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Energy Supply and Demand Technical Work Group

Draft Policy Options

Version 0.3 April 17, 2007

This document contains the current version of the policy options being considered by the Energy Supply and Demand Technical Work Group. This version is based on the original drafts by ESD TWG members, plus revisions as per ESD TWG #5, and further revisions as per PG meeting #4. They were approved at Plenary Group meeting #4 for further elaboration and analysis.

The main items in need of elaboration are the goals and timing of the policies, to develop quantitative targets and objectives that can then be quantified. It was agreed by the Plenary Group that the guiding objective is to meet the Governor's targets of 25% reduction (below 1990 levels) by 2012, and 50% reduction by 2028, if practical. The goals and timing of the policy options considered here are developed so as to help illuminate the prospects and challenges of meeting these targets while remaining practical and cost-effective.

Table 1: Goals and approach

Policy Number	Policy Name	Goals and Timing	Analysis Approach
ESD-1	Evaluation and continuation / expansion of existing DSM for electricity and natural gas	Reduce elec consumption by 15%* by 2015, and by 50% by 2028. Reduce gas consumption by 15% by 2015, and by 50% by 2028.	Build on GDS DSM study for potential and costs. Extend toward deeper savings through, for example: higher penetration, higher cost-effective threshold (justified by synergies with other ESD policies: training, education, outreach, CO2 tax, strengthened codes, etc.) Assess natural gas target in view of potential fuel shifts to gas from more carbon intensive fuels.
ESD-2	Evaluation and expansion of DSM to Other Fuels	Reduce fuels consumption by 12%* by 2015 and by 50% by 2028.	Build on GDS DSM study. Reach for deeper achievement through: higher penetration, higher cost-effective threshold (justified by synergies with other policies such as training, education, outreach, CO2 tax, etc.) Consider also switches to other fuels (wood, biodiesel, natural gas)

Policy Number	Policy Name	Goals and Timing	Analysis Approach
ESD-3	Building Efficiency Codes, Training, Tracking	New buildings: Ensure standards updated to national levels by 2009, then extend beyond to yield 50% reduction in energy consumption by 2028.	Analysis based on meeting most recent IBC suite of building codes (IIEC, ASHRAE) codes for new buildings in near term, extending toward 2028 on track with ESD-1 & ESD-2 targets. This will progressive tightening will be calibrated against, e.g., existing more stringent state codes (as in California), Energy Star requirements, Architecture 2030 analysis, etc.. Use Building Codes Assistance Project data and methodology appropriate to Vermont climate zone. ESD-3b and 3c provide greater operational consistency with codes, and greater penetration into existing building stock.
ESD-4	Evaluate Potential for Contracting Nuclear Power	Maintain current level of Vt Yakee purchases.	Asses costs taking into account steps (e.g., outage insurance) to improve reliability in view of large reliance on single source.
ESD-5	Support for Combined Heat and Power	Expand CHP to XX MW by 2015 and YY MX by 2028.	Base target on assessments of state potential for expanded use of CHP, specifically on site at industrial/institutional consumers with thermal load greater of several MW or more. Use recent techno-economic assumptions (Western Governors CHP White Paper) for performance and costs.
ESD-6	Incentives and/or Mandate for Renewable Electricity	Two tier approach: Tier I. "zero-carbon sources" Tier II = "renewables" Targets: Tier I. 85% of "zero-carbon sources" by 2015 and 100% by 2028. Tier II. 20% of "renewables" by 2015, and XX by 2028.	Assess extent of RPS and costs, in view of existing studies for Vermont (Synapse, 2003) and in view of available supply of renewable resources (see ESD-9 for wind, ESD-10 for hydro, and recent DPS study for biomass along with Ag/Forestry TWG analysis), and ESD-4 objectives for nuclear.

Policy Number	Policy Name	Goals and Timing	Analysis Approach
ESD-7	GHG Cap & Trade and/or GHG tax	Cap: goals correspond to the Governor's targets. Tax: Two options -- (i) corresponds to Governors targets given aggregate cost curve, or (ii) set to yield specific quantity of revenue for DSM, renewables incentive, etc.	See existing studies (e.g., ISO NE "Evaluation of Impact of RGGI", Rose et al., for RGGI). This analysis will be carried out as a scenario analysis, showing the impacts for given sets of assumptions for key parameters including state or regional permit cost, GHG tax rate, and aggregate Vt abatement cost curves. The analysis will not attempt to predict market impacts, such as consumption changes or shifts due to price elasticities or cross elasticities, trading between sectors, etc.
ESD-8	Incentives for Clean Consumer Technologies for Electricity or Heat	Measures that provide for at least XX tons of reductions by 2015, and YY tons of reductions by 2028.	Assessment of penetration of specific key technologies: (i) solar water heaters, (ii) clean wood heating, (iii) gas to displace oil.
ESD-9	Wind-specific support measures	Measures that provide for at least XX MW by 2012, and YY by 2028.	Consider maximum feasible penetration of wind into the Vermont power system while maintaining system reliability. Draw upon on assessments of Vermont wind potential (e.g., VERA study for ANR, PERI studies of wind/biomass and wind/hydro integration) and recent techno-economic studies of wind power costs.
ESD-10	Hydro-specific support measures	Maintain HQ purchases. Measures that provide for at least XX MW by 2012, and YY by 2028.	Draw upon ongoing assessment of Vermont wind potential (DPS) and recent techno-economic studies of hydro power costs.

**Note, the 2015 reduction targets for ESD-1 and ESD-2 are relative to reference scenario, whereas all other reduction targets are relative to 1990 levels.*

Some additional general assumptions and sources:

1. For energy avoided costs, draw upon:
    a. "Avoided Energy Supply Costs in New England" (AESC study group).
    b. "Update to 2005 Vermont Electric Plan" (Vt DPS)

Table 2: Summary table of results

	Policy Option	GHG Reductions ($MMtCO_2e$)			Net Present Value 2008–2020 (Million $)	Cost-Effectiveness ($/tCO_2e$)	Level of Support
		2012	2020	Total 2008-2020			
ESD-1	Evaluation and continuation / expansion of existing DSM for electricity and natural gas	*Not Yet Quantified*					Pending
ESD-2	Evaluation and expansion of DSM to Other Fuels	*Not Yet Quantified*					Pending
ESD-3	Building Efficiency Codes, Training, Tracking	*Not Yet Quantified*					Pending
ESD-4	Evaluate Potential for Contracting Nuclear Power	*Not Yet Quantified*					Pending
ESD-5	Support for Combined Heat and Power	*Not Yet Quantified*					Pending
ESD-6	Incentives and/or Mandate for Renewable Electricity	*Not Yet Quantified*					Pending
ESD-7	GHG Cap & Trade and/or GHG tax	*Not Yet Quantified*					Pending
ESD-8	Incentives for Clean Consumer Technologies for Electricity or Heat	*Not Yet Quantified*					Pending
ESD-9	Wind-specific support measures	*Not Yet Quantified*					
ESD-10	Hydro-specific support measures	*Not Yet Quantified*					Pending
	SECTOR TOTAL AFTER ADJUSTING FOR OVERLAPS						Pending
	REDUCTIONS FROM RECENT POLICY ACTIONS						Pending
	SECTOR TOTAL PLUS RECENT POLICY ACTIONS						Pending

ESD – # 1

Evaluation and continuation / expansion of existing DSM for electricity and natural gas

1. Policy Description

Ensure that Vermont's utility energy efficiency delivery mechanisms are fully integrated into the utility planning environment, continue to deliver cost-effective services, are adequately funded.

