Table XX.
Cross-Cutting Issues Technical Work Group
Summary List of Pending Mitigation Options

#	Name of Mitigation Option	Status
CC-1	GHG Inventories and Forecasts	Pending
CC-2	GHG Reporting	Pending
CC-3	GHG Registry	Pending
CC-4	Public Education and Outreach	Pending
CC-5	Adaptation	Pending
CC-6	Options for Goals or Targets (for CAPAG in support of LCTCC)	Pending

CC-1 GHG Inventories and Forecasts

Mitigation Option Description

[Insert text as appropriate]

Design

[Insert text as appropriate]

- **Goals:**
- **Timing:**
- **Coverage of parties:**
- **Other:** [Insert text if/as appropriate]

Implementation Mechanisms

[Insert text as appropriate]

Related Policies/Programs in Place

[Insert text as appropriate]

Types(s) of GHG Reductions

[Insert text as appropriate]

Estimated GHG Savings and Costs per MTCO2e

[Insert text as appropriate]

- **Data Sources:**
- **Quantification Methods:**
- **Key Assumptions:**

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

[Pending or Completed]

Level of Group Support

[Insert text as appropriate]

Barriers to Consensus

[Insert text as appropriate]

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Cross Cutting Issues Technical Working Group
Draft GHG Inventories and Forecasts Design Characteristics Matrix

Purpose and Goals of Inventories and Forecasts:

1. Tracking GHG emissions trends
2. Identifying opportunities and areas for action
3. Others?

#	Design Element	Options	Design Considerations	Preliminary Recommendation
1.	**Responsibility for Preparing Periodic Inventories and Forecasts**	• Sole responsibility with NC DENR Department of Air Quality (DAQ) • Shared responsibility between DAQ and other state agencies	• Purpose is to develop consistent, systematic inventories and forecasts from one year to the next. • Subject matter expertise is evolving rapidly.	• DAQ has substantial emissions inventory responsibility now, so recommend locating responsibility and authority for this function at DAQ as well. • Inventories and forecasts should include all sectors/sources. • Responsibility of other agencies to provide DAQ with related data and assistance (e.g., VMT) must be explicit.
2.	**Inventory Frequency**	• Annual • Other	• Inventory reflects historical emissions. • Different sized sources currently required to report emissions on different schedules (e.g., major sources annually; minor sources every 5 years). • Must be consistent with any NC GHG Reporting Program, and should strive for consistency with other inventory and forecasting programs.	• Prepare comprehensive, thorough recalculation every 5 years. • Publish inventory update annually based on readily available data (e.g., emissions filings from major sources; periodic filings of minor sources; etc.) for calendar year. • Starting year: Use CAPAG inventory and forecast for past data and 2005; prepare comprehensive revisions in 2010, 2015, 2020, etc. • Dovetail to the extent possible with existing CSA requirements. • DAQ to receive public input and comment before finalizing.

#	Design Element	Options	Design Considerations	Preliminary Recommendation
3.	**Forecast Frequency and Periods**	• Annual • Intervals • Other	• Forecasts reflect estimates of future emissions. • Define future years for which emissions inventory is prepared (i.e., frequency and overall forecast period). • Define intervals for future year forecasts (e.g., annual, 5-year intervals relative to a base historical year). • Limitations exist on availability of activity data for projecting emissions (e.g., current Energy Information Administration (EIA) projections of fuel consumption only go to 2025). • Should strive for consistency with other inventory and forecasting programs.	• Prepare comprehensive, thorough recalculation every 5 years, alongside inventory. • Publish forecast update annually based on readily available data (e.g., emissions filings from major sources; periodic filings of minor sources; etc.) for calendar year. • Project as far into the future as reasonably possible (e.g., 5, 10, 15, 20, 25, and 50 years) • Dovetail to the extent possible with existing CSA requirements. • DAQ to receive public input and comment before finalizing.
4.	**Greenhouse Gases Included**	• Six "Kyoto gases" (CO2, HFCs, CH4, N2O, PFCs, SF6) • Black Carbon	• Must be consistent with any NC GHG Reporting Program, and should strive for consistency with other inventory and forecasting programs. • Broader array promotes inventory building, public information, identification of GHG strategies, etc.	• Include mass emissions of the six "Kyoto gases" and black carbon. • Calculate CO2-equivalence to the extent possible.

