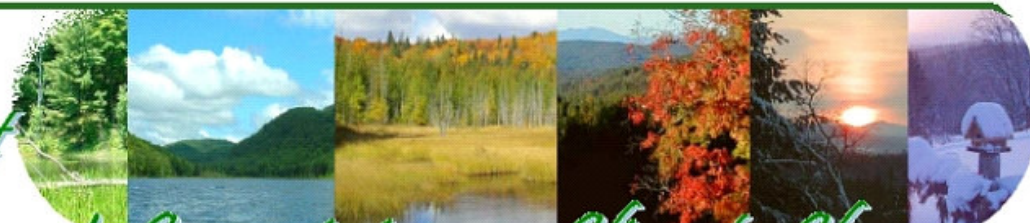




Vermont

Governor's Commission on Climate Change



Energy Supply and Demand Technical Work Group Teleconference Meeting #8

June 6, 2007



VERMONT
ENVIRONMENTAL CONSERVATION



CENTER FOR CLIMATE STRATEGIES

Today's Agenda

- Call to order, roll call, and approval of prior meeting summary
- Discussion of draft policy descriptions and analysis: focus on major design assumptions
- Agenda, date and time for next meeting
- Call to the public
- Announcements

ESD Policy Options

Option #	Option Name
ESD-1	Evaluation and continuation / expansion of existing DSM for electricity and natural gas
ESD-2	Evaluation and expansion of DSM to Other Fuels
ESD-3	Building Efficiency Codes, Training, Tracking
ESD-4	Evaluate Potential for Contracting Nuclear Power
ESD-5	Support for Combined Heat and Power
ESD-6	Incentives and/or Mandate for Renewable Electricity
ESD-7	GHG Cap & Trade and/or GHG tax
ESD-8	Incentives for Clean Distributed Technologies for Electricity or Heat
ESD-9	Wind-specific support measures
ESD-10	Hydro-specific support measures

Provisional Summary Results

	Mitigation Option	GHG Reductions (MMtCO ₂ e)			Net Present Value (Million \$) 2008-2030	Cost-Effective-ness (\$/tCO ₂ e)	Level of Support
		2012	2028	Total 2008-2030			
ESD-1	Evaluation and continuation / expansion of existing DSM for electricity and natural gas	0.23	1.16	14.39	(\$136)	(\$9.4)	
ESD-2	Evaluation and expansion of DSM to Other Fuels	0.12	0.59	7.49	(\$172)	(\$23.0)	
ESD-3	Building Efficiency Codes, Training, Tracking						
ESD-4	Evaluate Potential for Contracting Nuclear Power						
	(scenario 1)	0.87	1.30	24.3	\$18	\$0.8	
	(scenario 2)	0.43	0.65	12.1	\$9	\$0.8	
ESD-5	Support for Combined Heat and Power	0.05	0.23	3.00	(\$31)	(\$10)	
ESD-6	Incentives and/or Mandate for Renewable Electricity						
	(scenario 1)	0.13	0.68	8.4	\$8	\$1.0	
	(scenario 2)	0.26	1.31	15.8	\$27	\$1.7	
ESD-7	GHG Cap & Trade and/or GHG tax						
ESD-8	Incentives for Clean Distributed Technologies for Electricity or Heat						
	Natural Gas fuel switching	0.08	0.13	2.51			
	Solar thermal water heating	0.06	0.16	3.42	\$68	\$19.9	
ESD-9	Wind-specific support measures						
	(New wind, scenario 1)	0.05	0.27	3.3	(\$10)	(\$2.9)	
	(New wind, scenario 2)	0.09	0.46	5.5	(\$9)	(\$1.5)	
ESD-10	Hydro-specific support measures						
	(Continued large hydro, scenario 1)	0.02	1.28	19.9	\$0	\$0.0	
	(Continued large hydro, scenario 2)	0.01	0.64	9.9	\$0	\$0.0	
	(New hydro, scenario 1)	0.02	0.10	1.3	\$12	\$10	
	(New hydro, scenario 2)	0.04	0.20	2.4	\$23	\$10	
	Total						
	Scenario 1 (generation at historic levels)	1.58	5.69	84.97	(\$210)	(\$2.5)	
	Scenario 2 (generation at 50% of historic levels)	1.37	5.54	76.61	(\$219)	(\$2.9)	

ESD-1: electricity DSM

- Relies on GDS study (Most up-to-date and comprehensive efficiency study for Vt).
- GDS finds
 - technical potential: 34.6%
 - achievable: 22.1%
 - cost-effective achievable: 19.4%

Difference is due to penetration limit (80% for all measures) and especially finite lifetime of program

- Increase administrative costs (~31% of total costs) by factor of two.
- On average, \$50.1/MWh cost of saved electricity
- (Have not yet completed NG DSM analysis.)