Vermont has a history of leadership in the development and delivery of electric sector energy efficiency programs, beginning with early energy efficiency investment programs run by Vermont's electric utilities, and later by Vermont's Efficiency Utility. The majority of investments in energy efficiency within the electric sector are delivered under the auspices of Efficiency Vermont. The remainder is delivered through the City of Burlington's Burlington Electric Department. Vermont Gas delivers its own energy efficiency programs, primarily directed toward thermal programs associated for its own customers.
In 2004, Vermont led the nation in per customer investment in energy efficiency programs of roughly $16.5 million, or $47.35 per customer. Vermont recently completed studies of electric energy efficiency potential, concluding that with an increase in investment, Vermont could reduce its 2015 electricity demand by 15% through cost effective energy efficiency investments. After extensive review of the analysis and proposals, the Vermont Public Service increased the efficiency investment further by 75% above 2005 spending levels. (A complete summary of the analysis of the potential is available at the Board's web site at http://www.state.vt.us/psb/document/act61.htm.) By 2008, Vermont expenditures on electric sector energy efficiency will be $31.75 million per year or approximately $91 per customer, almost double that of 2004. In the Public Service Board's order it was noted that a further increase in funding would likely capture additional cost effective efficiency savings, but that alternative funding mechanisms should be explored.

> In this Order we establish the Energy Efficiency Utility ("EEU") budgets for 2006, 2007 and 2008 and announce a subsequent process to develop a means of financing energy efficiency services to reduce the impact of the Energy Efficiency Charge ("EEC") on electricity rates in the near term. This Order is the outcome of a comprehensive, ten-month-long workshop process that followed Legislative action removing the former cap of $17.5 million on the annual EEU budget and requiring the Board to set a new level based on objectives and criteria in the law. In this Order we raise the 2006 funding level to $19.5 million, and establish funding levels of $24 million and $30.75 million for 2007 and 2008, respectively. We also conclude that higher funding levels may be appropriate, if the effect of those levels on electricity rates in the near term can be reduced.

Based on the increased program activity, Vermont is now projecting roughly level growth between 2008 and 2015, assuming these program funding levels continue over time.

In parallel and overlapping initiatives, Vermont is blazing new trails for use of energy efficiency resources by strategically targeting programs toward geographically constrained areas of the state in an effort to avoid later costly investments in transmission facilities. Programs associated with this initiative are known as Geographically Targetted "GT" efficiency programs. Vermont regulators are now deliberating over the establishment of a central planning and coordinating body known as the VSPC that will be charged with, among other things, the systematic and strategic use of energy efficiency investments through GT programs to avoid or defer transmission investments. In the mean time, the Vermont Public Service Board has directed that the increased program funding levels of the Efficiency Utility be directed toward constrained areas as a pilot and transition mechanism pending the establishment of a broader planning framework.

Along with neighboring states, Vermont has also helped to shape the character of the market for installed electric capacity or Forward Capacity Market to include energy efficiency as an integral component of the resource base. This market is used in the region to ensure that there is adequate installed capacity to meet future demands for electricity. As it is designed, installed capacity can be bid in and delivered through either generation resources or energy efficiency programs and resources. In the future Vermont will bid in and invest in energy efficiency programs to meet its own commitments associated with the development of emerging markets for capacity. Vermont is currently working with other states in the region on establishing regional standards for measurement and valuation ("M&V") of efficiency programs that participate in the market.

The nature and character of the efficiency utility and the programs and opportunities that may be explored through the efficiency utility will continue to evolve over time. The Vermont General Assembly is currently debating legislative proposals for requiring utility plans and investments in advanced metering technology and advanced time-of-use pricing programs known as "real-time" or "critical-peak-pricing" programs. Vermont's efficiency programs, over time, will inevitably change in response to changing market circumstances and new technologies, including opportunities presented by advanced meter equipment and advanced time-of-use rates.

The Vermont General Assembly is also entertaining proposal to expand the scope of programs delivered through the efficiency utility to include non-regulated fuels, such as heating oil, propane, and kerosene. Movement in this direction could potentially require substantial expansion of efficiency program activities. (See ES#2)

More broadly, Vermont's efficiency utility mechanism undergoing tremendous change and will need to respond to and help inform the delivery of programs and policy choices for Vermont consumer, and in concert with the broader planning efforts Vermont utilities, Vermont regulators and the Vermont General Assembly.

In summary, Vermont has been a leader in its reliance on energy efficiency as a resource alternative to energy and now transmission resources. EVT is already going through major expansion and changes through the targeting of its programs activities around GT, and potentially non-regulated fuels in the future. It operates in a complex and dynamic market and technological environment. Vermont must consider ways to stabilize and ensure that programs remain (1) appropriately designed to deliver cost-effective system-wide programs (2) appropriately targeted to ensure that reliable service is delivered at the lowest cost when considering alternative transmission and capacity additions, (3) are designed to exploit emerging

opportunities for cost-effective energy efficiency created by new and emerging advanced meters and advanced rate designs.

2. Policy Design

1. Ensure adequate funding, sound and appropriately focused program design, and ongoing delivery of electric and gas efficiency programs to capture all reasonably available cost-effective energy efficiency potential.

2. Explore ways to better integrate the efficiency utility into the resource planning environment in Vermont. Such a role is currently being deliberated in the context of Docket 7081 by the Vermont PSB.3. For better resource planning and continuity, consider ways to effectively further institutionalize the role of EVT as a going concern rather than a time bounded performance contractor.

3. Explore ways to empower consumers to effectively respond to advanced time-of-use pricing programs (including reliance on utility, or efficiency utility programs initiatives).

4. Consider ways to mitigate rate impacts of energy efficiency programs by allowing amortization of efficiency expenditures in order to reduce electric rate impact and increase generational equity.

5. Explore new avenues of oversight, accountability, and incentives for efficient delivery of efficiency services to ensure the that ratepayer funds used to deliver efficiency services are used as effectively as possible.

6. Foster the development of effectively functioning competitive market for delivering efficiency services and/or programs. Ensure that the program strategies of the EEU are consistent with this policy.

