

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-2, SUB 1262

DOCKET NO. E-7, SUB 1243

In the Matter of

Joint Petition of Duke Energy)	DIRECT TESTIMONY OF
Carolinas, LLC and Duke Energy)	BARRY M. ABRAMSON,
Progress, LLC Issuance of Storm)	CFA, SENIOR ADVISOR –
Recovery Financing Orders)	SABER PARTNERS, LLC

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

Docket No. E-2, Sub 1262

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Direct Testimony of

Barry M. Abramson, CFA, Senior Advisor

Saber Partners, LLC

December 21, 2020

INDEX TO TESTIMONY

1	Introduction	2
2	Establishing The Ratepayer-Backed Bond Program For North Carolina	
3	Utilities	8
4	Importance of an Initial Ratepayer-Backed Bond Offering	15
5	Difference Between a Traditional Utility Debt Offering and a Ratepayer-	
6	Backed Debt Offering.....	18
7	CONCLUSION	21
8	Hurricane season ends historic as predicted by experts back in April Error!	
9	Bookmark not defined.	
10	Most groups predict an above-average hurricane season	26

INTRODUCTION

- 11 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**
- 12 A. Barry M. Abramson, Saber Partners, LLC, 260 Madison Avenue,
- 13 Suite 8019, New York, New York 10016.

1 **Q. BY WHOM ARE YOU EMPLOYED AND WHAT IS YOUR**
2 **POSITION?**

3 A. I am with Saber Partners, LLC, and serve as a Senior Advisor.

4 **Q. PLEASE DESCRIBE YOUR DUTIES AND RESPONSIBILITIES IN**
5 **THAT POSITION.**

6 A. I serve in a senior advisory position which includes participating in
7 business strategy and procurement of new business; meeting with
8 Saber Partners' clients and potential clients; meeting with senior
9 officers of the utilities, public utility regulatory commissions,
10 commission staffs, and investment banks with which we work, and
11 assisting in the development and review of presentations we make
12 to our clients and potential clients. I closely follow many utilities,
13 public service commissions, federal utility regulators, and state and
14 federal legislation that may affect utilities.

15 **Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND**
16 **PROFESSIONAL EXPERIENCE.**

17 A. I have a bachelor's degree in economics from Yale University. I have
18 a Certified Financial Analyst (C.F.A.) designation from the Institute
19 of Chartered Financial Analysts.

20 I have covered the U.S. utilities sector from the investment side for
21 more than 40 years.

1 From 1977 continuously through 2002, I worked for various Wall
2 Street investment banking firms in the equity research department,
3 always as an analyst covering electric and gas utilities stocks.

4 From 2002 continuously through 2016, I worked in two large money
5 management firms as an analyst and portfolio manager, managing
6 large portfolios that invested primarily in electric and gas utility
7 stocks, and secondarily in electric and gas utility debt securities.

8 During my 25 years on Wall Street, I worked at the following major
9 investment banking firms in the equity research department, in
10 chronological order, at Kidder, Peabody & Company, Merrill Lynch,
11 Goldman Sachs, Prudential Securities, PaineWebber, and UBS
12 Securities.

13 During my 14 years as a portfolio manager, I invested billions of
14 dollars primarily in U.S. utility stocks, and secondarily in utility debt
15 securities. I worked first at a large mutual fund company, Gabelli
16 Funds, and then at the world's largest sovereign wealth fund, Norges
17 Bank Investment Management.

18 In 2016, I joined Saber Partners, LLC, as a Senior Advisor, analyzing
19 electric and gas utilities.

20 I am one of the only electric and gas utilities analysts who has worked
21 for long periods of time at both Wall Street firms and at large money

1 management firms. In the parlance of the investment community, I
2 have lengthy experience with both the Buy Side and the Sell Side.

3 **Q. WHOM DO YOU REPRESENT IN THIS PROCEEDING?**

4 A. I represent Saber Partners, LLC, that has been hired by the Public
5 Staff of the North Carolina Utilities Commission to provide an
6 independent evaluation and opinion as to benefits to North Carolina
7 ratepayers from using best practices in the upcoming securitized
8 debt offerings, related to recovery of storm damage costs, for both
9 Duke Energy Carolinas, LLC (DEC) and Duke Energy Progress, LLC
10 (DEP).

11 **Q. ARE YOU SPONSORING ANY EXHIBITS?**

12 A. Yes. I am sponsoring the following exhibits:

13 Abramson Exhibit 1, Effects of Climate Change on the Southeast, a
14 study by North Carolina State University.

15 Abramson Exhibit 2, "What Climate Change Means for North
16 Carolina", a 2016 report from the U.S. EPA.

17 Abramson Exhibit 3, "Hurricane season ends historic as predicted by
18 experts back in April," about the 2020 hurricane season.

19 Abramson Exhibit 4, "The Missing Piece in the Climate Change Risk
20 Puzzle", an April 2020 report from Morgan Stanley.

1 In addition, except as otherwise defined in this testimony, terms have
2 the meanings assigned to them in the Glossary, attached as the final
3 exhibit to the testimonies of Public Staff witnesses Joseph Fichera
4 and Paul Sutherland.

5 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

6 A. **Investor Perception.** The purpose of my testimony is to describe
7 the potential impacts on investor perception for both equity and debt
8 investors in Duke Energy Corporation (DUK) and its subsidiary
9 companies, from optimizing the benefits of a securitization offering
10 to ratepayers of the respective utility subsidiaries. In particular, to
11 provide my independent opinion on how the stock prices, bond
12 prices, and investor perception would benefit from a securitization
13 offering that maximizes the benefits to ratepayers. Better investor
14 perception usually leads to better stock and bond prices for both
15 existing securities and new offerings, resulting in a lower cost of
16 capital, which benefits ratepayers.

17 **Achieving the Best Possible Outcome For Ratepayers Is Also**
18 **Good For Relations Between the Utility and its Regulators, A**
19 **Key Factor For Investors.** In addition, a securitization bond offering
20 that provides ratepayers the best possible outcome –namely the
21 greatest savings – would be viewed favorably by state regulators, in
22 my opinion. Knowledgeable, long-term investors in utility stocks and
23 bonds understand that a good regulatory environment is important to

1 the long-term success of their investments in regulated monopolies.
2 These investors understand the give-and-take of utility regulatory
3 proceedings, whereby neither the utility nor the ratepayer can get
4 100% of what they ask for – and yet still achieve – an outcome that
5 benefits both sides.

6 **Benefits of Involving an Independent Expert Financial Advisor.**

7 My testimony also aims to explain why using an independent expert
8 financial advisor, acting solely in the interests of the ratepayers,
9 would result in the greatest potential savings to ratepayers and
10 produce a transaction that satisfies the goals of the NCUC and the
11 Public Staff. In other words, in the traditional sense, an independent
12 financial advisor does not have a financial interest in the outcome of
13 the transaction and is not a beneficiary of the bond offering.

14 **A Programmatic Approach: This Is The First Of Many Storm**
15 **Damage Securitizations And Why It Matters For Future**
16 **Securitizations in North Carolina.** Significant storm damage is

17 likely to occur again in North Carolina, and probably with more
18 frequency and severity, due to the impacts of climate change. My
19 testimony addresses why achieving the optimal result in this first
20 storm damage securitization financing is extremely important for
21 achieving the best results again and again, in likely future storm
22 damage securitizations in North Carolina. I believe that investors in
23 The Companies, and in the holding company, Duke Energy should

1 view this, the first securitization of significant storm damage costs in
2 North Carolina, as not the last such securitization. I further believe
3 that these same investors should consider the ability of The
4 Companies to continue to use securitization of storm damage costs
5 in the future as a factor that reduces investment risk in the bonds the
6 companies and the stock and bonds of Duke Energy.

7 **Q. HAVE YOU TESTIFIED IN OTHER STATES IN THIS SUBJECT**
8 **MATTER?**

9 A. Yes. In 2018, I submitted testimony representing Saber
10 Partners before the California Public Utilities Commission. Saber had
11 been hired by the California Community Choice Association to
12 evaluate the risks and benefits of securitization to the consumers and
13 shareholders of the California utilities, and to explain how
14 securitization can be used to balance the interests of ratepayers and
15 investors.

