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Memo

To:	North Carolina Legislative Commission on Global Climate Change
From:	The Center for Climate Strategies and North Carolina Department of Environment and Natural Resources
CC:	North Carolina Climate Action Plan Advisory Group and Technical Work Group Members
Subject:	Consideration and Approval of Completed CAPAG Recommendations
Date:	February 20, 2007

At the fifth meeting of the North Carolina Climate Action Plan Advisory Group (CAPAG) on January 24, 2007 16 draft pending greenhouse gas (GHG) mitigation options were approved unanimously (without objection) as final recommendations of that body out of a total of 53 draft pending options. The remaining 37 options not yet fully reviewed and approved by the CAPAG will be considered at its upcoming meetings in May, July and possibly the fall. The list of 16 "early consensus" mitigation options by the CAPAG includes the following recommended actions:

Residential, Commercial and Industrial:

- RCI-2, Expand Energy Efficiency Funds
- RCI-3, Energy Efficiency Requirements for Government Buildings
- RCI-4, Market Transformation and Technology Development Programs
- RCI-5, Improved Appliance and Equipment Efficiency Standards
- RCI-6, Building Energy Codes
- RCI-7, "Beyond Code" Building Design Incentives and Targets, Incorporating Local Building Materials and Advanced Construction
- RCI-8, Education (Consumer, Primary/Secondary, Post-Secondary/ Specialist, College and University Programs)
- RCI-11, Residential, Commercial, and Industrial Energy and Emissions Technical Assistance and Recommended Measure Implementation

Energy Supply:

- ES-3, Removing Barriers to CHP and Clean DG
- ES-9, Incentives for CHP and Clean DG

Cross Cutting Issues:

- CC-1, GHG Inventories and Forecasts
- CC-2, GHG Reporting
- CC-3, GHG Registry
- CC-4, Public Education and Outreach
- CC-5, Adaptation
- CC-6, Options for Goals or Targets (for CAPAG in support of COMMISSION)

A summary table and brief template for each of the approved CAPAG options is attached that includes the following information:

1) Results of analysis (for quantified options) and voting, including:
    a. GHG reduction potential,
    b. Costs or cost savings per ton GHG removed, and
    c. Level of CAPAG approval (unanimous for all 16 early consensus recommendations).
2) Summary text with:
    a. Mitigation option description,
    b. Mitigation option design (goals, timing, coverage of parties), and
    c. Recommended implementation mechanism(s) as appropriate.

Completed CAPAG options are available for consideration and approval as recommendations of the North Carolina Legislative Commission on Global Climate Change (Commission). Detailed mitigation options and reference material for all 53 CAPAG options are posted to the CAPAG project website as follows:

- Technical Appendix 1: Residential, Commercial and Industrial Appendix, with Annexes
    - http://www.ncclimatechange.us/ewebeditpro/items/O120F10927.pdf
    - http://www.ncclimatechange.us/ewebeditpro/items/O120F10926.pdf
- Technical Appendix 2: Energy Supply Appendix, with Annex
    - http://www.ncclimatechange.us/ewebeditpro/items/O120F10925.pdf
    - http://www.ncclimatechange.us/ewebeditpro/items/O120F10924.pdf
- Technical Appendix 3: Transportation and Land Use Appendix
    - http://www.ncclimatechange.us/ewebeditpro/items/O120F10928.pdf
- Technical Appendix 4: Agriculture and Forestry Appendix
    - http://www.ncclimatechange.us/ewebeditpro/items/O120F10921.pdf
- Technical Appendix 5: Cross Cutting Issues Appendix, with Annex
    - http://www.ncclimatechange.us/ewebeditpro/items/O120F10923.pdf

- http://www.ncclimatechange.us/ewebeditpro/items/O120F10922.pdf

In addition, the Chairs of the Commission solicited additional suggested options for consideration by January 31, 2007. These are attached in a table at the conclusion of this memo. Most of these suggestions are already incorporated in one or more of the 53 CAPAG mitigation options, but some may require additional analysis or design modification of CAPAG options, as noted.

Table 1.
Residential Commercial and Industrial Technical Work Group
Summary List of Mitigation Options

	Mitigation Option	GHG Reductions ($MMtCO_2e$)			Net Present Value 2007–2020 (Million $)	Cost-Effectiveness ($/tCO_2e$)	Level of CAPAG Support
		2010	2020	Total 2007-2020			
RCI-2	Expand Energy Efficiency Funds	1.5	8.2	55.8	-$1,346	-$24	Unanimous
RCI-3	Energy Efficiency Requirements for Government Buildings	0.0	1.7	9.6	-$130	-$14	Unanimous
RCI-4	Market Transformation and Technology Development Programs	0.0	2.1	10.7	-$339	-$32	Unanimous
RCI-5	Improved Appliance and Equipment Efficiency Standards	0.0	1.0	5.4	-$336	-$62	Unanimous
RCI-6	Building Energy Codes	0.6	4.4	28.7	-$490	-$17	Unanimous
RCI-7	"Beyond Code" Building Design Incentives and Targets, Incorporating Local Building Materials and Advanced Construction	0.5	2.9	20.4	-$293	-$14	Unanimous
RCI-8	Education (Consumer, Primary/Secondary, Post-Secondary/ Specialist, College and University Programs)	*Not quantified*					Unanimous
RCI-11	Residential, Commercial, and Industrial Energy and Emissions Technical Assistance and Recommended Measure Implementation	0.7	2.8	20.4	-$662	-$32	Unanimous

