherine Ross	Parker Poe
Environmental Justice Groups (3)	EJE Board Representative	DEQ Environmental Justice & Equity (EJE) Board
	Rory McIlmoil	Appalachian Voices
	Alfred (Al) Ripley	NC Justice Center
Environmental Groups (5)	Dionne Delli-Gatti	Environmental Defense Fund
	Gudrun Thompson	Southern Environmental Law Center
	Will Scott	NC Conservation Network
	Sally Robertson	NC WARN
	David Rogers	Sierra Club
Universities (2)	Kate Konschnik	Duke University Nicholas Institute
	Stephen Kalland	NC Clean Tech Center

NERP Guiding Outcomes

Annotated votes selected the following as the Top 3 NERP Guiding Outcomes

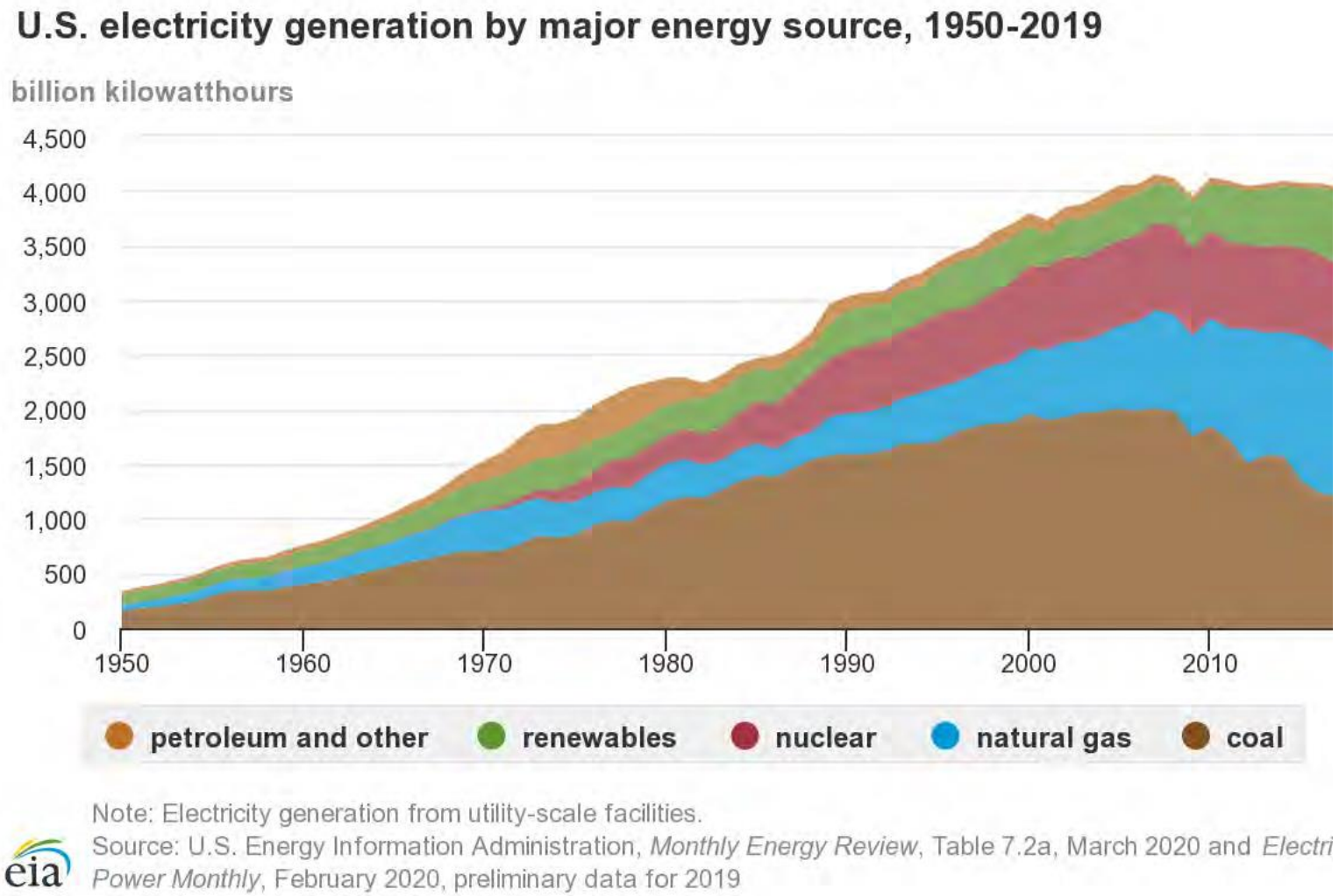
1. Carbon neutral by 2050 (13 votes)
2. Affordability and bill stability (10 votes)
3. Regulatory incentives aligned with cost control and policy goals (8 votes)

