Comments on the Draft LCGCC Report submitted by Dee Eggers – March 22, 2010

Hi,

Here is a long list of findings to consider in addition to what I sent in earlier. I apologize that I did not have time to tie them to specific recommendations.

I have a comment and a few questions.

In the recommendations section, please add wording somewhere in the Development and Transportation to strongly encourage increased pedestrian and bike accessible infrastructure.

Do we have costs associated with health effects in the findings other than mine below? I hope so.

Do we have a finding about temperature increase? (During the next century, temperatures could rise between X and Y^{o}F.)

To support the conservation and efficiency piece, do we have good job findings? Did anyone turn in jobs findings using Paul Quinlan's Dec 9, 2008 presentation or the brief Clean Water for NC document from August 2008 or from ASU Oct 2007 and or Feb 2008 or April 22 2008 presentation or CAPAG #s?

Does the document have any mention of the need for a smart grid or upgraded grid to achieve many of the goals? (I don't know the best terminology to use, but I know it needs to happen) If not, that would be good.

Let me know if you need anything further in the interim.

Best,
Dee Eggers

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Source: The Voice of Science on Climate Change, Doug Crawford-Brown, 2-28-06
We recognize that waiting for scientific consensus on this issue is inherently not possible. "All scientific beliefs are uncertain" and that "due to this uncertainty, there are always disagreements between individual scientists."

Source: Learning from State Action on Climate Change, Pew Center on Global Climate Change, February 2006
"Many states … are looking at policies that address climate change as economic opportunitities: to produce and sell alternative fuels, to become renewable energy exoporters, to attract high-tech business, or to sell carbon emission reduction credits."

Source: Pew - Judi Greenwald's presentation Feb 3, 2006
North Carolina's GHG emissions are nearly equivalent to the total emissions from Holland or Venezuela. (a comment)

Source: Progress Energy's Report to Shareholders, An Assessment of Global Climate Change and Air Quality Risks and Actions, 2006
"Progress Energy recognizes the importance of the global climate change issue and the enormous scale and complexity of the problem. Even with the considerable scientific uncertainties and the need for much more scientific research, we believe there is sufficient understanding of the problem and its potential consequences to warrant prudent action by both the private and public sectors."
Pg 11

Source: "Solution Opportunities Regarding Global Change from the Agriculture and Forestry Sectors" presentation by Dennis Hazel, PhD, C.F., Extension Forestry Specialist April 25, 2006.
North Carolina is losing land from forestry and agriculture. Between 1990 and 2002, one million acres of forestry land were lost to non-forest use. Farm acreage decreased by more than 2% from 2000 to 2004. Climate change solutions may help these sectors retain land.

Source: Presentation on Transportation Sector by David Greene, Oak Ridge National Laboratory, April 25 2006
The US transportation system emits more CO2 than total emissions from any country except China. (a comment)

Source: Draft Considated CAPAG Options presentation march 5, 2008
Of all energy efficiency options analyzed in the CAPAG process, the Demand Side Management Programs have the highest potential to reduce annual GHG emissions by 2020.
But -
Source: "Comments to the LCGCC Regarding Demand-Side Management Cost Recovery," Robert Gruber, Executive Director, Public Staff, NCUC, Oct 3, 2006
"…[the North Carolina] utilities have a financial disincentive to provide DSM programs." (pg 5)

Source: Recycling Energy: Profitable Climate Change Mitigation" Tom Casten, Alliance for Clean Technology December 11, 2006 (The slides I'm referencing are also in his handout "Are Worldwide Power Systems…")
Prices for CHP and recycled industrial energy are predicted to be half the cost of electricity from new coal (without CCS) or new combined cycle gas turbines. Electricity

from distributed generation is also predicted to be less expensive than from centralized conventional sources due largely to avoided costs of distribution. As well, distributed generation can improve energy security.

Source: Energy Balance and Emissions Associated with Biochar Sequestration and Pyrolysis Bioenergy Production," Gaunt and Lehmann, Env Sci and Tech publication passed out at a meeting in 2008 (I'm not sure about the date and publication date was not yet set.)
When applied to soil, biochar enhances the supply of nutrients to crops, increases plant growth, and increases the positive physical and biochemical characteristics of soil, reducing the need for fertilizer. Biochar also appears to reduce emissions of methane and N_2O from soil.

Source: Could site either SEO SEP and Schlesinger presentation on Feb 3, 2006
Increased temperatures will contribute to increased incidence of heat stroke, insect-borne disease, photochemical smog including ground level ozone concentrations and allergies.

Source: IPCC AR4
Human activities are responsible for the vast majority of climate forcing with solar irradiance contributing only approximately 7.5% to the total, according to the IPCC AR4.

Source: IPCC AR4 and the NCDC presentation and "When it Rains it Pours" Travis Madsen presented on Jan 16, 2008
While total annual rainfall amounts may not change or only increase slightly, climate models predict an increase in heavy precipitation, resulting in increased runoff and flooding, as well as longer periods of dry weather and drought.

