North Carolina

Clean Energy Plan Development

Facilitated Workshop #2

North Carolina Department of Environmental Quality

Raleigh, NC April 1, 2019

Objectives

- Build a collective understanding of other stakeholder groups' perspectives on the existing system and vision for the future
- Prioritize which existing structures are or are not supporting achievement of clean energy
- Strengthen this community's capacity to collaborate in this work

Agenda

- Welcome and Opening Remarks
- Overview of Workshop Agenda and Objectives
- Listening Sessions Update
- Capacity Building Activity

BREAK

- Stakeholder Presentations Session #1:
  - *Environmental Groups*
  - *Utilities*
- Participant Discussion
- Stakeholder Presentations Session #2:
  - *Local Governments*
  - *Residents, Consumer Advocates, and Environmental Justice Groups*

LUNCH

- Identifying Informative Metrics
- Stakeholder Presentations Session #3:
  - *Distributed Energy Resource and Renewable Energy Providers and Advocates*
  - *Businesses and Corporations*
  - *Higher Education*

BREAK

- Breakout Groups: Prioritizing Issues for Focus in Clean Energy Plan

Proposed Ground Rules

1. Be Present
2. Democracy of Time

Check-In

What is one exciting development for you since the last workshop?

Overview of Regional Listening Sessions

North Carolina

Clean Energy Plan Development

Workshop #1 - Raleigh

Listening Sessions

Charlotte – March 8

Asheville – March 14

Rocky Mount – March 19

Fayetteville – March 25

Wilmington – March 27

Hickory – March 20

Other Venues

NC Manufacturers Alliance (NCMA) Air Quality Workshops

Western NC – March 1

Central NC – March 19

Total Participants ~400

Regional Listening Sessions
Public Input Opportunities

I. Viewing of Compiled Videos from Workshop #1 and Participant Reflection

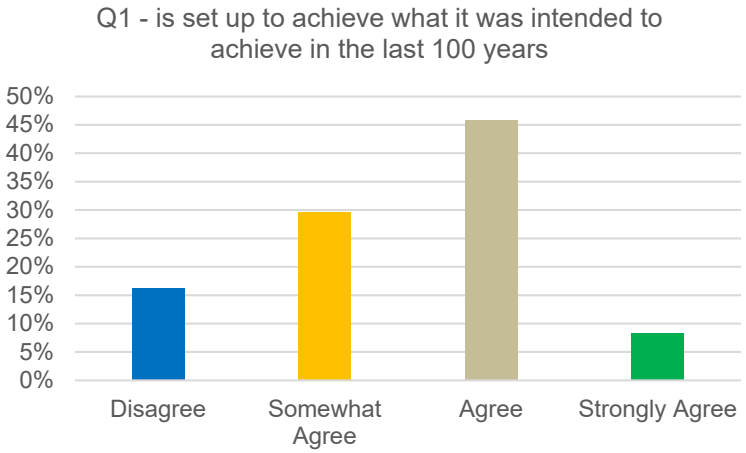
II. Live Polling: Participant Perspectives on the Existing Electricity System

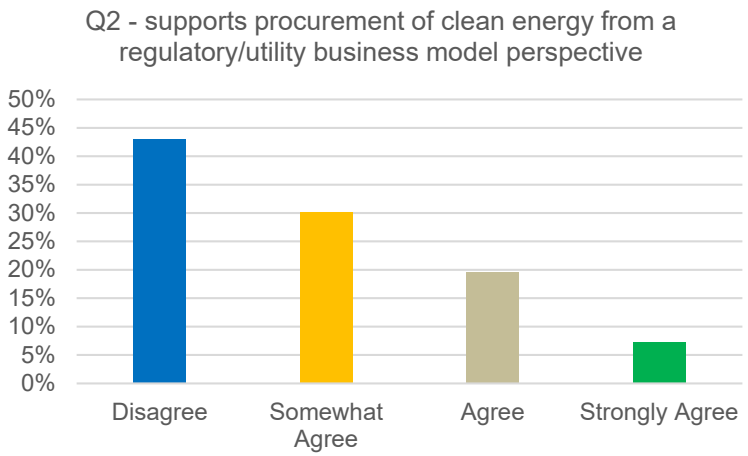
III. Guiding Principles Exercise

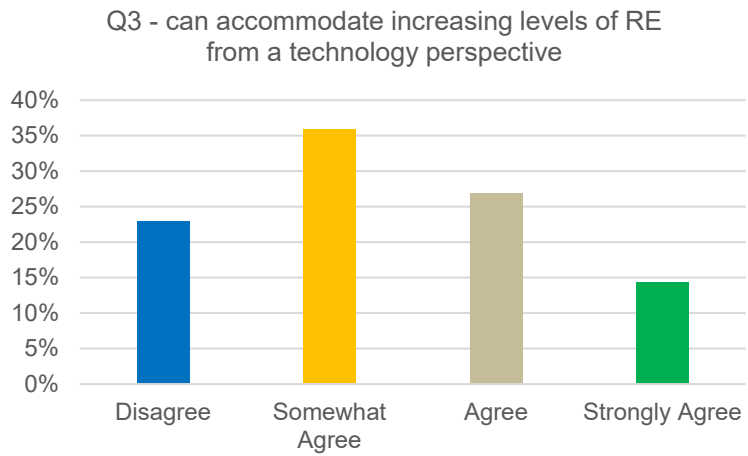
IV. Collection of Comments on the Existing System

Live Polling Results

North Carolina's electricity system as it is now:







Live Polling Results

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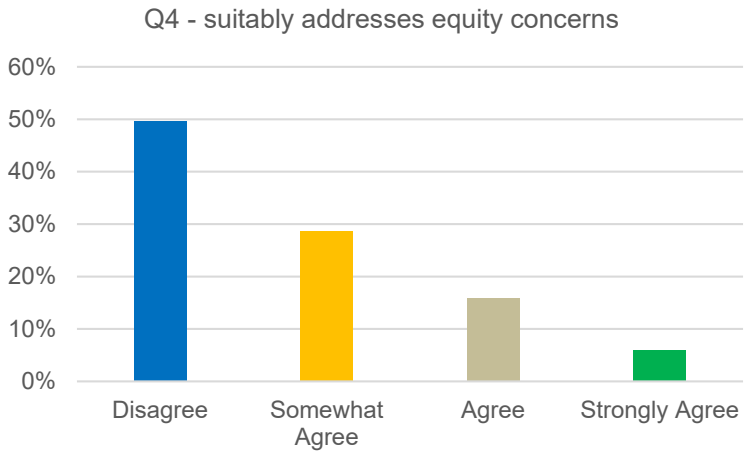
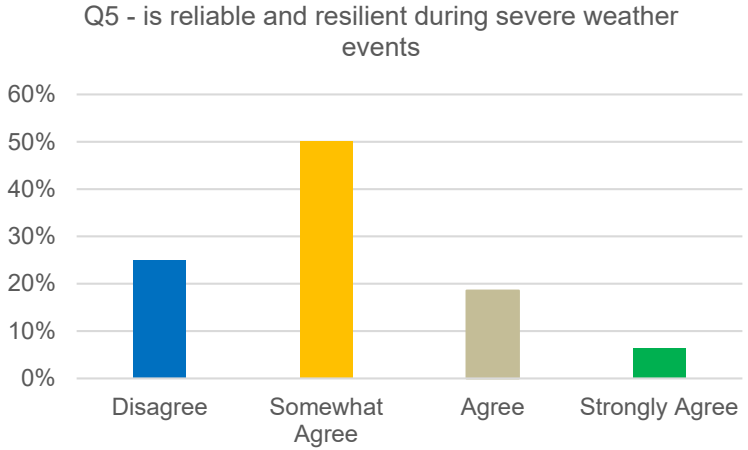
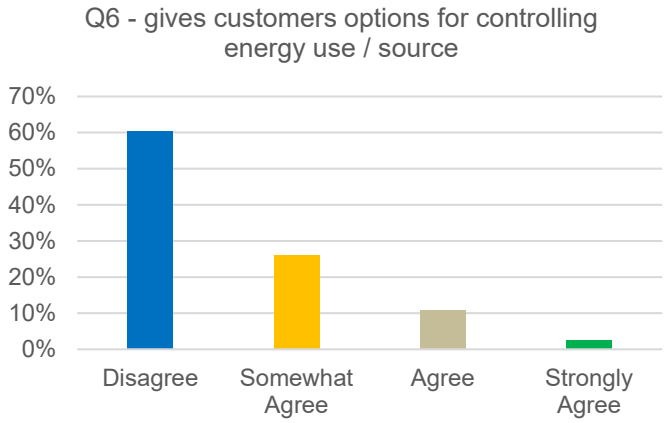
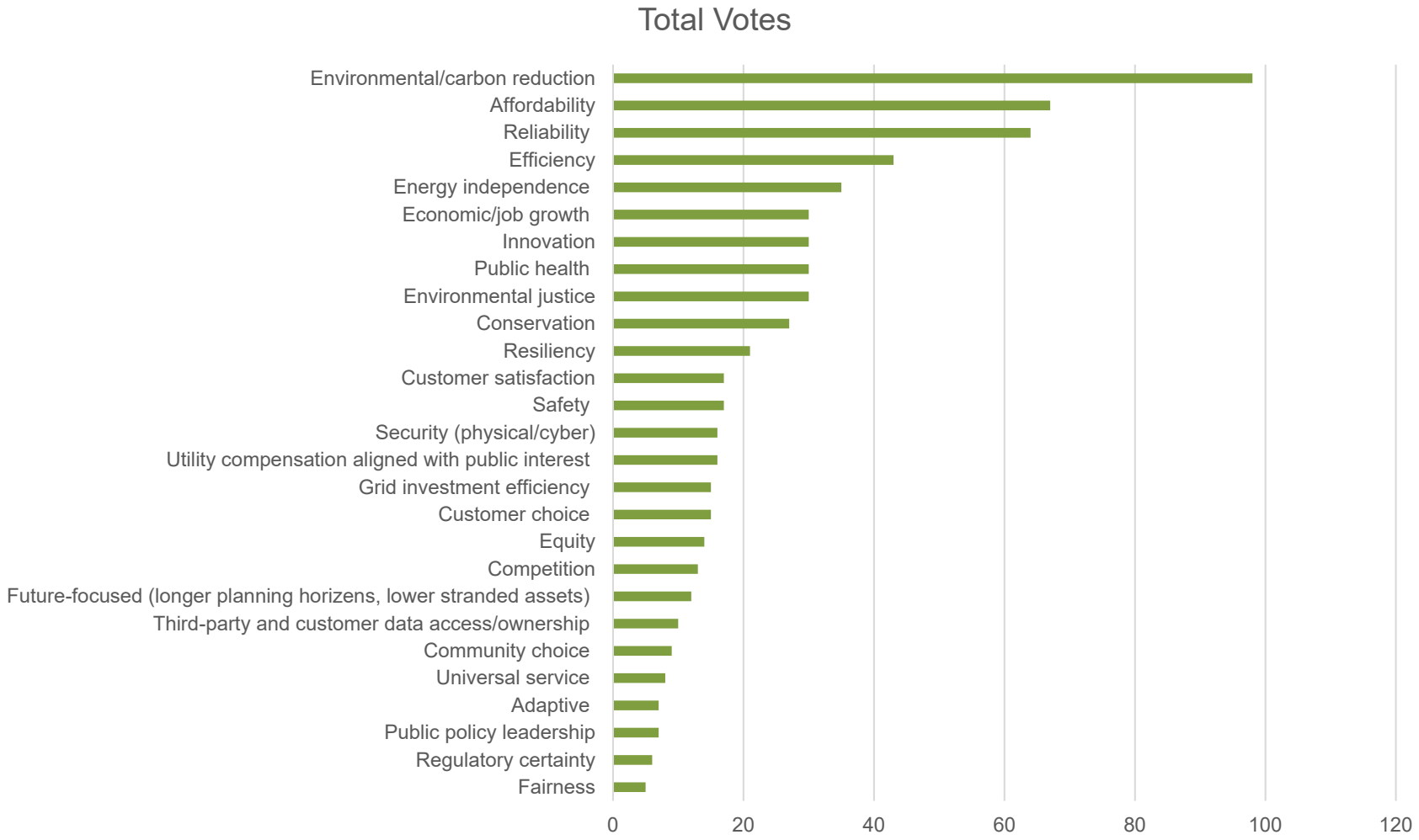