#	Design Element	Options	Design Considerations	Preliminary Recommendation
5.	**Basis for Calculating and Reporting Emissions**	• Production based • Consumption based	• Production refers to emissions generated by sources in-state (e.g., emissions from power generated in-state whether consumed in-state or exported). • Consumption refers to "Production" based emissions plus imports and minus exports, at least for the energy sector.	• Recommend calculating emissions on both production and consumption bases to the extent reasonably practicable.
6.	**Emissions Quantifi-cation**	• Calculation methods & tools • Federal 1605(b) program details quantification of black carbon emissions.	• Apply current best practice methods (e.g., *GHG Protocol* and calculation tools). • Strive for consistency with other reporting and quantification programs. • Some "other" or "home grown" approaches may be necessary (e.g., Flashing emissions; IPIECA[1], API's[2] SANGEA™ GHG Emissions Software).	• Recommend quantifying emissions on the basis of best available practices, minding the importance of consistency with other programs, and transparently noting any necessary departures or changes.
7.	**Public Access & Reports**	• Internet access and/or Online reports • Paper reports • Both	•	• Recommend DAQ make inventories and forecasts readily available to policymakers, interested parties, and the general public via the Internet.

[1] IPIECA is the International Petroleum Industry Environmental Conservation Association.
[2] API is the American Petroleum Association.

#	Design Element	Options	Design Considerations	Preliminary Recommendation
8.	**Funding**	• State-funded. • Emission-based fees (would require legislative approval). • Some combination? • Other?	• Inventories and forecasts can only be accomplished if adequate DAQ resources exist, so creative funding sources should be investigated (e.g., transaction fees, GHG credit sales, etc.)	• DAQ should publish the initial annual update based on CAPAG inventory and forecast. • Simultaneously, DAQ should consult with interested parties to identify, weigh, and select among creative funding approaches.
9.	**Periodic Reassessment of Inventory and Forecast Approach**	• Authority • Purpose • Frequency	• DAQ and involved agencies should have the ability to periodically reassess and revise (if necessary) designs element of the inventory and forecasting program • Sample reassessment considerations: - Relative impact of sources or groups on overall emissions totals vs. costs of calculating their emissions. - Benefits to NC air, taxpayers, businesses?	• DAQ should review at five-year intervals following implementation of the GHG inventory and forecast program. • DAQ's review should identify any revisions necessary and appropriate next steps and/or research questions.
10.	**Other?**	•	•	•

CC-2 State Greenhouse Gas Reporting

Policy Description

NOTE: All red text is meant to reflect only an illustrative example.

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. GHG reporting can help sources identify emission reduction opportunities and reduce risks associated with possible future GHG mandates by moving "up the learning curve." Tracking and reporting of GHG emissions would also help in the construction of periodic state GHG inventories. GHG reporting is typically a precursor for sources to participate in voluntary GHG reduction programs, opportunities for recognition, a GHG emission reduction registry, and to secure "baseline protection." Further, developing a GHG reporting program could enable the state to influence the development of GHG reporting practices throughout the region and nation and build consistency with other state or regional GHG reporting programs.

Policy Design

Recommendations for key reporting program characteristics are noted in the *GHG Reporting Design Options Matrix*. Key elements include:

- Subject to consistently rigorous quantification, GHG reporting should not be constrained to particular sectors, sources, or approaches, in order to encourage GHG mitigation activities from all quarters.
- Mandatory GHG reporting should be phased in by sectors as rigorous, standardized quantification protocols, base data, and tools become available, and as responsible parties become clear. Entities should be allowed to report GHG emissions voluntarily before mandatory reporting applies to them; and the state, municipalities, and other jurisdictions should be allowed to report emissions associated with their own activities and any programs they may implement.
- Reporting should be applicable to all sources (e.g., combustion, processes, vehicles, etc.) but using common sense regarding de minimis emissions.
- The goal should be reporting of "organization-wide emissions within North Carolina" but with greatest possible "granularity" in order to facilitate baseline protection.
- Reporting should occur annually on a calendar-year basis for all six traditional GHGs and, to the extent possible, for black carbon.

- Reporting of direct emissions[3] should be required; reporting of emissions associated with purchased power and heat[4] should be phased in, and voluntary reporting of other indirect emissions[5] should be allowed.
- Every effort should be made to maximize consistency with federal, regional, and other states' GHG reporting programs.
- GHG emissions reports should be verified through self-certification and DENR spot-checks; to qualify for future registry purposes, reports should undergo third-party verification.
- Project-based emissions reporting should be allowed, when properly identified as such and quantified with equally rigorous consistency.
- The reporting program should provide for appropriate public transparency of reported emissions.

- **Goals:** Implementation of a North Carolina GHG Reporting Program as early as possible.
- **Timing:** ASAP, preferably by 2008.
- **Coverage of parties:** [Insert text as appropriate].

Implementation Mechanisms

Reporting protocols, opportunities, and, in the case of mandatory reporting, underlying regulatory requirements.

Related Policies/Programs in Place

Many sources in North Carolina report criteria pollutant emissions in order to comply with various federal and state regulatory programs. Most electric generating stations are also required to report CO2 emissions to the Energy Information Administration (EIA). Some sources may report GHG emissions on a voluntary basis to federal, state, or privately-run programs. Otherwise, there is no broad, statewide GHG reporting program in North Carolina.