RCI-2 Expand Energy Efficiency Funds

Mitigation Option Description

Public (or systems) benefits charge is a fee assessed to utility customers based energy usage. A third party receives these funds to provide energy efficiency programming.

Mitigation Option Design

In order to support more energy efficiency/ renewable energy investments, it is recommended:

1. North Carolina's existing Public Benefits Charge increase significantly.
2. NC Utilities Commission collects fees and provides oversight through administrators.
3. Consistency in management and dedicated application of funds will be crucial.
4. Investments span a wide variety of residential, commercial and industrial applications.

Goals and Timing:

1. Reduce greenhouse gas emissions from RCI activities through public benefit charges.
2. Implement energy efficiency/ renewable energy programs comparable to more effective programs in other states.
3. One percent (1%) of utility revenues is an appropriate public benefits charge goal.
4. Three year phase-in of public benefits charges.

Parties Involved: Fee is collected from all customers of all utilities. Relevant stakeholder groups are involved in design, governance, oversight, management, and implementation of programs.

Implementation Mechanisms

Implementing Mechanisms:

1. Incentives for consumers, retailer training, marketing, promotion, and education.
2. Fund Research and Development through contracts with private firms, universities, government labs, and private/public consortia.
3. Performance-based contracting for funding of energy efficiency improvements, with capital costs paid back through energy savings.
4. Establish a Reinvestment Fund:
    a. Providing financing for energy-efficiency efforts.
    b. Create infrastructure to deliver renewable technologies.
    c. State agencies keep the net savings or reinvest savings in energy-efficiency.
    d. Example: Pennsylvania "Energy Harvest" program.

Implementing Agency: NC Utilities Commission

RCI-3 Energy Efficiency Requirements for Government Buildings

Mitigation Option Description

Governments should "lead by example": improve energy efficiency in all government buildings, set energy-efficiency goals for current buildings, new construction, and major renovations.

Mitigation Option Design

Elements of this Option Design include:

1. Adherence to energy-related guidelines in LEED+ standard.
2. Consolidate construction/maintenance budgets: energy efficiency is long-term savings.
3. Extend green campus initiatives to all public academic and government campuses.
4. Energy benchmarking, measurement, and tracking programs for government buildings.
5. Energy efficiency and renewable energy requirements for every government building.

Goals and Timing:

1. New construction/major renovations of government buildings meet LEED+ requirements.
2. Begin with all buildings entering the design phase by 2010.
3. Achieve 20% reduction from baseline 2002-03 energy consumption per gross square foot per year for all North Carolina existing government buildings by 2027.
4. In final year: new 5-year goal for government building energy efficiency improvement.
5. Build on current USI (Utility Savings Initiative) at North Carolina State Energy Office.

Parties Involved:

1. State agencies, UNC System and affiliates, Community College System, K-12 districts.
2. Local governments, building code enforcement, and other public entities.
3. Architects, building designers, engineers, developers, builders, contractors.
4. Regulators–State Construction, Energy, Budget and Management Offices.

Implementation Mechanisms

Implementing Mechanisms:

1. Performance-based Contracting (PC): funding energy efficiency improvements - Capital costs paid back through energy savings; should reach payback period threshold 12/15 yrs.
2. Create information clearinghouse with software tools to calculate impact.
3. Energy technologies that should be promoted include but are not limited to:
   a. Solar technologies: photovoltaic panels, solar hot water heaters/air conditioning.
   b. Support for new-to-market technologies, such as Solar Hybrid Lighting.
   c. Ground-source Heat Pumps.
   d. Focus on end uses: motors, plug loads, networked computer management, etc.
4. Comprehensive statewide survey of energy/water efficiency in government buildings.

Implementing Agency: TBD

RCI-4 Market Transformation and Technology Development Programs

Mitigation Option Description

Market transformation: the bulk of the private market automatically adopts/incorporates technologies resulting in improved energy efficiency. Energy efficiency technologies and practices will be demanded by the public and chosen by builders and manufacturers, revolving around public/private review of quality/effectiveness, including partnerships between government agencies, retailers, manufacturers, and non-governmental agencies.

