

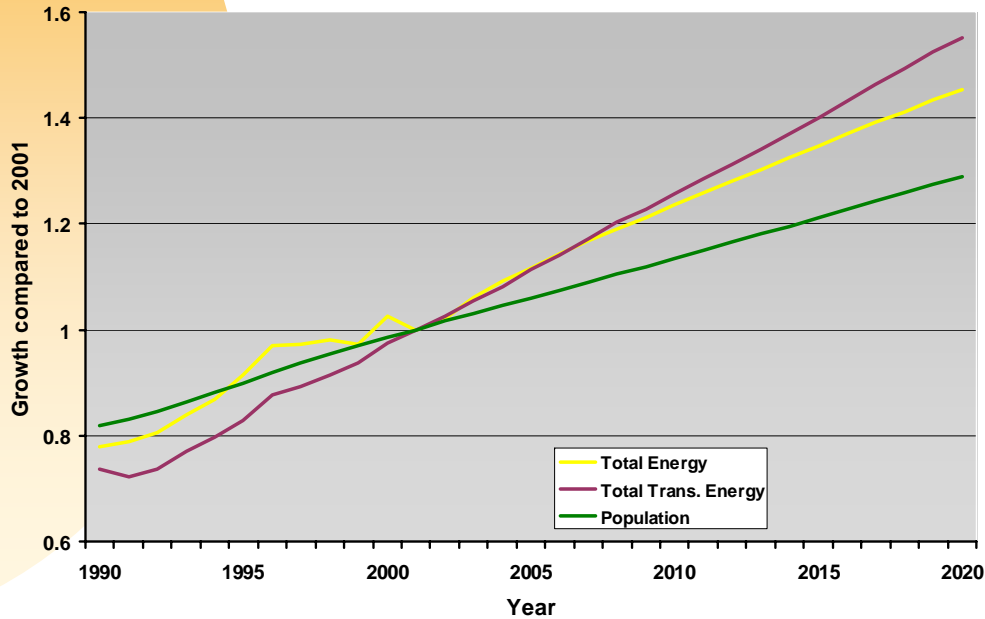
Sustainable Energy Strategies for Clean Air in North Carolina

Larry Shirley
State Energy Office
NC Department of Administration

State Energy Office

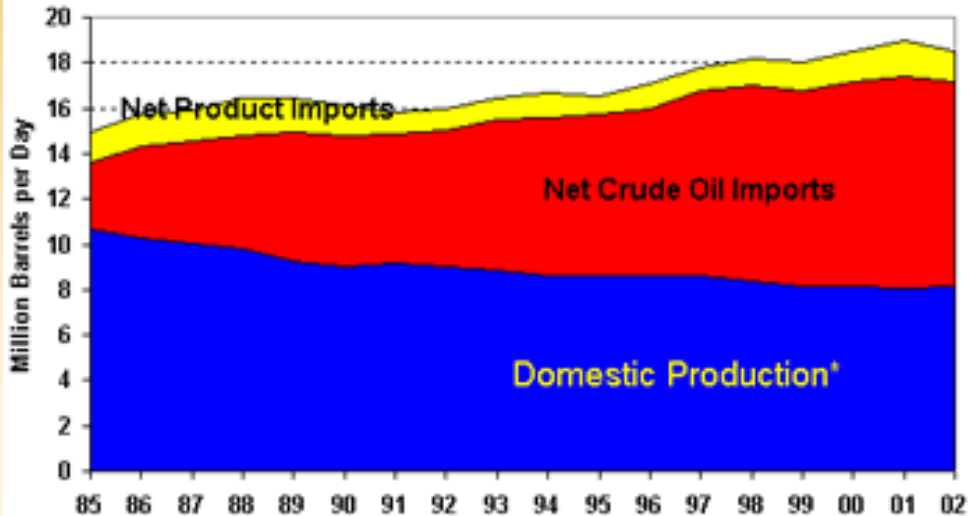
- ▶ Advancing ***energy efficiency*** in industrial, utility, transportation, government, and residential sectors.
- ▶ Developing the state's abundant ***renewable energy resources***.
- ▶ Accelerating use of ***alternative fuels and vehicles***.
- ▶ Responding to ***energy emergencies***.

