

Carteret-Craven Electric Cooperative

# Meeting Our Energy Challenges\*

*\*At what cost?*



Your Touchstone Energy® Partner  
*Looking out for you.*

[www.carteretcravenelectric.coop](http://www.carteretcravenelectric.coop)

Good evening. Tonight's discussion centers on OUR ENERGY and OUR FUTURE.

We are facing one of the most challenging times of our lives. Food prices are rising, gasoline prices are rising, and our economy is teetering on a recession. Moreover, the vast fleet of power generating plants constructed during the 1980s are reaching capacity limits and will no longer be able to serve our growing need for electricity.

Decisions on our future are needed NOW, and change will affect us all. The single most important point I want to share is that you need to be involved.

# Tonight's Agenda

## **1. Where are we today?**

## **2. N.C. Senate Bill 3**

- **Mandates and Caps**
- **Other Renewables & Generation**
- **Our Approach**
  - ▶ Cost-effective renewables
  - ▶ Renewable Energy Credits
  - ▶ Energy efficiency and conservation

## **3. National energy policy**

## **4. Conclusion: At what cost?**

# Infrastructure Needs

- **Transmission network expansion required**
- **Existing Generation**
  - ▶ Nuclear
    - 27 nuclear plants license renewals
    - 11 applications pending at NRC
  - ▶ Coal fired Plants
    - Addition of environment control equipment
- **New Generation**
  - ▶ Approximately 175,000 MWs required in U.S. by 2016
  - ▶ Approximately 21,000 MWs required in Southeast by 2016
  - ▶ Coal and nuclear generation risky, expensive investments

## Global Economic Pressures

- **'Delusions of energy independence'**
- **China, India, Africa, Russia, U.S.**
  - ▶ China will become world's largest consumer of energy in 2010
  - ▶ 75% of China's electricity is generated by coal
  - ▶ China and India have contracts that will give them control of one half of world's natural resources by 2012
  - ▶ 160+ new nuclear plants planned or proposed in China, India and Africa; 28 in Russia; 30+ in the U.S.

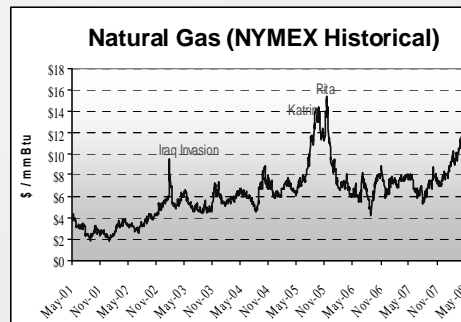
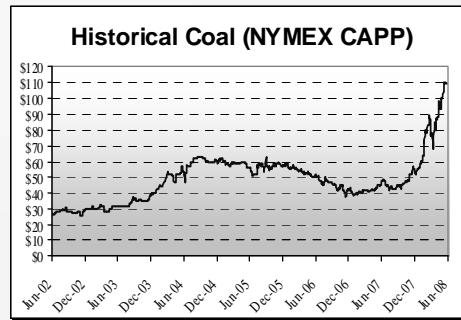
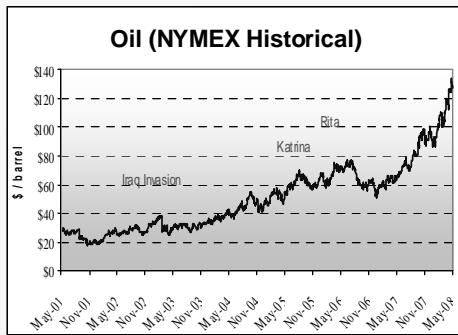
## Economic Pressures

- **\$400 billion investment forecast to address climate change**
- **\$900 billion investment in new U.S. utility infrastructure to meet energy needs over next 15 years**

\$400 billion forecast investment in new generation in U.S. to address climate change, USA Today reported on May 13, 2008. This is about as much as current market cap of entire IOU industry, according to the federal Energy Information Administration.

\$900 billion investment in new U.S. utility infrastructure to meet energy needs over next 15 years, according to Cambridge Energy Research (CERA)

# Energy Prices



You don't have to drill down into the details of these graphs to see what is happening in the energy market, and there is no predictable end in sight. These commodities are what fuel power plants, and when those costs rise, the cost of producing electricity rises along with it.