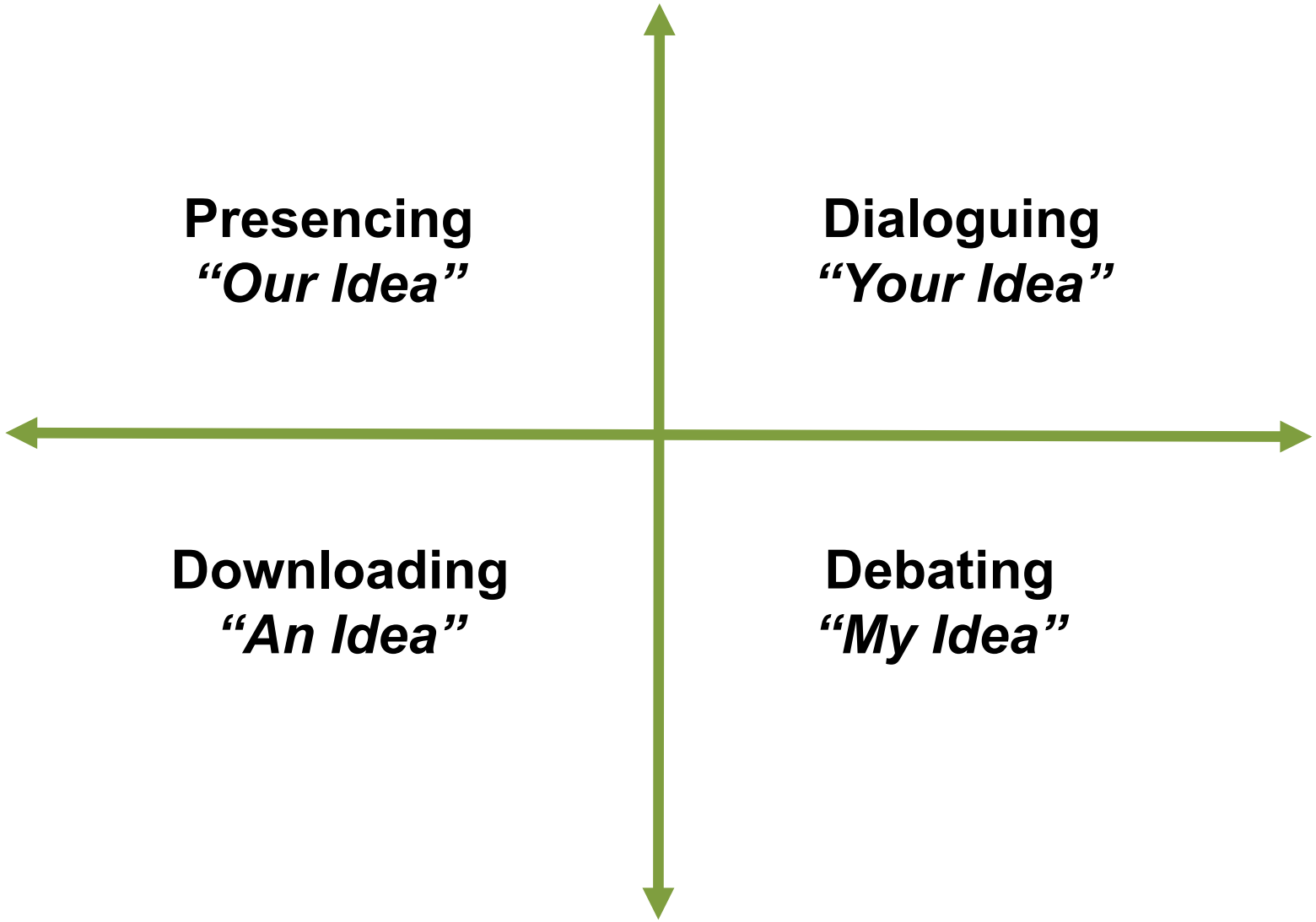


"What do you and/or your organization see as the most important values for the electricity system to uphold and promote going forward?"



North Carolina
Clean Energy Plan Development

Four Ways of Talking and Listening



Session 1: Stakeholder Group Presentations

North Carolina Conservation Network

NRDC

Clean Air Carolina

EDF Environmental Defense Fund — Finding the ways that work

Sierra Club North Carolina

cleanenergy.org Southern Alliance for Clean Energy

Dogwood Alliance

Southern Environmental Law Center

Environmental Table

April 1, 2019

Clean Energy Plan Goals

What are our three priorities?

1. **Targeting**
   Determine how much the electric sector needs to reduce emissions for NC to hit the EO80 statewide target of 40% reduction of GHG emissions below 2005 levels.

1. **Equity**
   a. Distribution of energy assets across the state
   b. Value of resiliency
   c. Need to distribute benefits and any costs equitably among ratepayers
   d. Plan for economic transition of fossil fuel generation communities

1. **Look Beyond 2025**
   North Carolina must go further than EO80 after 2025 and actions before 2025 should not conflict with long-term deep decarbonization

1. **Targeting**

   How much does the electric sector need to reduce emissions for NC to hit the EO80 statewide target of 40% reduction of GHG emissions below 2005 levels, assuming all other sectors essentially stay flat or see marginal reductions?