Mitigation Option Design

Ensure voluntary standards are rigorous enough, yet understandable and valuable to the buyer. Market transformation efforts go hand-in-hand with technology development efforts.

Market transformation and technology development program must be long-term and robust; to include CONSISTENT, enduring support, continued investment, and independent evaluation of the efficacy of the technologies.

This particular recommendation does not address a single technology or market, but is a method for bringing appropriate technologies and processes to the marketplace. Several technologies can be targeted, use of energy efficient motors, support processes that recover waste from one process to use in other processes, increase ENERTY STAR funding/products, encourage small purchasers to act in aggregate groups to reduce costs and quantify emission reduction benefits.

Goals:

1. Permanently transform markets to increase and accelerate uptake of products with higher energy efficiency and renewable energy products.
2. Provide consistent support with the end-result being a time when the support can be removed without the program benefits ending as well.

Timing: Set up agencies by 2010. Start activities in 2012.

Parties Involved: All sectors and stakeholders in the state may be involved, including retailers, utilities, manufacturers, non-profit consortia, consumers associations, professional associations (engineers, architects, builders, designers), and state agencies.

Implementation Mechanisms

Implementing Mechanisms:

1. Collaborative marketing, funding R&D, patent protection, tax credits for R&D or new technologies, government procurement. Consider funding for State Energy Office.
2. Specific options to create necessary participation and buy-in: tax credits, low/no interest loans; financial incentives to business, industries and commercial firms to upgrade their equipment to more energy efficient technologies.

Implementing Agency: TBD

RCI-5 Improved Appliance and Equipment Efficiency Standards

Mitigation Option Description

Appliance efficiency standards reduce market cost of energy improvements by incorporating technological advances into base appliance models. Efficiency standards can be implemented at the state level, though implementation at a regional level is more efficient and preferred.

Mitigation Option Design

This mitigation option involves the replication of standards adopted in other states for appliances not covered by federal standards. Where technically feasible and economically justified, the State can work with other states in the region, to advocate for stronger federal appliance efficiency standards. Implementation of stronger-than-federal standards together with other states in the Southeast region is preferred, as it provides a broader market for manufacturers and thus lowers net costs of higher-efficiency devices to North Carolina consumers.

Elements of this option design include:

1. Develop a committee/workgroup to develop recommendations on appliance standards.
2. Adopt State-level Appliance Efficiency Standards, to include commercial and information technology (IT) equipment.
3. The State voices support of more stringent federal-level appliance efficiency standards.
4. Design a standard for recycling of materials in appliances.
5. Include water use reduction as a criterion for appliance efficiency improvement.

Goals: Increase standards to level recommended by Appliance Standards Awareness Program.

Timing: Adopt new standards by 2010. Standards in force by 2012.

Parties Involved: State agencies to enforce state codes and standards.

Implementation Mechanisms

Implementing Mechanisms:

1. Appliance Standards promulgated by legislation or developed administratively.
2. Reduce the higher-first-cost burden of higher-efficiency appliances by assisting low-income families with purchase of appliances meeting more stringent standards.
3. Elevated energy standards for appliances and equipment purchased by public agencies.
4. Work with manufacturers to consider impacts when setting new standards.

Implementing Jurisdiction: TBD

RCI-6 Building Energy Codes

Mitigation Option Description

Building energy codes specify minimum energy efficiency levels for new buildings or existing buildings undergoing a major renovation. Energy use in North Carolina buildings accounts for one-third of North Carolina's current gross GHG emissions. Amending Building Codes to make strict energy efficiency requirements in buildings will significantly reduce GHG emissions.

Mitigation Option Design

International Energy Conservation Code 2000 is the model for North Carolina residential and commercial buildings. An ongoing process of code amendments is proposed as follows.

1. Adopt stringent codes to improve energy use in buildings. Use cost-effectiveness tests to identify where moving beyond national codes makes economic sense.
2. Adopt innovative features of advanced codes implemented in other states beyond current codes in force, including building systems codes (heating) and designs (lighting).
3. Improve statewide enforcement of existing and new building codes at all levels, and fully implement enforcement within 6 months of statewide code adoption.
4. Regularly update state energy codes in three-year cycle to coincide with national code.
5. Modify codes to remove obstacles to renewable energy use.
6. Include education for building inspectors and building industry professionals to assure the new codes are implemented and enforced.

Goals and Timing: Enforce existing building energy codes by 2008; establish a new energy code by 2010 that requires all buildings to be 20% more efficient than current national building energy codes. Update every 6 months when the national energy code changes.

Parties Involved:

1. North Carolina Department of Insurance to implement new codes.
2. State and Local government building code enforcement agencies.
3. Mobile Home Manufacturing Industry and Building Industry Associations.

Implementation Mechanisms

Implementing Mechanisms:

1. Develop training and education for builders, contractors, trade schools, and Officials in Energy Enforcement.
2. Develop clearinghouse for information, including software tools to calculate impacts.