ESD-2: fuels DSM

- Relies on GDS study (Most up-to-date and comprehensive efficiency study for Vt).
- GDS finds
 - technical potential: 29.7%
 - achievable: 14.5%
 - cost-effective achievable: 14.0%

Difference is due to penetration limit (80% for all measures) and especially finite lifetime of program

- On average, \$8.3/MMBtu cost of saved fuel
- Note: ESD-3 analysis is combined with ESD-2, which includes efficiency measures based on building shell improvements. (These account for 63% of efficiency gains.)

ESD-4: nuclear power

Two scenarios:

- *Scenario 1: generation continues at historic levels*
- *Scenario 2: generation continues at 50% of historic levels*
- Arguments have been made for nuclear electricity being both higher and lower than avoided cost of system purchases.
- Currently costs set equal except for \$1/MWh adder for insurance

ESD-5: CHP & DG

- Assumed potential:
 - ~24 x 1 MW on site CHP systems
 - ~2 x 18 MW district heating systems (e.g., Brattleboro study)(total of ~350 GWh)
50% biomass, 50% natural gas

ESD-6, 9,10: Renewables

Assumptions:

- *RPS sized to eliminate fossil elec by 2030.*
- *Wind (~40%), hydro (~20%), biomass (~40%)*
- *Two scenarios (corresponding to ESD-4, 10)*
 - *Scenario 1: 30% by 2030*
 - *Scenario 2: 45% by 2030*
- *(currently renewables = 14.5%, exclusive of large hydro)*

ESD-6,(9,10): renewables

Additional renewables for 20% RPS in 2015			
	%	GWh	MW
Wind	3.3%	225	73
Hydro	1.4%	97	22
Biomass	4.8%	322	49

Additional renewables for 45% RPS in 2030			
	%	GWh	MW
Wind	12.6%	838	273
Hydro	5.4%	359	82
Biomass	18.0%	1198	182

ESD-7: GHG Cap/tax

- To be completed last.
- Design criteria is to generate sufficient revenue to fund mitigation options.

ESD-8a: natural gas expansion

- Expansion to:
 - Middlebury
 - Rutland
 - Bennington
 - Brattleboro
 - Newport
 - Montpelier
- Displacement of Fuel oil (~87%) and LPG (~13%)
- Not yet costed

ESD-8b: solar water heaters

- SWHs considered here for displacing elec heaters (SWHs are already included in ESD-2 for displacing fuels)
- Assumed to be in all SF and MF homes with electric water heating by 2028.

ESD-9: wind

- See ESD-6, 9, 10

ESD-10: hydro

- Small-scale hydro: see ESD-6,9,10

Two scenarios:

- *Scenario 1: generation continues at historic levels*
- *Scenario 2: generation continues at 50% of historic levels*
- Currently, no cost (either positive or negative) assumed relative to system purchases.

Next step

- Distribute updated description of policy options with preliminary results and analytical methods.
- Get TWG feedback, revise and distribute before next Plenary.

Policy Template



Policy Description:

Policy Design:

- **Goals:**
- **Timing:**
- **Coverage of Parties:**

Implementation Methods:

Related Policies/Programs in Place:

Estimated GHG Savings and Costs per tCO₂e:

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

Key Uncertainties:

Additional Benefits and Costs:

Feasibility Issues:

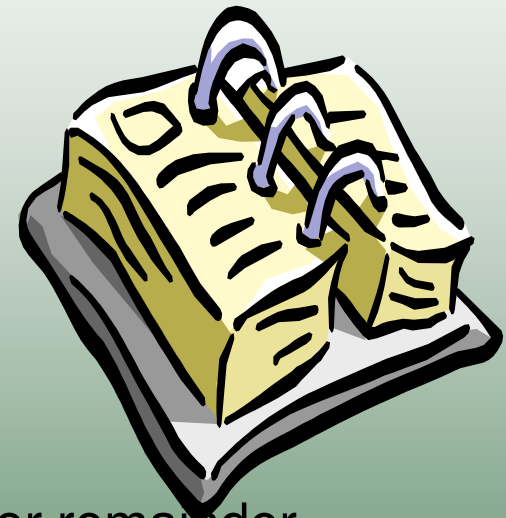
Status of Group Approval:

Level of Group Support:

Barriers to Consensus:

Next TWG Call

- Agenda:
 - Discuss Policy Descriptions and analysis
- Scheduled:
 - Friday June 29, 2007 from 1:30 - 3:30



Note: A document with the full schedule for remainder of the process posted on the Energy TWG page...

www.vtclimatechange.us/Energy_Supply.cfm

Public Input, Announcements