## The Market

\$104.75 projected  
 \$144 actual  
 (40% increase over budget)

Month	2005	2006	2007	2008	2009	2010
Jan	53.79	61.73	52.58		116.40	107.55
Feb	48.12	59.62	75.68		113.53	104.89
Mar	56.07	59.20	64.41		101.72	100.82
Apr	56.45	59.47	70.50		95.28	94.44
May	54.79	54.02	69.53	87.60	90.00	91.69
Jun	71.53	64.34	75.83	104.75	104.00	97.70
Jul	88.90	79.78	74.09	126.75	131.37	125.04
Aug	99.89	94.43	84.74	138.75	121.69	115.84
Sep	104.86	42.00	65.70	105.50	98.50	90.08
Oct	97.15	47.30	72.86	101.00	86.69	80.01
Nov	74.07	54.99	64.71	93.50	91.01	84.00
Dec	98.48	48.85	70.44	101.00	99.66	91.99

Price per megawatt-hour on the wholesale market.

This shows the market volatility of electricity. PJM Interconnection, a regional transmission organization, operates a wholesale electricity market and ensures the reliability of the electric power supply system in 13 states along the Eastern Seaboard. Our power supplier, NCEMC, is a member of PJM.

This chart shows the cost of power **per megawatt hour** for short-term contracts – five days, 16 hours a day.

Putting it terms we can better understand, the wholesale price in June 2005 was 7.15 cents **per kilowatt hour**; and was projected at 10.47 cents **per kilowatt hour** in June 2008. However, we learned in July that the actual cost was 14.4 cents per kilowatt hour – an increase of 40 percent over budget.

## Our goal

**‘We put our members first by providing safe, reliable energy at the lowest possible cost and by dedicating ourselves to innovation, value and a commitment to the individuals and communities we serve.’**

However, a mandate to purchase renewable energy places the cooperative at a disadvantage as it negotiates for power at the lowest possible cost – which is one of the primary goals in our service to you.

## How Power is Purchased

- **Capacity**

- ▶ Own or contract for generating plant capacity

- **Energy**

- ▶ No fixed energy prices
- ▶ Scheduled daily
- ▶ Varies by plant, fuel source and price
- ▶ Extremely variable

CCEC buys power, along with close to two dozen other cooperatives in the state, through North Carolina Electric Membership Corporation. These combined purchases provide economies of scale. There are 15 or more contracts, all varying in length of time.

There are two main elements to these purchases... capacity and energy

We budget for and buy capacity to meet the projected needs of our members, based on historical data, projected growth and other information. Capacity costs are mostly fixed.

We buy energy daily, based on the actual needs, which is primarily influenced by weather conditions. The cost for this electricity, however, is tied to the commodity prices of the fuels used to power generating facilities.

2006 Average Residential Electricity Cost			
(per 1,000 kilowatt hours)			
<b>U.S. Utilities</b>			<b>NC Publicly Owned • Municipal</b>
Publicly Owned	9.20	Greenville Utilities	11.70
Investor-Owned	10.50	New Bern	11.71
Cooperative	9.50	Washington	11.84
<b>North Carolina</b>		Kinston	11.95
Publicly Owned	10.30	Rocky Mount	12.80
Investor-Owned	8.40	Investor-Owned	
Cooperative	10.80	CP&L	9.03
<b>Electric Cooperative</b>		Duke Energy	7.96
Carteret-Craven	9.81	Virginia Electric & Power	8.82
Albemarle EMC	9.83		
Jones-Onslow EMC	9.85		
Pitt & Greene EMC	11.16		
Brunswick EMC	11.44		
Cape Hatteras EMC	11.60		
Tideland EMC	12.02		

Source: U.S. Department of Energy, Energy Information Administration, Form EIA-861, 2006 data.

When compared to other power supplies, Carteret-Craven has had lower residential rates among cooperatives across the state, and we are proud of this record.