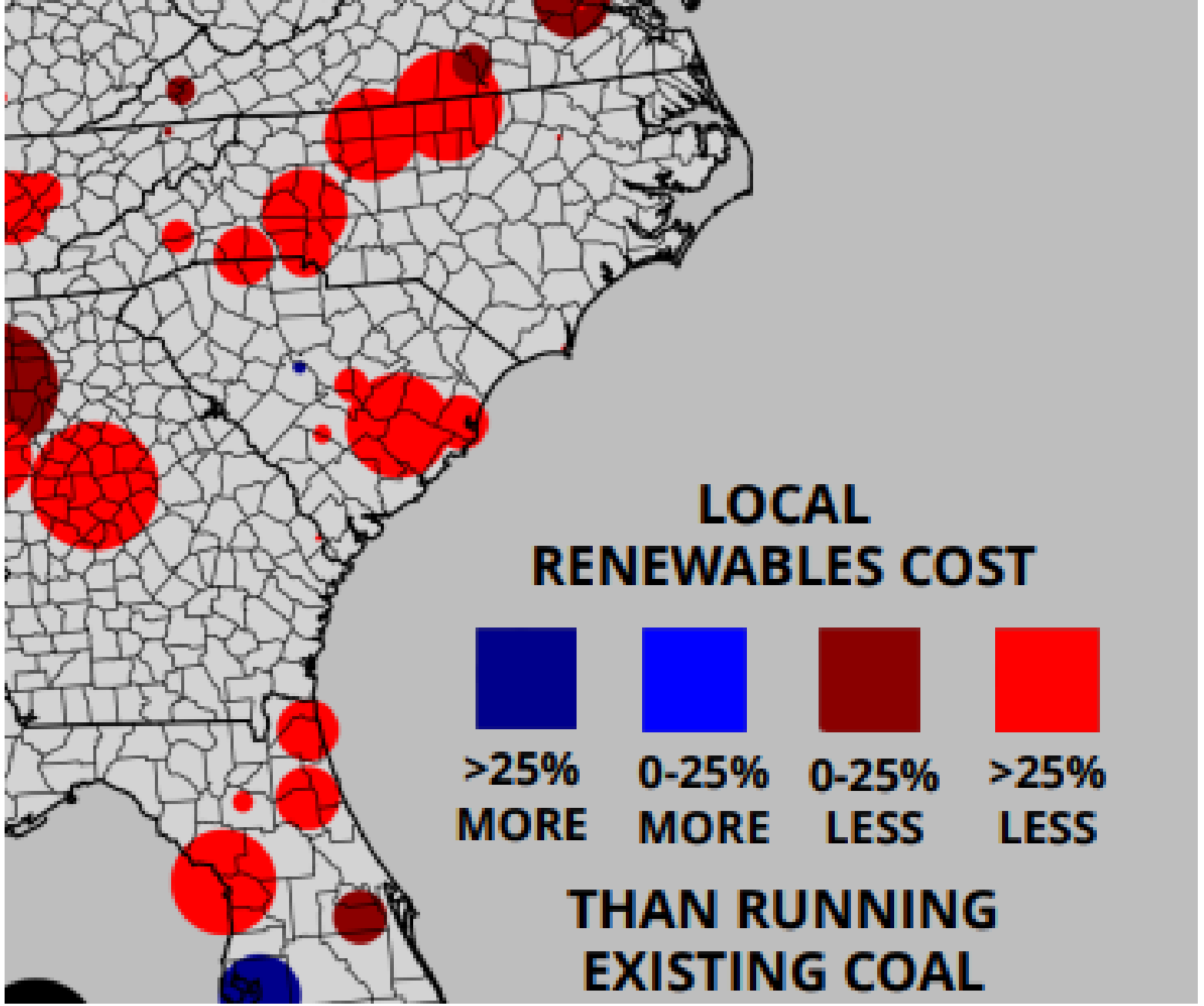
Table 1-1: North Carolina GHG Emissions Inventory by Source Sector (MMT CO_2e)

	Historic					Projected		
	1990	2005	2012	2015	2017	2020	2025	2030
Electricity Use	**54.57**	**79.37**	**66.85**	**58.48**	**52.60**	**45.74**	**40.59**	**42.46**
Electric Power Generation	46.28	73.27	55.95	51.10	45.32	38.34	32.99	34.70
Imported Electricity[a]	8.29	6.10	10.90	7.37	7.28	7.39	7.60	7.76
Residential/Commercial/Industrial Combustion[b]	**26.77**	**26.02**	**18.66**	**21.15**	**20.92**	**22.52**	**23.26**	**23.92**
Industrial	17.59	14.21	10.00	9.97	9.93	11.32	12.16	12.62
Commercial	3.79	5.06	4.17	5.76	5.72	5.84	5.76	5.93
Residential	5.39	6.75	4.48	5.43	5.28	5.36	5.35	5.38
Transportation	**40.21**	**55.19**	**46.36**	**49.02**	**48.72**	**45.27**	**41.00**	**39.22**
Gasoline & Diesel Highway	35.13	48.21	41.60	44.00	44.05	40.47	36.02	34.02
Non-Highway	5.08	6.96	4.72	4.98	4.62	4.74	4.91	5.12
Alternative Fuel Vehicles	0.00	0.03	0.04	0.05	0.05	0.06	0.07	0.08
Agriculture	**7.06**	**10.65**	**10.56**	**10.38**	**10.53**	**10.51**	**10.47**	**10.44**
Manure Management	2.59	6.02	5.63	5.90	6.05	6.06	6.09	6.11
Agricultural Soil Management	2.87	2.74	3.18	2.74	2.84	2.82	2.78	2.75
Enteric Fermentation	1.60	1.89	1.74	1.73	1.64	1.63	1.60	1.58
Burning of Agricultural Crop Waste	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Waste Management	**6.39**	**8.52**	**9.09**	**8.44**	**8.77**	**9.29**	**10.17**	**11.07**
Municipal Solid Waste	5.47	7.23	7.52	6.82	7.09	7.52	8.26	9.00
Wastewater	0.92	1.29	1.57	1.61	1.68	1.77	1.92	2.06
Industrial Processes	**1.04**	**3.83**	**5.39**	**6.03**	**7.18**	**8.84**	**11.31**	**12.73**
Natural Gas and Oil Systems	**0.86**	**1.17**	**1.28**	**1.32**	**1.35**	**1.40**	**1.47**	**1.55**
Gross Emissions	**136.89**	**184.74**	**158.18**	**154.82**	**150.08**	**143.57**	**138.28**	**141.37**
Net Carbon Sinks – LULUCF[c]	**-35.64**	**-32.66**	**-33.97**	**-34.16**	**-34.03**	**-34.03**	**-34.03**	**-34.03**
Net Emissions	**101.25**	**152.08**	**124.22**	**120.66**	**116.06**	**109.55**	**104.25**	**107.35**
Percent Reduction in Net Emissions from 2005					**24%**		**31%**	

Note: Totals may not equal exact sum of subtotals shown in this table due to independent rounding