7. Foster resource neutrality in the planning, delivery, and payment for supply and demand-side resources (e.g., allow regional cost recovery of investments in energy efficiency that avoid bulk transmission expenses otherwise borne by load serving entities in the region).

- **Goals:**
    - 15% reduction below reference case by 2015 (or as soon as possible, as per GDS study commissioned by DPS),
    - 35% reduction below 1990 levels in electricity and natural gas consumption by 2028.
- **Timing:** as above
- **Coverage of parties:** Residential, commercial, and industrial consumers of electricity and natural gas
- **Other:**

3. Implementation Mechanisms

Efficiency Utility or Gas Utility

4. Related Policies/Programs in Place

Building codes, appliance standards, federal tax incentives, investments in smart metering technology and advance time-of-use pricing for electricity, integrated transmission planning efforts of Vermont's electric utilities, emerging regional capacity markets.

5. Types(s) of GHG Reductions

Net reduction in CO2 emissions

TBD.

6. Estimated GHG Savings and Costs per $MtCO_2e$

a. **Data Sources:** The Department of Public Service Electric Efficiency Potential Study, prepared by GDS Associates.1 Marginal emissions coefficients reported by New England ISO for ther shorter term. The emissions coefficients of likely new generators (likely natural gas or a combination of natural gas with other generation types). 2 While Vermont's embedded resource mix reflect our overall costs, any reduction in energy demand that occurs in Vermont will reduce load in the region at the margin. Over the shorter term, this will translate into reductions in marginal emissions from embedded resources. Over the longer term this will help displace investments in new generating capacity.

b. Quantification Methods: TBD

c. Key Assumptions: TBD

7. Key Uncertainties

TBD

8. Additional Benefits and Costs

TBD

9. Feasibility Issues

TBD

10. Status of Group Approval

TBD

11. Level of Group Support

TBD

12. Barriers to Consensus

TBD

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[1] http://www.publicservice.vermont.gov/energy-efficiency/vteefinalreportjan07v3andappendices.pdf

[2]

ESD – # 2

Evaluation and expansion of DSM to Other Fuels

1. Policy Description

The Policy Description for ESD#1 here is included by reference. Both policies concern a similar program delivery apparatus like the existing Efficiency Utility responsible for delivery of electricity system-wide programs in the electric sector.

In response to legislative request, the Department of Public Service recently prepared an analysis of efficiency potential for non-regulated fuels, concluding that the potential for reduction was 12% by 2016.[3] The savings potential from an investment of roughly $150 million over 10 years would yield a net benefit $486 million. Savings opportunities for non-regulated fuels primarily center on thermal efficiencies for space and water heating and are associated primarily with # 2 heating oil.[4]

The Department concluded that were an efficiency utility program relied upon for delivery of the non-regulated fuel efficiency programs, that the annual investment requirement would be in the neighborhood of $14.9 million per year.

Vermont would likely need to start slowly with a program like this due to the need for additional service providers. It is unlikely that Vermont could effectively spend near the $15 million per year for a number of years.

2. Policy Design

Consider various strategies/models for acquisition of energy efficiency through alternatives, including an all-fuels efficiency utility.

- **Goals:**
  - 12% reduction below reference case by 2015 (or as soon as possible, as per DPS study)

[3] Oil prices have risen since the time that the last round of price projections were completed in December of 2005. The results of the analysis, however, are relatively insensitive to the oil price since there is little disparity between the "achievable potential" identified in the report, and the "cost-effective achievable potential" identified in the report.

[4] The DPS report used avoided cost levels based on 2007 oil that cost around $40 a barrel. In light of current prices of nearly $60 per barrel, this provides a seemingly conservative estimate of the cost effective savings available. The Department updates it fuel price projections on a biennial basis and should have new price projections in the summer of 2007.

- 50% reduction below 1990 levels in electricity and natural gas consumption by 2028.

- **Timing:** as above
- **Coverage of parties:** Residential, commercial, and industrial consumers (primarily of fuels for heating)
- **Other:**

3. Implementation Mechanisms

Efficiency Utility

4. Related Policies/Programs in Place

Building codes, appliance standards, time-of-sale disclosure requirements, time of sale energy requirements, expanded weatherization assistance, and other policies directed at thermal efficiency from non-regulated fuels and other programs that could similarly reduce the demand for non-regulated fuels (excluding transportation fuels).

5. Types(s) of GHG Reductions

Net reduction in CO2 emissions

TBD.

6. Estimated GHG Savings and Costs per $MtCO_2e$

a. Data Sources: The Department of Public Service Electric Efficiency Potential Study, prepared by GDS Associates.[5]

b. Quantification Methods: TBD

c. Key Assumptions: TBD

7. Key Uncertainties

TBD

8. Additional Benefits and Costs

TBD

9. Feasibility Issues

TBD

10. Status of Group Approval

TBD

11. Level of Group Support

TBD

[5] http://www.publicservice.vermont.gov/pub/other/allfuelstudyfinalreport.pdf

12. Barriers to Consensus

TBD

ESD #3a

(RCI-3.1: Improved Building Codes)

Mitigation Option Description

Allow for automatic updates of Vermont's Residential and Commercial Building Energy Codes based on updates to national energy codes (IECC or ASHRAE 90.1. Develop a code to ensure the improved efficiency of existing buildings.

Mitigation Option Design

Goals:

- Reduce the time it takes to update Vermont's Energy Codes
- Ensure Vermont's Energy Codes reflects the most up to date version of the national energy codes (IECC or ASHRAE 90.1).
- Ensure that the EnergyStar benchmarking, target finder and other valuable tools used to establish targets, goals and track progress are incorporated into everyday design.
- Develop a Time of Sale energy requirement for existing buildings to improve the efficiency.

Timing: Within 3 months after the national code update, Vermont's Energy Codes will be updated to reflect any increased efficiency requirements contained in the national update. Then 3 months after the Vermont update the new Vermont Energy Code will go into effect, in total 6 month update cycle from release of new national energy code.

Involved parties: Vermont Department of Public Service, Efficiency Vermont, Vermont Gas Service, Burlington Electric Department, Architects, Engineers, Contractors, Builders, Mortgage Lenders, Legislators.

Other:

Implementation Mechanisms

Vermont's Energy Codes legislation should be revised to allow for automatic updates of Vermont's Residential and Commercial Building Energy Codes based on updates to national energy codes (IECC or ASHRAE 90.1).

When a new national energy code (IECC or ASHRAE 90.1) is updated, within 3 months the Vermont Department of Public Service will update Vermont's Residential and Commercial Building Energy Codes to reflect any increased efficiency requirements contained in the national update.

An advisory board of regulators, architects, engineers and builders will guide the process as envisioned by the Commercial Buildings Energy Standards.