16 **ESTABLISHING THE RATEPAYER-BACKED BOND PROGRAM**
17 **FOR NORTH CAROLINA UTILITIES**

18 **Q. WHY ARE YOU SAYING THAT YOU BELIEVE THIS WILL BE THE**
19 **“FIRST OF MANY” SECURITIZATIONS TO RECOVER STORM**
20 **DAMAGE COSTS IN NORTH CAROLINA?**

21 A. The current financing of Ratepayer-Backed Bonds should not be
22 viewed as a one-time event. It is likely that there will be additional
23 Ratepayer-Backed Bond financings for storm damage costs, likely to

1 occur every few years in North Carolina. There are five reasons I
2 believe that storm damage costs will keep rising in the next several
3 years:

4 1. **Weather and Climate Change.** Looking at the weather from
5 recent years in the Atlantic Ocean region, and from my
6 reading of many experts' articles about Climate Change (of
7 which I am not an expert), I conclude that North Carolina will
8 experience storms with greater frequency and with greater
9 severity).¹

10 2. **Growth in Number of Customers.** The Companies continue
11 to experience growth in the number of customers. Therefore,
12 even if the future brings storms of the same severity and
13 frequency as the recent past, the number of customers
14 impacted will keep on growing because of growth in the
15 region. DEC had customer growth of 2.1% in 2019 and 1.5%
16 in 2018 (from Page 37 of the Duke Energy 2019 SEC

¹ There are innumerable articles (and news reports) to support the point of climate change and potential impacts for future storms in North Carolina. Three examples include these that are included as Abramson Exhibits 1, 2 and 3:

"Effects of Climate Change on the Southeast," <https://climate.ncsu.edu/edu/Impacts>

"What Climate Change Means for North Carolina,"
<https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-nc.pdf>

"Hurricane season ends historic as predicted by experts back in April,"
<https://www.cnn.com/2020/11/30/weather/record-breaking-atlantic-hurricane-season-wrap-up/index.html>

1 Form 10-K). DEP had customer growth of 1.3% in 2019 and
2 1.5% in 2018 (from Page 40 of the Duke Energy 2019 SEC
3 Form 10-K).

4 3. **Inflation.** Assuming normal rates of inflation for materials and
5 labor costs, storm damage expenses can only rise.

6 4. **Work From Home.** A large number of ratepayers of The
7 Companies learned during the 2020 Covid-19 pandemic that
8 they can do their jobs by working from home (WFH). It is likely
9 that many of these workers and their employers will continue
10 to prefer the benefit of WFH. Some forecasters have predicted
11 that this trend of WFH may remain widespread even after the
12 Covid-19 pandemic is over. I believe that this puts more
13 pressure on utilities to restore service after a major storm,
14 even faster than before, because more workers will be doing
15 their jobs remotely. A multi-day power outage becomes more
16 costly to a WFH customer than merely a refrigerator full of
17 spoiled food.

18 5. **Electric Vehicle Market Growth and EV Infrastructure.** As
19 the number of electric vehicles grows in North Carolina, there
20 will be more pressure on utilities to restore service after a
21 major storm, even faster than before.

1 **Q. HOW LONG HAVE YOU BEEN FOLLOWING DUKE ENERGY**
2 **CORPORATION AS A RESEARCH ANALYST?**

3 A. I have been following Duke Energy for my entire 40+ year career.
4 The current Duke Energy holding company was formed through
5 several mergers and acquisitions. Thus, I have also followed the
6 predecessor companies for more than 40 years, including Duke
7 Power Company, Carolina Power & Light Company, and Piedmont
8 Natural Gas, located in the Carolinas, and the holding company's
9 utilities in Florida, Ohio, Indiana, and Kentucky.

10 Duke Energy (and previously Duke Power Company) has always
11 been a leader in the electric utility industry. This leadership role was
12 not merely due to the company's size, but also because it was
13 regarded as one of the premier engineering and operating utilities in
14 the U.S., in both fossil fuel operations and nuclear power operations.
15 As most long-time followers of this industry are aware, the company's
16 legendary Chairman, President, and CEO Bill Lee (William S. Lee,
17 III) led the efforts to recover, shut down, and stabilize the Three Mile
18 Island Nuclear Plant in 1979 (which was not a Duke Power asset).
19 When the Edison Electric Institute needed to reassure utility stock
20 and bond investors in 1986, soon after the Chernobyl Nuclear
21 Disaster in the Soviet Union, it called upon Duke Power's Bill Lee to
22 come to New York and address hundreds of nervous utility analysts
23 and institutional investors.

1 **Therefore, I believe that the holding company and the North**
2 **Carolina operating companies would not suffer any decline in**
3 **stature if they agreed to a collaborative process, like the holding**
4 **company used for the 2016 issuance of Ratepayer-Backed**
5 **Bonds for Duke Energy Florida. In the 2016 financing in Florida,**
6 **Duke Energy Florida agreed to use a collaborative bond team**
7 **that included an independent financial advisor.**

8 **Q. WHAT DO INVESTORS LOOK FOR WHEN DECIDING WHETHER**
9 **TO OWN AND INVEST IN A UTILITY STOCK AND/OR A UTILITY**
10 **BOND?**

11 A. From investments in utility common stocks, investors seek relatively
12 low risk, low stock market volatility, and stability and predictability of
13 earnings and dividends. In addition, most investors choose common
14 stocks for long-term growth in earnings and dividends, which should
15 drive stock values higher. Even though U.S. utility stocks are not
16 considered a high-growth sector, in the long run they have produced
17 steady, modest growth for investors.

18 In general, U.S. utility common stocks have been attractive to
19 income-oriented investors, whether they are institutional investors
20 (pension funds, mutual funds, endowments) or individual investors
21 who need dividend income. During periods of low interest rates,
22 many investors view utility stocks as a substitute for investments in
23 debt securities. Even during periods of moderate to high interest

1 rates, many investors are attracted to utility stocks as a bond
2 substitute because most utility stocks have historically raised their
3 dividends annually, providing growing income to investors versus
4 fixed-income securities (i.e., debt securities).

5 Bond investors also seek out utility bonds for similar reasons, but
6 without the growth that can be achieved from rising dividends.
7 Relatively low risk, low market volatility and stability of cash flows
8 and earnings, make utility bonds attractive to risk-averse investors.

9 Looking at the two recent extraordinary financial/investor crises,
10 utilities did not suffer from fundamental or existential threats. During
11 the 2008-2009 Financial Crisis/Great Recession, utilities did not
12 require financial bailouts and their earnings, cash flows and
13 dividends, held up quite well. The same can be said for the Covid-19
14 financial and economic crash of 2020, when many industries other
15 than utilities required financial support and in some cases life
16 support.

17 These recent examples bolster the general belief that buying the
18 stocks and bonds of regulated utilities is a relatively low-risk
19 investment.

1 **Q. HOW DO INVESTORS IN UTILITY STOCKS AND BONDS VIEW**
2 **SECURITIZATION IN GENERAL?**

3 A. Institutional investors, and others who closely follow the utility sector,
4 do not like uncertainty. A very large unrecovered expense is
5 considered a risk. Investors want companies to avoid large write-offs
6 because that can hurt the balance sheet, hurt bond ratings, and could
7 require new common stock to be issued by the holding company that
8 might be dilutive to shareholder earnings.

9 In addition, investors like to see earnings growth in a utility, and they
10 understand that rate base growth leads to growth in earnings, which
11 benefits equity investors and bond holders. However, rate base
12 growth requires utilities to apply for rate increases in order to include
13 the new investments in rates. Rate increases, even when they are
14 justified, are never popular.

15 Therefore, securitization that enables a utility to recover significant
16 costs with the smallest impact on rates, is considered a positive. It is
17 then assumed that when future rate increases are needed to include
18 large new projects into rate base, it will be easier for regulators to
19 approve these necessary rate increases.

20 Furthermore, securitization enables the utility to receive the cash
21 proceeds upfront, after the closing of the securitization bond sale.

22 This is better than having to recover the expense over a period of

1 several years. By receiving the cash quickly, the utility has funds that
2 it can use to reinvest and grow its rate base.

3 **Importance of an Initial Ratepayer-Backed Bond Offering**

4 **Q. WHY IS THIS INITIAL PUBLIC OFFERING OF RATEPAYER-**
5 **BACKED BONDS FOR STORM DAMAGE COSTS IN NORTH**
6 **CAROLINA SO IMPORTANT TO INVESTORS IN DUKE ENERGY**
7 **AND DEP AND DEC? AND HOW DOES THIS FIT INTO THE**
8 **GROWING ASSESSMENT OF FINANCIAL RISKS OF CLIMATE**
9 **CHANGE FOR INVESTORS?**

10 **A.** Utility stock and bond investors are mostly risk-averse. There is a
11 broad market of stocks and bonds across many industries. When
12 investors want secure income streams with relatively low risk, they
13 often choose regulated utility stocks and bonds. Investors look at a
14 number of fundamentals when deciding to invest in the securities of
15 a particular utility, including, but not limited to, financial quality, fuel
16 mix, management quality, projected growth in earnings and cash
17 flows, projected growth in the service territory, the company's
18 strategic plans, and an assessment of the regulatory relations
19 between the company and its regulators in the states in which the
20 utility serves.

21 A new financial risk that has grown in importance is climate change.
22 In recent years, across all industries (not just utilities), most large

1 institutional investors have added climate change to the list of
2 fundamental factors that they assess in making investment
3 decisions.²

4 DEP is in many ways a coastal utility that has been significantly
5 impacted by large storms. DEC has a large territory, and while not
6 as close to the coast as DEP, DEC also has been significantly
7 impacted by large storms, such as Hurricane Hugo. Therefore, the
8 financial risk associated with climate change is likely to be
9 considered to a greater degree by investors in the holding company
10 Duke Energy and in its operating utilities in North Carolina and in
11 other coastal states, compared with investing in utilities in different
12 regions of the U.S.

