



Vermont



Governor's Commission on Climate Change

Vermont
Governor's Commission
on Climate Change
Plenary Group Meeting #2
November 8, 2006



VERMONT
ENVIRONMENTAL CONSERVATION



CENTER FOR CLIMATE STRATEGIES

Welcome & Introductions

- Governor's Commission on Climate Change (GCCC)
- VT DEC & State Agencies
- Plenary Group (PG) Members
- Public Observers
- Center for Climate Strategies (CCS)

Today's Agenda

- Welcome and Introductions; Logistics
- Update on Recent Climate Developments & State Actions
- Discussion of Vermont State Climate Goals
- Review and Addition of Items to the Catalog of State Actions
- Updates and Discussion regarding the Vermont Greenhouse Gas Emissions Inventory & Reference Case Forecast
- Next Steps for Technical Work Groups
- Agenda, Time and Date for Next Meeting
- Public Input and Announcements

Meeting Schedule

Date	Action
September 7, 2006	1st GCCC-PG meeting
November 8, 2006	2nd GCCC-PG meeting
January 18, 2007	3rd GCCC-PG meeting
March 22, 2007	4th GCCC-PG meeting
May 17, 2007	5th GCCC-PG meeting
July 26, 2007	6th & Final GCCC-PG meeting
August 2007	GCCC review meetings (as needed)
Between PG Meetings	Technical Work Group conference calls and meetings

Recent Climate Developments and State Climate Actions

- New Mexico CCAG
- Arizona CCAG and Governor's E.O.
- California: Passage of AB-32 to establish state greenhouse gas (GHG) emissions targets; SB-1368 re Clean Power; RGGI linkage
- Illinois Climate Change Executive Order
- Colorado Climate Change Project
- WRAP inventory and forecast and registry work
- Stern Report; Tufts/FOE Study, NH Winter Tourism Study

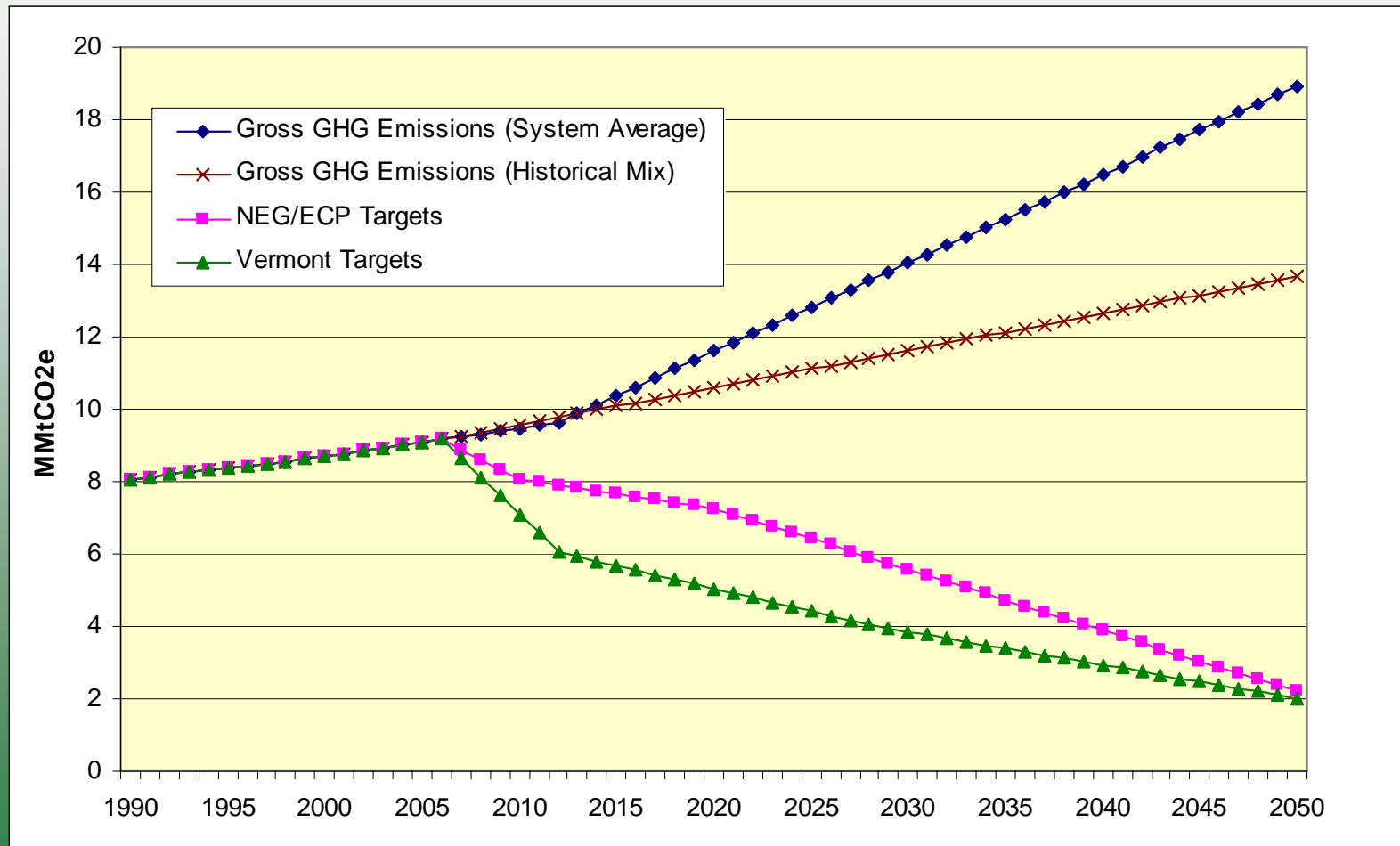
Vermont's State Climate Goals

- Levels:
 - 25% below 1990 levels by 2012
 - 50% below 1990 by 2028
 - 75% below by 2050
- More aggressive than many states
- GCCC-PG process is developing recommended actions for maximum achievable results
- Executive Order and Legislative goals provide a complementary vision: “Better to aim too high than too low.”