Then 3 months after the Vermont update the new Vermont Energy Code will go into effect, in total 6 month update cycle from release of new national energy code.

The Time of Sale energy requirement is currently on the books at the city of Burlington. The statewide requirement will be a part of the Vermont Energy Code to ensure that at the time of sale, existing buildings will be brought up to an improved efficiency level. The costs from the improvements can be borne by the seller (to improve the value of the building) or the buyer (to add as improvement costs in the mortgage).

Related Policies/Programs in Place

Vermont's Residential Building Energy Standards 21 V.S.A. sec 266

Vermont's Commercial Building Energy Standards 21 V.S.A. sec 268

United States Environmental Protection Agency's EnergyStar Program

City of Burlington Time Of Sale energy requirement

Burlington Electric Department and Efficiency Vermont provide statewide energy efficiency services that are funded by an energy efficiency charge (EEC) on electric utility bills. Burlington Electric Department and Efficiency Vermont can provide technical assistance and incentives to help the industry meet or exceed building codes.

Vermont Gas Service provides technical assistance and incentives to help the industry meet or exceed building codes.

Types(s) of GHG Reductions

TBD

Estimated GHG Savings and Costs per $MTCO_2e$

Data Sources: Vermont's Residential Building Energy Standards 21 V.S.A. sec 266

Vermont's Commercial Building Energy Standards 21 V.S.A. sec 268

Burlington Electric Department and Efficiency Vermont provide statewide energy efficiency services that are funded by an energy efficiency charge (EEC) on electric utility bills. Burlington Electric Department and Efficiency Vermont can provide technical assistance and incentives to help the industry meet or exceed building codes.

Vermont Gas Service provides technical assistance and incentives to help the industry meet or exceed building codes.

ESD #3b

(RCI-3.4: Building Commissioning)

Mitigation Option Description

The State should assign an entity to develop and implement a comprehensive Building Commissioning, Building Recommissioning, Energy Tracking and Benchmarking program for builders, contractors, building managers, enforcement officials, and others.

Mitigation Option Design

Goals:

- To provide assistance to owners of buildings greater than 5000 square feet.
- To assist owners of buildings in reducing energy usage in buildings by ensuring the buildings are operating at peak efficiency.
- To assist owners of buildings in benchmark buildings energy use to identify high use buildings to allow prioritization of funds to improve energy efficiency to where it is most needed.
- To develop and implement an inspection for commissioning on a regular yearly or multi-yearly interval.

Timing: policies could be implemented in a timely manner to place this option into operation.

Involved parties: Department of Public Service, engineers and architects.

Other:

Implementation Mechanisms

This entity can develop and deliver trainings on its own, and work with other industry groups to assess ways to supplement or improve the training that already exists in the State.

The State should assign an entity to develop and institute a Building Commissioning, Building Recommissioning, Energy Tracking and Benchmarking program for builders, contractors, building managers, enforcement officials, and others.

Related Policies/Programs in Place

Efficiency Vermont provides statewide energy efficiency services that are funded by an energy efficiency charge (EEC) on electric utility bills. Efficiency Vermont can provide funding for Building Commissioning and Building Recommissioning.

Types(s) of GHG Reductions

[Insert text as appropriate]

Estimated GHG Savings and Costs per $MTCO_2e$

Data Sources: Efficiency Vermont provides statewide energy efficiency services that are funded by an energy efficiency charge (EEC) on electric utility bills. Efficiency Vermont can provide funding for Building Commissioning and Building Re-commissioning.

ESD #3c

(RCI-3.3: Training and Education)

Mitigation Option Description

The State should assign an entity to develop and implement an energy efficiency training and education program for builders, contractors, building managers, enforcement officials, and others.

Mitigation Option Design

Goals:

- To delivery high quality training on various energy efficiency construction and energy management topics.
- To develop trained building professionals to ensure energy efficient construction and on going energy management in buildings.

Timing: policies could be implemented in a timely manner to place this option into operation.

Involved parties: Vermont Department of Public Service, Efficiency Vermont, Vermont Gas Service, Burlington Electric Department, Architects, Engineers, Contractors, Builders, Mortgage Lenders, Legislators, high schools, vocational schools, adult education programs.

Other:

Implementation Mechanisms

The State should assign an entity to develop and implement an energy efficiency training and education program for builders, contractors, building managers, enforcement officials, and others. This training and education program should be expanded to include non-electrical forms of energy which already have a program in place.

This entity can develop and deliver trainings on its own, and work with other industry groups to assess ways to supplement or improve the training that already exists in the State.

This entity can also be effective in assisting in the preliminary studies of energy optimization options in depth. This will provide support for the design team and the owners.

This entity will submit a report to the Department of Public Service on a yearly basis to outline what has been accomplished and the goals for the following year. The Department of Public Service will also perform random inspections to ensure compliance on the entity's part.

Related Policies/Programs in Place

Many trade groups for builders, architects, engineers, electricians, plumbers, HVAC contractors, etc provide training sessions for their members.

Many High Schools or Vocational Centers offer building trades training programs.

Efficiency Vermont provides statewide energy efficiency services that are funded by an energy efficiency charge (EEC) on electric utility bills. Efficiency Vermont has provided training for contractors and builders on energy efficient construction.

Types(s) of GHG Reductions

TBD

Estimated GHG Savings and Costs per $MTCO_2e$

Data Sources: Many trade groups for builders, architects, engineers, electricians, plumbers, HVAC contractors, etc provide training sessions for their members.

Many High Schools or Vocational Centers offer building trades training programs.

Efficiency Vermont provides statewide energy efficiency services that are funded by an energy efficiency charge (EEC) on electric utility bills. Efficiency Vermont has provided training for contractors and builders on energy efficient construction.

ESD – # 4

Evaluate Potential for Contracting Nuclear Power

1. Mitigation Option Description

Nuclear power plants do not emit CO2 during plant operation, and while there are carbon emissions during fuel processing, nuclear power emits considerably less carbon that fossil fueled power sources. By obtaining a contract for nuclear power Vermont utilities will be able to reduce CO2 emissions form their generation portfolio. To the extent that additional power is produced from the Vermont Yankee which is not contracted to Vermont utilities, operation of Vermont Yankee will further reduce carbon emissions in the region.

Currently, Vermont's portfolio has heavy reliance on the single plant, to the point where Vermont's utilities have concluded that insurance is warranted for protection in the event of an outage. A new contract with Vermont Yankee would likely be significantly smaller than the current obligation. Options for increasing nuclear reliance would be to diversify the nuclear portfolio through additional contracts, trades or swaps. These options can be developed by the purchasing utilities or by Vermont Yankee as its contract offer to Vermont. Including outage insurance in the contract could also help to mitigate exposure.

2. Mitigation Option Design

Explore opportunities for engaging in replacement contracts with nuclear generating stations or their owners to the benefit of Vermont consumers.