Types(s) of GHG Reductions

GHG reporting is an enabling policy to encourage management, and ultimately reduction, of GHG emissions. It does not reduce GHG emissions itself per se.

Estimated GHG Savings and Costs per MTCO2e

Not applicable.

Key Uncertainties

[3] Defined as "Scope 1" emissions in the *GHG Protocol*.
[4] Defined as "Scope 2" emissions in the *GHG Protocol*.
[5] Defined as "Scope 3" emissions in the *GHG Protocol*.

Uncertainties exist with respect to quantification of some GHG emissions from some sources, but standard quantification protocols are rapidly being developed and accepted widely. There remain significant uncertainties with respect to how various state, regional, and/or federal GHG reporting programs may develop.

Additional Benefits and Costs

Not applicable.

Feasibility Issues

None cited.

Status of Group Approval

Pending.

Level of Group Support

TBD.

Barriers to Consensus

TBD.

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Cross Cutting Issues Technical Working Group
Draft GHG Reporting Design Characteristics Matrix

July 11, 2006

WRI/WBCSD *GHG Protocol*'s Principles for GHG accounting and reporting:

1. Relevance
2. Completeness
3. Consistency
4. Transparency
5. Accuracy
6. Enable other goals

Potential Goals of GHG Reporting:

4. Identifying reduction opportunities
5. Reducing risks (e.g., start learning curve)
6. Tracking GHG emissions, assisting the state in constructing annual inventories
7. Participating in voluntary programs
8. Participating in – or preparing for – mandatory programs
9. Precursor for registry participation
10. Opportunities for recognition
11. Public reporting
12. Consistency with other programs
13. Others?

#	Design Element	Characteristics	Design Considerations	Preliminary Recommendation
1.	**Type of Program**	• Voluntary • Mandatory	• May need or want to constrain mandatory applicability to certain sectors and/or sources pending availability of accepted quantification protocols. • Mandatory reporting is in place in some states for permitted sources (ME, CT, etc.); anticipated soon for several others in Northeast and far West.	•
2.	**Sectors**	• All sectors eligible • Limited to certain sectors	• Participation may be limited by availability of quantification methods; may need to "stage" sector participation. • WRI calculation protocols: Stationary combustion, mobile, electric power, cement, iron & steel, aluminum, pulp & paper, wood products, lime, ammonia, purchased heat or power, others.	•
3.	**Sources**	• All • Stationary combustion emissions • Mobile combustion emissions • Process emissions • Fugitive emissions	• Could limit sources even within sectors, (e.g., via types, size thresholds, etc.). • Broader array promotes inventory building, public information, identification of GHG strategies, etc.	• From catalog 2.5: Require mandatory GHG reporting for permitted sources

#	Design Element	Characteristics	Design Considerations	Preliminary Recommendation
4.	**Organiz-ational Boundary**	• Entity-wide (e.g., corporation-wide) • Facility • Emissions unit or source point • Other (?)	• Clear definitions needed to avoid double counting where shared ownership exists. • Should strive to have design be consistent with possible future directions (e.g., mandatory reporting would not be enforceable above the facility level). • Combinations are possible (e.g., finer resolution aggregated to a greater whole).	• From catalog 2.2: Report NC emissions from state facilities & vehicles to public & 1605(b)
5.	**Reporting Period**	• Annual - Calendar - Fiscal • Other	• Should strive for consistency with other reporting programs.	•
6.	**Greenhouse Gases Included**	• Six "Kyoto gases" (CO2, HFCs, CH4, N2O, PFCs, SF6) • Black Carbon • Other	• Should strive for consistency with other reporting programs. • Broader array promotes inventory building, public information, identification of GHG strategies, etc.	• From catalog 2.3: Include non-CO2 GHGs

#	Design Element	Characteristics	Design Considerations	Preliminary Recommendation
7.	**Scope of Emissions Covered**	• Direct - "Scope 1" • Indirect - "Scope 2" - Indirect from purchased Heat & Electricity - "Scope 3" - other indirect (e.g., outsourced activities, employee travel, etc.) • Both	• May need or want to "stage" coverage (e.g., start small & expand). • direct emissions most like current reporting requirements, but may omit GHG reduction opportunities or encourage direct-indirect trade-offs. • For many entities, most GHG emissions are from indirect emissions sources.	•
8.	**Emissions Quantifi-cation & Monitoring**	• Calculation methods & tools • Direct measurement (e.g., CEMs, Stack Testing)	• Should strive to use current best practice methods, such as *GHG Protocol* calculation tools, and to have consistency with other reporting programs. • Some "other" or "home grown" approaches may be necessary (e.g., Flashing emissions; IPIECA[6], API's[7] SANGEA™ GHG Emissions Software).	•
9.	**Verification**	• State verification • 3rd party verification • Self-certification	• If mandatory, the state may be able to use current verification procedures for criteria pollutants. • DAQ does 3rd party verification.	•

[6] IPIECA is the International Petroleum Industry Environmental Conservation Association.
[7] API is the American Petroleum Association.