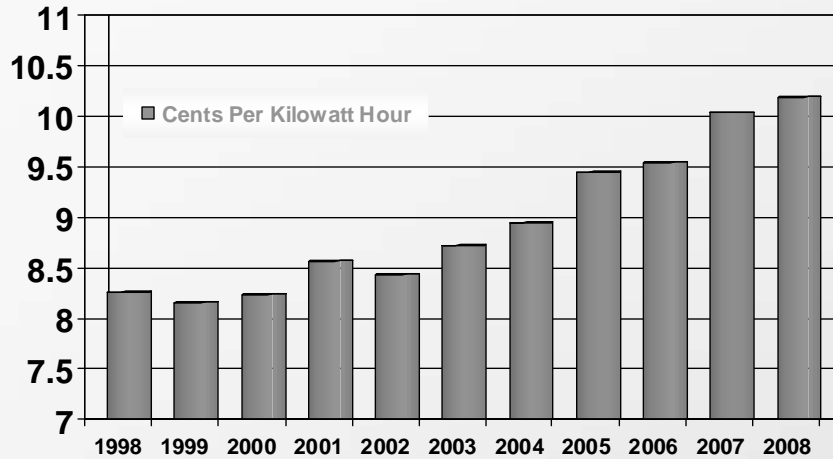
While we have had to implement a Wholesale Power & Fuel Cost Adjustment this year, we are not alone. Investor-owned utilities and municipal power providers are looking for rate modifications to recover additional power costs, and other cooperatives are finding themselves in a similar situation as us.

The information in the chart is the most recent historical information available, and 2007 data should be available later this year.

*To see the full Form EIA-861 report, go to:*  
<http://www.eia.doe.gov/cneaf/electricity/page/eia861.html>

# Retail costs

U.S. Average Residential Retail Price of Electricity



Source: EIA and "Bicentennial Edition: Historical Statistics of the United States, Colonial Times to 1970" - Census Statistical Abstracts

Over the years, we have been successful in keeping costs relatively low. And, although we are facing power cost increases, transportation cost increases and climate change mandates, we are always thinking of the impact our decisions and those of our state and federal legislators will have on our members.

## Our Energy Future

- Reducing carbon emissions is expensive
- Meeting demand is expensive
- Renewable energy is expensive
- Efficiency requires your commitment
- New generating plants required

We can talk about climate change, global warming, carbon emissions, energy independence, environmental stewardship and other hot topics of the day, but what we all need to understand is that there are a few certainties in our energy future:

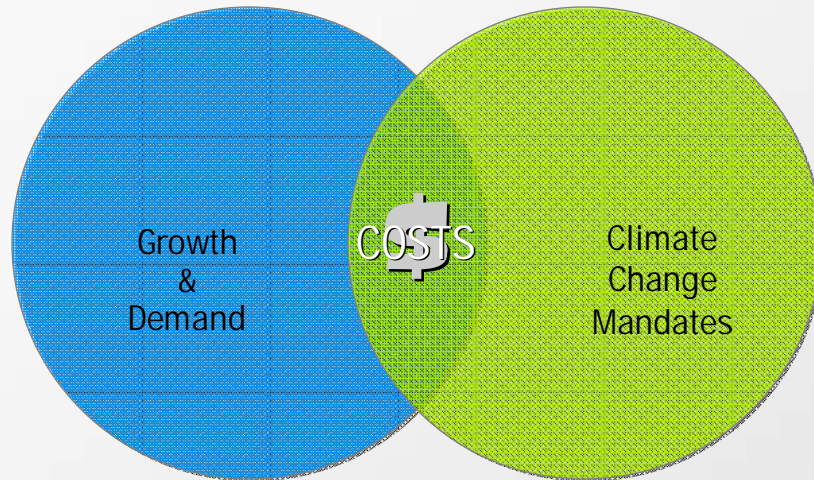
•**Reducing carbon emissions is expensive. Technology necessary to successfully capture carbon dioxide from power plant emissions has not yet been invented.**

•**Meeting increasing demand for electricity is expensive. We must build new power plants, but the price tag keeps going up with the increased cost of concrete, steel and other building materials.**

•**Renewable energy is available in limited supply in North Carolina; however, it is expensive and it cannot be counted upon to provide power when you need it most.**