Outcome Category	Outcome
Improve customer value	Affordability and bill stability
	Reliability
	Customer choice of energy sources and programs
	Customer equity
Improve utility regulation	Regulatory incentives aligned with cost control and policy goals
	Administrative efficiency
Improve environmental quality	Integration of DERs
	Carbon neutral by 2050
Conduct a quality stakeholder process	Inclusive
	Results oriented

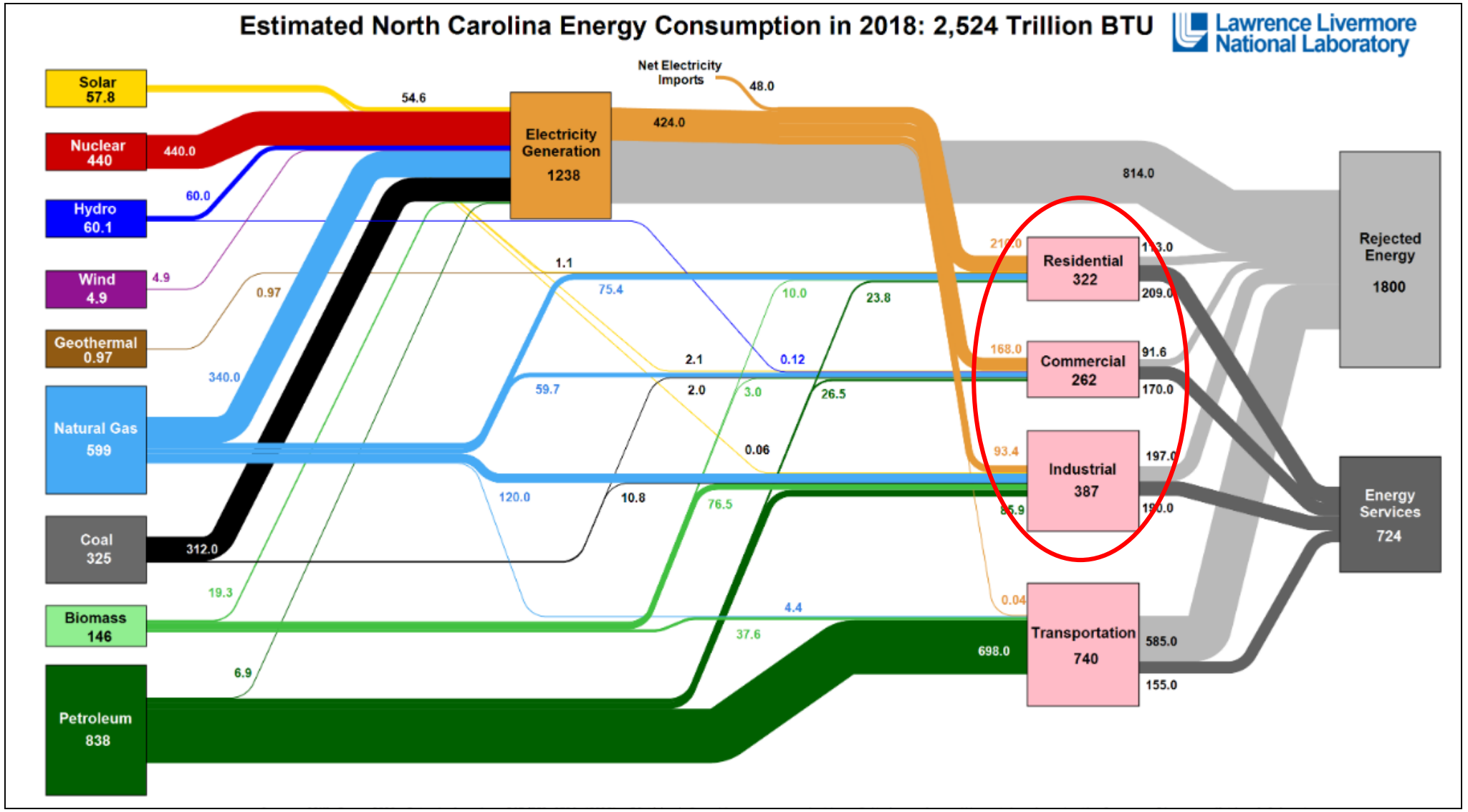
Utility Regulatory Policies Being Evaluated