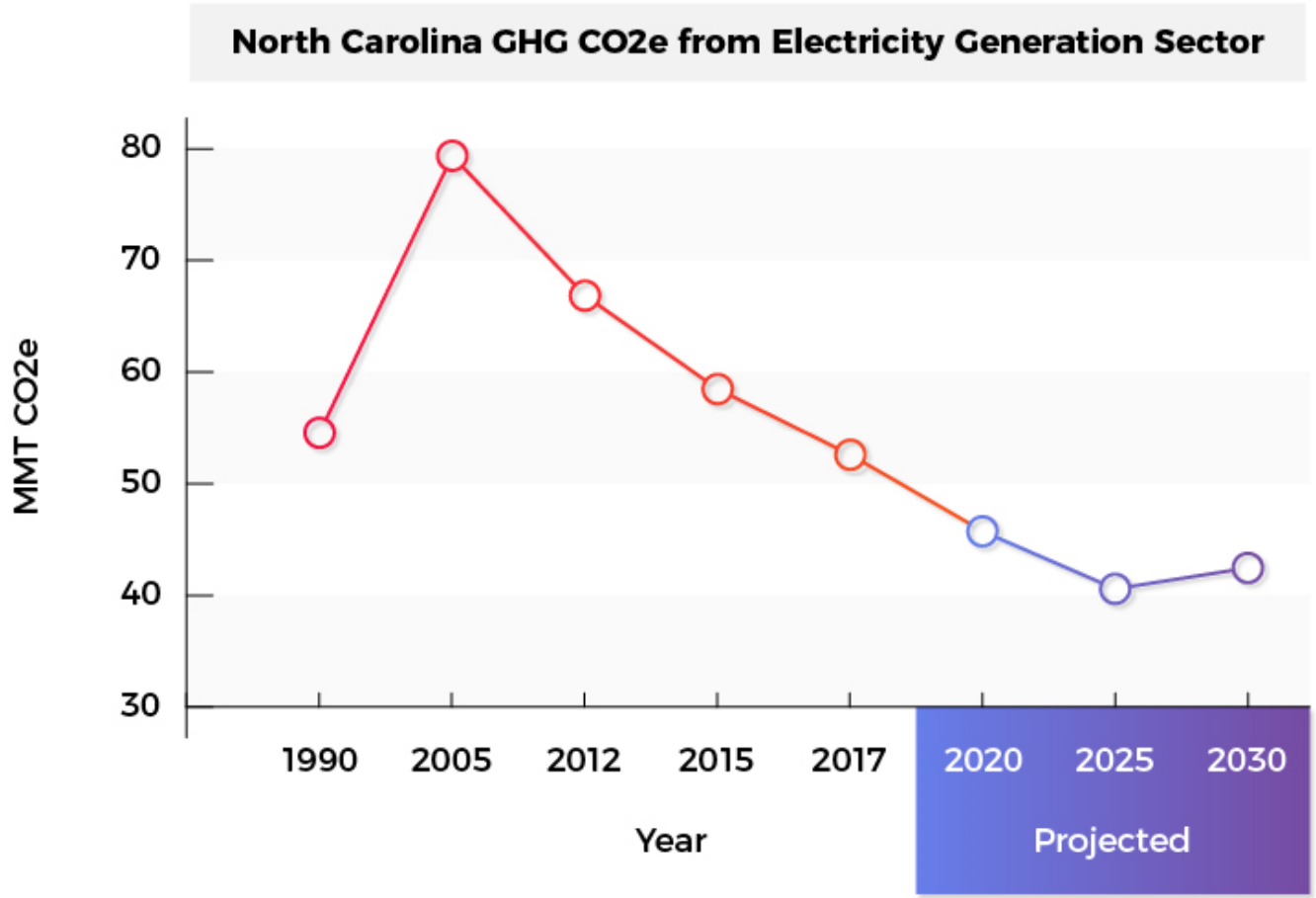
2. Equity

a. Distribution of energy assets across the state
b. Value of resiliency
c. Need to distribute benefits and any costs equitably among ratepayers
d. Plan for economic transition of fossil fuel generation communities



3. Look Beyond 2025

North Carolina must go further than EO80 after 2025 and actions before 2025 should not conflict with long-term deep decarbonization

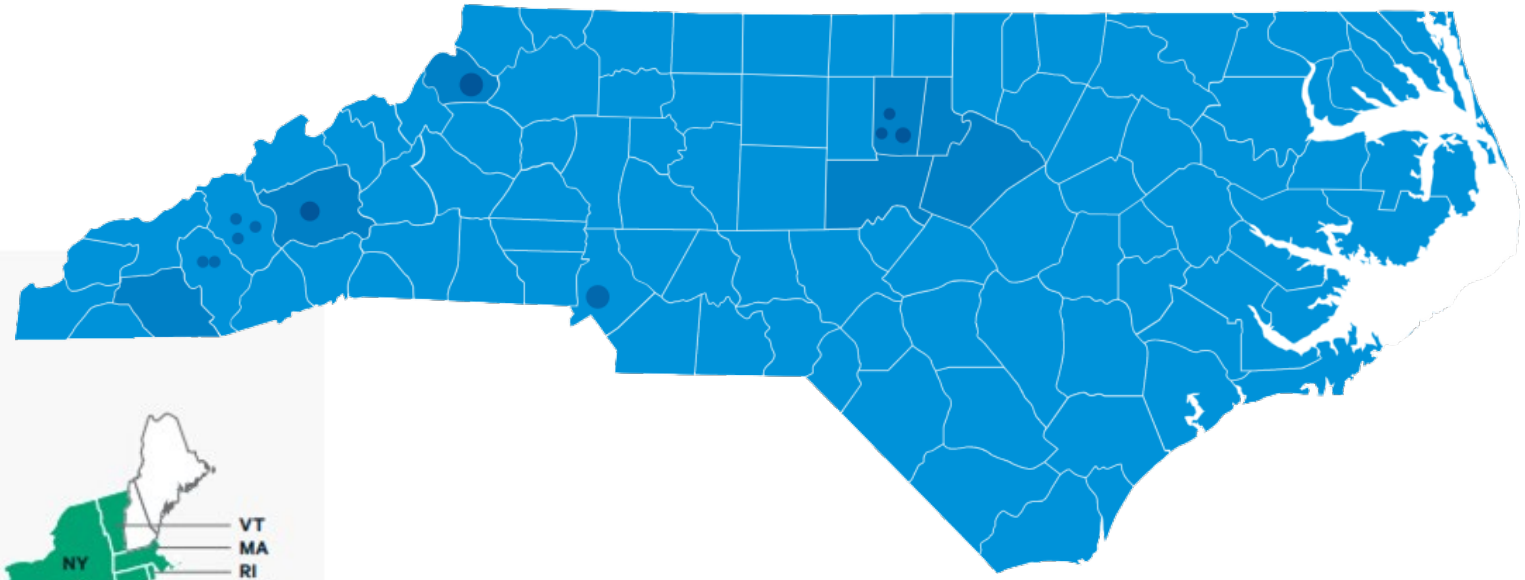


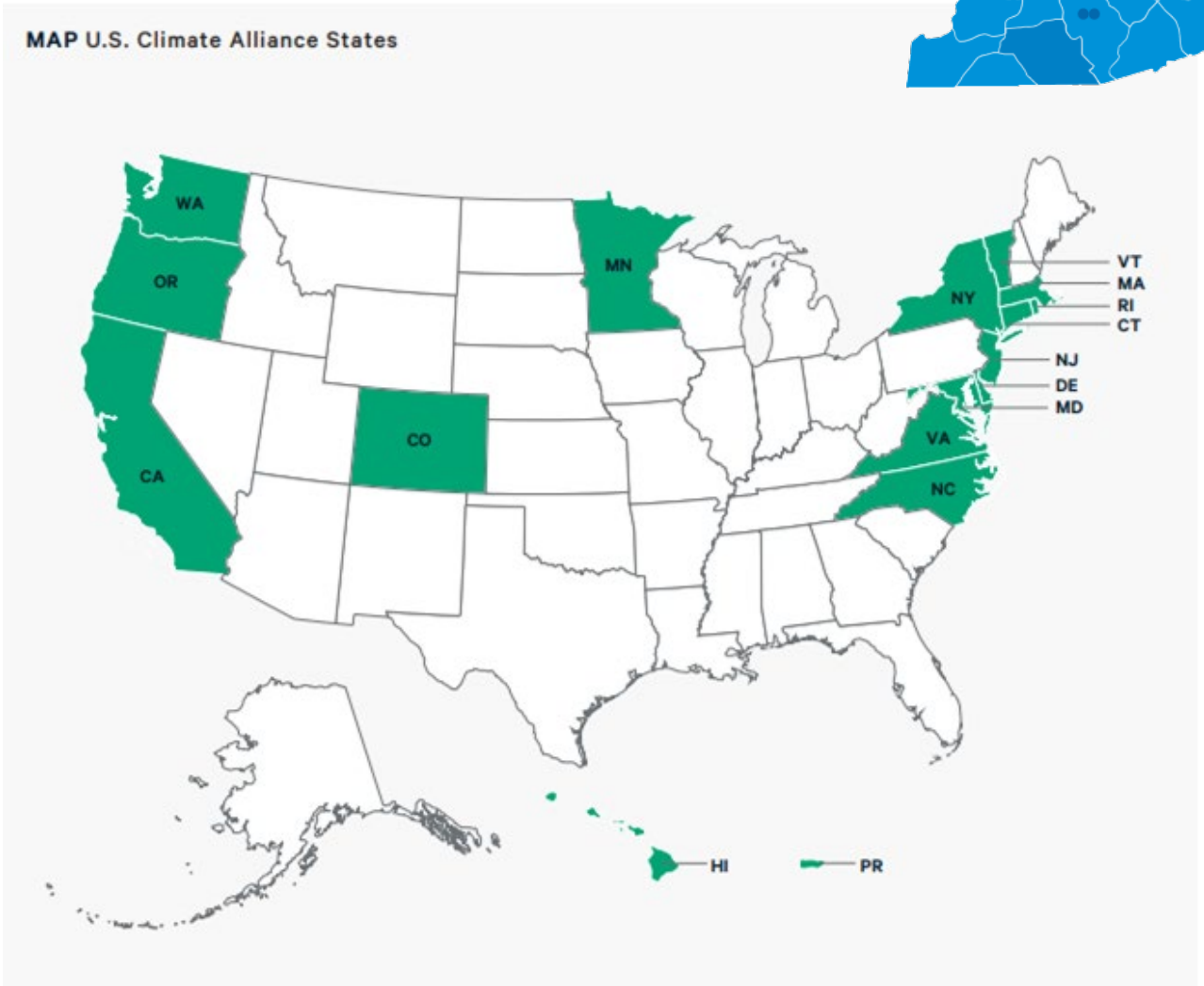
Motivating Factors

Urgency

We have 12 years to cut emissions in half to avoid a 1.5C temperature rise, according to the IPCC’s report last year.