#	Design Element	Characteristics	Design Considerations	Preliminary Recommendation
10.	**Public Access & Reports**	• Internet access and/or Online reports • Paper reports • Both	• "Confidential Business Information" (CBI) concerns	•
11.	**Project Level Reporting or "Offsets"**	• Yes/No • Constrain	• WRI: Raises quantification, baseline, "additionality," secondary effects, reversibility, and double-counting issues. • Location of co-benefits achieved. • May be most useful when there is an externally-imposed constraint (e.g., a "Cap").	
12.	**Funding**	• State-funded • Mandated requirement • Emission-based fees (would require legislative approval). • Other? A combination?	• Reporting is a necessary cornerstone for a GHG registry, so it may be appropriate to have registry participants share support costs.	•
13.	**Others?**	•	•	•

CC-3 State Greenhouse Gas Registry

Policy Description

NOTE: All red text is meant to reflect only an illustrative example.

A GHG registry enables measurement and recording of GHG emissions reductions at a macro- or micro-scale level in a central repository with a "transaction ledger" capacity to support tracking, management, and "ownership" of emission reductions as well as to encourage GHG reductions, to enable potential recognition, baseline protection, and/or the crediting of actions by implementing programs and parties in relation to possible emissions reduction goals, and to provide a mechanism for regional, multi-state, and cross-border cooperation. Subject to appropriately rigorous quantification, GHG registration should not be constrained to particular sectors, sources, or approaches so as to encourage GHG mitigation activities from all quarters.

Policy Design

Generally, the TWG recommendation calls for development of a state GHG registry and/or participation in a regional GHG registry, with adequate quality verification, allowing project-level reporting, and with costs borne primarily by participants. See GHG Registry Design Options Matrix for details.

Recommendations for key registry design characteristics build off the GHG Reporting policy option (CC-1) and are noted in the accompanying *GHG Registry Design Options Matrix*. Key elements include:

- Geographic applicability at least at the statewide level and as broadly (i.e., regionally or nationally) as possible.
- Allowing sources to start as far back chronologically as good data exists, as affirmed by third-party verification, and allowing registration of project-based reductions or "offsets" that are equally rigorously quantified.
- Incorporating adequate safeguards to ensure that reductions aren't double-counted by multiple registry participants; providing appropriate transparency; and allowing the state to be a valid participant for reductions associated with its programs, direct activities, or efforts.
- Striving for maximum consistency with other state, regional, and/or national efforts; greatest flexibility as GHG mitigation approaches evolve; and providing guidance to assist participants.

- **Goals:** Implementation of a North Carolina GHG Reporting Program as early as possible.

- **Timing:** ASAP after GHG reporting is operating.
- **Coverage of parties:** Probably overseen by DENR; costs shared by participants benefiting from the registry.

Implementation Mechanisms

None cited.

Related Policies/Programs in Place

None cited.

Types(s) of GHG Reductions

None cited.

Estimated GHG Savings and Costs per MTCO2e

Not applicable.

Key Uncertainties

There remain significant uncertainties with respect to how various state, regional, and/or federal GHG registry programs may develop. Involvement in early registry implementation – as issues are deliberated among states – will advantage North Carolina in their ultimate outcome.

Additional Benefits and Costs

None cited.

Feasibility Issues

None cited.

Status of Group Approval

Pending.

Level of Group Support

TBD.

Barriers to Consensus

TBD.

North Carolina Climate Action Plan Advisory Group

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Cross Cutting Issues Technical Working Group
Draft GHG Registry Design Characteristics Matrix

July 11, 2006

Notes:

- **Builds upon GHG Reporting Design Characteristics Matrix**
- **Some Reporting preferences could be outweighed by Registry preferences (e.g., if a regional registry has different specs).**

Potential Goals of GHG Registry:

1. Recording of GHG reductions (vs. emissions)
2. A central, independent repository for credible info about emissions activities
3. A "transaction ledger" – providing data management & accounting critical for trading (with or without a cap)
4. "baseline protection" – enabling early action current or future credit for trading
5. An incentive to track & manage emissions, seek productivity and energy efficiency gains, accelerate learning curve regarding competitiveness & carbon markets
6. Enhance public recognition and demonstrate corporate citizenship
7. Possible vehicle for regional, multi-state, & cross-border cooperation
8. Others?