13 These large institutional investors would consider the ability to
14 securitize significant storm damage costs as a factor that reduces
15 the financial risk of climate change to Duke Energy and its operating
16 subsidiaries.

17 As I stated earlier in this testimony, I believe that the current storm
18 damage securitization financing in this docket should be considered
19 the first of many. As also earlier stated, multiple studies by climate

² Here's a recent article about incorporating climate-change risks into the investment decision process from Morgan Stanley's Institute for Sustainable Investing, "The Missing Piece in the Climate Change Risk Puzzle," April 15, 2020, <https://www.morganstanley.com/ideas/climate-change-investing-risks-threats-opportunities>

1 scientists have predicted that the rising ocean temperatures will
2 result in storms that are more frequent and more severe.

3 Investors read these studies and use them to assess risk. There are
4 dozens of utilities in the U.S. from which investors can choose to
5 invest. Therefore, I believe that the ability to securitize significant
6 storm damage costs is an important factor that will make the holding
7 company Duke Energy, and its subsidiaries in North Carolina, more
8 attractive to investors.

9 **Q. WHY SHOULD THE INVESTOR IN DUKE ENERGY, DEC AND**
10 **DEP, BE CONCERNED ABOUT WHETHER A RATEPAYER**
11 **REPRESENTATIVE WITH AN INDEPENDENT FINANCIAL**
12 **ADVISOR IS USED IN THE PROCESS TO ACHIEVE THE**
13 **GREATEST POSSIBLE SAVINGS FOR RATEPAYERS IN THIS**
14 **SECURITIZATION DEBT OFFERING?**

15 A. Institutional investors understand the importance of good
16 relationships between utilities and their regulators. Utilities with large
17 capital spending programs are likely to require rate increases as new
18 investments lead to rate base growth. Duke Energy, the holding
19 company, reaffirmed its commitment to a large capital spending
20 program of \$56 billion over the next five years in a July 5, 2020 press
21 release. This followed the announcement on the same day that Duke
22 Energy and its partner Dominion Energy were cancelling the Atlantic

1 Coast Pipeline. Then in October 2020, the holding company raised
2 its 5-year capital spending forecast to \$58 billion.

3 It is my estimate that approximately 40%-50% of the \$58 billion five-
4 year capital spending program will be invested in the holding
5 company's two North Carolina electric utilities, combined. Therefore,
6 the rate bases of The Companies, are likely to grow fast enough to
7 require rate increase filings every one to two years, in my estimation.

8 **DIFFERENCE BETWEEN A TRADITIONAL UTILITY DEBT**
9 **OFFERING AND A RATEPAYER-BACKED DEBT OFFERING**

10 **Traditional utility debt offering.** In a traditional utility debt financing,
11 the utility has a strong incentive to achieve the lowest cost for the
12 debt, because it is directly responsible for the payment of the
13 principal and interest. Another reason why the utility wants the lowest
14 cost of debt is to keep utility service rates to customers as low as
15 possible, which is good for regional economic growth, customer
16 relations, and relations with state regulators. The current and future
17 stockholders and bondholders of the utility also benefit when the new
18 debt issuance achieves the lowest cost of financing, because then
19 there is more cash flow left over for coverage ratios on all of the
20 traditional debt (non-securitized debt) and also more earnings for
21 shareholders and for payment of common stock dividends.
22 Therefore, the utility and its investors, and its ratepayers all have a
23 stake in the outcome of the structure and pricing of a traditional utility

1 debt offering. In a traditional utility debt offering, the utility hires an
2 investment banking firm for advice and for execution of the
3 transaction. Because the utility's equity investors have a stake in the
4 outcome of the traditional debt financing, there should be pressure
5 on the investment bankers from the utility, to achieve the best
6 outcome.

7 **Ratepayer-Backed Bond offering is fundamentally different.** In a
8 securitization bond offering, the utility is not directly responsible for
9 the payment of the principal and interest. The utility is allowed by law
10 to collect a separate, non-bypassable charge from every ratepayer
11 to cover the principal and interest on the securitized bonds.
12 Therefore, the ratepayer and only the ratepayer is directly
13 responsible for the payment of the principal and interest on the
14 Ratepayer-Backed Bonds. This responsibility is on a joint basis. This
15 means if one ratepayer defaults on paying the charge, that amount
16 is allocated to other ratepayers who haven't defaulted until the bonds
17 are repaid in full. Even though the utility indirectly has a desire to
18 achieve the lowest cost of the securitization financing, the utility has
19 no direct financial stake in the final structuring and costs of the
20 Ratepayer-Backed Bond offering.

21 This is a critical distinction in how the capital markets work. When
22 one of the parties has no financial stake in the outcome of the pricing
23 process, the results can become skewed in the direction of the party

1 that does have a financial stake in the outcome. In this case that
2 would be the underwriters and the investors.

3 **Q. HOW ARE WE GUARANTEED THAT THE RATEPAYER'S**
4 **DIRECT FINANCIAL INTEREST IS REPRESENTED IN THE**
5 **SECURITIZATION BOND TRANSACTION?**

6 The utility has hired a financial advisor and investment banking firm
7 to advise, structure, market, and price the securitization bond
8 offering. None of these parties has a direct financial stake in the
9 outcome. We are asked to assume that these parties have the best
10 interests of the ratepayer in mind. The interest of the ratepayer is
11 represented by the Public Staff, with the final authority impacting
12 ratepayers vested in the Commission (NCUC). However, this is the
13 first ever storm damage securitization bond offering in North
14 Carolina. The utility has hired its experts, the investment bankers.
15 The Public Staff has hired their outside independent experts, Saber
16 Partners.

17 The companies and their expert witnesses, have not proposed to
18 include the NCUC or the Public Staff and its outside independent
19 experts, Saber Partners, in the process of structuring and pricing this
20 securitization bond offering. The ratepayer is the only party with a
21 direct financial stake in the outcome of the transaction. Because of
22 the statutory, non-bypassable charge, The Companies do not have
23 a direct financial stake in the pricing of this transaction. The

1 ratepayer, through the Public Staff, has hired outside independent
2 experts who have experience in structuring and pricing of
3 securitization bond offerings.

4 Therefore, as an independent financial analyst, I am concerned
5 about investor perception if the NCUC and the Public Staff are
6 excluded from the most important part of this financial transaction,
7 and the resulting impact on the relationship between the utility and
8 regulatory bodies. They are being asked to take the word of the
9 parties that do not have a material direct financial stake, that they did
10 achieve the lowest possible cost for ratepayers.

11 My colleagues, Rebecca Klein, Hyman Schoenblum, and William
12 Moore also have provided testimony in this proceeding. As a former
13 regulator and utility finance executives, respectively, they explained
14 why they believe that the Public Staff and its independent financial
15 advisor should be included in the structuring, marketing, and pricing
16 of the securitized storm cost recovery bonds through the bond team
17 process before the Commission makes the final decision on whether
18 the bonds should be issued.

19 **CONCLUSION**

20 **Include the Public Staff and its independent expert (Financial**
21 **Advisor) in the structuring, marketing and pricing.** From the
22 investor's point of view, as I have stated earlier, regulated

1 monopolies should make every attempt to maintain good
2 relationships with their regulators. There is no additional cost to the
3 companies' shareholders resulting from inclusion of the Public Staff
4 and its independent financial advisor, Saber Partners, in the process
5 of the structuring and the pricing of this securitized bond offering,
6 therefore go ahead and include the representatives of the
7 ratepayers.

8 **Q. DO YOU AGREE WITH THE COMMENT FROM THE COMPANIES'**
9 **WITNESS CHARLES ATKINS IN RESPONSE TO PS-DR6 THAT**
10 **PUBLIC STAFF SHOULD BE EXCLUDED BECAUSE**
11 **INTERVENORS SHOULD NOT BE INVOLVED IN PRICING,**
12 **STRUCTURING AND MARKETING OF THESE BONDS?**

13 A. In more than 40 years of following the regulated utility industry in the
14 U.S., I have looked at hundreds of utility rate cases and other
15 regulatory proceedings. In nearly every instance, there were one or
16 more intervenors in the rate case. Most of the time, these intervenors
17 were outsiders, pursuing a narrow agenda. Outside intervenors
18 typically represent a small segment of utility customers and/or these
19 outside intervenors are promoting a particular social, environmental,
20 or political agenda.

21 **THE PUBLIC STAFF IS NOT AN OUTSIDE INTERVENOR.**

22 The Public Staff in North Carolina was established by state law, with
23 a mandate to work on behalf of the public in matters of utility rates

1 and services. Therefore, I disagree with the blanket dismissal by the
2 utility's witness who declares that the Public Staff should not be
3 included in the Bond Team.