Energy Supply - Cost Outlook



US Petroleum Production vs. Imports

U.S. Oil Production and Imports

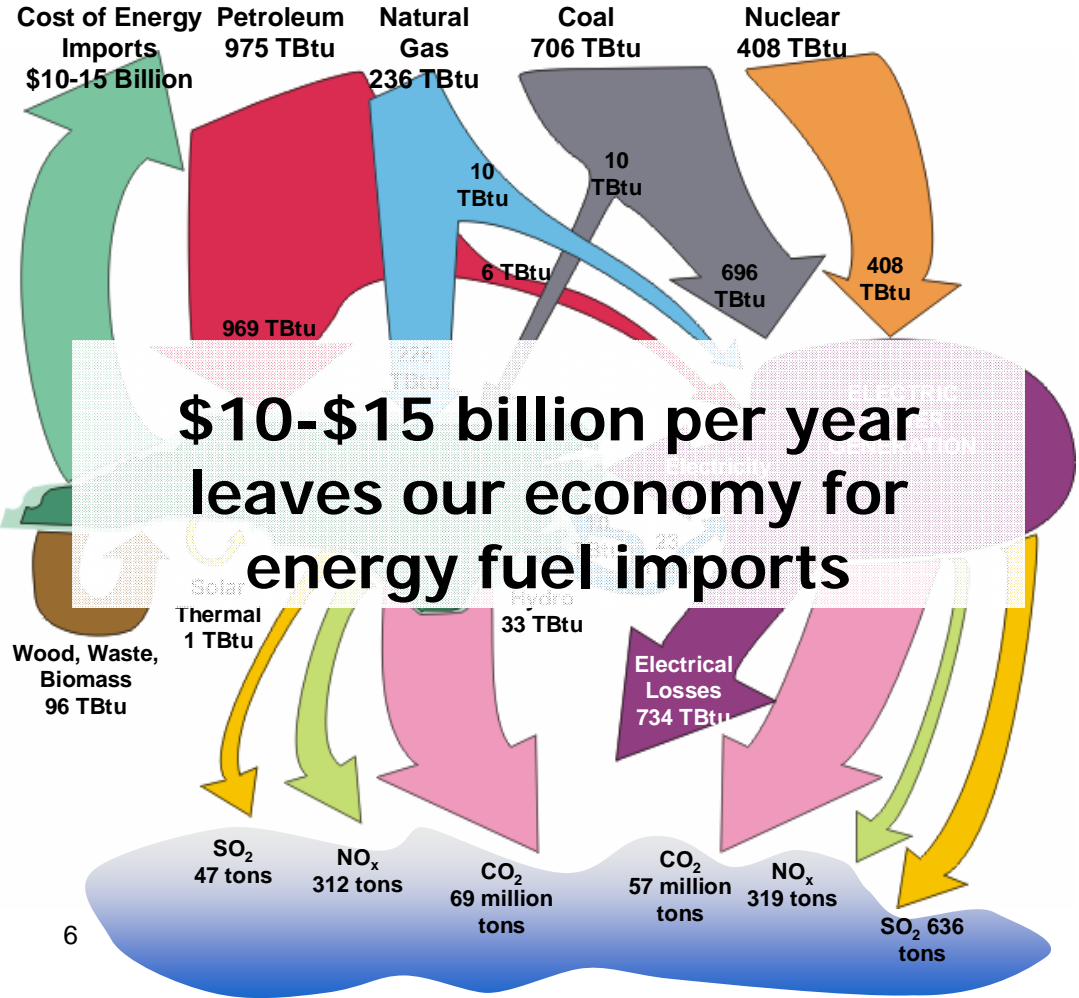


*Domestic production includes crude oil, natural gas liquids, and other hydrocarbons and alcohol production, but does not include refinery gain

Katrina and Rita

- ▶ 29% of Refinery Capacity Brought Down
- ▶ 66% of Gulf oil production shut-in
- ▶ 54% of Gulf natural gas production out
- ▶ 16 Natural Gas processing plants down
- ▶ Impacts will spill over to economy
- ▶ NC vulnerable: reliant on two pipelines with little storage

Energy Flows In North Carolina



\$10-\$15 billion per year leaves our economy for energy fuel imports

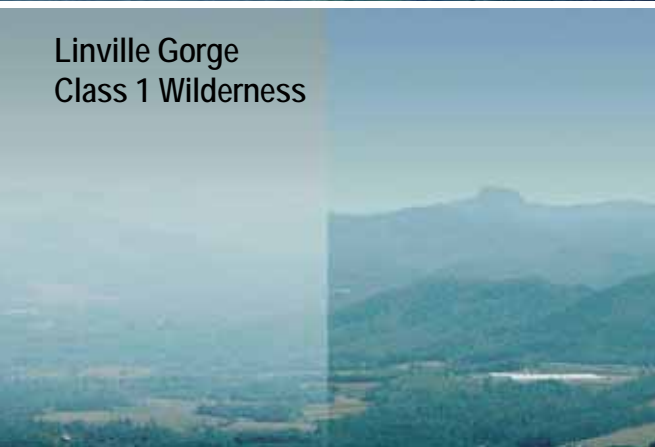
Shining Rock - Mt. Pisgah Vista
Class 1 Wilderness



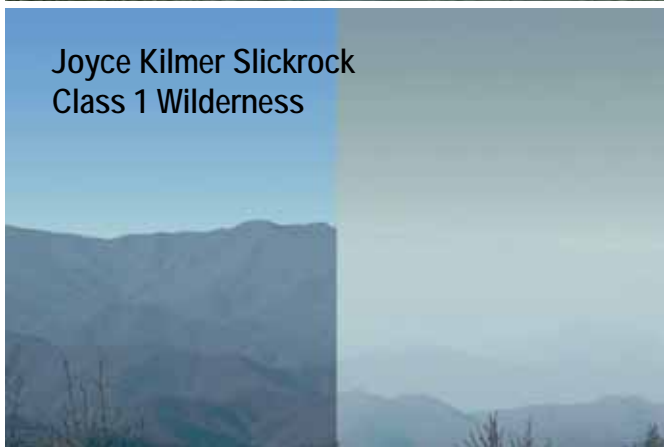
Shining Rock - Cold Mtn. Vista
Class 1 Wilderness