#	Design Element	Characteristics	Design Considerations	Preliminary Recommendation
1.	**Key Design Criteria (beyond *GHG Reporting Design Characteristics Matrix*)**			
1.1	Define geographical boundaries	• North Carolina • Regional (or broader)	• Span of control • Cost, economies of scale, & broader = better?	•
1.2	Verification	• State verification • Third-party verification	• See GHG Reporting Design Characteristics Matrix	•
1.3	Base Year	• Single specified year • Single entity-chosen year • Average of multiple years • Adjustment rules?	• Flexibility vs. Simplicity • Must have good data for Base Year.	•
1.4	Project-level submittals	• Yes / No / Constrain	• Against what baseline? • Additionality issues (what would have happened anyway?	•
1.5	"Offsets"	• Yes / Some / No	• Co-benefits location? • Nature / character?	•
1.6	Start Date	•	• Establish a "to be in operation" date?	•
1.7	Ownership	•	• Risk of double-counting	•

#	Design Element	Characteristics	Design Considerations	Preliminary Recommendation
1.8	Transparency	•	•	•
1.9	Others?	•	•	•
2.	**Technical Issues**			
2.1	Treatment of minority ownership	•	• *GHG Protocol*	•
2.2	Merger & acquisition issues	•	• *GHG Protocol*	•
2.3	Quality Assurance; Uncertainty Analysis	•	• *GHG Protocol*	•
2.4	Regulatory guidance (Protocols, guidance documents, etc.)	•	•	•
2.5	Data flow; filing methods, etc.	•	• Confidential business information (CBI), legal authority, etc.	•
2.6	Others?	•	•	•
3.	**Ancillary, Administrative, & Operational Issues**			
3.1	Location (Agency)	• NCDENR • Other?	• Regional potential	•

#	Design Element	Characteristics	Design Considerations	Preliminary Recommendation
3.2	Software; Web Interface, etc.	• North Carolina-specific • CCAR, RGGR, CCX, ERT, EATS? • Other?	• Multiple needs (emissions inventory, allowances, mandatory, voluntary, etc.) • Rapidly changing "state of the art"	•
3.3	Cost	• Transaction fee • Publicly supported? • Other?	• Development costs • Ongoing operating costs	•
3.4	Oversight & Management	• NCDENR • Publicly appointed board • Other?	•	•
3.5	Reporting of Results; Recognition	•	•	•
3.6	Others?	•	•	•

CC-4 State Climate Public Education and Outreach

Policy Description

NOTE: All red text is meant to reflect only an illustrative example.

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. Public education and outreach 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. Such awareness is necessary to engage citizens in actions to reduce GHG emissions. Public education and outreach efforts should integrate with and build upon existing outreach efforts involving climate change and related issues in the state. Ultimately, public education and outreach will be the foundation for the long-term success of all the mitigation actions proposed by the CAPAG as well as those which may evolve in the future.

Policy Design

The TWG recommends that the State lead by example in its own education and outreach activities by establishing a pro-active public education and outreach capability, and using it to target education and outreach activities to five specific audiences:

- Policymakers (legislators, regulators, executive branch, agencies) – because implementation of climate actions hinges on policymakers' approval.
- Younger Generations – by integrating climate change into educational curricula, post-secondary degree programs, and professional licensing programs.
- Community Leaders & Community-Based Organizations (e.g., institutions, municipalities, service clubs, social & affinity groups, non-governmental organizations, etc.) – in order to recognize leadership; share success stories and role models; and expand climate involvement and participation within civic society.
- General Public – to increase awareness and engage citizens in climate actions in their personal and professional lives.
- 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.

Specific public education and outreach suggestions are provided in the accompanying *GHG Education Design Options Matrix*.

- **Goals:** Not applicable.

- **Timing:** Public education and outreach efforts should commence as rapidly as possible.
- **Coverage of parties:** Probably overseen largely by DENR, but involving many parties.

Implementation Mechanisms

Public education and outreach.

Related Policies/Programs in Place

None cited.

Types(s) of GHG Reductions

Not applicable.

Estimated GHG Savings and Costs per MTCO2e

Not applicable.

Key Uncertainties

None cited.

Additional Benefits and Costs

None cited.

Feasibility Issues

None cited.

Status of Group Approval

Pending

Level of Group Support

TBD.

Barriers to Consensus

TBD.

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Cross Cutting Issues Technical Working Group
Draft Education Design Characteristics Matrix

August 10, 2006

The recommendations and options in this matrix originate in large part as a result of "Recommendation A-7" in the September 1, 2005 Clean Smokestacks Act report and State Energy Plan (SEP).

Goals of Public Education & Outreach:

1. Overarching goal: Promote awareness among citizens about the impacts of climate change, solutions, and co-benefits of action.
2. Education provides a foundation essential for all climate action.
3. Others?

General Approach:

1. Target the key general audiences and efforts below:
   a. "Walking the Talk" in terms of the State's own efforts and outreach activities
   b. Policymakers (legislators, executive, agencies, regulators, etc.)
   c. Future Generations
   d. Community Leaders and Organizations
   e. Business and Industry
   f. The General Public
2. Ensure long-term sustenance of education and outreach efforts regarding climate change.