4 NC Gen. Stat. § 62-15 ("Office of executive director; public staff,
5 structure and function") provides in-part:

6 (d) It shall be the duty and responsibility of the
7 public staff to:

8 (1) Review, investigate, and make appropriate
9 recommendations to the Commission with respect to
10 the reasonableness of rates charged or proposed to be
11 charged by any public utility and with respect to the
12 consistency of such rates with the public policy of
13 assuring an energy supply adequate to protect the
14 public health and safety and to promote the general
15 welfare;

16 (2) Review, investigate, and make appropriate
17 recommendations to the Commission with respect to
18 the service furnished, or proposed to be furnished by
19 any public utility;

20 (3) Intervene on behalf of the using and consuming
21 public, in all Commission proceedings affecting the
22 rates or service of any public utility.

23 **Q. CAN THE NCUC COMMISSIONERS AND THE COMMISSION**
24 **STAFF BENEFIT IN OTHER WAYS FROM HAVING A DIRECT**
25 **INVOLVEMENT IN THE PROCESS OF THE STRUCTURING**
26 **MARKETING AND THE PRICING OF THIS SECURITIZED BOND**
27 **OFFERING?**

28 A. The commissioners do not receive lifetime appointments to the
29 NCUC. Most of the commissioners will be involved in storm

1 securitization financings at least one or two times during their tenure
2 and possibly more. However, the staff of the Commission and Public
3 Staff are professionals who typically remain in their positions many
4 more years than the commissioners serve. As a positive side effect,
5 I believe that the decision-making and knowledge-base of the NCUC
6 and Public Staff will be enhanced by direct involvement in the
7 structuring, marketing, and pricing of this first ever storm damage
8 cost securitization in North Carolina. Experience of this nature will
9 make the NCUC commissioners and staff better in understanding
10 and overseeing future securitization bond financings.

11 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

12 **A.** Yes. Exhibits are attached beginning on the following page



[OFFICE ▼](#) [EDUCATION ▼](#) [DATA SERVICES ▼](#) [TOOLS ▼](#) [NEWS ▼](#) [SEARCH \(/SEARCH/NODE\)](#)

EFFECTS OF CLIMATE CHANGE ON THE SOUTHEAST

Education Menu

[Education Home \(/edu/home\)](/edu/home)

▼ [Background and Basics \(/edu/Background\)](/edu/Background)

[Climate and Weather \(/edu/Climate\)](/edu/Climate)

[Tilt and Latitude \(/edu/Tilt\)](/edu/Tilt)

- › [Atmospheric Properties \(/edu/Properties\)](/edu/Properties)
- › [Energy Transfer \(/edu/EnergyTransfer\)](/edu/EnergyTransfer)
- › [The Atmosphere \(/edu/Atmosphere\)](/edu/Atmosphere)
- › [Understanding Weather Patterns \(/edu/Patterns\)](/edu/Patterns)
- › [Weather Forces \(/edu/Forces\)](/edu/Forces)
- › [The Water Cycle \(/edu/WaterCycleHome\)](/edu/WaterCycleHome)
- › [Severe Weather \(/edu/SevereWeather\)](/edu/SevereWeather)
- › [Measuring Weather and Climate \(/edu/Measuring\)](/edu/Measuring)

▼ [Climate Variability \(/edu/Variability\)](/edu/Variability)

› [Circulations \(/edu/Circulations\)](/edu/Circulations)

[Semi-Permanent Highs and Lows \(/edu/HighLow\)](/edu/HighLow)

[Mid-Latitude Cyclones \(/edu/MidLatCyclones\)](#)

[Tropical Cyclones \(/edu/TropicalCyclones\)](#)

[North Atlantic Oscillation \(/edu/NAO\)](#)

[Pacific/North American Pattern \(/edu/PNA\)](#)

[El Niño \(/edu/ElNino\)](#)

[La Niña \(/edu/LaNina\)](#)

› [Southeast Climate Patterns \(/edu/SEPatterns\)](#)

› [Drought and Heat \(/edu/DroughtHeat\)](#)

▼ [Climate Change \(/edu/ClimateChange\)](#)

[Vegetation: Its Role in Weather and Climate \(/edu/Vegetation\)](#)

[Greenhouse Effect \(/edu/GreenhouseEffect\)](#)

› [Greenhouse Gases \(/edu/Greenhouse\)](#)

[Global Warming vs. Climate Change \(/edu/DefineCC\)](#)

[Models \(/edu/Models\)](#)

[Effects of Climate Change on the Southeast \(/edu/Impacts\)](#)

[Index \(/edu/PageIndex\)](#)

[Activities Index \(/edu/Activities\)](#)

The Southeast is experiencing climate change. Generally, temperatures are expected to become warmer with more extreme heat waves. Changes in rainfall are less certain. Sea level rise coupled with increased hurricane intensity could be detrimental to Southeastern coastlines.

Why do I care? The climate is changing in the Southeast, and if you live there, these changes will affect you. However, computer models vary in exactly how and when these changes will occur. For example, average rainfall amounts could increase or decrease and the seasonal patterns and timing of precipitation may change.

I should already be familiar with: [Global Warming vs. Climate Change \(/edu/DefineCC\)](#)

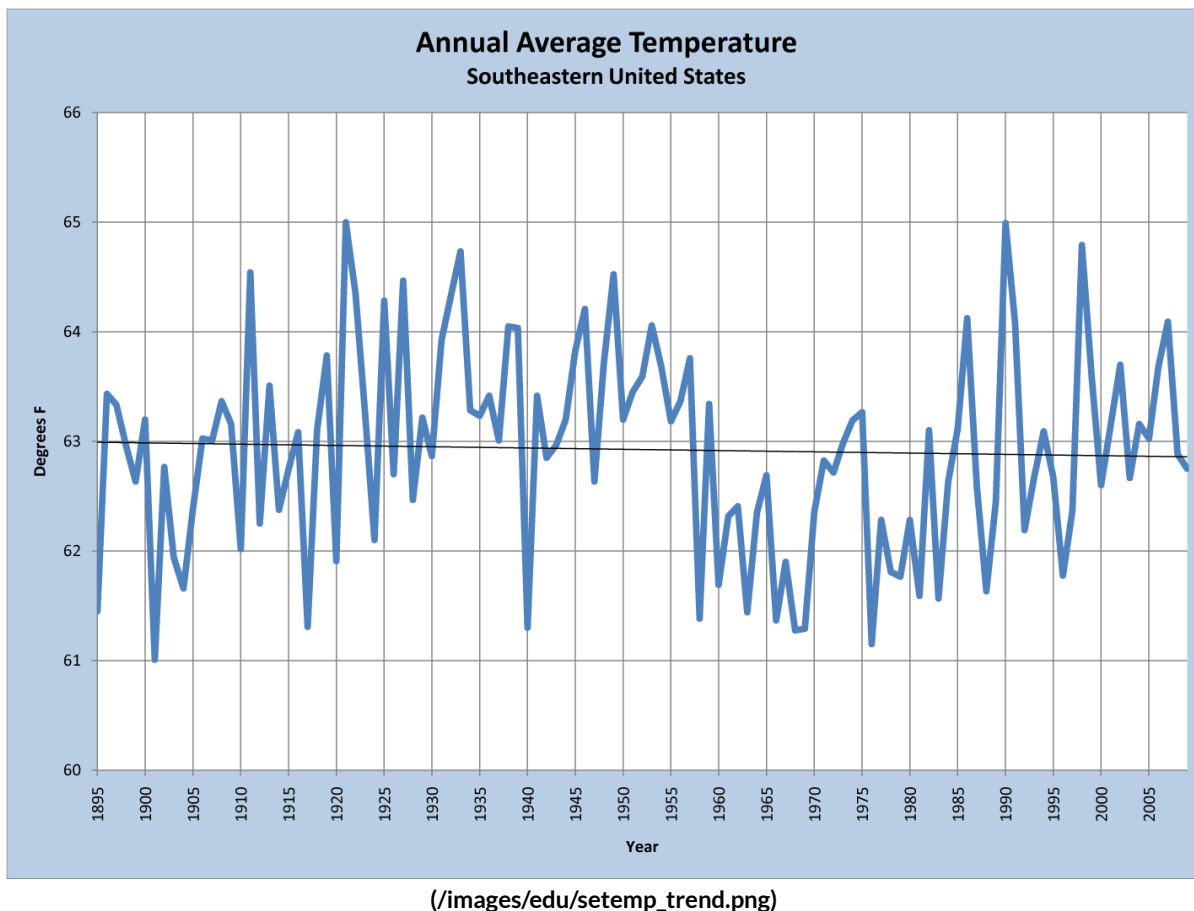


Figure A. Annual average temperature of the southeast United States for the period 1895-2009. The trendline shows a decrease in average temperature.