- **Goals:** Develop a power supply portfolio that is low in emissions while being stably priced and reliable.
- **Timing:** The current VY contract expires in 2012. Vermont Yankee must also renew its operating license by 2012. The Vermont General Assembly is likely to vote before 2010 on whether or not the Public Service Board issue an order to approve or deny a new license for Vermont Yankee.
- **Coverage of parties:**
- **Other:**

3. Implementation Mechanisms

To implement this recommendation, several steps are necessary.

The Vermont Yankee plant must receive a license extension from the NRC

Per agreement, the Vermont legislature must approve the license extension.

The Vermont Public Service Board must issue a certificate of public good for any continued operation of the facility.

Vermont utilities must agree on contract terms that are acceptable to all parties and that provide sufficient benefit to justify continued operation of the plant.

Each of these steps is a significant undertaking by itself. Taken in combination, they require significant regulatory, legislative and utility actions as well as acceptance by the public at each step.

Currently, about one third of Vermont's electricity requirements are supplied by this one plant. The Department and others have long criticized our heavy reliance on one single plant. Should Vermont desire increased reliance on nuclear power above what is a reasonable amount for one plant to contribute, it will need to explore ways to mitigate this exposure. This can come through swaps with other nuclear plant owners (developed through efforts of the utilities or by Entergy) or insurance mechanisms.

4. Related Policies/Programs in Place

Integrated Resource Planning (LCIP)

NRC relicensing procedures

Legislative directives and approvals.

5. Types(s) of GHG Reductions

Net reduction in CO2 emissions from the electric sector, subject to interaction with RGGI

TBD.

6. Estimated GHG Savings and Costs per $MtCO_2e$

a. **Data Sources: NEPOOL Marginal emissions analysis. RGGI**

b. **Quantification Methods:** TBD

c. **Key Assumptions:** TBD

7. Key Uncertainties

TBD

8. Additional Benefits and Costs

9. Feasibility Issues

TBD

10. Status of Group Approval

TBD

11. Level of Group Support

TBD

12. Barriers to Consensus

TBD

ESD – 5: Support for Combined Heat and Power

1. Mitigation Option Description

Combined Heating, Cooling and Power (CHP) also known as co-generation, is a method of utilizing the thermal energy (heat) produced, when generating electricity (power) in a single, coordinated process. CHP is more energy efficient that 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 surface water at centralized electric generating stations, to meet onsite thermally driven demand such as process and space heating, cooling and dehumidification. This option is possible at locations where there is a year round demand for heat, cooling and electrical demand, ie. IBM, Fletcher Allen, University of Vermont and others to be identified.

2. Mitigation Option Design

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

- **Goals:** Identify and implement CHP where practical once new electrical growth is identified in Vermont. Power currently employed at IBM, Fletcher Allen and/or University of Vermont could be returned to the grid for use elsewhere to address power demands in Vermont.
- **Timing:**
- **Coverage of parties:**
- **Other:**

3. Implementation Mechanisms

Identify locations within Vermont that would be suitable for utilization of CHP. Allow energy service companies to sell CHP output to third party customers.
Expand availability of natural gas in Vermont.

4. Related Policies/Programs in Place

The policy design statements point to key related policy and programs which already exist at the national level in states such as California, Connecticut, New York, North Carolina and Texas.

5. Types(s) of GHG Reductions

Use of CHP in Vermont could reduce the overall GHG emissions emitted by Vermont utilities. CHP would provide the most efficient use of the fuel utilized rather than purchases of other fossil based utility generation. In addition, use of CHP could be considered a portion of base load

generation in the state of Vermont. Back-up support must be provided when the CHP facility goes off-line for maintenance

6. Estimated GHG Savings and Costs per $MtCO_2e$

d. Data Sources: Please provide text here (any sources you know of that will help in the quantification)

e. Quantification Methods: TBD

f. Key Assumptions: TBD

7. Key Uncertainties

TBD

8. Additional Benefits and Costs

TBD

9. Feasibility Issues

TBD

10. Status of Group Approval

TBD

11. Level of Group Support

TBD

12. Barriers to Consensus

TBD

ESD – # 6

Incentives and/or Mandate for Renewable Electricity

1. Mitigation Option Description

This policy expands existing programs or adopt new incentives/mandates for expanding the role of renewable energy within the state and regional power mix.

Currently Vermont's electric sector is only a moderate contributor to carbon emissions in Vermont. Roughly 45% of Vermont's energy is attributable to renewable resources that include large contracts for system power attributable to large hydro resources. However, Vermont's entitlements to much of its non-emitting sources are due to expire in the coming decade. To maintain Vermont's profile as a low-emitter of greenhouse gas emissions in the electric sector, Vermont needs to replace significant portions of existing entitlements with low or non-emitting sources.

Following Act 61, 74, and 208 of 2005 and 2006, Vermont has already embarked on a number of initiatives to encourage or reduce barriers to renewable sources of electricity including the establishment of new transparent and timely interconnection standards for small and renewable generation, the promotion of new contracts with renewable energy resources through the Sustainable Priced Energy Enterprise Development Program (SPEED), the establishment of the Clean Energy Development Fund, and through various modifications to the net metering programs in Vermont and related tax policy.

Vermont has already had some success with its green pricing programs. Both of Vermont's largest investor owned utilities have programs. The CVPS program "Cow Power" now has over 2% (check) of its customer base participating in the program. The Vermont legislature is now considering requiring that all utilities establish similar programs and made them available to all consumers.

Other efforts to promote the construction or purchase of electricity from renewable resources could come from by strengthening the role of the SPEED and/or create a renewable portfolio standard. At present, four of Vermont's New England neighbors and New York possess a renewable portfolio standard that requires that a certain percentage of sales are attributable to new renewable resources. Efforts are underway at the regional level for further harmonize the RPS requirements of states with an RPS.

The role of large hydro in an RPS should also be explored. Currently, Vermont does not recognize large hydro resources above 200 MW as renewable energy in any of its goals for SPEED or an RPS. Yet large hydro exhibits the price stability and low-emissions profile of other renewable. It also represents the greatest share of Vermont's existing renewable mix. By virtue of existing interties with Canada, New Hampshire, and New York, Vermont has the advantage of relatively good access to large hydro resources from our immediate neighbors. Through existing intertie capabilities with its neighbors Vermont may also have access to new large hydro resources in New Brunswick, and Labrador.

Even beyond Vermont, the ISO-New England region, from which Vermont purchases the bulk of its market energy depends disproportionately on volatile fossil fuels. Efforts are underway to further diversify the regional resource mix, including strengthening transmission intertie capabilities between Canada and New England. The decisions that Vermont makes with respect to new resource contracts can, in turn, positively impact the character of decisions within the ISO-New England region.