Implementing Agency: TBD

RCI-7 "Beyond Code" Building Design Incentives and Targets, Incorporating Local Building Materials and Advanced Construction

Mitigation Option Description

This option provides incentives and targets to induce the owners and developers of new and existing non-government buildings to markedly improve the efficiency of energy and resource use in those buildings, along with provisions for raising targets periodically and resources to help achieve the desired building performance.

Mitigation Option Design

Goals:

1. Promote and provide incentives for "beyond code" construction, using programs of various types for various sectors, such as:
2. Improved design and construction standards and guidelines addressing multiple aspects of resource conservation, with a focus on energy.
3. Promote the use of renewable energy technologies.
4. Provide incentives to induce 5% of new residential buildings and 2% of new commercial buildings annually to go to "beyond code" energy use levels that improve energy performance over the average new building (that meets the upgraded building code) by 30%.
5. Provide incentives to upgrade 20% of existing buildings by 2015 as follows:
   a. Increase residential building energy performance improvements by 15%.
   b. Increase commercial building energy performance improvements by 20%. This increase in efficiency should bring 20% of existing buildings up to the standard of the 2003 IECC (the current NC code, not the improved codes).

Timing: Begin program in 2007 and fully implement by 2012, except where noted otherwise.

Parties Involved: State and local governments, and other public entities. Building-code-enforcement practitioners.

Implementation Mechanisms

Implementing Mechanisms: TBD

Implementing Agency: TBD

RCI-8 Education (Consumer, Primary/Secondary, Post-Secondary/Specialist, College and University Programs)

Mitigation Option Description

The effectiveness of emissions reduction activities in many cases depends on providing information and education to consumers, as well as to future consumers (primary and secondary school students), regarding the energy and greenhouse gas emissions implications of consumer choices. In addition, specific and targeted education, outreach, and licensing requirements will be required for professionals in a variety of building-related trades.

Mitigation Option Design

Goals:

1. Training and education for builders and contractors in energy management and building code and other officials in energy code enforcement.
2. Continuing Education for building design and related professionals.
3. Energy-efficiency-related education introduced at community colleges and trade schools.
4. Consumer education programs.
5. Funding to the State Energy Office to support its role of providing consumer information.
6. Direct consumers to information and technologies for energy-efficiency and climate impacts reduction.
7. Introduce in School Curriculum.

Timing: Education/Training option *X* in place by *20YY* to coincide with need to support Option *Z*.

Parties Involved: Code enforcement agencies. Building professional trade groups. Community colleges. Universities. Primary/Secondary Schools. Public Information Agencies.

Implementation Mechanisms

Implementing Mechanisms: TBD. Coverage of energy efficiency topics in the exam for general contractors and energy efficiency topics in continuing education and recertification course and exams for public school teachers.

Implementing Agency: TBD.

RCI-11 Residential, Commercial, and Industrial Energy and Emissions Technical Assistance and Recommended Measure Implementation

Mitigation Option Description

This option provides incentives, expertise, information, and technical assistance to identify options to reduce fossil energy use and non-energy emissions of GHGs to the RCI sectors.

Mitigation Option Design

This initiative may include the following elements:

1. A residential energy audit program providing diagnostic testing and analysis that estimates energy use, energy cost savings, and reductions in emissions due to implementation of recommended measures.
2. A commercial energy audit program similar to the residential program that also considers alternative utility rate structures and load control opportunities.
3. An industrial energy audit program similar to the commercial program that also identifies key efficiency measures and opportunities for: capture and use of process heat, implementation of combined heat and power, and reducing the use of non-energy GHGs.
4. A Q&A and implementation follow-up mechanism.
5. Incentives and financial assistance to encourage implementation.

Goals: Annually, 10,000+ residential visits, 1,500+ commercial visits, and 300+ industrial visits. Over 50% of those to whom services are provided should implement at least 50% of the recommendations. The CAPAG recommended increasing this goal to 400,000 audits total.

Timing: An initial period of 3 years beginning in 2008, followed by an evaluation to determine whether or not to continue the program.

Parties Involved: Utilities, State Agencies, third-party efficiency providers, regulators, and others, such as a variety of stakeholders.

Implementation Mechanisms

Implementing Mechanisms: TBD. Negotiated Emissions or Energy Savings Agreements. Participation in Voluntary Industry-Government Partnerships. Integration with Regional Demand Response Initiatives/recommendations.

Implementing Agency: The State Energy Office can fund and/ or manage the effort or the Department of Environmental and Natural Resources could manage the program. The State Construction Office could conduct technical assistance and analysis of state facilities.