#	Measures & Strategies	Tasks & Examples	Notes & Elaborations
1.	**State Government Actions** The State should lead by example (i.e., "walk the talk") regarding education and outreach.		
1.1	Create a multi-agency body to oversee on-going state climate efforts, starting with the implementation of CAPAG policies adopted by the Governor; report progress to the public annually.	• Assemble annual progress reports & make them publicly available.	• Staff the effort adequately; should have one or more "outreach coordinators" specifically tasked with outreach and coordination among agencies and organizations.
1.2	Establish an Education & Outreach Subcommittee of the body established in §1.1 to educate audiences regarding CAPAG policies, and to oversee those relating to education.	• Lead implementation of CAPAG education & outreach measures. • First task: Identify already existing resources & programs. • Identify additional needs and potential funding sources.	•
1.3	Include state public education and higher education officials in the bodies established in §1.1 & §1.2.	•	• A "two-way street": education officials bring research & info to the body, act as outreach arm for reaching students and others.
1.4	Educate state employees across-the-board, and assign "point persons" to do so on an on-going basis.	•	• One possibility: Add climate change outreach as a natural extension to the existing role of Agency Energy Managers.
1.5	Disaggregate the State's GHG emissions to the agency level and require annual agency-specific reports on GHG reduction progress.	•	• Make agency-specific reports public as part of the report in §1.1.

#	Measures & Strategies	Tasks & Examples	Notes & Elaborations
2.	**Target Audience: Policymakers (legislators, regulators, executive branch, agencies)** Implementation of climate actions hinges on policymakers' understanding and approval.		
2.1	Educate policy makers on climate change & CAPAG policies in order to promote acceptance and implementation.	• Conduct regular legislative briefings. • Identify & offer agency-specific info on climate issues & opportunities.	• Use input derived from policy maker interactions to develop new mitigation measures going forward.
2.2	Provide continuing outreach & assistance to Governor's office, legislature, and implementing agencies on a regular basis.	• Educate press liaisons from agencies, etc. • Provide regular press releases or updates on reductions, events, etc.	•
3.	**Target Audience: Future Generations** Integrate climate change into educational curricula, post-secondary degree programs, and professional licensing.		
3.1	Organize groups of educators to identify, assemble, and employ climate change curricula appropriate to age groups.	•	• Check out British Petroleum's www.aplusforenergy.org
3.2	Public Education Department: include climate change in science and social studies performance standards; identify (a) gaps in climate change education, and (b) curriculum to fill any gaps.	•	•
3.3	Integrate "best practices" into public school design & construction to educate student (and parent's) first-hand in their communities & colleges (i.e., walk the talk).	• Investigate whether North Carolina could provide bonding for school districts to fund energy efficient construction. • Include in-building signage & displays to explicitly point out efficiency aspects built in to public buildings.	•

#	Measures & Strategies	Tasks & Examples	Notes & Elaborations
3.4	Promote research into climate change and solutions at state universities.	•	•
3.5	Integrate climate change into existing and/or new educational competition programs (e.g., Envirothon, science fairs, etc.).	•	•
3.6	Work with science centers, zoos, and museums to include a climate science focus appropriate to their core mission.	• A key area for an Outreach Coordinator to focus on	• Examples exist in other regions (e.g., Clean Air-Cool Planet science center initiative) • Could provide speaking opportunities for teachers; have college professors host forums for high school students on weekend, etc.
3.7	Introduce core competencies on climate change into professional licensing programs (e.g., energy efficiency in building design and construction, use of recycled materials, etc.)	•	•
4.	**Target Audience: Community Leaders & Community-Based Organizations** (Institutions, municipalities, service clubs, social & affinity groups, NGOs, etc.) Recognize leadership; share success stories & role models; expand involvement and participation; within civic society.		
4.1	Identify individual community leaders who are acting effectively on climate change; showcase and share their successes.	• Enlist/encourage them to be a de facto "speakers' Bureau." • Host discussion forums featuring them.	• Include all walks of work & life (retail, services, manufacturing, healthcare, auto, facilities, etc.) • Put examples, guidance, links, contacts, etc. up on the web clearinghouse.

#	Measures & Strategies	Tasks & Examples	Notes & Elaborations
4.2	Identify "late bloomer" individuals and target a special effort to include, educate, and prod them to act.	•	•
4.3	Engage associations and participate in their meetings periodically to educate them about climate change and sector-specific mitigation actions.	•	•
4.4	Develop statewide recognition program(s) for community leaders and entities.	•	•
4.5	Organize & host outreach events that focus on leading by example, sharing how-to, co-benefits, illuminating financial risks and opportunities, etc.	•	•
4.6	Identify, assist, and leverage community-based organizations with expertise or interest in climate-related issues	• Faith community • Service clubs; sportsmen; recreational/hobbyist groups • Metropolitan planning organizations • environmental, social, & civic advocacy organizations	•
4.7	Work with community-based organizations to identify & build upon climate issues related to their core mission	• Public health vs. new disease vectors? • Low-income vs additional stressors?	•