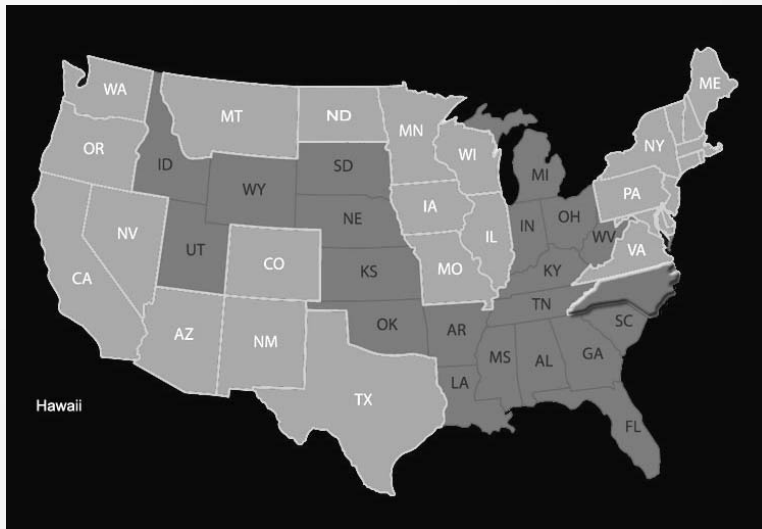
•**Despite all our efforts to reduce our consumption and a push for renewable energy projects, traditional power plants must be available to ensure you will have electricity 24/7.**

## Finding Balance



Meeting the standard isn't going to be easy on cooperatives and their consumers, but we are dedicated to developing and executing a strategy that balances environmental obligations with economic reality.

# Renewable Energy Mandates



On August 20 of last year, with the signing of Senate Bill 3, North Carolina became the first state in the Southeast to adopt a Renewable Energy and Energy Efficiency Portfolio Standard (REPS).

The states in darker blue have not yet adopted standards.

Under the standard, North Carolina's electric cooperatives will be required to meet up to 10% of their energy needs through renewable energy resources – such as solar electric, solar thermal, wind, biomass and others – alone or in combination with energy efficiency measures.

## Meeting the mandate

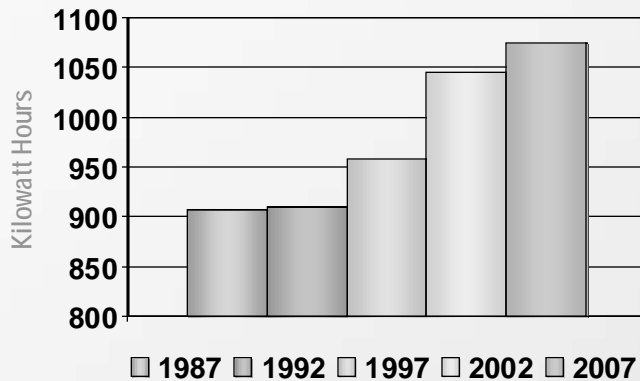
**Meeting the mandate of adding renewable energy and/or energy efficiency measures to equal 10% and at the lowest possible cost will require all of us to reduce our energy consumption.**

If the cooperative is to be successful in meeting the state mandate – to purchase renewable energy or to reduce consumption by an amount equal to 10 percent of our energy needs – and if we are to meet the mandate at the lowest possible cost, we must take steps collectively to reduce our consumption.

# Our obligation

- Consumer demand increasing
- Wind, solar can't provide 24/7 power
- U.S. must build traditional plants

**Average Annual Residential Usage**  
Carteret-Craven Electric Cooperative



Further, neither wind nor solar energy can be counted on to provide power 24 hours a day, seven days a week to meet the needs of consumers.

Our requirement to provide you electricity around the clock means the U.S. still must build traditional, cost-effective and reliable power plants to back up renewable resources and meet the increasing energy demands of our growing population. Not only is population increasing, but individual consumer demand is increasing, as shown in this graph of average electric use for the homes on our lines.

## Senate Bill 3

	Renewable & Energy Efficiency Requirements	Annual Spending Caps Per Residential Account
2008	3%	\$10
2012	6%	\$12
2015	10%	\$34

Let's take a closer look at Senate Bill 3. The standard requires a phase-in of renewable energy and energy efficiency measures. There are also certain specific mandates in Senate Bill 3, which address solar energy, as well as swine and poultry waste set asides.