Table 2.
Energy Supply Technical Work Group
Summary List of Mitigation Options

	Mitigation Option	GHG Reductions ($MMtCO_2e$)			Net Present Value 2007–2020 (Million $)	Cost-Effectiveness ($/tCO_2e$)	Level of CAPAG Support
		2010	2020	Total 2007-2020			
ES-3	Removing Barriers to CHP and Clean DG	0.4	1.6	11.6	$66	$5.7	Completed
ES-9	Incentives for CHP and Clean DG	Combined with ES-3					Completed

ES-3 and ES-9 Removing Barriers and Providing Incentives to CHP and Clean Distributed Generation (DG)

Mitigation Option Description

Combined Heating Cooling and Power (CHP), also know as cogeneration, is a method of utilizing the thermal energy (heat) produced when generating electricity (power) in a single, coordinated process. CHP is more energy efficient than separate generation of electricity at a separate central electric plant and production of localized thermal energy for the end user. This distributed generation resource allows for recycling the heat, which is normally wasted to cooling towers or lakes at centralized electric generating stations, to meet onsite thermally driven demand such as process and space heating, cooling and dehumidification.

Mitigation Option Design

The proposed policy would encourage the adoption of CHP through a combination of regulatory improvements and expanded incentives designed to improve interconnection and net metering standards, adopt output based emission standards, and allow GHG friendly business arrangements, such as third party ownership of CHP based generation.

Goals: 50 percent of North Carolina's 4,000 MW of planned new electric generation will be CHP.

Timing: Goal should be achieved by 2018, within the time frame for new generation additions.

Parties involved: NC Utilities Commission, Utilities, NC Sustainable Energy Assoc.

Other: None Cited.

Implementation Mechanisms

Implementing Mechanisms: This is a command and control policy that would be implemented with the following steps: 1) Encourage CHP systems of 20 MW or smaller (or of equivalent mechanical power) by a speedy adoption and customer friendly implementation of FERC Order 2006 Standardization of Small Generator Interconnection Agreements and Procedures, 2) Qualify recycled energy from CHP generation for existing renewable and energy efficiency incentive and loan programs, 3) Allow energy service companies to sell CHP and CDG output to third party customers, and 4) Facilitate governmental and non profit organizations to easily sell renewable energy credits and tax credits to the market place.

Implementing Agencies: TBD

Table 3.
Cross Cutting Issues Technical Work Group
Summary List of Mitigation Options

	Mitigation Option	GHG Reductions ($MMtCO_2e$)			Net Present Value	Cost-Effective-ness	Level of CAPAG Support
		2010	2020	Total 2007-2020	2007–2020 (Million $)	($/$tCO_2e$)	
CC-1	GHG Inventories and Forecasts	*Not Quantified*					Unanimous
CC-2	GHG Reporting	*Not Quantified*					Unanimous
CC-3	GHG Registry	*Not Quantified*					Unanimous
CC-4	Public Education and Outreach	*Not Quantified*					Unanimous
CC-5	Adaptation	*Not Quantified*					Unanimous
CC-6	Options for Goals or Targets (for CAPAG in support of COMMISSION)	*Not Quantified*					Unanimous

CC-1 GHG Inventories and Forecasts (I&F)

Mitigation Option Description

I&Fs elucidate the magnitude of all emission sources and sinks, the relative contribution of various emission sources and sinks to total emissions, and the factors that affect trends over time. Initially, the I&F will be used to inform state leaders and the public on statewide trends, opportunities for mitigating emissions or enhancing sinks, and verifying GHG reductions associated with implementation of North Carolina's Climate Action Plan.

Mitigation Option Design

Goals:

1. Periodically develop I&Fs with forecasts to reasonable and realistic future years (5 and 10 years), up to and including 2020.
2. Inventory of all emissions generated within the state as well as emissions associated with energy imported and consumed in the state.
3. Provide a projection that realistically forecasts future emissions based on expected growth and expected mitigation options.
4. Provide a basis for documenting reductions and credits "by difference" from year to year.

Timing: The program should be implemented as soon as possible. Reporting by major (Title V) point sources holding an air permit will begin for calendar year 2008. To be in agreement with routine EPA air emissions reporting requirements and regulations for other regulated air pollutants, the process for these and other sources should repeat as follows: every year for major point sources and every third year for other sources.

Parties Involved: The responsibility for preparing I&Fs should reside with the Division of Air Quality (DAQ). Other state agencies as well as private facilities (sources) will need to provide data to DAQ on a periodic basis.

Implementation Mechanisms

Implementing Mechanisms:

1. The program should be integrated with existing DAQ I&F functions as committed to by DAQ in the September 2005 Report under the Clean Smokestacks Act.
2. An annual unofficial "difference" report should be issued for major point sources and include updates as available for other categories that are on an every-third-year rotation.
3. The state would develop I&Fs for area sources, small point sources, and mobile emissions.