2. Mitigation Option Design

Expand voluntary green pricing programs

Continued reliance on or strengthening SPEED

Establish a renewable portfolio standard

Explore ways to incorporate large hydro resources in setting goals for renewable energy for Vermont

- **Goals:** Replace part of expiring contracts with renewable resources. Offer consumers who desire, options to purchase various attributes for their energy consumption. Goal is expressed in two tiers, one includes large hydro and nuclear, to guarantee the carbon intensity of the power sector progressively decrease, and the other to limited to renewables (not including large hydro) to serve as a catalyst for ushering renewables into the market place. The goals will gradually rise, from XX in 2017 to YY in 2028.
- **Timing:** ASAP
- **Coverage of parties:**
- **Other:**

3. Implementation Mechanisms

There are at least several options for doing this:

1. Renewable Portfolio Standard

A Renewable Portfolio Standard ("RPS") is one such mechanism to ensure a certain amount of renewable energy in the portfolio serving Vermont customers. An RPS generally requires that a seller of electricity in Vermont maintain a certain percentage of renewable energy in its resource mix (generally as a percent of sales). The renewable component is generally demonstrated by the retirement of a Renewable Energy Credit ("REC"), representing one MWh of renewable electricity generated. These credits are traded in the New England market through the NEPOOL GIS system. Under this system, Vermont could define its own standards for what constitutes a renewable generator and qualify those generators meeting that criteria.

Individual state renewable portfolio standard targets in New Negland and the Northeast represent a potentially important reference point for Vermont. The market for electricity and the renewable resources needed to meet such a standard is primarily located in the region. Vermont is currently one of only two states in New England without an RPS.

Those states with an RPS have structured their targets in ways that differentiate embedded resources from new renewable resources. The target in Connecticut, for example, is 7% for "Class I" RECs on or after 2010. Massachusetts establishes a 4% standard for 2009, but allows the standard to grow by 1% each year until the an administrative agency determination halts it. New York set a target of 25%, but relied on approximately 19% of existing renewable resources when the target was established. Rhode Island's RPS is currently targeting 13% in 2017. Maine just recently established a 10% target for 2017. Based on the targets set by the region, Vermont could set of goal of 10-13% in 2017.

Alternatively, Vermont could establish an alternative target that might be based on a ground-up assessment of Vermont or regional potential.

2. Voluntary Purchase Programs

Under this type of program, individual consumers are given the opportunity to designate a portion of their energy sources as renewable. The serving utility fulfills this obligation through the purchase of RECs in the same manner as the RPS. However, under a voluntary purchase arrangement, only participating customers are charged for the renewable premium.

3. SPEED

Continue or expand the SPEED goals for Vermont utilities to engage in long term contracts SPEED resources.

4. Definitions of Renewable Resources

Consider including large hydro resources in setting goals for Vermont's renewable energy mix or contract goals.

4. Related Policies/Programs in Place

SPEED

NEPOOL GIS

5. Types(s) of GHG Reductions

Net reduction in CO2 emissions

TBD.

6. Estimated GHG Savings and Costs per $MtCO_2e$

a. Data Sources: ISO-NE, Marginal Emissions

b. Quantification Methods: TBD

c. Key Assumptions: TBD

7. Key Uncertainties

TBD

8. Additional Benefits and Costs

TBD

9. Feasibility Issues

TBD

10. Status of Group Approval

TBD

11. Level of Group Support

TBD

12. Barriers to Consensus

TBD

ESD – # 7

GHG Cap & Trade and/or CO2 tax

1. Policy Description

This policy is designed to identify ways to constrain (cap) or internalize the cost of greenhouse gas emissions through complementary strategies to existing greenhouse gas emissions cap and trade structures.

Vermont is already part of the nine-state Regional Greenhouse Gas Initiative (RGGI) currently located only in the Northeastern US. Vermont was also the first state to establish legislation adopting the implementing framework for RGGI.

In implementing the framework, Vermont has already allocated 100% of the revenues generated from the program toward consumer benefit, including directing program funds toward energy efficiency programs covered by ESD #1 above or to be directed in ways that may reduce rates or foster non-emitting resources.

While RGGI is structured to permit and even encourage adoption by other states and regions, RGGI is currently limited in scope both geographically and to one sector of the economy. RGGI covers only the electric sector, and is limited to large commercial generating stations over 25 MW in size.

Not addressed through RGGI are the carbon emissions from transportation, home and commercial heating, and industrial processes that depend on sources of energy other than electricity. Some carbon emissions is also capped for a number of organizations through the voluntary Chicago Climate Exchange.

This policy, then, addresses other complementary mechanisms for internalizing the cost of greenhouse gas emissions beyond the large generating stations covered under the current RGGI structure and that participate in the Chicago Climate Exchange. This includes transportation, home and commercial heating, and industrial processes that depend on sources of energy other than electricity.

2. Policy Design

Policy design options include:

1. Carbon tax for fossil fuel sources. (Funds collected from a carbon tax could be used to fund programs directed at reducing the carbon footprint of Vermont or simply returned to taxpayers by displacing other form tax revenues.).

2. Create state level GHG cap and trade programs for other sectors of the Vermont economy.

3. Strengthen linkages between RGGI (or CCX) and state GHG reduction policies and by recognizing more non-electric sector initiatives as RGGI offsets, or by allowing the trading of credits among RGGI certified state GHG cap and trade programs.

- **Goals:**
- **Timing:**
- **Coverage of parties:**
- **Other:**

3. Implementation Mechanisms

RGGI

Tax policy

4. Related Policies/Programs in Place

RGGI

Chicago Climate Exchange

Efficiency Utility

5. Types(s) of GHG Reductions

Net reduction in CO2 emissions

TBD.