- Ex. Performance Based Ratemaking (PBR)
- Wholesale Markets
- Options for Retiring Uneconomic Assets
- All Source Competitive Procurement

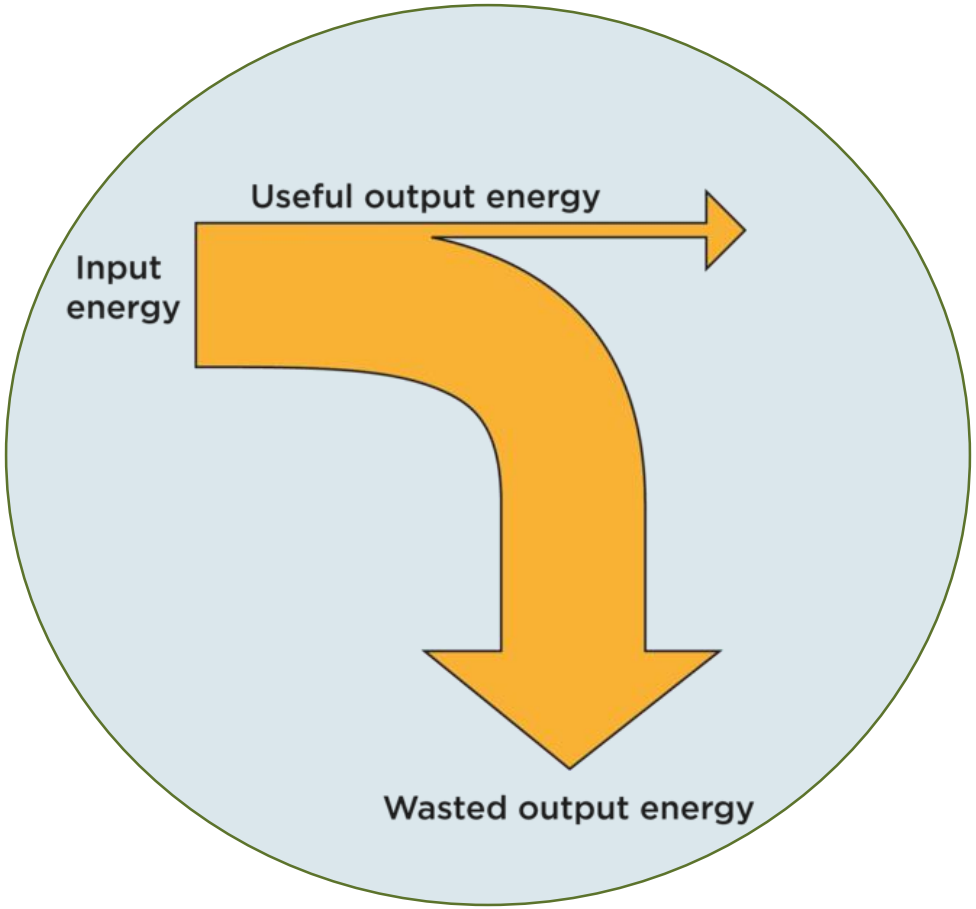
Electricity Generation is Declining.



The Really Big Picture: Significant Energy is Wasted.



Why focus on Demand Side Management?
Energy Efficiency + Demand Response



- Lean Principles
  Make more with less
- Reduce energy intensity
  LESS MMBTU/ton
  LESS MMBTU/widget
- Save on energy purchases (kWh)
  - $/yr
  - $/widget

Energy Efficiency ⟷ Technology Solutions

- Use less (kW) during peak periods
- Shift usage
- Save on demand charges

Demand Response ⟷ Time Based Rates / Other Financial Incentives

PBR Example: What Problem is Revenue Decoupling Solving?