Public Support

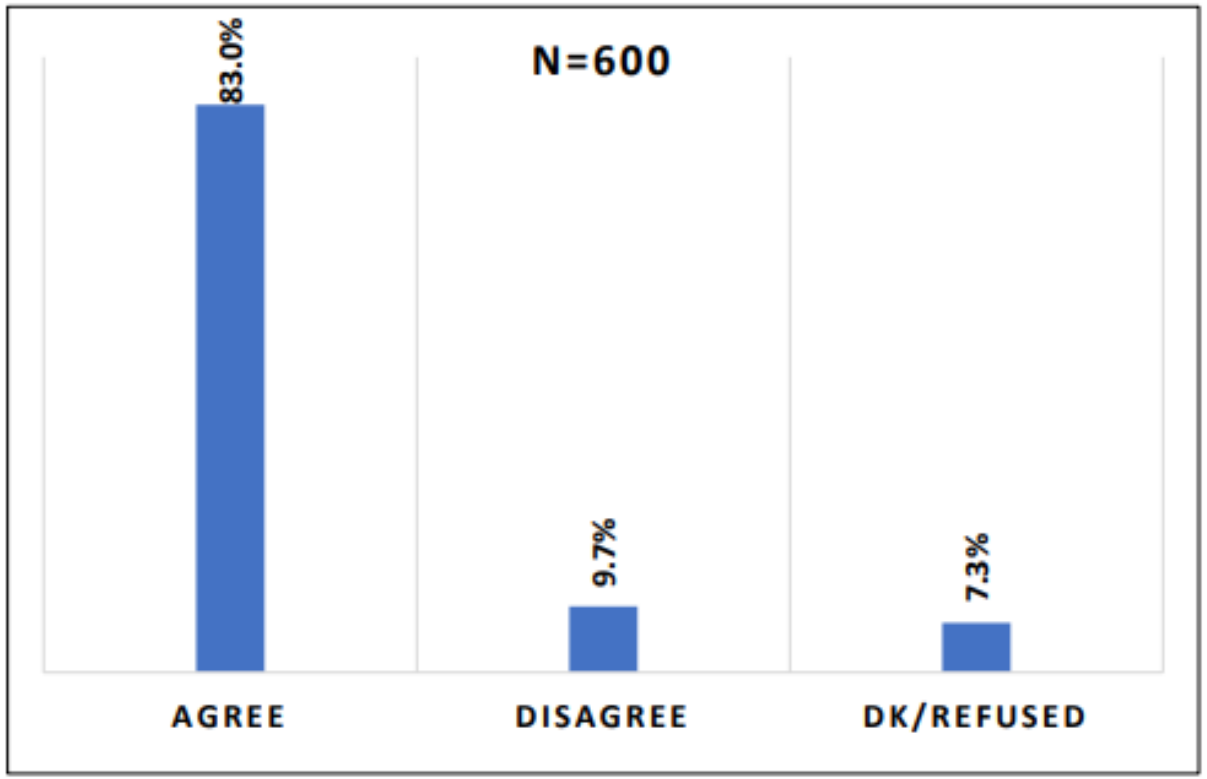




- There is strong support nationally for moving states to 100% clean energy by 2045, including 79% of North Carolinians.

  Source: Sierra Club, February 2019 Polling

Now, more than ever, state lawmakers should be reducing regulations and allowing for more private-sector development of renewable energy sources such as solar, wind and waste-to-energy technology.



	N=	Agree	Disagree	DK/Refused
RDU	192	78.6%	15.6%	5.7%
Charlotte	154	86.4%	5.2%	8.4%
Greensboro	107	84.1%	7.5%	8.4%
Wilmington	31	83.9%	16.1%	0.0%
East	63	81.0%	4.8%	14.3%
West	53	88.7%	7.5%	3.8%
Liberal	142	84.5%	9.9%	5.6%
Moderate	164	84.1%	8.5%	7.3%
Conservative	260	81.9%	11.2%	6.9%
Republican	197	85.3%	6.1%	8.6%
Democrat	257	79.4%	14.4%	6.2%
Unaffiliated	131	87.0%	6.9%	6.1%

Over 80% of all voters agree that lawmakers should be reducing regulations to allow for more private-solar development. Unaffiliated and Republicans voters agreed over 85% while Democratic voters were just under 80%.

What is our vision of a clean energy future in NC?

A full transition to 100% clean energy by 2045 through deployment of renewable energy, energy efficiency and other clean technologies.

We envision a just and equitable process in North Carolina to do our part in keeping global warming below 1.5C.

What three features of the existing system are challenges for clean energy deployment?

1. Lack of alignment between utility incentives and public desire for 100% clean & renewable energy

2. Environmental and public health impacts are not factored into generation cost assessment

3. Limitations on financing options for renewable energy and energy efficiency

What three features do you want to ensure are maintained going forward to support clean energy resources?

1. Support for strong homegrown solar and energy efficiency industries.

2. Maintain & expand the Renewable Energy Portfolio Standard & Residential Energy Conservation Codes.

3. Build upon our existing clean energy R&D cluster.

Any Questions?

Utility Group

April 1, 2019

Sarah Adair, Duke Energy

Mike Davis, Williams | Transco

Jason Hoyle, New River Light & Power

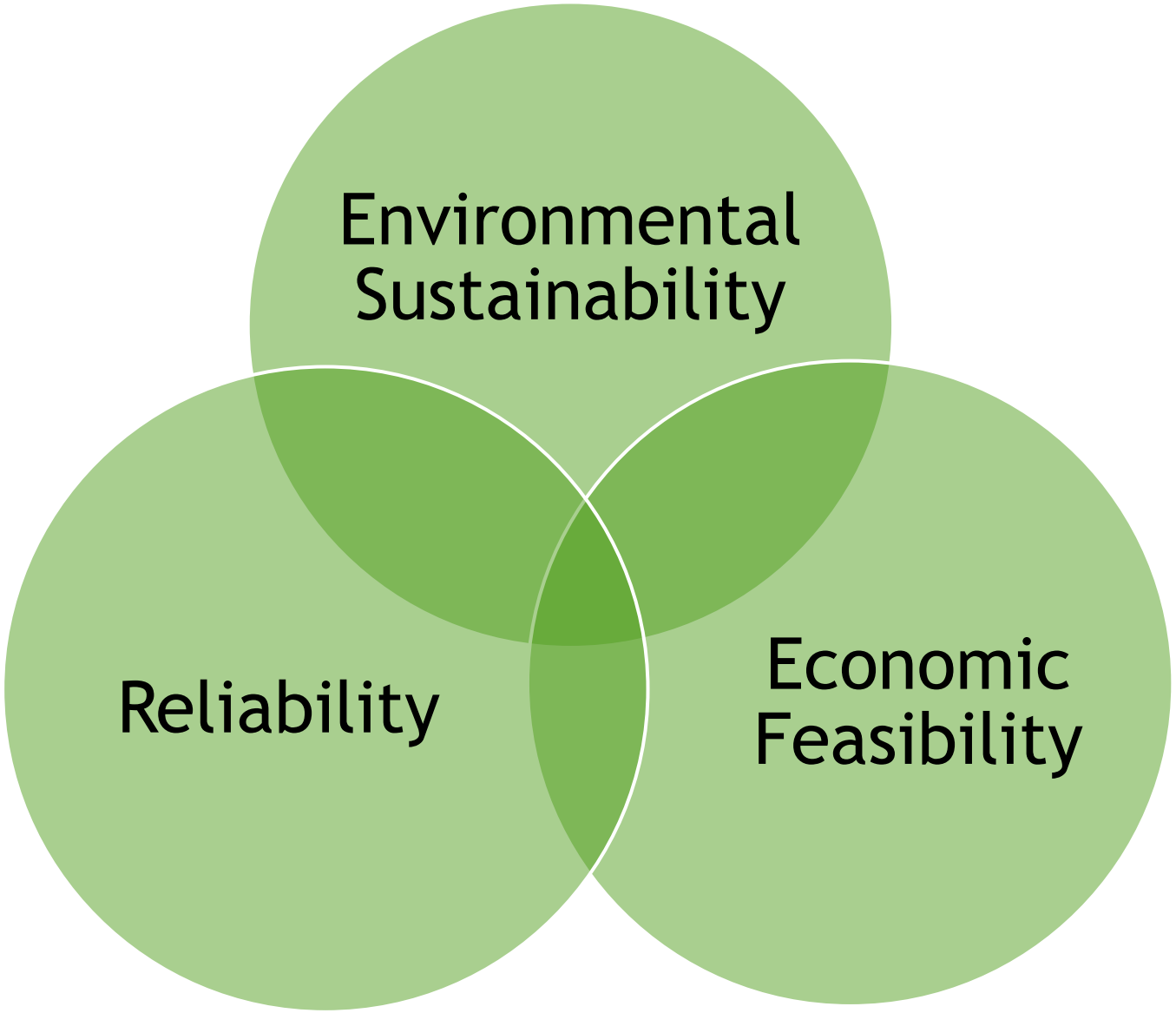
Keith Lynch, Fayetteville PWC

Elizabeth Severt, Cape Fear Public Utility Authority

Michael D. Youth, NC Electric Cooperatives

This presentation reflects a collaborative effort of the workshop participants identified above; it does not necessarily reflect the official position of any one of the utilities identified above.