Linville Gorge
Class 1 Wilderness

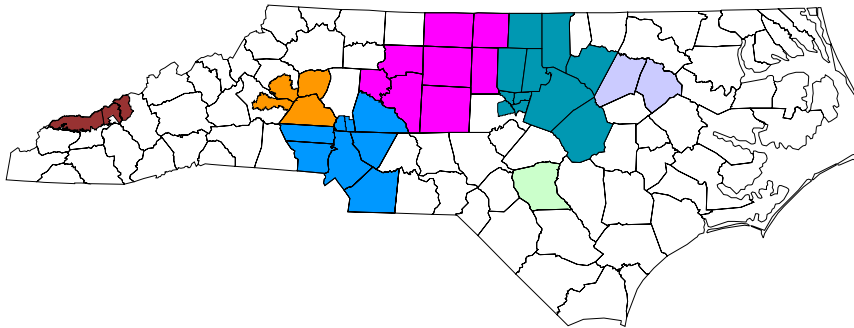


Joyce Kilmer Slickrock
Class 1 Wilderness



Ozone Nonattainment Areas

EPA's Boundary Designations for 8-Hour Ozone Standards for North Carolina (4/15/04)



- Triangle_cty_415.shp
- ncco_rmeter.stp
- charlotte_cty_415.shp
- Charlotte_twn_1.shp
- Triad_cty_415.shp
- Triangle_twn.shp
- unifour_cty_415.shp
- Mpo_hickm
- Great Smoky Mtn.
- Fayetteville Area.shp
- Rockymount_cty_415.shp



Notes:

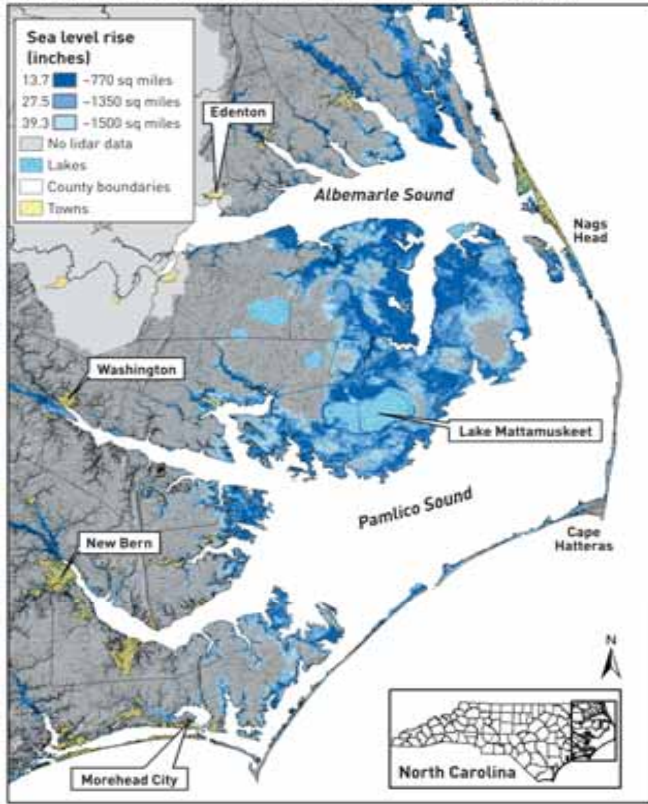
- Charlotte area: Moderate, Max. attainment date: June 2010
- Triad area (EAC): Moderate, Max. attainment date: Dec. 2007
- Triangle area: Basic, Max. attainment date: June 2009
- Unifour area(EAC): Basic, Max. attainment date: Dec 2007
- Haywood & Swain cos: Basic, Max. attainment date: June 2009
- Fayetteville area(EAC): Basic, Max. attainment date: Dec 2007
- Rocky Mount area: Basic, Max. attainment date: June 2009

Air Pollution's Impact on Health in *North Carolina*

- EPA studies show:
 - 1/3 to 1/2 asthma in NC due to air pollution
 - Every summer in NC, air pollution causes:
 - 240,000 asthma attacks
 - 6,300 emergency room visits
 - 1,900 hospital admissions

(Source: Clay Ballentine, M.D., Asheville, NC)