Implementing Agency: NC DAQ

CC-2 State Greenhouse Gas Reporting

Mitigation Option Description

GHG reporting reflects the measurement and reporting of GHG emissions at a statewide, sector, or sub-sector level to support tracking and management of emissions. It can help sources identify emission reduction opportunities and reduce risks associated with possible future GHG mandates by moving "up the learning curve" and helps in the construction of periodic state GHG inventories. Reporting is typically a precursor for participation in GHG reduction programs, opportunities for recognition, a GHG emission reduction registry, and securing "baseline protection."

Mitigation Option Design

Goals:

1. Encourage GHG mitigation activities from all quarters.
2. Phase in by sectors, with all entities reporting their GHG emissions and any emissions reduction programs they implement.
3. Applicable on a voluntary basis to all sources.
4. Reporting of GHG emissions on an organization-wide basis within North Carolina.
5. Occur annually on a calendar-year basis for all six traditional GHGs and, to the extent possible, for black carbon.
6. Verified through self-certification and NC DENR spot-checks. To qualify for future registry purposes, reports should undergo third-party verification.
7. Maximize consistency with federal, regional, and other states' GHG reporting programs and quantification protocols.
8. Reporting of direct emissions should be required; reporting of emissions associated with purchased power and heat should be phased in; and reporting of other indirect emissions should be allowed.
9. Reporting of emissions from GHG reduction projects should qualify for reporting.
10. Provide appropriate public transparency of reported emissions.

Timing: Implementation should begin as soon as possible.

Parties Involved: All entities that can verify ownership of GHG emissions.

Implementation Mechanisms

Implementing Mechanisms: GHG reporting may be required by DAQ for some categories of sources through normal state rulemaking procedures. All else as per CC-1.

Implementing Agency: NC DAQ

CC-3 State Greenhouse Gas Registry

Mitigation Option Description

A GHG registry enables uniform measurement and recording of GHG emissions reductions in a central repository. Typically, it also includes transaction ledger capability in order to support tracking, management, and ownership of emission reductions.

Mitigation Option Design

Goals:

1. Actively engage with other states in developing a regional or national GHG registry that will comprehensively meet the state's needs.
2. Cover all mitigation options the CAPAG recommends, provide adequate quality verification, and allow project-level reporting.
3. Participation should be voluntary, and costs should be borne primarily by participants.
4. Key elements include:
    a. Geographic applicability.
    b. Inclusion of as broad an array of sectors, sources, facilities, and approaches as possible.
    c. Start as far back chronologically as good data exists, as affirmed by third-party verification and allow registration of project-based reductions or "offsets" that are equally rigorously quantified.
    d. Incorporate adequate safeguards to ensure that reductions are not double-counted by multiple registry participants and provide appropriate transparency.
    e. Strive for maximum consistency with other state, regional, and/or national efforts; allow greatest flexibility as GHG mitigation approaches evolve; and provide guidance to assist participants.
    f. The state and its political subdivisions should be valid registry participants and should be allowed to participate in emission trading if and when such a program is developed and authorized. Revenues associated with the sale of any emission reduction credits generated by the state or its political subdivisions could be used to support the GHG emission inventory, forecasting, reporting, and registry functions within state government.

Timing: As soon as possible after a GHG reporting program is operating.

Parties Involved: All entities that can verify ownership of GHG emission reductions.

Implementation Mechanisms

Implementing Mechanisms: TBD. Costs should be shared by participants benefiting from the registry.

Implementing Agency: NC DENR

CC-4 State Climate Public Education and Outreach

Mitigation Option Description

Public education and outreach can support GHG emissions reduction efforts at the macro- or micro-scale level in relation to emissions reduction programs, policies, or goals. It is vital to fostering a broad awareness of climate change issues and effects (including co-benefits, such as clean air and public health) among the state's citizens and is necessary to engage citizens in actions to reduce GHG emissions.

Mitigation Option Design

Goals:

1. The state should "lead by example" in its own education and outreach activities by establishing a pro-active public education and outreach capability to assist in the implementation of CAPAG mitigation options adopted by the Governor.
2. Education and outreach activities would target five specific audiences:
   a. Policymakers and managers (e.g., legislators, regulators, executive branch, agencies, and employees);
   b. Educators and Students – by integrating climate change into primary and secondary educational curricula, post-secondary degree programs, and professional licensing programs;
   c. Community Leaders and Community-Based Organizations (e.g., institutions, municipalities, service clubs, social & affinity groups, non-governmental organizations, etc.);
   d. General Public – to increase awareness and engage citizens in climate actions in their personal and professional lives; and
   e. Industrial and Economic Sectors – in order to recognize leadership; share success stories and role models; and expand climate involvement and participation within the business community.

Timing: As rapidly as possible.

Parties Involved: NC DENR and many other key parties.

Implementation Mechanisms

Implementing Mechanisms: TBD. Public education and outreach.