Priorities


Environmental Sustainability
Reliability
Economic Feasibility

Motivating Factors

- We recognize that our customers increasingly want:
  - Environmentally-friendly/low- to zero-carbon operations,
  - Reliability,
  - Affordability, and
  - Safe operations.

- Our customers also increasingly want:
  - Control,
  - Convenience, and
  - Choices.

Visions

- Duke Energy's strategic vision includes generating cleaner energy and modernizing the grid to make it more secure and resilient and to give customers more options and control. We share EO80's objectives of continuing to reduce carbon emissions, expanding charging infrastructure to meet growing demand for zero-emission vehicles and continuing to promote and expand energy efficiency programs to help customers reduce and control energy use.
- Fayetteville PWC and New River Light & Power view clean energy as necessary to address climate change and as an opportunity to invest/retain capital in local communities, create blue/white/green collar jobs, increase property values, and earn a return on equity.
- NC's Electric Cooperatives envision a Brighter Energy Future where decisions are made not only based on affordability, reliability, and safety, but also with three new tenets in mind: low carbon, grid flexibility, and beneficial electrification.

What is Working Well

- **Reliable and Affordable**
  - Utilities provide reliable service, 24/7
  - Long-term planning balances customer rate impact, generation balance and grid stability
- **Low carbon generation**
  - Existing nuclear units provide zero-carbon energy and are a critical component of a low-carbon portfolio, as well as, provide a capacity factor above 90%
  - North Carolina is second in the nation in solar capacity and continues to connect renewables to the grid

Challenges

- Much of the existing electricity infrastructure was designed to be unidirectional, flowing from large central generation to transmission to distribution to load. The existing grid was not designed – from either an engineering or a financial perspective – for a high penetration of distributed energy resources.
- Lack of timely investment recovery mechanisms create barriers transitional grid modernization. (Duke Energy)
- Limits in full-requirements power supply contracts on implementing/supporting energy efficiency investments, peak demand reduction, and renewable energy generation options that our customers demand. (New River Light & Power)
- Customer surveys have taught us that different customers want different services – for example, one customer may place an emphasis on affordability, while another may place an emphasis on carbon attributes. Utilities strive to balance these customer desires.
- We need a mechanism to coordinate clean energy policy among the North Carolina Utilities Commission, the North Carolina Economic Development Board, the Energy Policy Council, and the Environmental Management Commission. (Williams | Transco)

Any Questions?

Session 2: Stakeholder Group Presentations

DEQ Clean Energy Workshop 2: Local Government Insights

APRIL 1, 2019

Process for Local Government Feedback

- Discussion at original Raleigh stakeholder meeting among local governments in attendance
- Discussion among North Carolina members of the Southeast Sustainability Directors Network, made up of local government sustainability staff
- Input from EDF Cities Initiative

3 PRIORITY GOALS FOR PARTICIPATING IN THE CLEAN ENERGY PLAN

1. Define and remove barriers to achieving local greenhouse gas emission reduction goals
    1. Examples:
        1. Auto-adoption of most up-to-date building energy codes
        2. Deregulation of NC electricity market
        3. Incentives for solar - Better net-metering rates/incentives for battery storage
        4. Increase options for renewable energy procurement
        5. More options for retaining RECs
2. Speak for the needs of a unique constituency- local governments are both large ratepayers and can speak on behalf of their broader communities
3. Create integrated strategies that focus on demand-side and supply-side, prioritizing where there will be the biggest impact.

MOTIVATING FACTORS

- The impacts of climate change are felt locally and local governments bear the greatest costs and effort to address these
- Strive to deliver on residents' expectations
- Local governments are leading by example, but our action is not enough to meet the reductions that need to be made
- Residents are asking for goals, such as 100% renewable energy, and we need state/utility support to meet those goals
- Belief that working together to align goals and strategies will amplify impacts

VISION FOR A CLEAN ENERGY FUTURE

- North Carolina is a leader in clean energy, sustainable transportation, and waste management using a multi-sector approach that leverages partnerships that have long term benefits including risk mitigation and positive economic impacts. The socio-economic, environmental, and other benefits of clean energy are inclusive of lower-income communities, urban & rural communities and traditionally underserved regions of the state.

EXISTING SYSTEM CHALLENGES

- Price for energy does not factor in the social and environmental costs of GHG emissions
- Lack of consumer choice
- Renewable energy procurement is expensive, complicated, limited
- Existing options for accessing clean energy are not equitable
- Lack of funding and finance options for energy and efficiency related investments
- Lack of accounting for GHG impacts in investment/funding decisions at the state level

EXISTING SYSTEM BENEFITS

- Grid reliability
- Affordable energy
- Building codes— it is good to have state-level codes. However, more aggressive adoption of amendments would drive building energy performance.
- We have momentum in building a robust clean energy economy and have create further opportunities for innovation

Any Questions?

Consumer Protection

DEQ Clean Energy Plan Stakeholder Group

Groups with influence on this conversation

NC WARN

NC Justice Center

NC Interfaith Power & Light

Pritchard Engineering

Sunrise Movement

Advanced Energy

NCUC Public Staff

DEQ's Environmental Justice Advisory Council

Environmental Justice

+

Consumer Advocacy

=

Consumer Protection

?

No endorsement implied by any group

We hope for a process & plan that is

Clean

Provides a path to a verifiably pollution-free energy system

Fair

Ensures that the system is equitable for all stakeholders

Fairness = ***equitable,*** *NOT equal*

Efficient

Enables an open system that maximizes each user's value

Why

Clean?

Science and Ethics: moral obligation to act

Fair?

Burdens of life cycle impacts are felt based on socioeconomic status

Efficient?

Urgency: there is limited time and infinite complexity

Vision

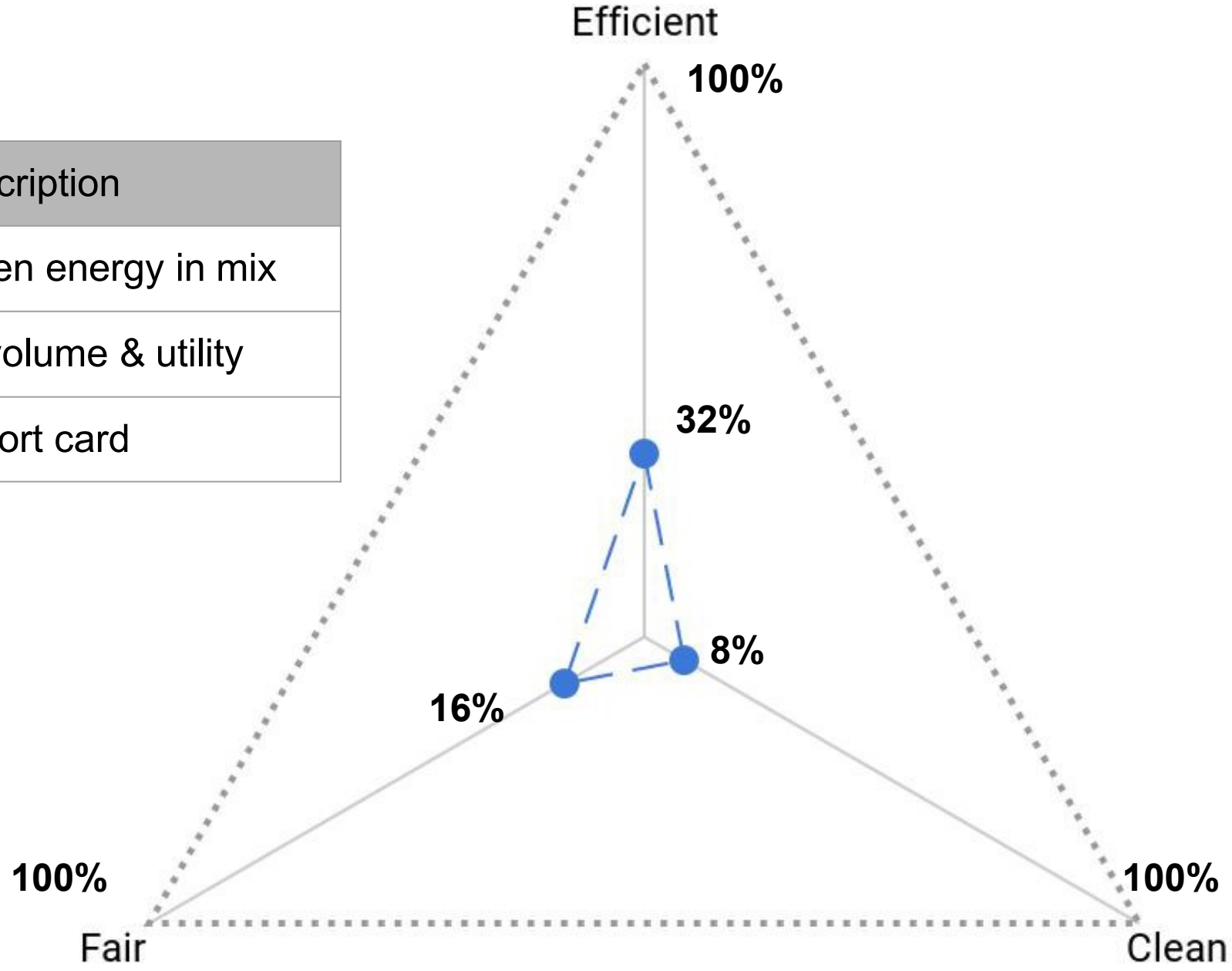
We envision a just transition to a fair energy system that provides equal opportunity to all participants to maximize their clean energy potential.