- Targets the throughput incentive (kWh sold)
- Breaks the link between the amount of energy a utility delivers to customers and the revenue it collects
- Utilities no longer have a disincentive to invest in solutions that decrease sales

Requires Performance Incentive Mechanisms (PIMS) to Benefit Customers

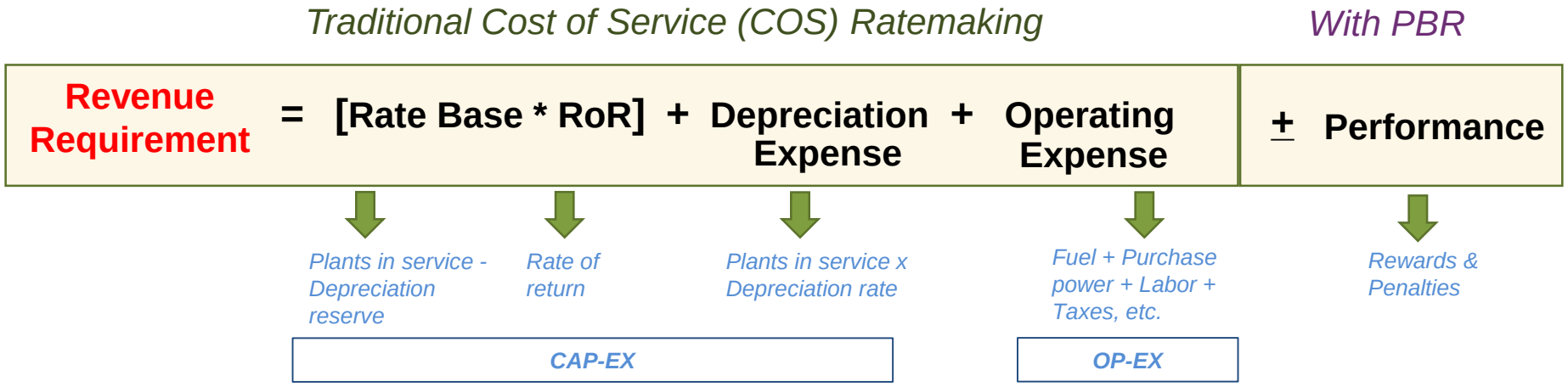
Energy Efficiency PIM

- Creates true incentives for customer savings to be increased
- Reduces need for generation assets
- Use less/pay less….Use more/pay more

Demand Response PIM

- Creates flexible grid operation by reducing or shifting electricity usage during peak periods
- Reduces need for peak serving generation assets
- Reduces overall cost of the integrated system