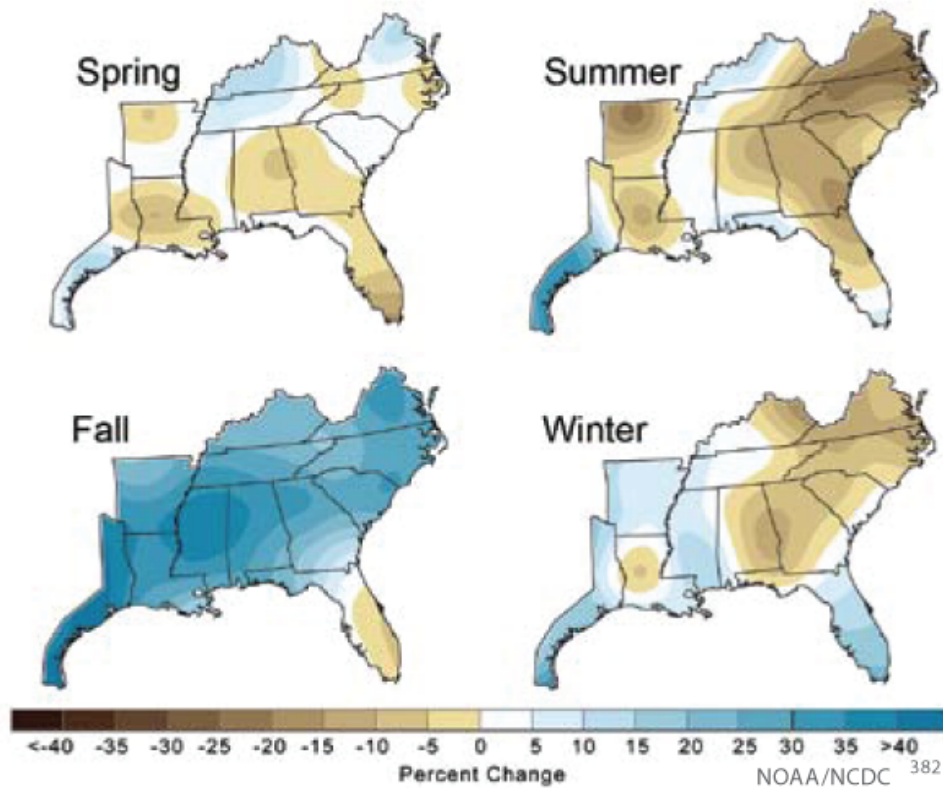
Temperature Changes

Although annual average temperatures across much of the United States are expected to increase in the future, over the past 100 years annual average temperatures in the Southeast have decreased slightly as shown in Figure A. This cooling has been attributed partially to changes in land use over time from bare fields of cotton and row crops in the early 20th century to the present forest stands, which are cooler and moister than open fields.

Over the last 40 years, however, temperatures have increased throughout much of the Southeast. This is true even in rural areas away from cities and suburbs which are becoming more urban in nature over time. Winters are becoming milder, but the summers are also becoming more sweltering. In parts of the Southeast, like northern Georgia, there are 20 fewer days below freezing each year than there were 40 years ago. The number of days above 90°F is expected to almost triple over the next 100 years. This could cause heat stress not only for humans, but animals and crops as well.

Precipitation Pattern Changes

Observed Changes in Precipitation 1901 to 2007



While average fall precipitation in the Southeast increased by 30 percent since the early 1900s, summer and winter precipitation declined by nearly 10 percent in the eastern part of the region. Southern Florida has experienced a nearly 10 percent drop in precipitation in spring, summer, and fall. The percentage of the Southeast region in drought has increased over recent decades.

(/images/edu/precipchanges.png)

Figure B. Map of changes in precipitation by season.

(<http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts>)

Generally, for everyone outside of Florida fall is becoming wetter and all other seasons are the same or becoming drier. Annual average rainfall in many locations is nearly constant, but the rains have been falling in more intense and short-lived episodes, with longer dry spells in between. In some locations rainfall is becoming heavier, but occurrences of drought have also increased by about 10% in the past 40 years. Global climate models have a difficult time predicting whether the rainfall in the Southeast will increase or decrease in the next 100 years, however, because the physical processes that form clouds and rain in the computer models are highly variable and do not do a good job of simulating even the current rainfall well. While water supply from reservoirs is likely to be adequate under good management practices and conservation efforts, more frequent droughts or large population increases will stress the ability of water utilities to meet everyone's needs.

Sea Level Rise



(/images/edu/shorelinech.jpg)

Figure C. Changing shoreline over many centuries. (Image from Carrie Thomas).

There is a potential for the sea level to rise by about two feet off the Southeast coast over the next one hundred years. Not only could this flood low lying areas like barrier islands, but it could also increase the salinity in estuaries, wetlands and tidal rivers. It could also increase vulnerability of coastal areas to the damaging effects of storm surge. Low lying areas that currently flood during heavy rains would likely flood more frequently, and others that don't currently flood may start to experience flooding.

Hurricane Intensity Increases

There is some theory and scientific evidence that hurricanes will increase in intensity in the next hundred years. This would mean more strong hurricanes (CAT3+), and storms that form would have stronger winds and the associated storm surge would be higher, pushing more water inland before and during the storm. This coupled with sea level rise could spell catastrophe for some coastal

communities in the Southeast.

How does this relate to agriculture?

Warmer temperatures would likely result in a change of the ecosystem. Plants that once grew in certain regions will now thrive farther north. Soil moisture could decrease under the higher temperatures and more intermittent rainfall, even if the total amount of rainfall increases. The growing season could increase in length, leading to longer growing periods. Some crops could benefit from warmer temperatures and increased carbon dioxide while others might not. Crops that are already near their temperature limits will be the most affected in terms of yield and quality if temperatures continue to rise. The crops that are not near their temperature thresholds would benefit from warmer temperatures, and would likely increase their yield and quality. Freezes in Florida would be reduced, leading to decreased loss from cold weather, and citrus crops might be able to migrate north of their current range.

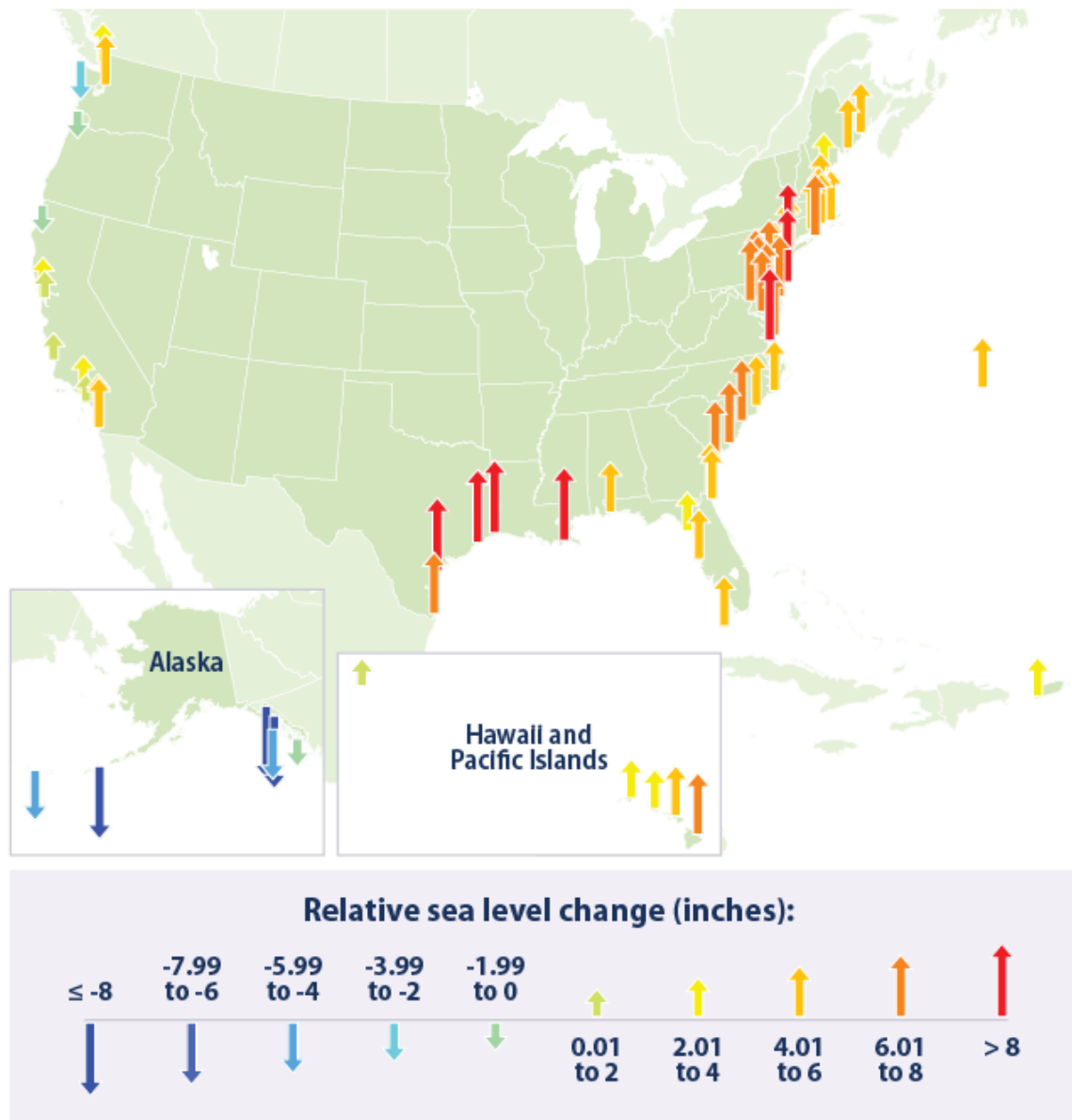
Because of the warmer temperature and potential drying of the soil, irrigation may need to be expanded, or else marginal lands will have to be taken out of production or switched to more suitable crops. Pests could increase in range, necessitating the use of more pesticides. Forests could also die back and change to a more open prairie.