In this future, everyone can choose to exchange clean energy among each other over a reliable network at fair rates, efficiently providing abundant clean & affordable energy to all North Carolinians.

Clean - Fair - Efficient

Status

	Score	Source	Description
Clean	8%	EPA	Green energy in mix
Fair	16%	EIA	By volume & utility
Efficient	32%	ACEEE	Report card



Things to fix:

Access

Clean

Absence of strong policy mandates and price signals toward cleanliness

Fair

Market constructs and impacts vary disproportionately by demographics

Efficient

Current system does not allow us to maximize benefits of energy efficiency

Things to keep:

Market

Clean

A statewide standard for clean energy

Fair

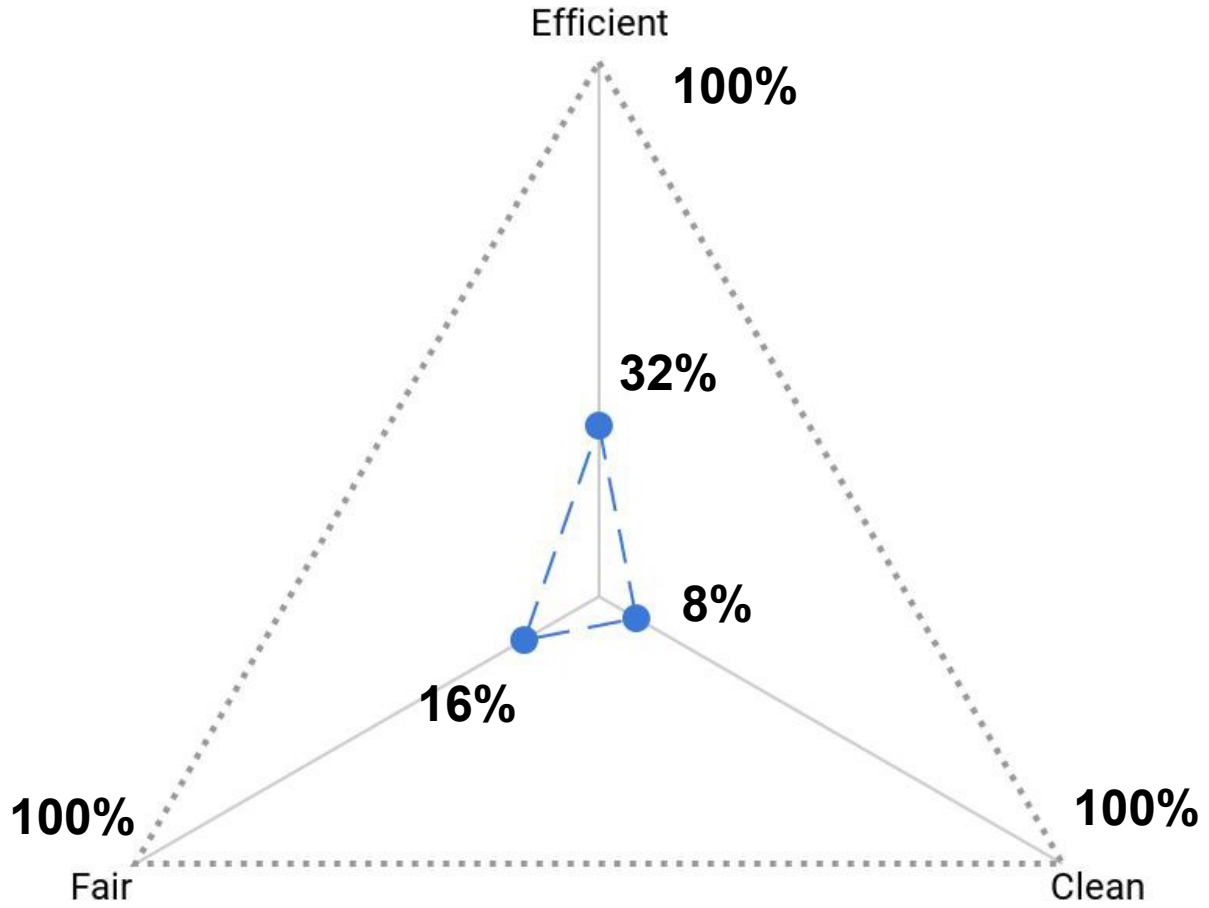
Compensating users for performance based on transparent metrics

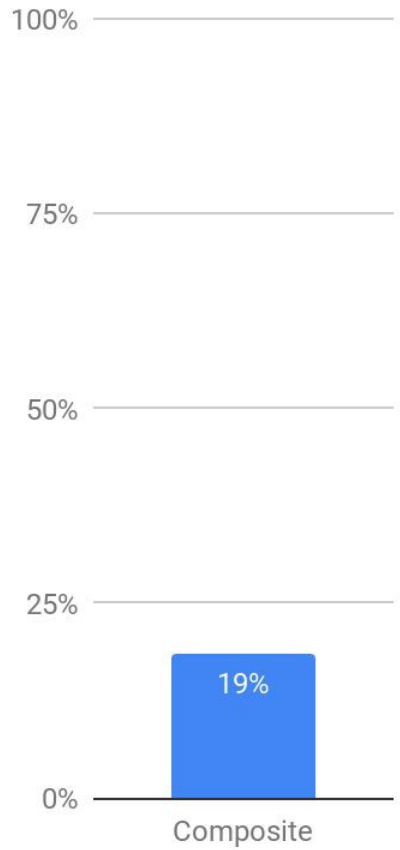
Efficient

Allowing users to exchange their energy rights with each other

Conclusion

Consumer Protection





	Clean	Fair	Efficient	Overall
Score	8%	16%	32%	19%
Fix	Policy & Price	Jurisdiction Friction	Transparency	Access
Keep	Clean Standard	Performance Rates	Right to Trade	Market

Any Questions?

Lunch Break

Principles/Values from Feb 25 Workshop

- Environmental/carbon reduction
- Competition
- Customer equity
- Affordability
- Reliability
- Resiliency
- Economic/job growth
- Utility compensation aligned with public interest

Session 3: Stakeholder Group Presentations

STAKEHOLDER GROUP 9

DISTRIBUTED/RENEWABLE ENERGY PROVIDERS AND ADVOCATES

E.O. 80 Workshop #2

April 1, 2019

Renewable Energy Category

Biofuels, Biomass, Hydro, Solar, Wind

- Kevin Alzamora — **Ovanova** - kevin@ovanova.co
- Daniel Brookshire — **North Carolina Sustainable Energy Association** - daniel@energync.org
- Chris Brown — **Enviva** - christopher.brown@envivabiomass.com
- Chris Carmody — **North Carolina Clean Energy Business Alliance** - director@ncceba.com
- Paolo Carollo — **Entsorga** - carollo@enstorga.it
- Adam Forrer — **Southeastern Wind Coalition** - adamf@sewind.org
- Hayes Framme — **Orsted** - hayfr@orsted.com
- Richard Harkrader — **Carolina Solar** - rharkrader@carolinasolarenergy.com
- Daniel Kemp — **Ovanova** - daniel@ovanova.co
- Katharine Kollins — **Southeastern Wind Coalition** - katharinek@sewind.org
- Larry Shirley — **Interstate Renewable Energy Council** - leshirleyjr@gmail.com

Goals for Participating in Clean Energy Plan Process

1. Create a viable path for a rapid transition of NC's energy portfolio to primarily clean energy sources.
2. Ensure that the perspective of clean energy providers and advocates is considered in the final Clean Energy Plan.
3. Expand this stakeholder planning process to incorporate recommendations for policy and regulatory reforms of NC's energy system.

Motivating Factors

- **Elements that are critical to a clean energy future**
  - **Carbon Emissions Reduction** - *Replacing fossil fuels with renewable and distributed energy sources*
  - **Diversity in Energy Sources** – *Diversify the power generation mix; Expand access to the grid for non-utility generators.*
  - **Political Leadership** – *Courage to innovate; Willing to listen and act on stakeholders needs; Engage constituents on issue.*
  - **Resiliency and Reliability** – ***Q****uickly recover from disruptions; Keep the lights on and the EVs charged*
  - **Sustainability** – *Encourage the use of renewable sources of energy; Relying on finite resources is short term vision.*
  - ***Technical Research*** – *Investment in technology research to enable new clean energy sources; Energy Storage.*

Vision for Clean Energy Future

North Carolina should quickly transition to a clean and efficient energy system that is affordable and accessible to all. Future energy policy and regulations should properly incentivize utilities, independent power producers, and consumers to make this vision a reality.