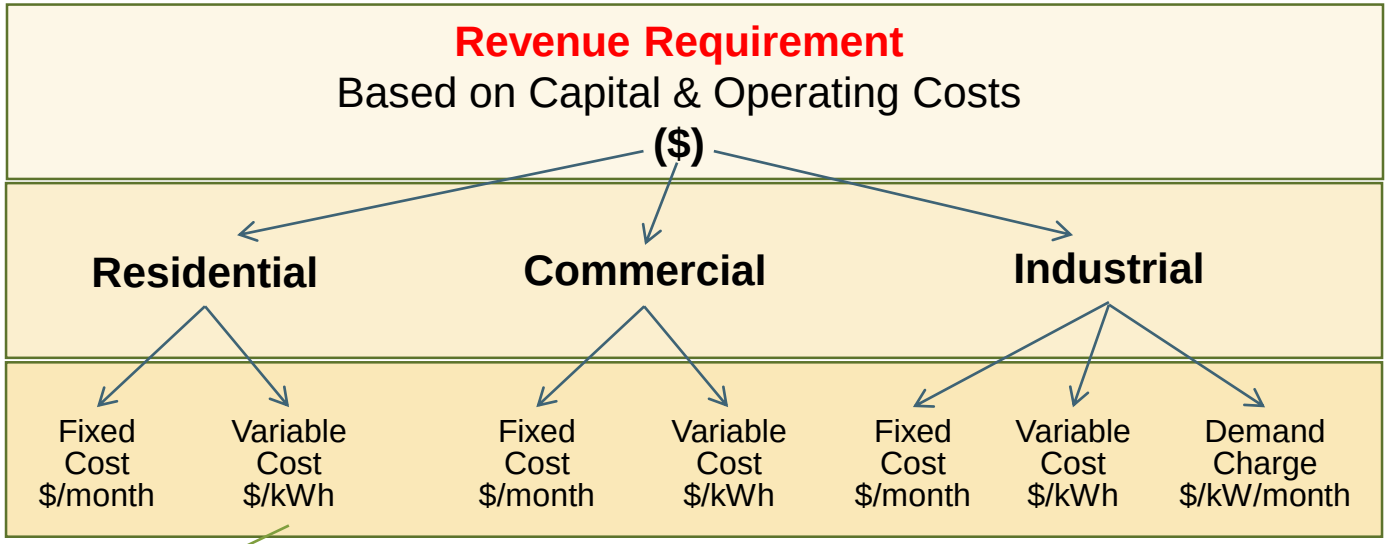
Rate Design Differences



Rate Design Differences

Cost Allocated Among Customer Classes

Retail Rates



Cost of Service

Base Rate or Fixed Price ($/kWh) = **Revenue Requirement** / **Projected Sales**

Actual Revenue = **Price * Actual Sales**

Throughput Incentive: more sales mean more profit

With Revenue Decoupling

Decoupling Price = **Fixed Revenue** / **Projected Sales**

Decoupling Adjustment = **Actual Revenue** - **Fixed Revenue**

Refunds or Surcharges allocated to affected customers

Example Residential Energy Efficiency Options

Weatherization Assistance

Community Solar Participation

Upgrade and Save
Manufacturered Housing Program

Efficient
Electrification

Financing Options (PACE &
PAYS)