All of these local changes will take place in the context of a world that is also changing in many ways. Economic demands, health issues, coastal changes, energy needs and production methods, and population growth will also be varying in ways that are difficult to predict now. All of these changes will affect the costs of agricultural production and the demand for your products in the future.

How does this relate to public health?

Some of the biggest climate change concerns for public health include rising temperatures, rising sea levels, and increasing intense precipitation events. Mid-latitude cities, such as those in North Carolina, tend to experience greater summer climate variability. These cities are also expected to experience the greatest increase in summertime heat-related deaths as a result of climate change.¹

Relative Sea Level Change Along U.S. Coasts, 1960–2011



Data source: NOAA (National Oceanic and Atmospheric Administration). 2012 update to data originally published in: NOAA. 2001. Sea level variations of the United States 1854–1999. NOAA Technical Report NOS CO-OPS 36. <http://tidesandcurrents.noaa.gov/publications/techrpt36.pdf>.

For more information, visit U.S. EPA's "Climate Change Indicators in the United States" at www.epa.gov/climatechange/indicators.

(/images/edu/sealevel.png)

Figure D. Sea level.

Rising average temperatures and more frequent and more intense heat waves due to climate change are affecting human health in several ways. Most directly, warmer average temperatures and more extreme temperatures put more people at risk for heat-related death and disease, such as heat stroke and dehydration.¹ For example, in North Carolina, the number of heat-related visits to the emergency department increases by 15.8 for every 1°F increase in temperature from 98°F to 100°F.²

Older adults and young children are vulnerable to heat-related illnesses. However, over the past two summers, North Carolina has seen the greatest number of heat-related visits to the emergency department among men ages 25-64.^{3,4} The state of North Carolina has much more rural land mass and less densely populated urban areas than other states, making it less susceptible to the urban heat island effect.^{5,6} In fact, research suggests that in North Carolina, heat-related illnesses are more likely to occur in rural areas than in urban areas.⁷

Rising temperatures may facilitate the melting of glaciers and ice caps in the ocean, contributing to rising sea levels. When coupled with more frequent storm surges, more frequent and intense flooding may result.⁸ These extreme weather events can reduce the availability of drinkable water, compromise the integrity of public health infrastructure, and cause direct death or injury in coastal communities.^{9,10} The North Carolina coast is especially vulnerable to sea level rise, which has risen over a foot in the past 100 years, with large areas of land elevated only a small amount above sea level.¹¹ A one-foot rise in sea levels is correlated with 200 feet of beach erosion in North and South Carolina.⁶

¹Portier CJ, et al. 2010. A human health perspective on climate change: a report outlining the research needs on the human health effects of climate change. Research Triangle Park, NC: Environmental Health Perspectives/National Institute of Environmental Health Sciences. doi:10.1289/ehp.1002272 <www.niehs.nih.gov/climate/report> Accessed November 17, 2012.

²Rhea, S; Ising, A; Fleischauer, AT; Deyneka, L; Vaughn-Batten, H; Waller, A. 2012. Using near real-time morbidity data to identify heat-related illness prevention strategies in North Carolina. *Journal of Community Health* 37:495-500. DOI 10.1007/s10900-011-9469-0.

³North Carolina Division of Public Health, Occupational and Environmental Epidemiology. The 2011 North Carolina heat report. July 2011. <<http://publichealth.nc.gov/chronicdiseaseandinjury/doc/HeatReport-13-2011.pdf>> Accessed November 17, 2012.

⁴North Carolina Division of Public Health, Occupational and Environmental Epidemiology. The 2012 North Carolina heat report. <<http://publichealth.nc.gov/chronicdiseaseandinjury/doc/HeatReport20-2012.pdf>> Accessed November 17, 2012.

⁵Reid CE, O'Neill MS, Gronlund CJ, Brines SJ, Brown DG, Diez-Roux AV, Schwartz J. 2009. Mapping community determinants of heat vulnerability. *Environmental Health Perspectives*. Nov;117(11):1730-1736.

⁶UNC Institute for the Environment, The University of North Carolina at Chapel Hill. 2009. Climate change committee report 2009. <http://www.ie.unc.edu/PDF/Climate_Change_Report.pdf> Accessed November 17, 2012.

⁷Fuhrmann, C.M., Kovach, M.M., and C.E. Konrad II: Heat-related illness in North Carolina: Who's at Risk? Annual Education Conference of the North Carolina Public Health Association, New Bern, NC, September 20, 2013. <http://www.sercc.com/sercc_projects> Accessed December 22, 2012.

⁸Tebaldi, C., Strauss, B. H., & Zervas, C. E. (2012). Modelling sea level rise impacts on storm surges along US coasts. *Environmental Research Letters*, 7(1):014032.

⁹Environmental Protection Agency. Climate change: Human impacts and adaptation. June 14, 2012. <<http://www.epa.gov/climatechange/impacts-adaptation/coasts.html#impactssea>> Accessed November 17, 2012.


¹⁰English, PB; et al. 2009. Environmental health indicators of climate change for the United States: Findings from the State Environmental Health Indicator Collaborative. *Environmental Health Perspectives*. Nov;117(11):1673-1681.


¹¹RENCI at ECU. 2011-2012 focus: Sea level rise. March 29, 2012. <<http://www.ecu.edu/renci/Focus/SeaLevelRise.html>> Accessed November 17, 2012.


Want to learn more?


Greenhouse Effect (/edu/GreenhouseEffect), Greenhouse Gases (/edu/GreenhouseGases)

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 877-684-8056

 sco@climate.ncsu.edu (<mailto:sco@climate.ncsu.edu>)

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2 DAYS 2 HOURS AGO

It may be wet this year, but at this point in 2007, we were deep in drought after a hot and dry spring, summer, and... <https://t.co/hr7njDLkSy> (<https://t.co/hr7njDLkSy>).

1 WEEK 2 DAYS AGO

Check out this podcast with our [@ncstate_ncics](http://twitter.com/ncstate_ncics) (http://twitter.com/ncstate_ncics) colleague in Asheville! <https://t.co/B5yLqwm2E6> (<https://t.co/B5yLqwm2E6>).

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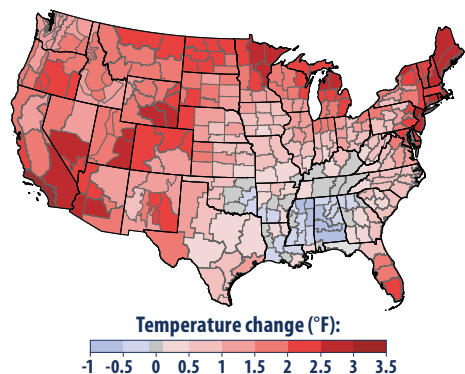
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What Climate Change *Means for* North Carolina

North Carolina's climate is changing. Most of the state has warmed one-half to one degree (F) in the last century, and the sea is rising about one inch every decade. Higher water levels are eroding beaches, submerging low lands, exacerbating coastal flooding, and increasing the salinity of estuaries and aquifers. The southeastern United States has warmed less than most of the nation. But in the coming decades, the region's changing climate is likely to reduce crop yields, harm livestock, increase the number of unpleasantly hot days, and increase the risk of heat stroke and other heat-related illnesses.

Our climate is changing because the earth is warming. People have increased the amount of carbon dioxide in the air by 40 percent since the late 1700s. Other heat-trapping greenhouse gases are also increasing. These gases have warmed the surface and lower atmosphere of our planet about one degree during the last 50 years. Evaporation increases as the atmosphere warms, which increases humidity, average rainfall, and the frequency of heavy rainstorms in many places—but contributes to drought in others.

Greenhouse gases are also changing the world's oceans and ice cover. Carbon dioxide reacts with water to form carbonic acid, so the oceans are becoming more acidic. The surface of the ocean has warmed about one degree during the last 80 years. Warming is causing snow to melt earlier in spring, and mountain glaciers are retreating. Even the great ice sheets on Greenland and Antarctica are shrinking. Thus the sea is rising at an increasing rate.