North Carolina's legislators were careful in setting the standards and were sensitive to financial impacts that could affect our customers. Senate Bill 3 did place a cap on spending. The mandates required the standard to be met, but only if it can be achieved under these maximum spending limits. The standards and limits begin this year.

# CCEC & SB 3

## **Making Commitments Now**

- **Efficiency & Conservation**

- ▶ Consumer information & tools
- ▶ Targeted programs
  - Power cost monitors
  - EnergyStar lighting

- **Renewables**

- ▶ Solar Set Aside
- ▶ Wind
- ▶ Bio Mass
- ▶ Renewable Energy Credits (RECS)

Carteret-Craven, as well as other state's cooperatives, are making commitments now to meet the staged mandates of Senate Bill 3.

We have been expanding energy efficiency information programs to help our members manage electricity usage and resulting costs -- in our schools, in our monthly newsletter, in presentations to civic organizations and in the media.

We have adopted an interconnection standard for members who install renewable energy resources and want to tie into the electric grid. For instance, we are collecting data from a member-owned wind turbine on Harkers Island and are presenting that information on our Website for consumers.

We have joined other co-ops in the newly formed, not-for-profit statewide cooperative – GreenCo Solutions – to focus on renewable resources and energy efficiency programs that benefit residential and commercial consumers at the lowest possible cost.

In addition to providing such things as compact fluorescent lights, we are developing a pilot program that provides members with PowerCost monitors. These real-time energy use displays will be installed in member's homes and in the homes of 5<sup>th</sup>-grade students at Morehead City Elementary School at Camp Glenn. In addition to the monitors, the students will participate in an energy efficiency learning program. We will track usage in the homes with the installed monitors, which will help us evaluate not only their value to consumers, but the value of energy

## Renewable options

- Is the resource reliable?
- How much does it cost?
- When & how often can it run?
- How much electricity is available?

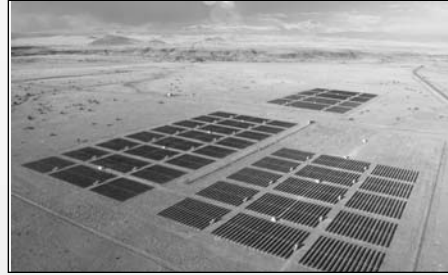
Our power supplier, N.C. Electric Membership Corporation, has recently accepted proposals from suppliers for future energy needs. Proposals included traditional sources of generation, as well renewable energy projects. We are looking for power supply options that will deliver energy beginning in 2012, and must extend many years into the future. When we study these proposals, we must determine:

- The reliability of the resource: when and how often it can run**
- How much it costs,**
- How much electricity is available.**

And finally, can the project developers deliver what they say.

The fact is, renewable resources must undergo rigorous review so we are assured we have an adequate supply of electricity to serve the needs of our members.

## Reliability



- **Wind effective about 10 days/month**
- **Solar effective only 6 days/month**

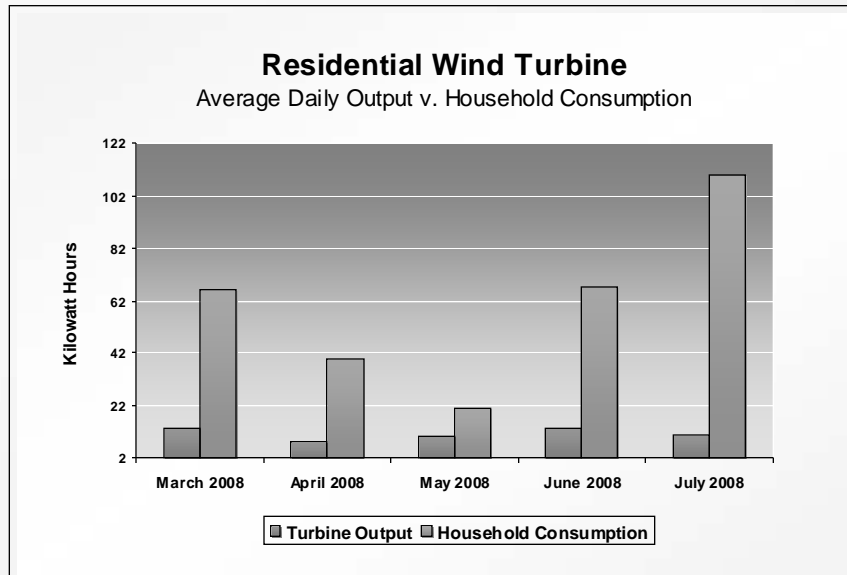
Reliability is another significant factor in considering renewable energy resources. If the wind isn't blowing, wind turbines aren't producing energy. Solar energy is available only when the sun is shining.. And, there's no real effective way today to store that energy when the sun goes down.