Possible North Carolina coastline after continued sea level rise



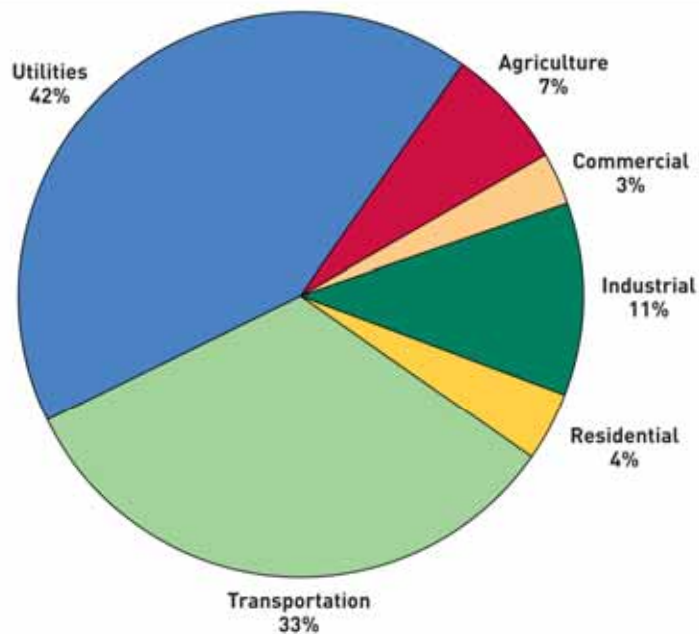
Ben Poulter, Duke University; Sam Pearsall, The Nature Conservancy

Sea Level Rise: Climate Change

FIGURE 7

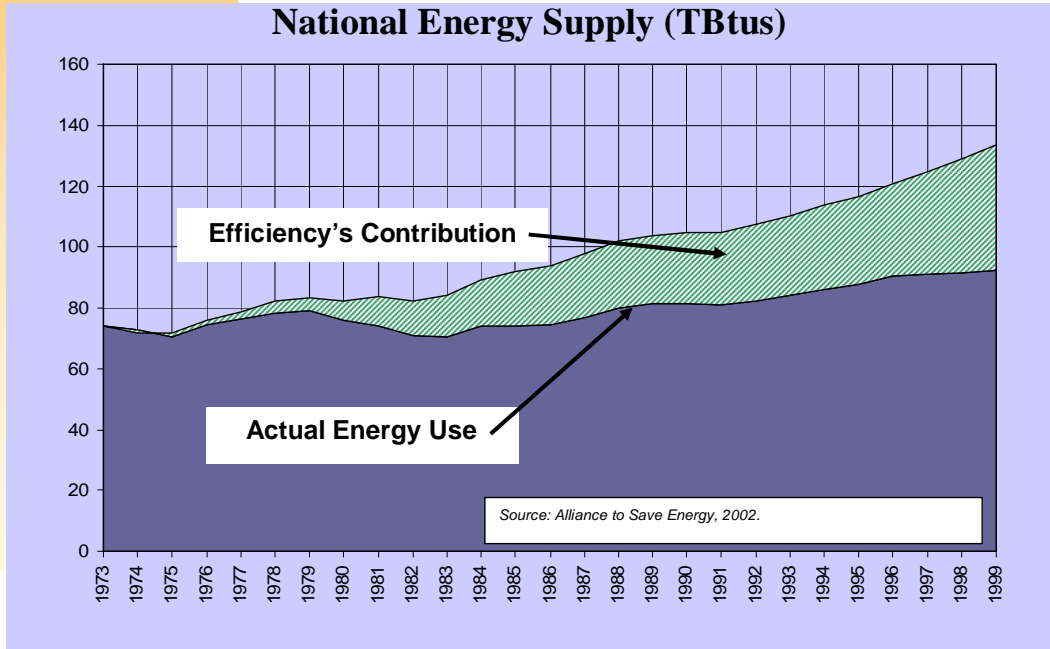
**Primary sources of greenhouse gases in North Carolina, 1999
(million metric tons carbon equivalent)**

Most greenhouse gases come from our tailpipes and our electricity use.