Energy Assessments/
EE Retrofits

DEQ
NORTH CAROLINA
Department of Environmental Quality

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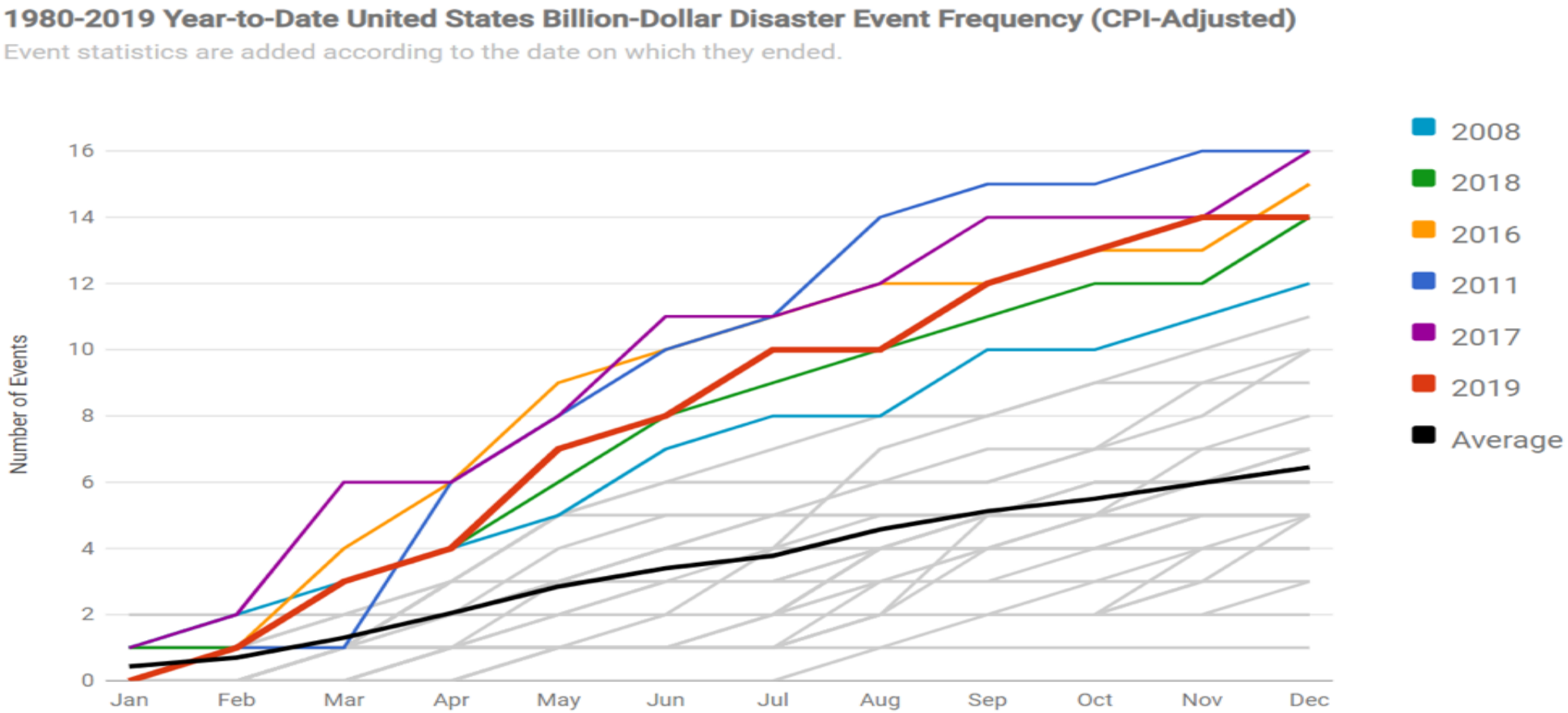
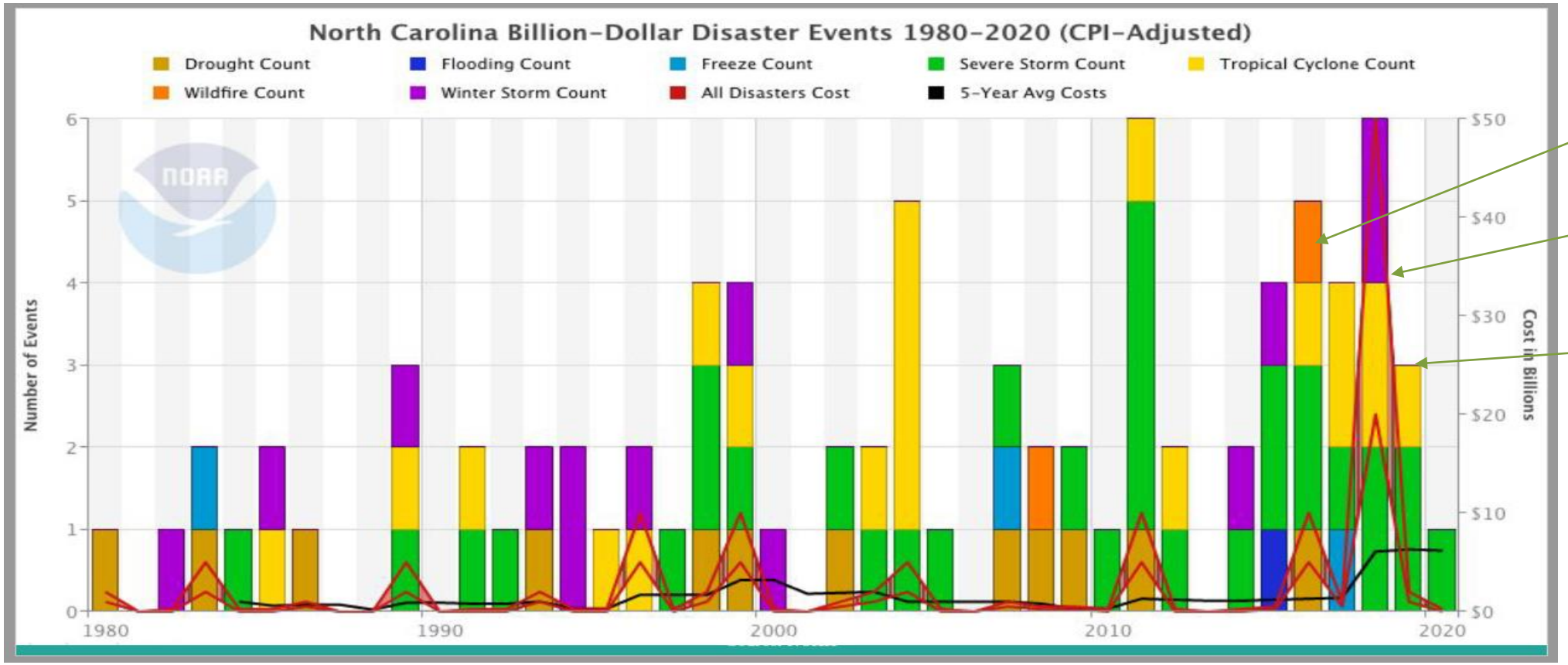
Frequency of Billion-Dollar Disaster Events in the U.S.