#	Measures & Strategies	Tasks & Examples	Notes & Elaborations
4.8	Support and facilitate outreach and education within community-based organization regarding climate change issues and actions	• Provide content for websites, newsletters, List Servs? • Coach & assist community Outreach coordinators?	•
4.9	Develop & coordinate a network of community-based organizations acting on climate change so they can link up, organize joint events, etc.	• Community Outreach coordinators? • Assistance in organizing	•
4.10	Encourage cities to join ICLEI's[8] Cities for Climate Protection program	•	• *(Formerly 4.14 on CC Catalog).*
4.11	Encourage cities to join the U.S. Mayors Climate Protection Agreement[9]	•	• *(Formerly 4.15 on CC Catalog).*
5.	**Target Audience: Business and Industry** Promote best practices, recognize leadership; share success stories & role models; expand involvement and participation.		
5.1	Extend training programs for RCI building and facility operators	•	• *(Formerly 4.5 on CC Catalog).* • From "Recommendation A-1" and "Recommendation LT-1" in the *9/1/05* CSA report.
5.2	Promote energy-tech economic development	•	• *(Formerly 4.3 on CC Catalog).*
5.3	Promote R&D & demo projects for economic development	•	• *(Formerly 4.4 on CC Catalog).*

[8] See www.iclei.org.
[9] See http://www.ci.seattle.wa.us/mayor/climate/.

#	Measures & Strategies	Tasks & Examples	Notes & Elaborations
5.4	Promote combined heat and power (CHP) in order expand its use and technological penetration	•	• *(Formerly 4.8 on CC Catalog).* • *From "Recommendation A-1" in the 9/1/05 CSA report.*
5.5	Inform sources of the advantages of registering GHG emission reductions	•	• *(Formerly 4.13 on CC Catalog).* • *From "Recommendation A-4" in the 9/1/05 CSA report.*
5.6	Develop and provide concrete information on co-benefits to entities in order to boost their climate efforts	•	•
6.	**Target Audience: General Public** Increase awareness and engage in climate actions in personal and professional lives.		
6.1	Educate broadcasters, reporters, editorial boards, etc. about climate change, the risks it imposes, and solutions	•	•
6.2	Work with state broadcasters and print media associations to develop & run climate change public service announcements	•	•
6.3	Conduct public polling to benchmark strength and depth of climate understanding; track over time to measure progress and better tailor outreach efforts	•	•

#	Measures & Strategies	Tasks & Examples	Notes & Elaborations
6.4	Keep a high profile on climate change issues and actions through regular public mention by Governor and other public leaders	•	•
6.5	Develop and use a state-based "brand" on climate awareness and action	•	•
6.6	Develop & maintain a state climate change website for the public; establish & maintain a web-based clearinghouse for climate change information and education resources.	• Link to scientific developments, What you can do, How you can help, What the state is doing, etc.	• Post annual progress reports on commitments, plan implementation, etc.
6.7	Reinforce sources (causes) of GHG emissions, and the need to implement the State Energy Plan	•	• *(Formerly 4.1 on CC Catalog).* • From Recommendation LT -2 in the *9/1/05* CSA report.
6.8	Work with existing company outreach efforts to customers (e.g., utilities) to enhance awareness of climate change issues & actions	• Retail advertising and/or "bill stuffers" • Environmental disclosure of electricity fuel mix/emissions; recycled content, etc. • Product messages (e.g., yogurt labels)	•
6.9	Promote local farm produce	•	• *(Formerly 4.10 on CC Catalog).* • Appendix D – Preliminary Analysis of Selected Policy Options: Agriculture and Forestry, Support Local Farming/Buy Local

#	Measures & Strategies	Tasks & Examples	Notes & Elaborations
6.10	Promote clean fuel technologies	•	• *(Formerly 4.2 on CC Catalog).*
6.11	Promote green power in order to expand subscription	•	• *(Formerly 4.7 on CC Catalog).* • *From "Recommendation A-5" in the 9/1/05 CSA report.*
6.12	Require environmental disclosure on utility bills	•	• *(Formerly 4.9 on CC Catalog).* • *From Appendix C – January 2005 Revisions to the State Energy Plan (SEP), Alternative Energy Sources: Exec-10*
6.13	Add GHG to Air Awareness efforts	•	• *(Formerly 4.12 on CC Catalog).* • *From "Recommendation A-7" in the Sept. 1, 2005 CSA report and State Energy Plan (SEP).*

CC-5 State Climate Change Adaptation Strategy

Policy Description

NOTE: All red text is meant to reflect only an illustrative example.

Because of the build-up in the atmosphere of greenhouse gases that already has occurred, North Carolina will experience the effects of climate change for years to come, even if immediate action is taken to reduce future GHG emissions. As such, it is essential that the state develop a strategy to manage the projected impacts of ongoing climate change.