Success of Current System

- **Physical Structure –** *Existing grid currently distributes energy throughout state across a wide range of geographies.*
- ***Regional Leader****– Thanks to historic forward-thinking policies, North Carolina is a regional leader in renewable energy and energy efficiency. But we face significant challenges for maintaining our leadership position.*
- **Reliable** –
  - *Breadth: The system provides energy to most everyone in the state*
  - *Ubiquity: General public does not think about it much, which is good and bad.*
  - *Resilience?*

Challenges of Current System

- **Entrenched & Exclusive System Inhibiting future Growth of Renewable & Distributed Energy**– *NC's historic advances in renewable and distributed energy is now threatened by long interconnection delays and decreasing market access; Monopoly system should merit more accountability, not less.*
- **Lack of Transparency to Consumers** – *Customers do not know how and why they pay what they pay; Do not have choice on power generation. How can a consumer gain access to a renewable and distributed options for business or home?*
- **Energy Planning and Utility Investment Decision Making is Outdated & Lacks Accountability** – *Traditional energy resource planning in NC prioritizes costly centralized generation and does not adequately value or plan for better distributed energy options.*

Areas of Agreement or Disagreement / Conclusions

- Changing Utility Incentives is essential to any real change
  - *Incentive structure needs to reward utilities for encouraging low cost renewables and clean technology, and to discourage them from spending on expensive / obsolete, capital intensive generation*
- Moving To A New System: Market-based vs. Performance-Based? Or a Hybrid?
  - *Transmission: A natural monopoly?*
  - *Generation & Distribution: A robust marketplace and models exist*

Any Questions?

NC Clean Energy Plan Development

Business Working Group

Participants:

- **John Thigpen** - JLL
- **Ryan Miller** – North Carolina Building Performance Association
- **Jerry Williams** - SAS
- **Lori Collins** - DEQ
- **Tim Gasper** - Siemens Industry, Inc.
- **Vicki Lee Parker** - NC Business Council
- **Rob Morrow** - Building Clarity
- **Skip Yeakel** - Volvo

NC Clean Energy Plan Development

Business Working Group

What are the group's three priority goals for participating in the Clean Energy Plan process?

Increase:

1. Capacity and access to affordable renewable energy
2. Building efficiency requirements and finance options
3. Size of skilled workforce
    a) Invest in development of a future skilled labor pipeline
4. Number and use of EVs and charging networks

NC Clean Energy Plan Development

Business Working Group

What are some motivating factors for you, your organization, or the people your organization represents that you would like the state representatives and/or other stakeholders to understand better?

1. **Be proactive and be a good corporate citizen**
    a) Risk mitigator for customers + competitive differentiator for suppliers
    b) Demonstrate environmental responsibility
        i. Helps with employee recruitment and retention
        ii. Increased desire to work for companies with strong sustainability values

2. **3rd party sales of electricity**
    a) PPAs enable negotiated electricity rates
        i. Businesses can then spend capital on core competencies and growth initiatives
        ii. Business can control rates for 15-20 years
        iii. Budget certainty

3. **Labor market shortage for skilled trades**
    a) Major issue/opportunity in NC
        i. Corporations starved for skilled & motivated workforce
        ii. K12 & Higher Education needs to
            i. Rebrand career technical pathways
            ii. Align curriculum with needs of industry

4. **Small and mid-size businesses - voice in NC's energy future**
    a) Include participation of these businesses
        i. Allow the benefits of clean energy improvements to impact them as well

NC Clean Energy Plan Development

Business Working Group

What is your vision of a clean energy future for North Carolina?

State of North Carolina Clean Energy Vision:

- *Proactive* policies and actions
- Facilitate equitable access to renewable and efficiency energy options
- Include all NC businesses, municipalities, universities, nonprofits
- Catalyst for innovation, new business and continued economic development
- Strengthen our resiliency to natural threats
- Preserve opportunities for future generations
- Execute in a Bipartisan way

NC Clean Energy Plan Development

Business Working Group

What three features of the existing system do you see as challenges to deployment of clean energy resources that should be addressed going forward?

1. Lack of 3rd party sales and state incentives to encourage expansion of clean energy generation

2. Duke Energy interconnection approval process & rates they are willing to pay for qualified systems as well as general access to utility data.

3. Political Will

NC Clean Energy Plan Development

Business Working Group

What three features of the existing system do you want to ensure are maintained going forward to support deployment of clean energy resources?

1. Reliability, Safety, Affordability

2. REPS

3. Continued investment in smart grid and smart metering technologies

Any Questions?

Higher Education Working Group

April 1 Clean Energy Plan Workshop

Higher Education Working Group

Working Group Members

- Robert Cox, UNC Charlotte
- Erik Hall, NC State
- Shanna Harwell, NC State
- Walter Robinson, NC State
- Jaimie Russell, App State
- Jen Weiss, Duke University

Our Process

- Include public universities, private colleges and universities, and community colleges.
- Sent out a “survey” to over 250 higher education facility managers, sustainability directors and faculty.
- Received 45 total responses

Higher Education's 3 Top Priority Goals

- Facilities management:
  - Each higher education institution will develop an internal operation plan to go beyond the Executive Order 80 goal of 40 percent reduction in energy use.
- Research:
  - Faculty, staff and students will research clean energy opportunities that will support building sustainability leaders throughout the state.
- Education:
  - Faculty, instructors, and extension agents will educate students, decision-makers and the general public on these clean energy opportunities.

Motivating Factors

- We are educating our leaders of the future. We need to insure that they are both informed about and committed to carbon neutrality and global warming.
- There is an absolute lack of skilled tradespeople needed to build and run current and future energy systems. We HAVE TO make North Carolina a leader in vocational education for energy.
- Our children’s future is my motivating factor.

Clean Energy Vision 2025: “Tweets from the Future”

- “A university in which roofs are solar gathering elements and buildings receive their cooling and heating from solar and renewable systems and all street lights use solar-based motion detector LEDs, and wind enhancement elements that tap energy from wind movement.”
- “Students seek out UNC System institutions and employers hire our graduates because we model what innovating for sustainability looks like (and the critical/creative/systems thinking that enables this...).”
- “Finally -- they let us buy clean, green power! And it will be generated mostly in North Carolina. Hard to believe there were people who said it couldn't be done -- charging up all our electric cars was too big a market to pass up.”
- "We just opened our third NetPositive building today on our campus, using state of the art PV energy storage, and high efficient geothermal systems, & repurposing of all rainwater. Thanks #NCCleanEnergyPlan for all your work these past 5-years!"

Top 3 Challenges and Opportunities

Top 3 Challenges

1. State Level
   a. First cost of Renewables
   b. DEP Monopoly of Electrical production and distribution
   c. Reliance on natural gas

2. University Level
   a. Carbon fuel infrastructure
   b. No Strategy/Leadership
   c. Funding dedicated to RE

Top 3 Opportunities

1. State Level
   a. Reliable energy transmission/distribution
   b. Net/Smart metering
   c. PUC Oversight

2. University Level
   a. Strategic Planning
   b. District Energy/Cogen
   c. Energy Research

Ares of Consensus and Non-Consensus

Consensus

1. The state requires that new building Operating and Maintenance (O&M) costs be calculated only out for 10 years, an excessively short life-cycle that leads to short-sighted design decisions based on lower first cost.
2. Commonly available "flexible" utility options in the state are fueled by natural gas fired Combined Cycle Gas Turbines (CCGT), leading to a future in which the state becomes dependent on natural gas as opposed to renewable energy options.
3. Utilities oversight, regulation, and incentives for renewables.

Non-consensus

1. Greater consideration of nuclear power

DASHE – Design Application for Sustainable Higher Education

- Using a participatory design methodology to create multiple models of clean energy futures for North Carolina's higher education system.
- Bridging the gap between visions of a sustainable future and the current state of higher education.
- Create a platform that will allow all stakeholders including students, faculty, staff, and the general public to access campus energy data along with technically feasible clean energy options plus estimated costs. Participants can create numerous variants of clean energy futures. Using crowd sourced inspiration and aspirations of a sustainable future coupled with the real-world data to create realistic solutions.
- Precedents:
  - Block by Block <blockbyblock.org>
  - UT Austin LCOE Calculators <energy.utexas.edu/calculators>

Any Questions?

Breakout Groups Topic Areas

1. Customer access to renewables
2. DER interconnection and compensation
3. Grid modernization to support clean energy
4. Utility business model (e.g., how utilities are currently incentivized)
5. Utility system planning and investment
6. Equitable access and just transition clean energy
7. Grid resiliency enhancements
8. Clean energy economy

Questions for Breakout Groups

Regarding your topic, please discuss:

- What are *three* key current policies, regulations, or structures that are **working well**, and why?
- What are *three* current policies, regulations, or structures that **are not working well**, and why?

Breakout Group Discussion Question

- Identify one **interdependency** between a policy, regulation, or structure you identified within your group and that of another group?

Check-Out

What is one insight from today's work that you are looking forward to discussing further in the upcoming workshops?

Next Steps