6. Estimated GHG Savings and Costs per $MtCO_2e$

a. Data Sources: RGGI, EIA, EPA EGRID

b. Quantification Methods: TBD

c. Key Assumptions: TBD

7. Key Uncertainties

TBD

8. Additional Benefits and Costs

TBD

9. Feasibility Issues

TBD

10. Status of Group Approval

TBD

11. Level of Group Support

TBD

12. Barriers to Consensus

TBD

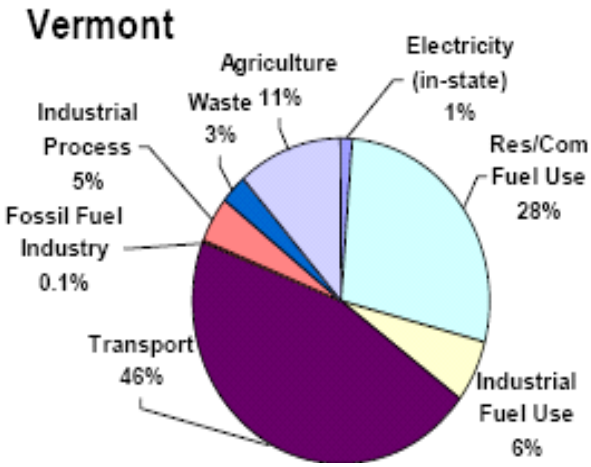
ESD #8

Incentives for Clean Consumer Technologies for Electricity or Heat

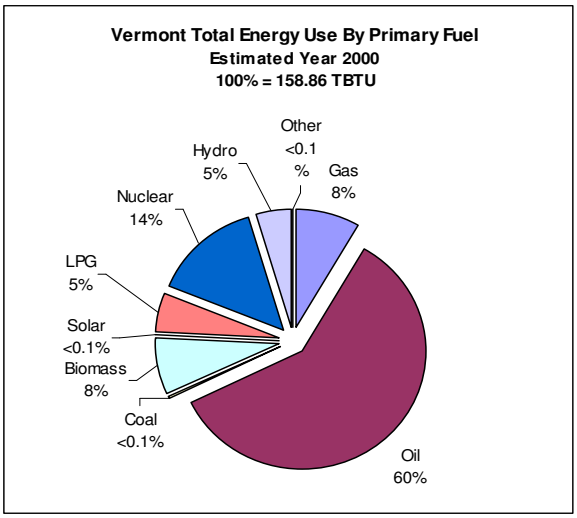
1. Mitigation Option Description

This option focuses on incentives for clean consumer technologies for electricity or heat. Conceptually this would include incentives to encourage clean technologies such as solar roofs and water heaters (RCI-6.1) as well as support for switching to less carbon intensive fuels (i.e. conversions of coal or oil applications to natural gas or biomass). (RCI 8.1) The following data provides some insight into the potential effect that this mitigation option can have on reducing GHG emissions in Vermont and how to structure these incentives to maximizing the reduction in GHG emissions.

Based on information provided to the Plenary Group, 34% of Vermont's House Gas emissions comes from residential, commercial, and industrial fuel use while currently approximately the GHG emissions comes from electricity.



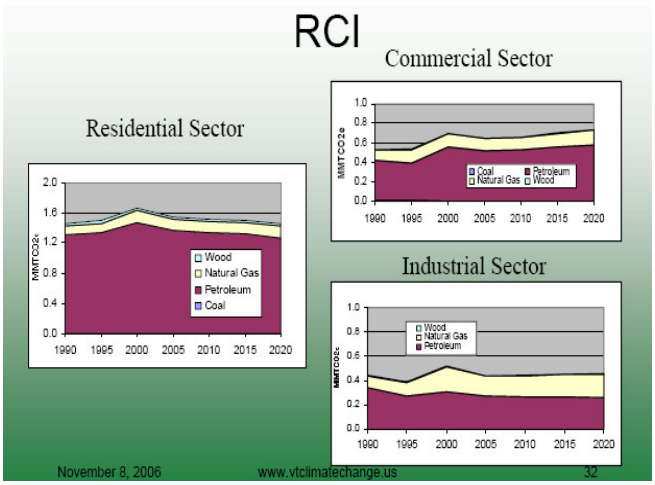
Green (RCI) 1% of



The primary fuel used in Vermont is oil which represents 60% of the total fuel used in the state. Cleaner fuels and technologies including solar, natural gas, and LPG represent significantly lower percentages of Vermont's total fuel used in Vermont.

While a large portion of the oil consumed in Vermont is for transportation, there is still a significant amount used for heating and process loads in the RCI sectors. This can be seen from the analysis of GHC emissions from this sector shown below.

The data indicates that the RCI sector is responsible for over 3 MMTCO2e of GHG emissions annually. The vast majority of the RCI emissions come from petroleum-fired equipment, the largest portion of which is in the residential sector (most likely from heating equipment). This is a particular problem in Vermont as the percentage of oil-fired equipment is proportionately higher than the rest of the region - and significantly higher than the rest of the country.



Therefore, given that the RCI sector is the second largest emitter of green house gas emissions in Vermont and that oil is the predominate fuel used in this sector, to maximize the reduction of GHG from this sector the incentives should be designed to displace RCI oil applications and usage.

2. Mitigation Option Design

- **Goals:** Establish incentives to reduce or displace the use of oil in the RCI sector through incentives to encourage clean consumer technologies and conversions to lower carbon fuels.
- **Timing:** ASAP
- **Coverage of parties:** Residential, commercial and industrial applications.
- **Other:** NA

3. Implementation Mechanisms

Potential mechanisms include:

- Incentives to support clean consumer technologies to displace oil usage include rebates, direct subsidies and tax credits.
- Incentives to support the conversion to lower carbon fuels targeted at:
  - Expansion of cleaner fuels in Vermont
  - Incentives for consumers to convert to lower carbon fuels

4. Related Policies/Programs in Place

TBD

5. Types(s) of GHG Reductions

The potential for reductions in GHG from clean consumer technologies will need to be determined by first identifying specific technologies and then determining the potential emissions reductions.

The potential for reductions of GHG emissions by conversion to lower carbon fuels can be seen from the following comparison of emissions by fuel type.

TYPICAL EMISSIONS OF COMMON FUEL SOURCES

Pollutant,lb/Billion Btu	Natural Gas	No, 2 Oil	Wood
Carbon Dioxide (CO2)	117,647	159,286	195,000
Nitrogen Oxides (NOX)	92 to 98	129 to 143	139 to 300
Sulfer Disoxide (SO2)	1	507	23 to 25
Volatile Organic Compounds (VOC)	5	5	17 to 694
Total Organic Compounds (TOC)	11	4 to 18	39 to 1,618
Total Particulate Matter (PM)	8	12 to 24	300 to 844

Based on information from U.S. EPA and VT ANR
Emissions from residential and small commercial boilers

The actual level of GHG reductions that can be achieved through conversions to lower carbon fuels will depend on the fuel type and usage. As an example, the use of natural gas to displace oil usage in Vermont over the past 40 years has significantly reduced the level of GHG emissions that would otherwise have been emitted in Vermont. The table below quantifies the annual levels of emissions reductions that have been achieved through natural gas' displacement of alternative fuels in Vermont.

EMISSIONS REDUCTION DUE TO DISPLACEMENT OF ALTERNATIVE FUELS BY NATURAL GAS IN VERMONT

Assuming Annual Consumption of 8,000 Billion Btu

Pollutant, annual tons emitted	No, 2 Oil	Wood
Carbon Dioxide (CO2)	166,554	309,412
Nitrogen Oxides (NOX)	418	216
Sulfer Disoxide (SO2)	2,026	94
Volatile Organic Compounds (VOC)	(1)	1,400
Total Organic Compounds (TOC)	1	3,271
Total Particulate Matter (PM)	42	2,258

Based on information from U.S. EPA and VT ANR
Reflects emissions from residential and small commercial boilers

6. Estimated GHG Savings and Costs per $MtCO_2e$

The potential for GHG Savings and cost per $MtCO_2e$ from clean consumer technologies will need to be determined based on the specific technologies identified.