We have interconnected and installed a load-recording meter a cooperative member's small wind turbine in Harkers Island. The data collected from that meter is posted on our website.

The reality is that wind is effective less than 30% of the time (roughly 10 days a month), and solar panels are effective about 20% of the time (about 6 days a month).

And, because of the inherent reliability issues of wind and solar, backup generation must be present to use when renewable resources are not producing. Being required to have backup power sources behind renewable resources, will add to our costs and raise electricity prices.

# 'Practical Potential'



In an effort to help our members make an informed decision about residential wind power, we have gotten permission to share data we are collecting from a Skystream 3.7 residential wind turbine installed last year at a waterfront home on Harkers Island . The turbine is at a height just under 50 feet and basically free of wind obstructions from the south across the water. The wind quality from all other directions, however, is lessened because of trees and buildings in the wind's path.

The turbine has its own load-recording meter installed by the cooperative to collect data on how often and how much electricity it is generating.

# Potential v. Realities



## **Basin Electric G&T**

- 136 MWs of wind generation installed
- 6 MWs available at Summer '06 peak

## **Texas**

- Over 700 wind turbines in west Texas
- Only 13 turning at Summer '06 peak

# Poultry Litter Resources



**1 million tons of Litter = 800 Million Broilers**

- **ALL** the Broilers raised in North Carolina, or
- **ALL** the Breeders, Layers and Turkeys in North Carolina



**38,000 Truck loads =**

**104 Trucks per day =**

**1 Truck every 9 minutes (16-hour day)**

The poultry litter resources needed are huge for a just a year of operation of 100-megawatt power generation units, and the associated transportation needed would have a significant impact on greenhouse gas emissions.

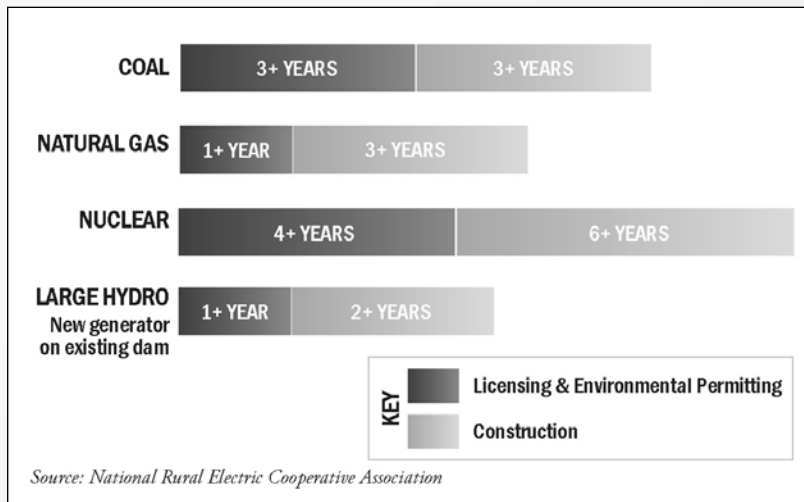
Broilers each produce 2.5 pounds of litter a year.

Breeders and layers produce 42 pounds, and Turkeys produce 31 pounds.