Source: National Oceanic and Atmospheric Administration, https://www.ncdc.noaa.gov/billions/

North Carolina Billion-Dollar Disaster Events



Hurricane Matthew (2016)

Hurricanes Michael and Florence (2018)

Hurricane Dorian (2019)

Hazards Affecting the Energy System

Non-Climate Stressors

- ***Population Growth***
- ***Aging Infrastructure***
- ***Socioeconomic disparity***
- ***Physical Attacks, Cyber Security, and other manmade disasters***
- ***Rural-Urban Divide***
- ***Public Health Threats/ Pandemics***

Climate Stressors

(Projected by the end of this century under both the lower and higher emissions scenarios)

Virtually Certain Sea Level will continue to rise	***Very Likely*** Summer Heat Index Values will increase	***Likely*** Annual Total precipitation will increase
Likely Hurricane intensity will increase	***Likely*** Severe droughts will become more intense	***Likely*** Increase in precipitation will lead to an increase in inland flooding

Virtually Certain= 99-100% probability of outcome
Very Likely= 90-100% probability of outcome
Likely= 66-100% probability of outcome
About as Likely as Not = 33-66% probability of outcome
Unlikely= 0-33% probability of outcome
Very Unlikely= 0-10% probability of outcome
Exceptionally Unlikely= 0-1% probability of outcome

Source: North Carolina Climate Science Report, https://ncics.org/nccsr

Policy on Resiliency

- No uniform methodology or best practice
- No state utilizes a resilience metric in regulated utility planning processes such as IRP, IDP, ISOP
- NARUC Report found that in regulatory proceedings resilience values for DER's have only been used qualitatively for decision making