Rising temperatures in the last century. North Carolina has warmed less than most of the United States. Source: U.S. EPA, Climate Change Indicators in the United States.

Rising Seas and Retreating Shores

As the oceans warm, seawater expands and raises sea level. Melting ice adds more water to the ocean, further raising sea level. Along much of the Atlantic Coast, including parts of North Carolina, the land surface is sinking, so the observed rate of sea level rise relative to the land is greater than the global average rise. Sea level is likely to rise one to four feet in the next century along the coast of North Carolina.

As sea level rises, the lowest dry lands are submerged and become either tidal wetland or open water. Most existing wetlands can create their own land and keep pace with a slowly rising sea. But if sea level rises three feet in the next century, most of the wetlands on the Albemarle-Pamlico peninsula are likely to be submerged by the higher water level.

Beaches also erode as sea level rises. A higher water level makes it more likely that storm waters will wash over a barrier island or open new inlets. The United States Geological Survey estimates that the lightly developed Outer Banks between Nags Head and Ocracoke could be broken up by new inlets or lost to erosion if sea level rises two feet by the year 2100. Eroding shores will threaten most coastal towns unless people take measures to halt the erosion.



Beach houses in Nags Head are vulnerable to severe storms, flooding, and coastal erosion. © James G Titus; used by permission.

Coastal Ecosystems

As sea level rises, salt water can mix farther upstream and farther inland in aquifers and wetlands. Increasing salinity can kill some types of trees found in swamps. Salt water also reacts with some wetland soils, which causes the surface of the wetlands to sink below the water, adding to the loss of wetlands.



Trees killed by increasing salinity near Camden Point. © James G. Titus; used by permission.

Many species of birds and fish in North Carolina depend on coastal wetlands threatened by rising sea level. Blue crabs, shrimp, and southern flounder use marshes for both feeding and evading larger predators. Larger fish such as sea trout and red drum also feed in these marshes. Many types of birds feed on fish in the marsh, including egrets and herons. Wetlands along the Alligator River are the principal habitat in the wild for the endangered red wolf. Pocosin swamps provide refuge for black bears and bobcats, and they help to maintain water quality in the nearby sounds.

Storms, Homes, and Infrastructure

Tropical storms and hurricanes have become more intense during the past 20 years. Although warming oceans provide these storms with more potential energy, scientists are not sure whether the recent intensification reflects a long-term trend. Nevertheless, hurricane wind speeds and rainfall rates are likely to increase as the climate continues to warm.



Water covering front yards near Swan Quarter. © James G. Titus; used by permission.

Whether or not storms become more intense, coastal homes and infrastructure will flood more often as sea level rises, because storm surges will become higher as well. Rising sea level is likely to increase flood insurance rates, while more frequent storms could increase the deductible for wind damage in homeowner insurance policies. Many cities, roads, railways, ports, airports, oil and gas facilities, and water supplies in the Southeast are vulnerable to the impacts of storms and sea level rise. People may move from vulnerable coastal communities and stress the infrastructure of the communities that receive them.

Increased rainfall may further exacerbate flooding in some coastal areas. Since 1958, the amount of precipitation during heavy rainstorms has increased by 27 percent in the Southeast, and the trend toward increasingly heavy rainstorms is likely to continue.

Agriculture

Changing the climate will have both harmful and beneficial effects on farming. During the next few decades, hotter summers are likely to reduce yields of corn. But higher concentrations of atmospheric carbon dioxide increase crop yields, and that fertilizing effect is likely to offset the harmful effects of heat on cotton, soybeans, wheat, and peanuts—if enough water is available. More severe droughts however, could cause crop failures. Higher temperatures are also likely to reduce livestock productivity, because heat stress disrupts the animals' metabolism.

Energy

Seventy years from now, temperatures are likely to rise above 95°F approximately 20 to 40 days per year in most of the state, compared with about 10 days per year today. Greater use of air-conditioning will increase electricity consumption.

Human Health

Hot days can be unhealthy—even dangerous. Certain people are especially vulnerable, including children, the elderly, the sick, and the poor. High air temperatures can cause heat stroke and dehydration and affect people's cardiovascular and nervous systems. Warmer air can also increase the formation of ground-level ozone, a key component of smog. Ozone has a variety of health effects, aggravates lung diseases such as asthma, and increases the risk of premature death from heart or lung disease, so EPA and the North Carolina Division of Air Quality have been working to reduce ozone concentrations. As the climate changes, continued progress toward clean air will become more difficult.

The sources of information about climate and the impacts of climate change in this publication are: the national climate assessments by the U.S. Global Change Research Program, synthesis and assessment products by the U.S. Climate Change Science Program, assessment reports by the Intergovernmental Panel on Climate Change, and EPA's *Climate Change Indicators in the United States*. Mention of a particular season, location, species, or any other aspect of an impact does not imply anything about the likelihood or importance of aspects that are not mentioned. For more information about climate change science, impacts, responses, and what you can do, visit EPA's Climate Change website at www.epa.gov/climatechange.

Hurricane season ends historic as predicted by experts back in April.

By Allison Chinchar and Haley Brink, CNN meteorologists

Updated 1:32 PM ET, Mon November 30, 2020

(CNN) Monday officially marks the final day of Atlantic hurricane season, and it has been one for the record books.

2020 has been undoubtedly a crazy year -- with the [Covid-19 pandemic](#), [murder hornets](#) and some of the [largest wildfires](#) in recorded history. It seems understandable that hurricane season would also be memorable.

This season was forecast to be a busy season. Two of the most well-known and respected entities that forecast their predictions for the upcoming hurricane season are Colorado State University (CSU) and the National Oceanic and Atmospheric Administration (NOAA).

CSU's Tropical Meteorology Project team predicted an above-average Atlantic hurricane season on April 2. The team forecast 16 named storms, including eight hurricanes.

"We were forecasting a well above-average season in April, June and July, and increased that forecast to an extremely active season in August," said Phil Klotzbach, [a research scientist](#) at the university's Department of Atmospheric Science.



Forecast Parameter Average (in parentheses)	Issue Date April 2	Issue Date June 4	Issue Date July 7	Issue Date August 5	YTD
Named Storms (12)	16	19	20	24	30
Hurricanes (6)	8	9	9	12	13
Major Hurricanes (3)	4	4	4	5	6

"Active seasons can play out very differently," Klotzbach said. "For example, both 2004 and 2005 had comparable levels of ACE (227 ACE in 2004 and 245 ACE in 2005), but 2005 had 28 named storms while 2004 had only 15 named storms."

ACE stands for "accumulated cyclone energy." It is the metric used by meteorologists to account for both a storm's strength and how long the storm lasts. Typically, the more ACE there is in a single hurricane season, the more active the season is.

Seven weeks after CSU put out its initial forecast, NOAA forecast a 60% chance for an above-normal season, predicting a 70% chance of having 13 to 19 named storms, of which six to 10 could develop into hurricanes, including three to six major hurricanes.

"Obviously, given our forecast named storm numbers, we were quite surprised to see 30 named storms, but as you can see from other indices that we forecast, most of them were close to in line with our predictions," Klotzbach said.

Researchers at CSU use forecast models mainly based on ACE to make their hurricane season predictions.

Most groups predict an above-average hurricane season

The Atlantic hurricane season begins on 1 June, and over one dozen groups have already issued seasonal hurricane forecasts for the 2020 season. To date, most groups have predicted an above-average season, with several forecasting an extremely active season.

The records

The season began early when Tropical Storm Arthur formed on May 14, more than two weeks before Atlantic hurricane season officially began. The season runs from June 1 through November 30.

"The 2020 Atlantic hurricane season ramped up quickly and broke records across the board," said Neil Jacobs, acting NOAA administrator, [in a media release](#).

Every named storm so far this season except three (Arthur, Bertha, and Dolly) set a record for the earliest named storm ever recorded.

For example, Cristobal was the earliest third named storm on record when it formed on June 2, beating the previous record -- Colin in 2016 -- by three

days. By the time Wilfred formed, the earliest 21st named storm, these systems were beating the previous records by nearly three weeks.

When Hurricane Delta was churning in the Atlantic, it [broke numerous records](#), only to see many of them broken a few weeks later when Hurricane Iota moved through the western Caribbean.

During the peak of the season, there were five tropical cyclones in the Atlantic at the same time -- Paulette, Rene, Sally, Teddy and Vicky -- for [only the second time in history](#).

The only other time there were five active tropical cyclones -- hurricane, tropical storm and/or tropical depression -- in the Atlantic was in 1971.

This year, six storms reached major hurricane status -- Laura, Teddy, Delta, Epsilon, Eta and Iota. This ties for the second highest number of major hurricanes in a single season. A major hurricane is a Category 3 or larger storm with winds of at least 111 mph (178 kph).