Source: For example, SACE document, "Indications that Climate is Changing Faster than Anticipated: A Sample of Peer-Reviewed Studies from 2007"
The trend in scientific literature over the past several years indicates that climate is changing faster than anticipated.

Source: "Impact of Global warming on NC's Coastal Economy," App State University, presentation in 2008 sometime (1/15?)
Because the coastal plain is relatively flat, a one foot rise in sea level can cause inland movement of the shoreline y 2,000 to 10,000 feet.

Source: The Power to Choose North Carolina's Clean Energy Future, Environmental Defense 2007.
As several utilities have found, energy demand can be met through conservation and efficiency programs that reduce demand rather than by building new power plants. In a report pared for the NC Utilities Commission, the least expensive option was identified as energy efficiency at $0.03 per kWh with the next closest option being solar hot water at $0.06 per kWh. Adding additional capacity of pulverized coal generation was estimated at $0.07 – 0.09 per kWh.

The Tellus Institute predicted that over 38,000 jobs could be created by 2020 if North Carolina aggressively pursues energy efficiency and renewable energy.

Source: I don't recall. This has been discussed. NCSEA? ED?
The capacity for North Carolina's educational institutions to train the workforce needed for energy efficiency and renewable energy jobs is developing but not yet adequate meet projected workforce training needs.

Source: "Cornerstones: Building a Secure Foundation for North Carolina's Energy Future" Southern Alliance for Clean Energy, May 2008
Using conservative figures from credible sources, the Southern Alliance for Clean Energy has determined it is possible to decrease North Carolina's global warming pollution by 60% in two decades through energy efficiency, clean (primarily renewable) energy, pollution capture and long-range transportation and land use planning.

Source: Discussion of the Opportunities and Recommendations for Carbon Offset Projects in NC's Agriculture and Forestry Sectors" William C. McDow III, Dec 4, 2007.
Farmers in North Carolina can benefit from participation in the carbon offset market through best management practices that are already known to be economically beneficial such as reduced use of nitrogen fertilizer through precision application and conservation tillage as well as actions that reduce erosion such as riparian buffer restoration, and conversion of marginal or highly erodible land to forests.

Source: "Real and Verifiable Carbon Offsets" William Chameides, Duke University Nicholas Shool of the Environment, December 4, 2007
For members of North Carolina's agriculture and forestry sectors to participate in the carbon offset market their offsets must be credible which means accurate baseline information must be established as well as leakage assessment, measurement of change and independent verification.

Source: CAPAG report X. or use Brock Nicholson and Tom Peterson's presentation from Oct 23, 2007
The 56 CAPAG recommendations combine to result in no net costs for the state and result in avoiding 828 million metric tons of CO_2 ($MMTCO_2$) being added to the atmosphere and annual emissions in 2020 of 137 $MMTCO_2$ which is within 1% of 1990 levels.

Source: CAPAG final report
NC's emissions have grown more rapidly than other states since 1990 due to economic prosperity and population growth and land use patterns.

Source: Memo from Steven Smith to George Givens Jan 6, 2009
Several barriers to CHP and energy recycling exist including the following: 1. Surplus electricity is undervalued. 2. Interconnection standards are insufficiently standardized and retain unnecessary barriers to installation of energy recycling systems. 3. Non-utilities are barred from selling excess power in NC. 4.Environmental permitting is perceived as a barrier to retrofitting existing facilities.

Source: The "Power" of Energy Efficiency," Chris Mathis, Dec 9, 2008.
"Buildings use over 40% of our nation's energy."
"A 30% improvement in US buiding efficiency would reduce energy bills by $75 billion in 15 years and eliminate the need for 80 new nuclear power plants over the next 20 years." (He's citing DOE OEERE for this)
Over half of the existing homes in the US have single pane windows.
Retrofitting existing building stock will use local companies, purchasing materials from local businesses and using local contractors and labor. "This is job creation on a huge scale." Power plants only employ about 500 people whereas energy retrofit programs can employ thousands.

It takes 30 gallons of water to produce 1kW of electricity, of which about 10% are lost in evaporation. During drought conditions, most people do not know they can conserve water by conserving electricity.

Energy efficiency creates jobs, helps the poor, protects local businesses, stimulates growth, cleans the air, conserves water, provides a hedge against energy inflation, promotes energy security, and helps mitigate climate change.

Source: 2005 DENR DAQ CO2 Emission Reduction Strategies doc
Pg 32 – state government is one of larger energy users and GHG generators in NC (xx see state Energy Office report for more on this.)

Source : Economic Opportunity in Addressing Global Warming, Environmental Defense 2005

NC imports virtually all of its fuel resources spending over $10 billion each year to import fossil fuels. (See finding related to this at bottom under State Energy Office – the range I've seen is $6-13 billion – the latter being most likely.)
Pg 9 – citing State Energy Office

The emerging carbon market represents a potentially significant financial opportunity for North Carolina. At $20 per ton CO2, a landowner converting 1,000 acres to forest could earn $58,000 per year.
Pg 8 (They cite source 11 for this)

"…summertime ozone costs North Carolina about $296 million a year in health costs or $37 per citizen"
Pg 13 (They cite source 37 for this)

Increased temperatures are expected to result in higher tick and mosquito populations, which may increase a number of diseases including West Nile, Degue Fever, Lyme disease and malaria.
Pg 13 (They cite source 33)

"…sea level rise of less than 14 inches could inundate 770 square miles of the state's coast."
Pg 13 (They cite source 38)

(***Note:***There are other impacts to foresrty, tourism and recreation in mountains and ag on pg 14 if they'd be supportive.)