## New Generation Costs

Energy Source	Range of Costs	Availability
<b>Wind</b>	5 to 10 cents/kWh	<b>30%</b>
<b>BioMass</b>	7.5 to 9 cents/kWh	<b>90%</b>
<b>Livestock Waste</b>	8 to 20 cents/kWh	<b>86%</b>
<b>Photovoltaic</b>	15 to 40 cents/kWh	<b>14-20%</b>
<b>Landfill Gas</b>	5 to 7 cents/kWh	<b>90%</b>
<b>Combustion Turbine</b>	16 to 21 cents/kWh	<b>10-20%</b>
<b>Combined Cycle</b>	10.5 to 13 cents/kWh	<b>40-70%</b>
<b>Coal w/o CCS</b>	9 to 10.5 cents/kWh	<b>70-85%</b>
<b>Coal w CCS</b>	13 to 15 cents/kWh	<b>70-85%</b>
<b>New Nuclear</b>	11 to 14.5 cents/kWh	<b>85-90%</b>

# Power Plant Construction Times



Another big problem facing us all today is the time required to build and commission power plants. Environmental challenge, as well as permitting and power plant manufacturing issues, are slowing utilities from making commitments to build plants. Depending on the plant and fuel, it may be more than 10 years before a plant can deliver electricity to our homes.

We cannot allow our industry to reach a point where lack of generation leads to regularly occurring blackouts during peak electricity use periods.

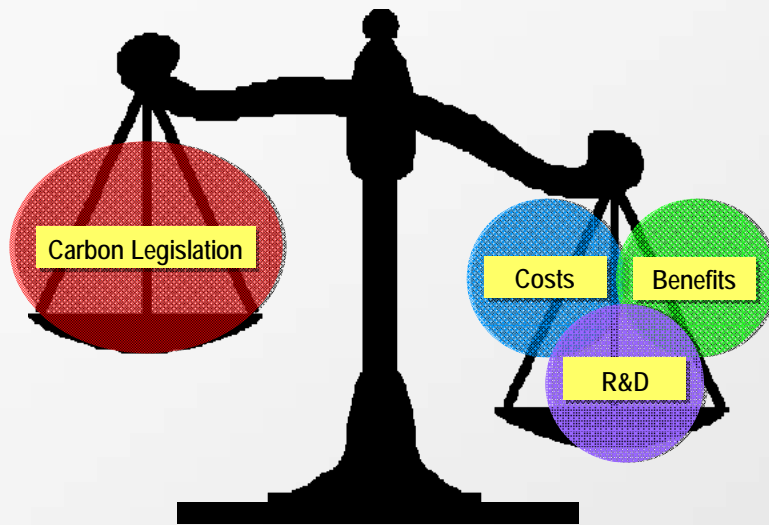
## Get involved



The federal government is considering various methods to address climate change. One of the more common suggestions is to create a carbon tax, a new tax that requires energy users to pay the federal government for the amount of carbon dioxide emitted from a power plant. This new tax will be passed to you, the electric customer.

You must help us insert a voice of reason into this debate. If we are going to reduce our carbon footprint, we must consider the unintended consequences.

# Carbon legislation

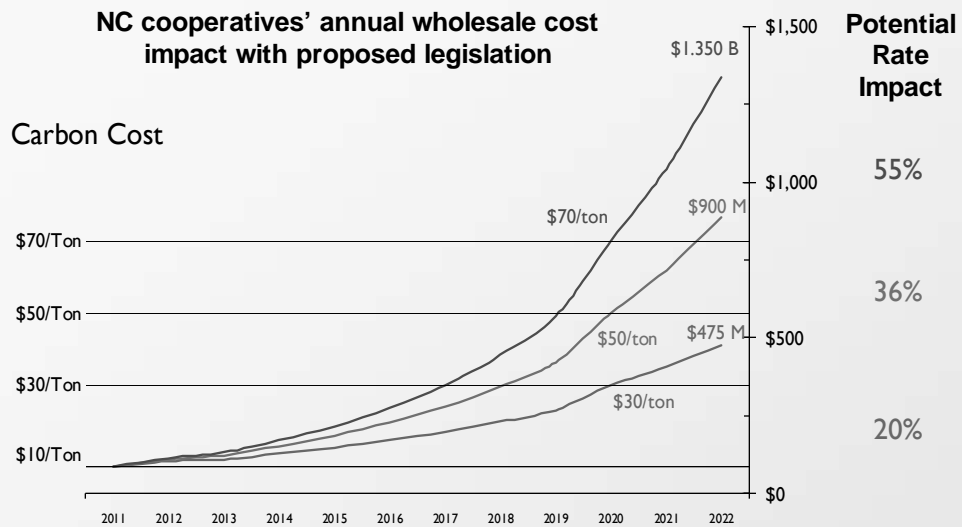


We have estimated that for each \$1 of carbon tax, we will suffer a one percent increase in power costs.