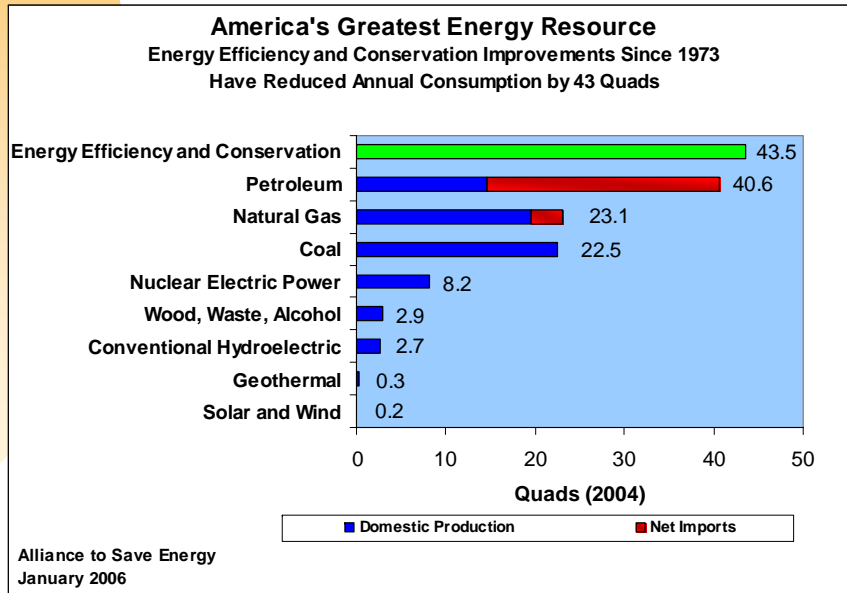


Source: United States Environmental Protection Agency

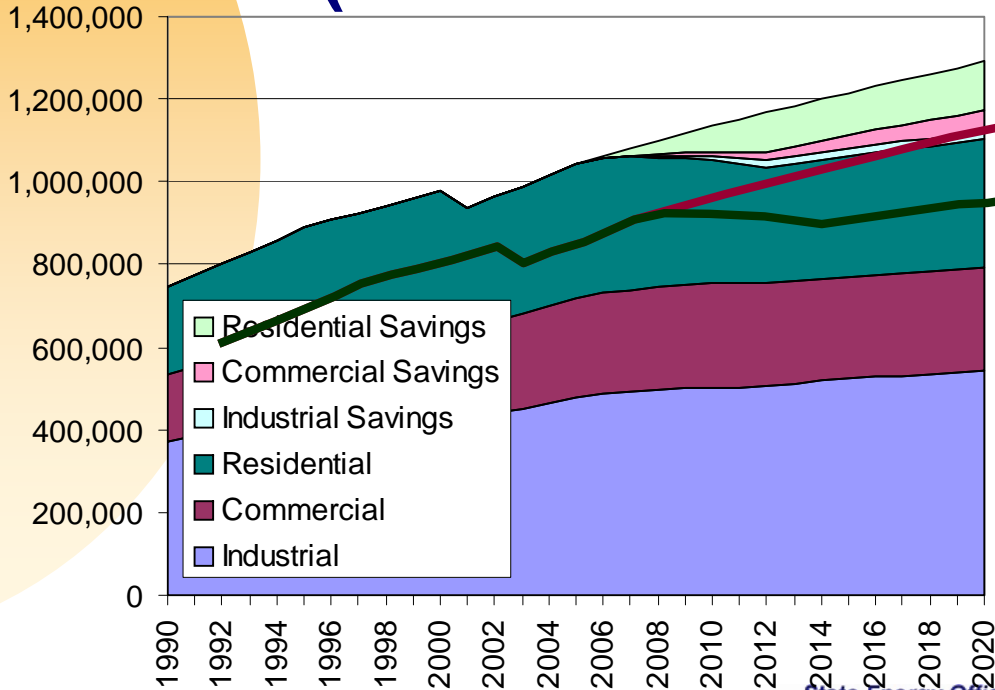
Energy efficiency's contribution to our energy supply



America's Greatest Energy Resource



Total Savings (TBtu – 15% Reduction)



State Energy Office



www.energync.net

1-800-662-7131

N.C. Department of Administration

"Ensuring a sustainable energy future"

Energy Management Program

Results 1988 to 2005

- ▶ 800 surveys completed
- ▶ 75.9 MW saved
- ▶ \$40.4 million annual cost savings
- ▶ \$38.7 million initial investment
- ▶ 11,466 Workshop Attendees in 511 Workshops

**\$355 million Total Economic Benefit
recommended/\$160 million
implemented**

Utility Savings Initiative (USI)

- ▶ Comprehensive energy management program for all **state facilities**.
- ▶ Goal is to reduce energy consumption by 20% by 2008
- ▶ 100+ million square feet state-owned property; 4 million square feet leased
- ▶ State's Energy and Water Bill: \$275 M in 2004-05
- ▶ Total Avoided Costs 2002-03 to 2004-05: \$22 Million

Upgrade and Save Program for Manufactured Housing

- ▶ Upgrade from electric furnace to high efficiency heat pump
- ▶ 17-county region in Eastern NC
- ▶ Managed by East Carolina University
- ▶ Energy Costs can be \$400/month/winter
- ▶ Savings of \$350-700/winter
- ▶ Cost of \$500/home
- ▶ Payback is 1-2 years



