TLU GHG Reduction Options: Discussion Items

For Technical Working Group (TWG) Call #3, June 8, 2006

1. Categories (H/M/L) of emissions reductions

The current categories of estimated reductions are:

Potential Emission Reductions
High (H): At least 1 Million Metric Tons (MMT) carbon dioxide equivalent (CO_2e) per year by 2020 (~1% of current NC emissions)
Medium (M): From 0.1 to 1 MMT CO_2e per year by 2020
Low (L): Less than 0.1 MMT CO_2e per year by 2020, or 1 MMT CO2e by 2050

Inventory / forecast is:

Table 1. North Carolina Historical and Reference Case GHG Emissions, by Sector

Million Metric Tons CO_2e	1990	2000	2010	2020	Explanatory Notes for Projections
Energy Use (CO_2, CH_4, N_2O)	**124**	**162**	**191**	**230**	
Electricity Use	**53.6**	**75.1**	**85.0**	**104**	
Electricity Production (in-state)	46.0	66.6	80.2	97.5	*See electric sector assumptions*
Coal	*45.7*	*65.3*	*77.9*	*93.4*	*in appendix*
Natural Gas	*0.15*	*0.88*	*1.64*	*3.25*	
Oil	*0.16*	*0.37*	*0.65*	*0.84*	
Imported Electricity	7.52	5.89	4.78	6.41	
Res/Comm/Ind (RCI)	**30.3**	**34.3**	**39.2**	**44.4**	
Coal	10.8	9.10	11.9	14.6	Based on *North Carolina Energy Outlook 2003*
Natural Gas	11.0	13.5	14.0	14.5	Based on *North Carolina Energy Outlook 2003*
Petroleum	8.19	11.5	13.1	14.9	Based on *North Carolina Energy Outlook 2003*
Wood (CH_4 and N_2O)	0.23	0.24	0.32	0.36	Based on *North Carolina Energy Outlook 2003*
Transportation	**39.7**	**52.7**	**66.4**	**81.5**	
Gasoline	29.7	38.1	46.3	52.2	NCDENR VMT, *North Carolina Energy Outlook 2003*
Diesel	6.86	11.0	15.1	22.2	NCDENR VMT, *North Carolina Energy Outlook 2003*
Natural Gas and LPG	0.92	0.76	0.74	0.75	NCDENR VMT, *North Carolina Energy Outlook 2003*
Jet Fuel and Aviation Gasoline	2.28	2.91	4.25	6.45	Based on *North Carolina Energy Outlook 2003*
Industrial Processes	**NA**	**3.07**	**7.14**	**15.1**	
ODS Substitutes	0.01	2.16	6.36	14.6	Based on national projections (US EPA)
Semiconductor Manuf.	0.01	0.03	0.03	0.02	Based on national projections (US EPA)
Electricity Transmission and Dist.	1.02	0.55	0.47	0.26	Based on national projections (US EPA)
Aluminum Production	0.51	0.24	0.18	0.15	Based on national projections (US EPA)
Limestone and Dolomite	NA	0.01	0.01	0.01	Assumed no growth from 2002
Soda Ash	0.07	0.08	0.09	0.10	Increases with state population
Natural Gas Trans. and Dist.	**NA**	**0.84**	**1.03**	**1.23**	Increases with natural gas consumption (*North Carolina Energy Outlook 2003*)
Agriculture	**2.27**	**3.12**	**3.97**	**4.38**	Based on historical trends (except swine)
Waste Management	**4.83**	**6.97**	**6.52**	**6.59**	
Solid Waste Management	4.50	6.57	6.05	6.05	Assumed no growth from 2005
Wastewater Management	0.33	0.40	0.47	0.54	Increases with state population
Forestry	**-23.2**	**-23.7**	**-23.7**	**-23.7**	Assumed no growth from 2000
Gross Emissions (excl. sinks*)[1]	**132**	**176**	**209**	**257**	
increase relative to 1990		*33%*	*58%*	*95%*	
Net Emissions (incl. sinks*)	*109*	*152*	*185*	*232*	
increase relative to 1990		*39%*	*70%*	*113%*	
Net Emissions (production-basis)	*102*	*146*	*180*	*226*	
increase relative to 1990		*43%*	*76%*	*122%*	

So:

If "High" = 1 mmtCe, then = 1.5% of 2010 transportation CO_2e
1.2% of 2020 transportation CO_2e

To discuss:

- Is the TWG happy with the H/M/L categories?