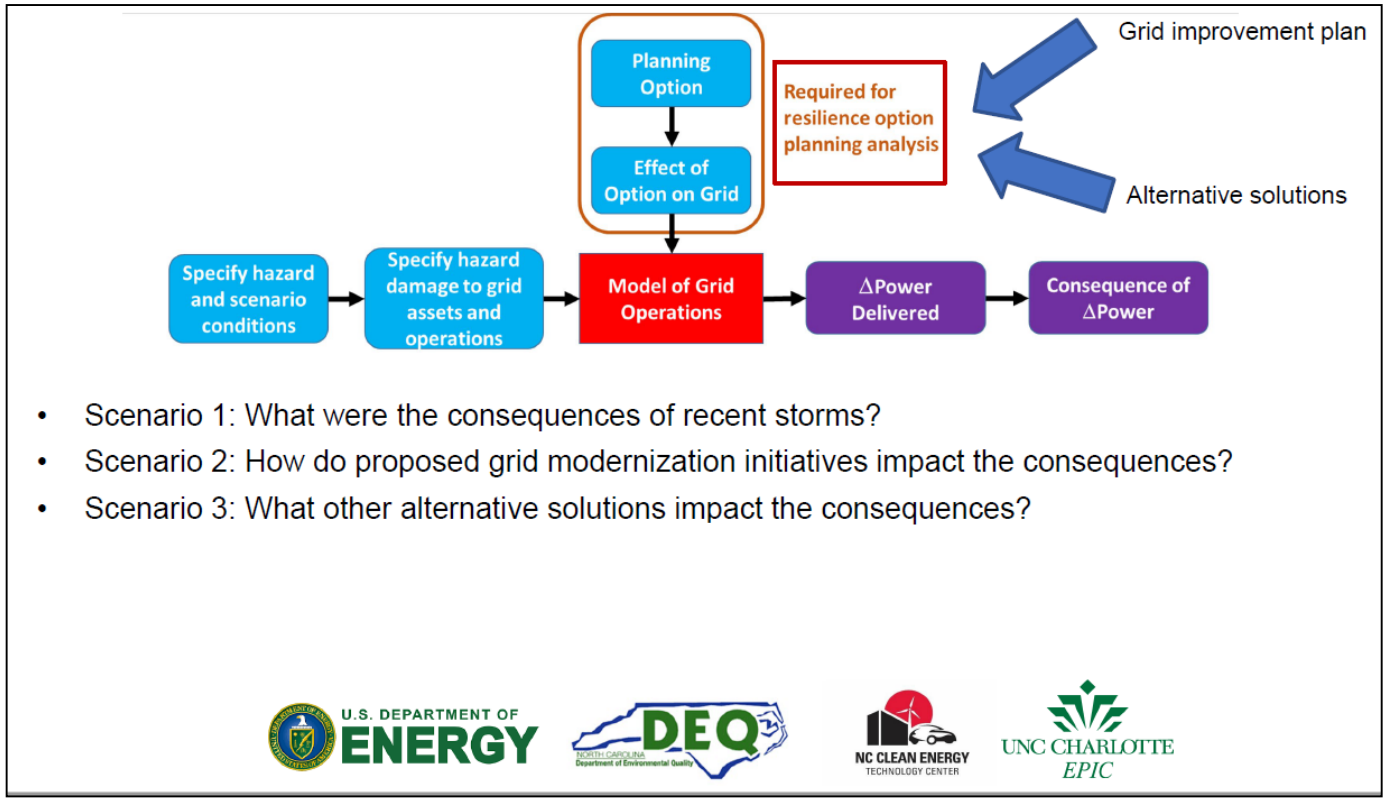
Valuing Energy Resilience

Planning an Affordable, Resilient, and Sustainable Grid in NC

- U.S. Dept. of Energy, State Energy Program Award
  - 2-year project began in June 2019
  - Project Team: DEQ, UNCC/EPIC, NC Clean Energy Technology Center
- Building on & contributing to resilience-related efforts in NC & U.S.
  - 2023 Duke Energy Integrated Resource Plan and Grid Improvement Plan
  - DEQ Clean Energy Plan & 2023 NC Hazard Mitigation Plan
  - NARUC, NASEO,U.S. DOE Comprehensive Electricity Planning Task Force
- DOE interest in developing metrics to evaluate the societal and economic impact of inflation-adjusted cost of weather-related power outages estimated to be up to $70 billion annually in the U.S.

Planning an Affordable and Resilient Grid

Project focuses on historic analysis looking at impact of recent storms on DEC and DEP.



- Scenario 1: What were the consequences of recent storms?
- Scenario 2: How do proposed grid modernization initiatives impact the consequences?
- Scenario 3: What other alternative solutions impact the consequences?

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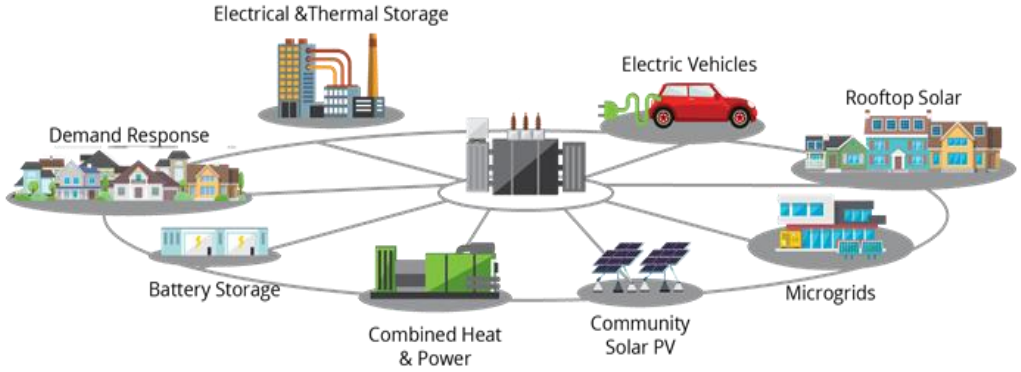
Distributed Energy Resources (DERs)



Source: NARUC Manual on DER Rate Design & Compensation

Scenario 3 Examples of DERs

- Solar PV
- Combined Heat & Power
- Energy Storage
- Microgrids
- Demand Response

Summary

1. Clean Energy Plan - recommendations
2. Carbon and Clean Energy Policy Design – underway
3. Energy Regulatory Process - underway
4. Energy Resiliency – underway

Thank You

Questions?

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