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ENERGY

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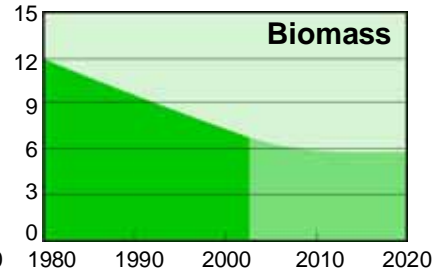
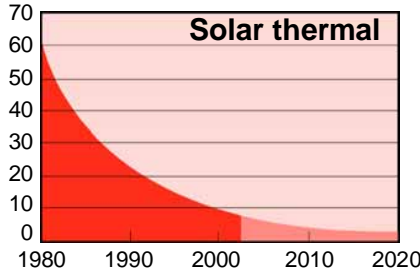
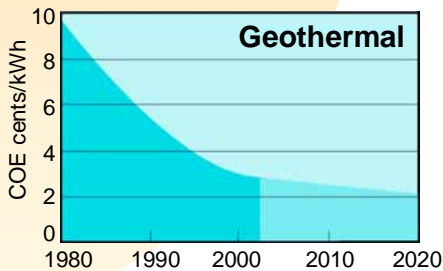
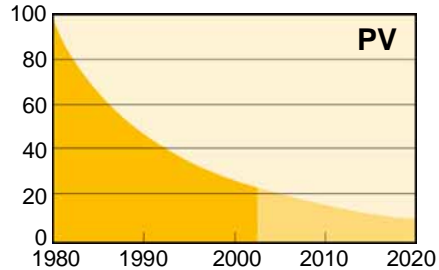
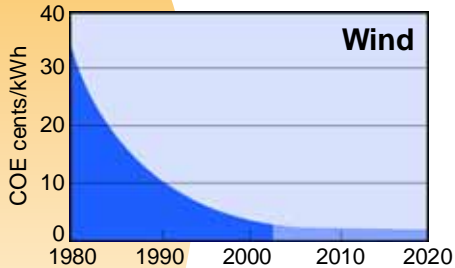
"Ensuring a sustainable energy future"

Why Renewable Energy?

- ▶ High Technology Growth Industries
 - » PV, Wind and Fuel Cells combined growth from 2005 – 2014 of nearly 23% annually
 - » Combined market is doubling about every 3 years, projected at \$167 billion in 2015
- ▶ Demand Routinely Outstrips Supply
 - » SOLD OUT - N. American Wind manufacturers in 2005 sold-out available capacity

Renewable Energy Cost Trends

Levelized cents/kWh in constant \$2000¹



Source: NREL Energy Analysis Office (www.nrel.gov/analysis/docs/cost_curves_2002.ppt)

¹These graphs are reflections of historical cost trends NOT precise annual historical data.

Updated: October 2002

NC Renewable Energy Tax Credits

- ▶ 35% for Renewable Energy Applications
- ▶ Up to \$2.5 million/application for industrial and commercial
- ▶ Up to \$10,500 for consumers
- ▶ Can be stacked on federal credits
- ▶ 25% credit for manufacturing plants
 - » Does not include fuel cells or hydrogen technology

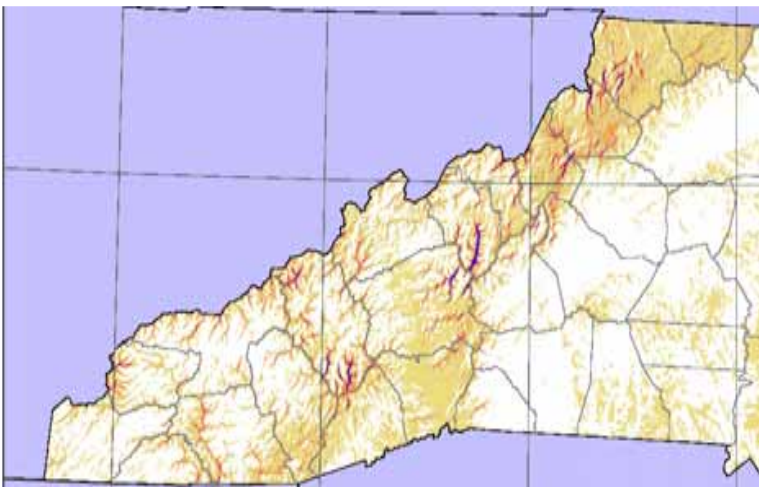
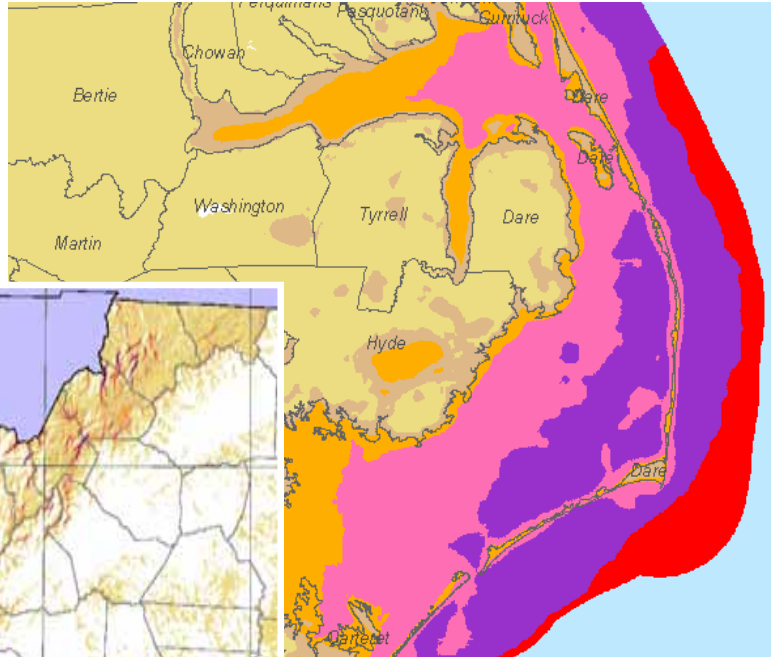
Wind Power Benefits