There were four major hurricanes that formed in October and November only. Before this year, [no year ever had more than two](#) major hurricane formations in those two months.

The season's strongest storm was Hurricane Iota, which peaked at 160 mph. It was the second major hurricane to form in the month of November, which has never happened in recorded history -- Eta was the first.

Iota made landfall in Nicaragua as a Category 4 hurricane with sustained winds of 155 mph, just 2 mph shy of the Category 5 threshold. It was the strongest November hurricane on record to hit Nicaragua, breaking the record set by Eta two weeks before.

US landfalls

A record 12 named storms made landfall across seven states this year: Bertha, Cristobal, Fay, Hanna, Isaias, Laura, Marco, Sally, Beta, Delta, Eta and Zeta.

People along [nearly every mile of coastline from Texas to Maine](#) were affected by at least one named storm this season.

"Every mile of the US Gulf and Atlantic coast has been under a tropical storm or hurricane watch or warning, except for one single county with coastline: Wakulla County, Florida," said Jake Carstens, a meteorology graduate research assistant at Florida State University.



Almost the entire Gulf and Atlantic coastlines, save for a small area in Florida, have been under at least a tropical storm watch or stronger alert this year.

In 2020, every month of hurricane season saw a storm make landfall in the US. May, considered pre-hurricane season, also experienced a storm landfall, meaning there were seven straight months of direct landfalls.

Despite most of the storms hitting the Gulf Coast, the Northeast was affected by three named storms -- Fay, Isaias and Zeta. Tropical Storm Fay was the only storm to make landfall in the Northeast, hitting New Jersey on July 10. Hurricane Isaias, which made landfall in North Carolina in August, triggered a huge swath of power outages along the East Coast.

Remarkably, Florida made it almost to the very end of hurricane season before a storm made landfall. Eta became the first November landfall for Florida since Mitch in 1998. And since Eta made two landfalls in Florida, it added to the many miles of coastline under tropical alerts this season.

But of all the areas affected by tropical cyclones this year, Louisiana was the most frequent target. It had a record-breaking five storms make landfall: Cristobal, Laura, Marco, Delta and Zeta.

Hurricane Laura made landfall as a strong Category 4 storm near Cameron, Louisiana, on August 27. Six weeks later, Hurricane Delta struck the same area, battering homes and businesses that were still being repaired from Laura.



Zeta was the fastest of these storms, making landfall at 24 mph. The slowest was Hurricane Sally, which was moving at 3 mph at landfall. Even though the storms were Category 2, the varying landfall speeds changed how the storms affected the local communities.

An average human walks at 3 to 4 mph, which means a person could have walked faster than Sally. But Sally's super slow movement allowed the storm to dump a tremendous amount of rain over a prolonged period of time in the same locations. An average September sees 4-5 inches of rainfall along the Florida-Alabama-Mississippi panhandle, but Sally dropped that in just a couple of hours. By the time the storm left the region, at least three months of rain had accumulated in some spots.

Zeta's fast speed allowed the tropical storm-force winds to travel very far inland, not just along the coast, and those winds felled trees and power lines from Louisiana to Virginia. More than [2 million people lost power](#) from Zeta. But that speed also meant that rainfall totals were not as high as they were with Sally. Widespread totals were within the 2-4 inch range, with one small area of 6 inches near the Mississippi-Alabama border.

Isaias, the name people struggled to pronounce, affected almost everyone along the Eastern Seaboard. More than 100 million people were under either a hurricane watch or warning or tropical storm watch or warning stretching from Florida to Maine.

Damaging winds triggered power outages for [more than 3 million customers](#). Tornadoes were also a big factor with Isaias -- at one point more than 30 million people were under tornado watches. The storm produced [more than 50 tornado reports](#) in two days, a high number given

that tropical systems in the Gulf are [more likely to produce tornadoes](#) than their Atlantic counterparts.

Texas had two landfalls, Hanna in July and Beta in September. Alabama was hit by Hurricane Sally in September. South Carolina was hit by the preseason storm Bertha in May.

The Greek alphabet

For the second time in recorded history, the National Hurricane Center used every name on the pre-determined list of names for tropical systems in the Atlantic basin, [prompting the use of the Greek alphabet](#) to name storms for the remainder of the season.

And there were a record number of Greek alphabet letters used for storm names -- nine: Alpha, Beta, Gamma, Delta, Epsilon, Zeta, Eta, Theta and Iota. Four of the 12 US named storms were from the Greek alphabet. Two of the top five worst storms to ever hit Nicaragua in recorded history were from the Greek alphabet.

The latter portion of the season was remarkably the more intense portion of the season.

Of the first 21 named storms, on the regular hurricane season list, only two were major hurricanes -- Laura and Teddy. However, of the nine names used in the Greek alphabet, four were major hurricanes -- Delta, Epsilon, Eta and Iota.

2020 Atlantic hurricane season named storms

All of the named storms used during the record-breaking 2020 Atlantic hurricane season

Arthur	Isaias	Rene	Delta
Bertha	Josephine	Sally	Epsilon
Cristobal	Kyle	Teddy	Zeta
Dolly	Laura	Vicky	Eta
Edouard	Marco	Wilfred	Theta
Fay	Nana	Alpha	Iota
Gonzalo	Omar	Beta	
Hanna	Paulette	Gamma	

CNN WEATHER



Source: National Hurricane Center / World Meteorological Organization Tropical Cyclone Programme

The Missing Link in the Climate Change Risk Puzzle.

Companies and investors often overlook the costly knock-on effects of climate change. The solution? Accounting for climate change vulnerability, according to a new report from the Morgan Stanley Institute for Sustainable Investing.

Consider this: Two industry competitors have key manufacturing facilities in the same coastal community. After weathering a damaging hurricane season, one company suspends operations for six months, while the other is up and running in six weeks. Why the disparity? The latter moved key internal infrastructure to the roof after a recent flood disrupted manufacturing. The former restored its facility exactly as it was beforehand. Their respective climate vulnerabilities—the underlying weaknesses that can exacerbate the consequences of exposure to climate-related events—differ significantly, leading to different levels of risk and financial impacts. In this case, and others, companies and investors are unprepared, having overlooked the adverse knock-on effects of climate-related events on both direct and indirect operations, according to a new report from the [Morgan Stanley Institute for Sustainable Investing](#).

However, by considering these climate vulnerabilities, the report says, markets, investors and consumers can be better prepared.

[Climate change](#) has become an investment consideration impossible to ignore, as related disasters and economic losses grow¹ and regulators increasingly recognize it as a systemic financial risk. Moreover, among institutional and individual investors, demand to integrate climate change as a factor in portfolios is high: Of institutions, 44% are actively considering or seeking to address climate change as a sustainability issue and 78% of individuals are interested in it as an investment theme, according to the report.

Despite this, investors find themselves charting new territory when it comes to assessing climate-related risk. Efforts by organizations including the Task Force on Climate-Related Financial Disclosures (TCFD) and the Sustainability Accounting Standards Board (SASB) have helped spur more transparent corporate environmental disclosures, but access to certain data continues to be a challenge. While related information may reveal direct operational exposure to potential climate-related events, it rarely accounts for indirect repercussions that would help investors better assess risk and compare peers.

The onus, then, falls on investors to ask the right questions and perform thorough analyses, which they can do only if they're equipped with a comprehensive way to assess climate change risk. The Morgan Stanley Institute for Sustainable Investing's three-pronged framework is designed to do just that.

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Climate Change Risk: A Three-Dimensional Assessment Framework

The Morgan Stanley Institute for Sustainable Investing defines climate-related risk in three ways:

- **Events:** Natural or human-induced incidents that may have adverse effects on people, companies or investors. Examples include the implementation of policies to price greenhouse gas (GHG) emissions like carbon taxes, or physical hazards, such as hurricanes or drought.
- **Exposure:** Factors such as business activities or locations that influence whether climate change-related events will affect companies directly. Examples include operations at risk from new carbon regulations or manufacturing sites that may be at risk from extreme weather.
- **Vulnerability:** The underlying weaknesses that can exacerbate the consequences of exposure to climate-related events. In a hurricane, for example, vulnerability could include the failure to raise a facility's key infrastructure to avoid flood damage and prevent business disruptions.

Given the interrelated nature of companies, their supply chains, the communities they operate in and the infrastructure they rely on, developing a thorough understanding of climate risk can help investors make more informed investment decisions. By integrating climate vulnerability into the risk assessment process, investors can improve their evaluation of potential financial impacts on portfolio companies and develop more climate-resilient investment approaches. Factoring in vulnerability can also help investors

more accurately weigh risks and returns, differentiate securities, build portfolios and inform shareholder engagement strategies.

To learn more, get the full report: *[“Climate Impact: Understanding Vulnerability as the Missing Piece in the Climate Risk Puzzle.”](#)* Plus, discover *[Morgan Stanley’s Institute for Sustainable Investing](#)*.

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