Implementing Agency: NC DENR

CC-5 State Climate Change Adaptation Strategy

Mitigation Option Description

The state must develop a plan to manage the projected impacts of ongoing climate change.

Mitigation Option Design

Goals:

1. Create a state-sanctioned Blue Ribbon Commission on Adaptation to Climate Change (the Commission) to develop a state Climate Change Adaptation Plan (the Plan) to address the adaptation issues identified in the accompanying table.
2. The Plan should include at least the following:
   a. Comprehensive identification of potential climate change impacts.
   b. Recommended steps to respond to these impacts.
   c. Coordination of response efforts through state, local and federal agencies, organizations, etc.
   d. Establishment of time- and program-based goals.
   e. A benefit-cost analyses of the potential costs of a "status quo" approach as compared to implementing the Plan's recommendations.
   f. Prioritization of adaptation measures that also mitigate GHG emissions and recommendations based on the certainty and severity of adverse impacts to citizens, ecosystems and local economies.
   g. Periodic review and update of the Plan.
3. The state Legislature should provide funding to support development of and on-going revisions to the Plan.

Timing: The Commission should be established as soon as possible, and the Plan should be completed within one year of establishing the Commission. Parallel public education and outreach efforts regarding adaptation should commence immediately. "Early-adoption" opportunities should be addressed as rapidly as possible (even before the Commission is established, if possible), and pro-active adaptation initiatives should commence within the next 2-3 years.

Parties Involved: The Commission should involve and coordinate with all appropriate state and local agencies, organizations, institutions, and all affected sectors and interests.

Implementation Mechanisms

Implementing Mechanisms: TBD.

Implementing Agency: TBD.

CC-6 Options for State Greenhouse Gas Goals or Targets

Mitigation Option Description

In response to a widely-anticipated cap on GHG emissions by the federal government, a number of states are currently establishing GHG caps. North Carolina should also establish voluntary goals to limit GHG emissions to prepare the state's economy for the likely caps at the national level and begin to sever the link between increasing energy demand and GHG emissions. \

Mitigation Option Design

Goals: The voluntary goal should be set to bring emissions back to a baseline, such as year 2000.

Timing: The goal should be set over a long-time horizon of 10-15 years to meet the baseline. It should be expressed as an interim goal on the longer path toward ultimate climate stabilization.

Parties Involved: This would be an overall voluntary goal for the State of North Carolina. There would be no mandates to any specific party. However, all sectors of the state's economy would have the opportunity to contribute toward meeting the state's goal.

Implementation Mechanisms

Mechanisms: If recommended by the Commission, such a goal could be established by the General Assembly or by an executive order of the Governor.

Implementing Agency: Multiple agencies could be involved in implementation, depending on actions undertaken as a part of a plan to reach the goals.

Table 4. NC Commission Member Additional Options

Suggestion #	GHG Mitigation Action	Notes	Recommended By
1)	Renewable Portfolio Standard combined with Energy Efficiency Standards amounting to a 20% Energy Supply and Offset Mix (REPS) by the year 2020	Under consideration by the CAPAG, and will require some additional analysis. This is generally consistent with RCI-1 and RCI-2, though we will need to consider the need for aligning the goals of ES-2 with RCI options (which we would have had to do anyway. Linked to several AFW options covering animal waste to methane energy, landfill gas to energy, agricultural waste to energy, forestry biomass to energy. Note linkage to feedstock supplies for this option coming out of AFW-5, 9, 10 and 11.	Toben, Shore
2)	Increase funding to the Forest Development Program (FDP) by $5 million.	Under consideration by the CAPAG and appears to be covered under the AFW's forestry options (AFW8-10).	Slocum
3)	Increase Allowable Tractor-Trailer Truck Weights on state roads to 90,000 lbs., for units with 6th axle.	Not under direct consideration by the CAPAG and will require additional analysis.	Slocum
4)	Increase Funding for Agricultural Development and Farmland Preservation Trust Fund; provide at least $40 million annually. Through some funding mechanism (or combination of mechanisms), provide at least $40 million annually to the Agricultural Development and Farmland Preservation Trust Fund to support long-term conservation of our farm and forest land resources:	Under consideration by the CAPAG and covered under AFW-4 and 7.	Slocum
5)	Expand Allowable Range of Forest Biomass Under the NC Green Power. Expand the NC Green Power program to include all available sources and not just a very limited subset of forest biomass: C	Under consideration by the CAPAG under RCI-9 and covered under AFW-9&10.	Slocum