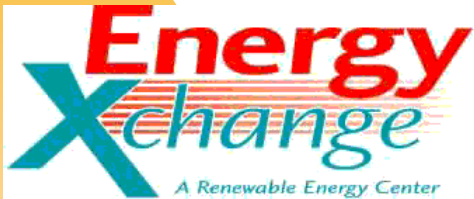


1.5 mW turbine

- ▶ 5 million kWh/yr
- ▶ 500 homes
- ▶ \$500,000/yr green power, keeps \$ in NC
- ▶ Saves 7.5 million lbs CO₂
- ▶ 2nd or 3rd crop for farmers
- ▶ Quiet, no water use, small footprint, no emissions
- ▶ 2,500+ MW potential in NC

Wind Power at 50 meters





Landfill Methane

Buildings, greenhouses, glassblowing and ceramics kiln heated by landfill methane gas.

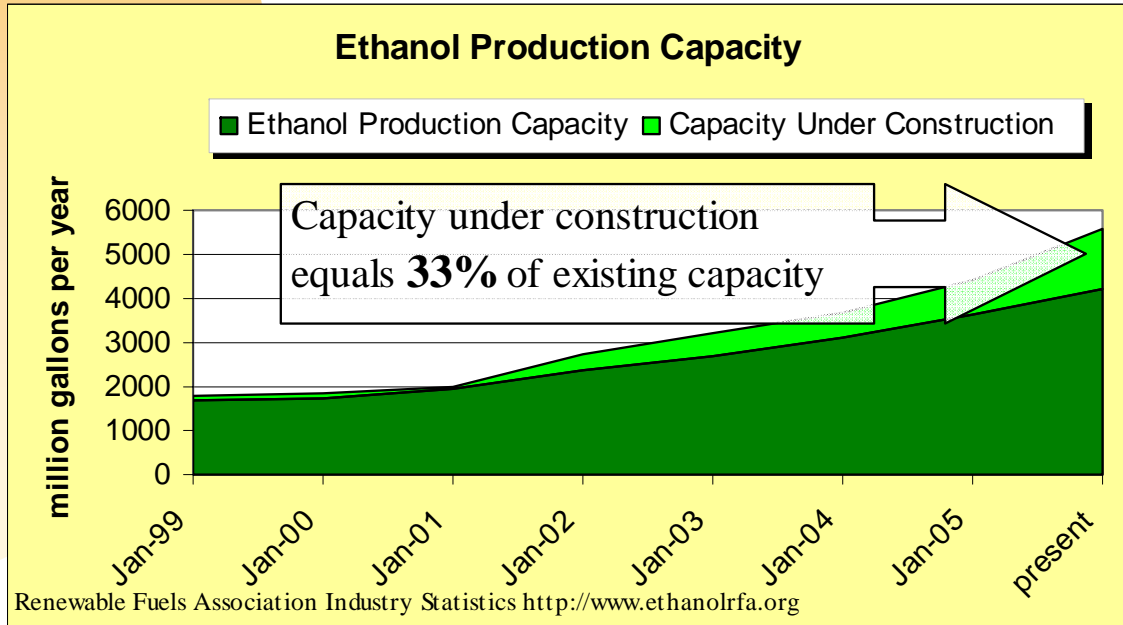


Regional Conservation District,
Cultural Resources, EPA, USDA,
Foundations, Community College

Alternative Fuels

- ▶ Ethanol: 4,600 state vehicles/E-85
- ▶ E-10 useable by anyone/MTBE Ban
- ▶ Biodiesel: Soybean/Canola or Waste Oil
- ▶ 20% blend can be used by everyone
- ▶ State must cut petroleum use by 20% by 2010
- ▶ Clean Cities Programs