2. General considerations for describing and analyzing options

Many options can be implemented, in order of increasing impact:

- Allow
- Promote / subsidize / otherwise support
- Require

Analysis and evaluation needs a sense of roughly where on this continuum an option will fall.

Discussion:

- CCS has made some assumptions in order to get the ball rolling, but choosing the level is part of choosing the option, and up to the TWG.

- Need "champions" to take responsibility for options they and others would like to see analyzed.

3. Process for discussing options

- Ultimate goal: report ~10 recommended options back to the CAPAG.

- With 70 options, have only 2/3rd minute per option! Need to develop a process to

    - *Group* options quickly.

    - *Evaluate* even groups quickly.

4. Preliminary ratings to get the ball rolling

The goal of this meeting is to begin tiering options for analysis. The current Policy Catalog contains *preliminary* ratings in order to support discussion. Sources:

- CCS professional judgment and experience;

- Previous ICF analysis for the Southern Appalachian Mountains Initiative (Alabama, Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia).

5. *General* considerations by TLU category

TLU 1. PASSENGER VEHICLE GHG EMISSION RATES

TLU 1.1 Vehicle Technology

- Doesn't require behavior change. Success relatively high.
- Requires fleet turnover; turnover has been slowing.

TLU 1.2 Vehicle Operation

- Does require behavior change; success mixed.
- Can affect entire fleet now
- Changes can be non-trivial; changing driving habits can reduce fuel use 30%

TLU 1.3 Incentives & Disincentives

- In general, should be more efficient way of achieving any given goal
- Speed of effectiveness depends on rate of change in target population; incentives for efficient vehicle purchase subject to same slow fleet turnover as tech-forcing regs.
- Effectiveness and costs depend on level of incentives. Difficult to rate without establishing level of incentive/disincentive.

TLU 2. LAND USE AND LOCATION EFFICIENCY

- Compact/mixed-use ("traditional") neighborhoods show ~50% emissions relative to conventional.
- Can affect existing fleet usage
- Changes at rate of change of LU; not as slow as most imagine. But most of LU is fixed in the relevant timeframe.
- Generally saves governments money. Personal costs probably relatively low.

TLU 1. INCREASING LOW-GHG TRAVEL OPTIONS

TLU 3.1 Increase Transportation Funding for Efficient Modes

- Can reach areas where LU (TLU 2) won't reach soon
- Changing existing transit systems is relatively quick
- Getting riders in already-paid-for seats is relatively cheap

TLU 3.2 Incentives & Disincentives

- In general, should be more efficient way of achieving any given goal
- Otherwise, mostly the same as 3.1.
- Impact a function of a) size of incentive, b) size of population applied to.

TLU 3.3 Fuel Measures

- Impacts and costs depend on alt fuel. Difficult to talk in general alt-fuel terms.
- Many alt fuels' CO2 impact depends not on fuel type itself, but on how made. Need specificity to be able to rate.
- Any new technology subject to same comments as on new vehicle tech.

TLU 4. FREIGHT

TLU 4.1-2 Vehicle Technology + Vehicle Operation

- Freight traffic is growing much faster than passenger, making it a good target
- But incentives to limit fuel use are already much stronger; less room to cut off the baseline.
- Additional tech and behavior change can produce sig fuel saving per truck, but given slow turnover and anticipated baseline penetration, idle reduction and speed reduction are the only options that show much truck emissions impacts. Biodiesel shows potential depending on method of production.

TLU 4.3 Increasing Low-GHG Travel Options

- Intermodal freight does face some non-private barriers
- Truck to rail mode shifts show very large emissions benefits. Impact limited by size of potential market.

TLU 4.4 Incentives & Disincentives

- In general, should be more efficient way of achieving any given goal

TLU 4.5 Intercity Travel: Aviation, High Speed Rail, Bus

- Like freight, passenger rail shows very large emissions benefits relative to SOV, but overall limited by size of potential market.

TLU 4.6 Off-Road Vehicles (construction equipment, out-board motors, ATVs, etc)

- Not a large portion of the inventory