6)	Remove the barriers that prevent start-up and retrofit/adaptive operations of government, commercial, industrial and institutional cogeneration and tri-generation plants throughout North Carolina.	Under consideration by the CAPAG. Covered in general in the mitigation option design and implementation measures in RCI-10, but could be included in slightly more detail. No particular impacts on modeling.	Cowell
7)	Remove barriers preventing micro-cogeneration at the household and small-business level.	Under consideration by the CAPAG, and will require additional analysis. Covered in general in the mitigation option design and implementation measures in RCI-10, but could be included in slightly more detail. No particular impacts on modeling. Covered also in the mitigation option design and implementation measures in ES-3 and ES-9. The effect of the second would need to be incorporated into ES analysis after RCI consideration.	Cowell
8)	Management of Hog Manure.	Under consideration by the CAPAG under AFW-1 (anaerobic digesters and energy utilization). This has a direct link with ES-1 and ES-2.	Profeta
9)	Consider the Biofuels Group Recommendations.	Under consideration by the CAPAG. Covered under the AFW ethanol and biodiesel options.	Peele, Shore
10)	Fund NC Farm Bureau, NC GreenPower	Under consideration by the CAPAG under ES and AFW options.	Peele
11)	Revolving Loan Fund for Green School Construction.	Not under consideration by the CAPAG, and will require additional analysis. Suggests a "Revolving Loan Fund for Green School Construction", which could fairly easily be added as an implementation measure for RCI-3 (which also could be more explicit in its application to schools).	Garrou
12)	5% RPS with Other Energy Conservation Measures.	Under consideration by the CAPAG. Tangential relation to RCI options, as it recommends biomass power generation, which is a part of RCI-10 (so no additional work required, some assumptions could be changed).	Clark
13)	Encourage Development of "Low Hanging Fruit" Renewable	Under consideration by the CAPAG under various ES, TLU and AFW	Clark

	Options.	options.	
14)	Voluntary and incentive-based activities and programs suggested by other member of the Legislative Commission could be implemented to determine their impact.	Under consideration by the CAPAG under various options.	Everett, Choi
15)	CO2 equivalent emissions reduction. Draft bill that directs the State to design an emissions reduction program by 2010, and sets the goals reduce emissions (from what level?) by 60% by 2025, and 80% by 2050.	Generally consistent with what we have so far in terms of overall reduction potential from the 53 options as currently configured, but would require additional analysis to go beyond 2020 to the 2025 time period.	Eggers
16)	Draft bill directing NC DOT to make plans public, consider and analyze climate impacts of plans.	TLU-1a focuses more on local growth plans; although there is some overlap, this recommendation would best be seen as a useful complement to TLU-1a. Linkage to AFW-4 and AFW-7 (Ag and Forestry land protection measures). Could be mentioned as implementation measures/goals in RCI-7 and RCI-8.	Families Together
17)	Draft bill to change NC net metering regulations to allow more use, streamline regulations.	Covered and included, in a more general way than the bill, in the mitigation option design and implementation measures in RCI-10.	Eggers
18)	This list of options prepared by environmental NGOs includes several that overlap with RCI, ES, TLU and AFW options.	Generally covered but may require additional analysis. The REPS option includes energy efficiency, and mentions a range of target investment (as a fraction of utility revenue). It also includes a specific target for a combination of solar hot water and solar PV. Several education options are mentioned. In general, most of the options included here appear in some form in RCI, but some could be made more explicit as parts of goals or implementation measures within RCI option write-ups. In particular, a goal is cited for State Lead by Example, that isn't really explicit enough (as to whether it applies to new and/or existing buildings, and as to the scope of what "government"	Shore, Smith, Stephenson, and Urlaub

		includes) to know whether the existing RCI-3 goal is consistent with it.	
19)	Fuel Savings Measures (idle reduction)	Covered: TLU-4, Truck Stop Electrification, and TLU-8, Anti-Idling.	Shore, Smith, Stephenson, and Urlaub
20)	Appropriate funds for research and development of microalgae for fuel.	Covered: algal oil feedstock for biodiesel production is recognized within AFW-2, as an example of new feedstock source needed to meet the in-state production targets. We assume that the R&D addressed in this bill ($500k/yr) would be covered within the incentives estimated to be needed to promote production to achieve the targets for AFW-2 (discounted costs range from $5MM-$33MM/yr).	Eggers
21)	Incentives for Carbon Reduction Technologies in Agricultural Sector, including bio char.	Covered under AFW-1.	Smith, Shore
22)	Formulation of a climate adaptation strategy for North Carolina.	Covered under CC-5.	Riggs, Stephenson and Clark
23)	More analysis of options is needed under Section 5 of the COMMISSION	Costs and GHG reduction benefits for options have been calculated to the specifications of the CAPAG and its TWGs, as reflected in the mitigation option templates and reference materials. Additional analysis of costs and secondary economic impacts and other co-benefits is possible, depending on need. GHG reductions from specific actions are cumulative in their contribution toward reduced global GHG atmospheric concentrations. Results of reduced GHG concentrations have been established by the Intergovernmental Panel on Climate Change (IPCC) and affirmed by the US National Academies of Science (NAS).	Pittenger, Everett, Choi, Howard, and Slocum