Biofuels Potential

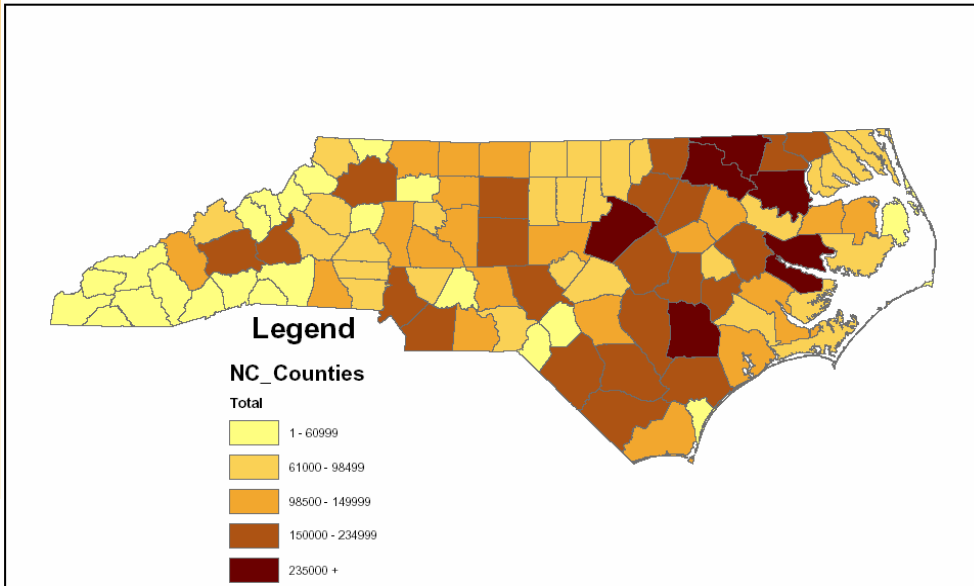


For North Carolina, this could be a ~\$1 billion opportunity

- ▶ North Carolina could produce 30-36 million barrels/year (1.2-1.5 billion gallons/year) of **ethanol** from forestry wastes, mill residues, agricultural residues, CRP/other acreage, and conversion of tobacco lands using current technology
 - » State of the art technology could increase this to ~58 million bbl/y (2.4 billion gallons/year)
- ▶ The economic value is significant
 - » Ethanol Fuel Value @ \$1.50/gallon: \$1.8+ Billion/year
 - » Annual **crop value** paid to farmers: **\$131 - \$263 Million/year**
 - » Annual value paid to the forestry sector: \$130 Million/year
 - » In addition, farmers could get \$14 - \$70 Million/year in carbon credits (@10-50 \$/ton)
 - » If 36 new 40-million gallon/year ethanol plants were sited in NC, the economic multiplier benefit would provide a one time **\$5 billion** boost, and nearly **1,000 direct jobs**

Where is NC's biomass?

POTENTIAL TOTAL RESOURCES, DRY TONS



Electric Power Production

- ▶ Hog waste.....79 MW
- ▶ Poultry litter.....111 MW
- ▶ Crop residue.....216 MW
- ▶ Urban, mill, & forest residue.....900 MW
- ▶ Energy crops.....356 MW
- ▶ Landfill gas.....116 MW
- ▶ Total generating capacity.....1,779 MW
- ▶ Tons of coal displaced.....4,321,813
- ▶ Value of coal displaced/year.....\$112,367,151

Biodiesel

- ▶ NC uses more than 1 billion gallons of diesel fuel annually
- ▶ 5% blend of biodiesel=29 million bushels of soybeans
- ▶ 1 million acres soybeans
 - » or 300,000 acres of rapeseed
 - » or a combination of; waste vegetable oil, rendered animal fats, and refined vegetable oil
- ▶ 15% less particulates, 10% less CO, 10% less hydrocarbons

State Competition

- ▶ Jan. 11, 2006
 - » PA Gov. Rendell announced \$8.5 million investment in 25 renewable energy projects
 - » Expected job creation 1,000 with 238 perm. jobs
 - » Landed Spanish wind company with 400 jobs
- ▶ Jan. 12, 2006
 - » NY Gov. Pataki proposed a statewide tax-free zone for renewable energy companies and making renewable fuels available across the state

Pending Legislation

- ▶ *S402/H454 Water and Utilities Savings in Government Facilities*
 - » Performance contracting conservation measures
 - » Raises debt ceiling
- ▶ *S190/H445 Income Tax Credit–Energy Efficient Homes*
 - » Energy Star Home: \$500 new, \$1000 updated
 - » HealthyBuilt Home: \$1500 new, \$2000 existing
- ▶ *H1369 Expand Renewable Energy Tax Credit*
 - » Establishes manufacturing incentive for makers of fuel cell & hydrogen equipment

Pending Legislation

- ▶ S1015/H1766 *Alternative Fuel Tax Credit* (\$2,000 for hybrids & AFVs)
- ▶ S11150/H1296 *Renewable Fuels Motor Fuels Tax Exemption* (exempts biofuels from state motor fuel excise tax)
- ▶ S1038 *Mobile Source Emissions Reduction Program* (AFV Fund)
- ▶ S1006 *Low Emission Vehicles*

Recommendations

- ▶ Carefully consider pending state legislation
- ▶ Lead by Example: Local and State Governments should be the model
- ▶ Community Energy Plan: establish Energy Efficiency and Renewable Energy Goals
- ▶ Weatherize Nonprofit Agencies & Schools
- ▶ New Buildings = Green Buildings
- ▶ Alternative Fuels and Hybrids for Fleets
- ▶ Food Lion and Catawba College: catalysts

NC Sustainable Energy Conference

March 29, 2006

- Multiple tracks
 - Transportation
 - Efficiency
 - Sustainability
 - Buildings
- Energy Champions
- Speakers include:
James Woolsley, Ray
Anderson & Dr. William
Schlesinger



Deputy Secretary of Department of Administration
Carlton Myrick; Jim Parker, NCSU, Industrial Extension
Service; Larry Shirley, State Energy Office

• www.energync.net



For More Information

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