The potential savings and cost from conversions to lower carbon fuels can be determined by using the example of the conversion of oil applications to natural gas using the following data and quantification methodology.

g. Data Sources:

EIA Data at http://www.eia.doe.gov/emeu/states/sep_sum/html/sum_btu_tot.html will provide specific data regarding the current fuel usage in Vermont

EPA and VT ANR data provides emissions for various fuel types.

h. Quantification Methods:

Utilizing EIA data, estimate potential oil usage that can be displaced by lower carbon fuel. Use EPA data to quantify potential GHG emissions reductions.

i. Key Assumptions: Potential oil usage that can be displaced with lower carbon fuel.

7. Key Uncertainties

TBD

8. Additional Benefits and Costs

Additional benefits and costs related to clean consumer technologies – TBD

Additional benefits from the expansion of natural gas to displace oil usage in Vermont include;

- Reductions in emissions from the transportation of alternative fuels.
- The availability of natural gas energy efficiency programs that reduce fuel use and further reduce emissions.
- The efficiency of natural gas equipment is higher than that of alternative fueled equipment. This reduces overall fuel usage and thereby further reduces emissions.
- Support of economic development in Vermont.
- Increased property tax to base.

9. Feasibility Issues

TBD

10. Status of Group Approval

TBD

11. Level of Group Support

TBD

12. Barriers to Consensus

TBD

ESD #9

Wind-specific support measures

1. Mitigation Option Description

Financial and regulatory incentives that support wind generation in Vermont.

2. Mitigation Option Design

- **Goals:** To stimulate new investment in wind generation in Vermont and, at the same time, provide incentives to owners of existing resources to maintain their presence in the energy portfolio. Specific goal is to stimulate commissioning of 150 MW of incremental wind generation by 2015.
- **Timing: Establishment** of financial and regulatory incentives by 2009.
- **Coverage of parties:** All developers of wind generating facilities would be eligible to receive payments and to develop projects under more expeditious regulatory and permitting regime.
- **Other:**

3. Implementation Mechanisms

Three mechanisms are suggested:

1. 50 basis points added to allowed return on equity for utility investment in wind generation or 10 basis points added to allowed return on equity to utility commitment to purchase non-utility owned wind generation, so long as the total of the added investment and/or purchase equals five percent of the utility's load.

2. Amendment to Act 250 permit and Title 30, Section 248 VSA provisions requiring wind generation permit and regulatory approval process to be completed within nine months of submission of application.

3. Utility investment in or contractual commitment to purchase wind generation, once approved by the Public Service Board, is deemed prudent and used and useful for ratemaking purposes.

NOTE: Similar incentives should apply to investments in equipment that allows existing wind generating resources to operate or that extends existing contractual commitments to buy wind generation.

4. Related Policies/Programs in Place

SPEED requirement that utilities commit to renewable resources

Federal tax incentives for investment in wind generating facilities

Ambiguous ratemaking precedent regarding recovery of power supply costs in rates after a supply resource commitment is made and approved.

5. Types(s) of GHG Reductions

Net reduction in CO2 emissions

Every kwh of wind generation offsets a kwh of fossil-based generation in New England (most likely natural gas fired generation). Currently, only 6 MW of wind generation is available in Vermont, out of a total generating capacity of more than 1100 MW in the state.

TBD.

6. Estimated GHG Savings and Costs per $MtCO_2e$

a. **Data Sources: Please provide text here (any sources you know of that will help in the quantification) Department of Public Service may have data pertinent to this issue.**

b. **Quantification Methods:** TBD

c. **Key Assumptions:** TBD

7. Key Uncertainties

TBD

8. Additional Benefits and Costs

TBD

9. Feasibility Issues

TBD

10. Status of Group Approval

TBD

11. Level of Group Support

TBD

12. Barriers to Consensus

TBD

ESD #10

Hydro-specific support measures

1. Mitigation Option Description

Financial and regulatory incentives that support hydroelectric generation in Vermont and contractual commitments to purchase hydroelectric generating capacity and energy by Vermont utilities.

2. Mitigation Option Design

- **Goals:** To stimulate new investment in hydroelectric generation in Vermont as well as contractual commitments by Vermont utilities to purchase the output of hydroelectric generating facilities owned by others. In addition, renewal or extension of such arrangements should be encouraged. Specific goal is to stimulate 150 MW of incremental hydroelectric generation by 2015.
- **Timing:** Establishment of financial and regulatory incentives by 2009.
- **Coverage of parties:** All owners and developers of hydroelectric generating facilities would be eligible to receive payments and to develop projects under more expeditious regulatory and permitting regime.
- **Other:**

3. Implementation Mechanisms

Several mechanisms are suggested:

1. 50 basis points added to the allowed return on equity for utility investment in new hydroelectric generation or 10 basis points added to the allowed return on equity for utilities committing to buy hydroelectric generation from another entity, so long as the total of the added investment and/or purchase commitment equals 25 percent of the utility's load.

2. Amendment to Act 250 permit and Title 30, Section 248 VSA provisions requiring hydroelectric generation permit and regulatory approval process to be completed within nine months of submission of application.

3. Utility investment in or contractual commitment to purchase hydroelectric generation, once approved by the Public Service Board, is deemed prudent and used and useful for ratemaking purposes.

4. State regulatory determination of water quality in Federal hydroelectric re-licensing proceedings must be completed within nine months of submission of application and must take

into account economic and global warming impact of approving or denying water quality certificate.

NOTE: Similar incentives and regulatory streamlining provisions should apply to investments in equipment that allows existing hydroelectric resources to continue to operate or that extends existing contractual commitments to buy hydroelectric generation.

4. Related Policies/Programs in Place

Please provide text here

5. Types(s) of GHG Reductions

Net reduction in CO2 emissions

Every kwh of hydroelectric generation offsets a kwh of fossil-bsed generation. In New England, this is most likely to mean that natural gas generation is displaced with renewable kwhs. Currently about 20 percent of Vermont's capacity and five to seven percent of its energy resources comes from in-state hydroelectric facilities, while nearly 40 percent of its supply portfolio is provided by out-of-state hydroelectric entitlements.

TBD.

6. Estimated GHG Savings and Costs per $MtCO_2e$

a. **Data Sources: Please provide text here (any sources you know of that will help in the quantification)**
b. **Quantification Methods:** TBD
c. **Key Assumptions:** TBD

7. Key Uncertainties

TBD

8. Additional Benefits and Costs

TBD

9. Feasibility Issues

TBD

10. Status of Group Approval

TBD

11. Level of Group Support

TBD

12. Barriers to Consensus

TBD