"North Carolina businesses can potentially sell hundreds of millions of dollars worth of carbon equivalency credits in the carbon marketplace."
Pg 15

Methane emissions from agriculture increased nearly 60% between 1990 to 2000. This is largely due to manure-management in large hog and poultry operations.
Pg 23 (Citing source 53)

Source: Understanding Global Warming for North Carolina, Environmental Defense 2005

In the mountains, climate change is expected to have adverse effects on Christmas tree production and skiing.
Pg 13 (skiing isn't – I added that – could site the SEO State Energy Plan for that)

US cropland has the potential to sequester over 8% of national GHG emissions (about 154 million metric tons of carbon per year).
Pg 15. (Citing USDA).

Source: State Energy Office "State Energy Plan" 2005
Currently NC imports virtually all of its fuel resources. These imports represent an annual financial diversion of about ($ 6 billion)…" (My $12-13 billion figure was based on personal communication with Larry Shirley a few years ago when gas prices were significantly higher. $13 billion was mentioned in a presentation, but I'm not sure of the date. Also, note that the EDF report below has $10 billion from a SEO source – we need to call the SEO and find out the latest #for this)
Pg 7

According to the 2005 State Energy Plan," over 60% of the energy in the fuel used in our state's coal and nuclear power plants is lost primarily in the form of heat. As well, a portion of the energy generated must then be used then used to operate the plants themselves. Electric power generation accounts for 57 million tons of CO_2 emissions annually. (pg 10)

In 1998, 240,000 asthma attacks were triggered by ozone. Repeated exposure to ozone can cause permanent damage to a person's lungs and immune system. (pg 14) Higher ozone concentrations also increase the incidence of asthma (Source: Glen Anderson, Nov 14, 2008)

"The Public Staff believes that special ratemaking treatment of DSM is appropriate in order to encourage utilities to aggressively invest in DSM resources." (See pg 23 sidebar - they are citing Docket No.E-100…)

Recommendation for UC to promote policies to diversify energy sources (pg 25, 4-1) Perhaps we should use language more like this in our recommendations since it's explicit.) "The (NCUC) is encouraged to promote policies that create diversity in energy supply such as natural gas, solar energy, wind energy, biomass, and hydrogen from renewable sources with particular emphasis on in-state energy development."

Rec 4-2 on that page would support peak shaving, which could be used to *support DSM* recommendation.

CHP "The State Energy Office should explore the development of combined heat and power (CHP) technologies." (pg 25 – 4-4 - this is a rec cited from State EPC)

*Dist Gen (*pg 25 – 4-5) ("…SEO should study distributed generation and appropriate applications.")

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Page 28 contains info for findings to support *animal waste*-related recommendations. Perhaps add the table(?)

Page 29 contains additional info to support *animal waste*-related recommendations. (weak)

Alt fuel and microalgae Pg 29

In FY02 the state government spent $179 million on energy and fuel, excluding gasoline. Of that, 65% was for electricity, 14% natural gas and LPG, 13% coal, and 7% fuel oil. (pg 43)

Among all state agencies, the UNC system is the largest consumer of energy accounting for 53% of the total. Transportation accounts for 12%.
(pg 43)

Public schools in the state spent $176 million in FY01 on energy bills, not including transportation expenses.
Pg 44

Residential consumption accounted for 23% of total energy consumption in North Carolin in 2000.
Pg 47

54% of residential energy (in Btu) is in the form of electricity, 22% natural gas, 19% petroleum and 5% wood.
Pg 47

Seventy percent (70%) of residential hot water needs are met with electricity suggesting significant potential for solar water heating.
Pg 47

Under the State Energy Office's "High Efficiency Scenario" for residential energy use, which would phase in a 30% increase in efficiency of new homes constructed and include basic retrofitting of existing homes, total in-state residential energy use in 2020 would virtually mirror that of 1990.
Pg 50

(Should there be findings for commercial (18% of total in 2000 - of this, 65% is electricity, pg 53) and industrial (32% in 2002 – sources are highly mixed but mostly petroleum followed by natural gas, electric, then coal, pg 57)sectors? They are later in the document.)

The transportation sector consumed 27% of total energy used in the state and represented one third of total energy-related CO_2 emissions in 2000.

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Pg 63

Vehicle miles traveled per capita increased 2.2% annually from 7,014 in 1980 to 10,933 annual miles per capita in 2000.
Pg 63

"The design of most of North carolina's towns and cities fails to encourage transportation efficiency…"
Pg 64

Alternative fuels from domestic sources have "compelling advantages in terms of national security and national and state economies."
Pg 66