Policy Design

While taking action to reduce greenhouse gas (GHG) emissions in North Carolina, the Governor also should explore, develop, and implement a state climate change adaptation strategy that identifies the potential near-term and short-term impacts of climate change scenarios affecting the State, outlines steps that should be taken to respond to those impacts, and coordinates these steps with response plans and efforts that are underway or may be contemplated at other agencies or organizations or through other initiatives.

A comprehensive state climate change adaptation strategy should include time- and program- based goals, characterization of the potential risks and costs of inaction, and the potential costs, benefits, and co-benefits associated with specific policy and program actions and time periods.

The Governor should consider appointing a task force or advisory group to develop recommendations for the state adaptation strategy. Moreover, the Governor should direct state agencies and other appropriate institutions to identify and characterize potential current and future risks in North Carolina to human, natural and economic systems, including potential risks to water resources, temperature sensitive populations and systems, energy systems, transportation systems, vital infrastructure and public facilities, and natural lands (such as coastal areas, forests, and farmland).

Adaptation measures that also help mitigate GHG emissions should be given priority in the state climate change adaptation strategy, particularly water conservation and efficiency, forest and agriculture conservation and management, energy production and use, facility siting and management, infrastructure development, and efficient transportation and land use systems. These actions should be linked to implementation of other specific recommendations of this CAPAG to the greatest extent possible.

Finally, the state climate change adaptation strategy should be reviewed and updated on a regular basis.

- **Goals:** Not applicable.
- **Timing:** Public education and outreach efforts should commence as rapidly as possible.

- **Coverage of parties:** Probably overseen largely by DENR, but involving many parties.

Implementation Mechanisms

Public education and outreach.

Related Policies/Programs in Place

None cited.

Types(s) of GHG Reductions

Not applicable.

Estimated GHG Savings and Costs per MTCO2e

Not applicable.

Key Uncertainties

None cited.

Additional Benefits and Costs

None cited.

Feasibility Issues

None cited.

Status of Group Approval

Pending

Level of Group Support

TBD.

Barriers to Consensus

TBD.

North Carolina Climate Action Plan Advisory Group

WWW.NCCLIMATECHANGE.US

Cross Cutting Issues Technical Work Group
Draft Adaptation Issues Matrix
August 31, 2006

#	Issue	Potential Effects or Impacts	Possible Responses	Preliminary Recommendation
A. Coastal Resources				
1.	Rising sea levels	•	• Loss of barrier islands, property damage, serious disruption to local and regional economies and tourism	•
2.		•	•	•
3.		•	•	•

#	Issue	Potential Effects or Impacts	Possible Responses	Preliminary Recommendation
		B. Agriculture and Forestry		
4.	Habitat Change (Types of Crops Supported)	• Warmer climate may change the types of crops for tree species that can be grown economically	•	•
5.	Pest Vectors	• Warmer temperatures accelerate life cycle of pest increasing rate of damage (e.g., lodgepole pine beetle has been observed to have changed its life-cycle from 2 to 1 year in the northwestern U.S., thus increasing treat to lodgepole pine)	•	•
6.	Disease Vectors		•	•
7.		•	•	•
		C. Water Quality and Quantity		
8.	Saltwater Intrusion in Aquifers	•	•	•
9.	Stormwater Runoff	•	•	•
10.	Drought Risk		•	•

#	Issue	Potential Effects or Impacts	Possible Responses	Preliminary Recommendation
11.		•	•	•
D. Air Quality Issues				
12.	Fine Particulate Concentrations	•		
13.	Ground Level Ozone Increases	•	•	•
14.	Visibility Impacts	•	•	•
15.		•	•	•
E. Public Health				
16.	Insect Disease Vectors	•	•	•
17.		•	•	•
F. Economic Issues				
18.		•	•	•
G. Other Issues				
19.	Wildlife and Fishing Impacts	•	•	•
20.		•	•	•

CC-6 Options for State Greenhouse Gas Goals or Targets

Policy Description

NOTE: All red text is meant to reflect only an illustrative example.

Statewide GHG emissions reduction goals and/or targets for future time periods.

Policy Design

[Insert text as appropriate]

- **Goals:** [Insert text as appropriate]
- **Timing:** [Insert text as appropriate]
- **Coverage of parties:** [Insert text as appropriate]

Implementation Mechanisms

[Insert text as appropriate]

Related Policies/Programs in Place

[Insert text as appropriate]

Types(s) of GHG Reductions

[Insert text as appropriate]

Estimated GHG Savings and Costs per MTCO2e

[Insert text as appropriate]

Key Uncertainties

Future growth rate in emissions, particularly after 2020, as well as the timing and scope of implementation of the CAPAG recommendations for specific policy options.

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

Pending

Level of Group Support

TBD.

Barriers to Consensus

TBD.