The Lieberman/Warner Bill, which was co-signed by North Carolina's own Sen. Elizabeth Dole, would raise retail electric rates 44 percent by 2030, based on a \$46 per ton carbon tax.

If the legislators believe this tax is necessary to address the problem, real or perceived, of global warming, the tax should be collected and committed to funding research and development to help find viable, cost-effective solutions.

# Costs



## Conversion factor for Carbon Cost to Member Cost

\* 2015 => \$10/ton = \$4.20/MWh || 21 million MWh

\* 2022 => \$10/ton = \$5.00/MWh || 25 million MWh

# Economic Impact

- **Climate change legislation**
  - ▶ CO<sub>2</sub> reductions; economy-wide impact
  - ▶ Cap and trade
  - ▶ New technology (clean coal), energy efficiency and renewables all required
  - ▶ Retail rate impacts range from 4% to 40% increases across the country

**CO<sub>2</sub> Reductions:** Any regulations calling for reductions in carbon emissions are going to drive the price electricity higher. Carbon capture and storage technology DOES NOT exist today to cut carbon emissions at the levels that would be mandated by proposed federal legislation.

**Cap & Trade:** Legislation being considered aims to reduce greenhouse gas emissions by putting a price on carbon. That would essentially require factories, utilities and refineries to pay for the right to emit carbon dioxide. The government would set an upper limit on the amount of carbon dioxide emitted during the production of electricity and in other industries. These organizations are issued emission permits and are required to hold an equivalent number of allowances (or credits) which represent the right to emit a specific amount. The total amount of allowances and credits cannot exceed the cap, limiting total emissions to that level. Companies that need to increase their emissions must buy credits from those who pollute less. The transfer of allowances is referred to as a trade.

**Our Energy, Our Future**  
A Dialogue With America

- Contact Elected Officials
- Home

**Productive dialogue** begins by asking tough questions and requiring straight answers.

Start by asking your elected officials these questions to get the dialogue headed in the right direction:

- Experts say that our nation's growing electricity needs will soon go well beyond what renewables, conservation and efficiency can provide. What is your plan to make sure we have the electricity we'll need in the future?
- What are you doing to fully fund the research required to make emissions free electric plants an affordable reality?
- Balancing electricity needs and environmental goals will be difficult. How much is all this going to increase my electric bill and what will you do to make it affordable?

Contact your elected official and begin the dialogue now. ▶

The atmosphere around energy policy is politically charged as polarized positions dominate the debate. Today, Americans are sensitive to global climate issues. The availability of affordable, reliable power has never been more in doubt.

There is a leadership vacuum in the energy debate. Finding a balance in meeting energy needs and climate goals must be a priority, yet the “voice of the consumer” is not being heard

We are providing you a way to be heard. You may contact your legislators on your own, or you may elect to join millions of cooperative members across the nation who are raising their voices through Our Energy, Our Future at [www.ourenergy.coop](http://www.ourenergy.coop).



**Our Energy, Our Future**  
A Dialogue With America



Let's Start the Conversation  
with Our Elected Officials...

*Ask Tough Questions.  
Demand Straight Answers.*

[www.ourenergy.coop](http://www.ourenergy.coop)

We must educate elected officials about our capacity needs and give them a reality check on the status of technology to reduce carbon emissions. The need to put cost issues in the context of new power supply and technology is vital.

Across the nation, we are **40 million strong**. That gives cooperative members **credibility and political power**. Now is the time to get involved...later will be too late

Please join the "Our Energy, Our Future" campaign by sending us your card to enroll or by visiting the Website.

## Our goal



**‘To continue supplying  
*affordable*, reliable electricity  
in an environmentally and  
financially responsible way.’**

Our intent tonight was to provide you with facts and objective realities to help inform you of the critical period we face in today’s energy climate. We **MUST** make wise decisions to provide for our children and their children.

Remember...

Our primary goal remains to continue supplying *affordable*, reliable electricity in an environmentally and financially responsible way. However, we need your help to make that happen.



Thank you.