State Climate Goals

STATE	1990-2020 GHG FORECAST	STATE GOALS	CLIMATE PLAN COVERAGE
ARIZONA	149%	2000 LEVELS BY 2020; 50% BELOW BY 2040	106%
CALIFORNIA	34%	- E.O.: 2000 LEVEL BY 2010; 10% BELOW BY 2020; 80% BY 2050 - AB-32: 1990 LEVELS BY 2020	TBD
CONNECTICUT	32%	1990 LEVEL BY 2010; 10% BELOW BY 2020; 75% BY 2050	100%
MASSACHUSETTS	?	1990 LEVEL BY 2010; 10% BELOW BY 2020; 75% BY 2050	?
MAINE	34%	1990 LEVEL BY 2010; 10% BELOW BY 2020; 75% BY 2050	100%
NORTH CAROLINA	113%	?	TBD
NEG/ECP	?	1990 LEVEL BY 2010; 10% BELOW BY 2020; 75-85% ULTIMATELY	TBD
NEW JERSEY	?	5% BELOW 1990 BY 2005	100%
NEW MEXICO	48-64%	2000 LEVEL BY 2012; 10% BELOW BY 2020; 75% BY 2050	~140%
NEW YORK	24%	5% BELOW 1990 BY 2010	?
OREGON	38%	1990 LEVEL BY 2010; 10% BELOW BY 2020; 75% BY 2100	85%
PUGET SOUND	37%	1990 LEVEL BY 2010; 10% BELOW BY 2020; 75% BY 2100	100%
RHODE ISLAND	35%	1990 LEVEL BY 2010; 10% BELOW BY 2020; 75% BY 2050	100%
VERMONT	?	25% BELOW 1990 LEVELS BY 2012; 50% BELOW 1990 BY 2028; 75% BY 2050	?

Illustration: Goals and Draft Gross Emissions



Break



Ten Step Work Plan

1. Develop initial GHG inventories and forecasts
2. Identify possible GHG mitigation options
3. Identify initial priorities for evaluation
4. Evaluate GHG reduction potential; cost effectiveness; ancillary and feasibility issues as needed
5. Identify barriers, alternative policy design needs
6. Modify, add or subtract options as needed
7. Evaluate cumulative results of options
8. Iterate to consensus, with votes as needed
9. Aggregate options into implementation scenarios
10. Finalize recommendations and report language

Catalog of State Actions

- 250+ actions undertaken or considered by a wide variety of US states
 - Many provide GHG reductions coincidentally or as a co-benefit
 - Cover all economic sectors
 - Cover many implementation mechanisms
- Starting place for identifying priorities for further consideration by the PG

Screening of Potential Actions - Agriculture Sample

Option No.	Climate Mitigation Option	Priority for Analysis	Potential GHG Emissions Reduction	Potential Cost or Cost Savings	Additional Impacts, Feasibility Considerations	Notes
AFW-1	AGRICULTURE – PRODUCTION OF FUELS AND ELECTRICITY					
1.1	Manure Digesters/Other Waste Energy Utilization**					
1.2	Biodiesel Production (incentives for feedstocks and production plants)					
1.3	Biomass Feedstocks for Electricity or Steam Production**					
1.4	Ethanol Production					

Policy Design Proposals

- PG identifies about 50 draft potential options for further development
- TWGs propose initial policy option designs (“straw proposals”)
 - Goal Levels
 - Timing
 - Coverage
- CCS quantifies GHG reductions and cost/cost savings for TWG and PG review
- PG considers potential priorities and revises as needed

Categories of Transportation Actions

- Reduce travel demand for passengers and freight
- Reduce vehicle emissions for cars and trucks
- Expand use of low emitting (renewable) fuels
- Remove fine particulates (black carbon or soot)
- Reduce emissions from service equipment

Categories of Electricity Generation Actions

- Expand low-emitting and renewable sources
- Capture and recover waste energy
 - e.g., Heat, pressure, tail gases
 - RCI overlap
- Capture and store carbon (sequestration)
- Remove particulates (black carbon)
- Reduce delivery-related emissions
- (Reduce fuel extraction and process emissions)

Categories of Residential, Commercial, & Industrial Actions

- Increase energy efficiency and conservation
- Reduce industrial process related emissions
- Expand waste recovery and recycling
 - AFW overlap
- Expand low-embedded-energy products
- Shift to low-emitting product inputs

Categories of Forestry Actions

- Protect forestland from permanent clearing
- Restore and expand forests
- Improve forest regeneration and stocking (increase carbon stock densities)
- Sustainable thinning and density management of forests
 - Expand wood products carbon storage
 - Expand renewable biomass energy use
- Recycle wood products

Categories of Agriculture Actions

- Protect farmland carbon stocks, biomass supplies
- Expand soil carbon storage and biomass supplies
- Expand renewable energy production
- Increase energy recapture and reuse
- Improve animal feed efficiency
- Reduce process/waste emissions
- Reduce food delivery/transportation emissions

Categories of Waste/Resource Management Actions

- Expand solid and liquid waste energy recovery
- Expand low-emitting waste storage
- Expand source reduction, reuse, recycling
- Expand energy efficient processing of waste

Categories of Cross Cutting Issues

- Inventory and Forecasting
- Emissions reporting
- Emissions registries
- Education and Public Outreach
- Adaptation
- Goals
- State's Own Emissions

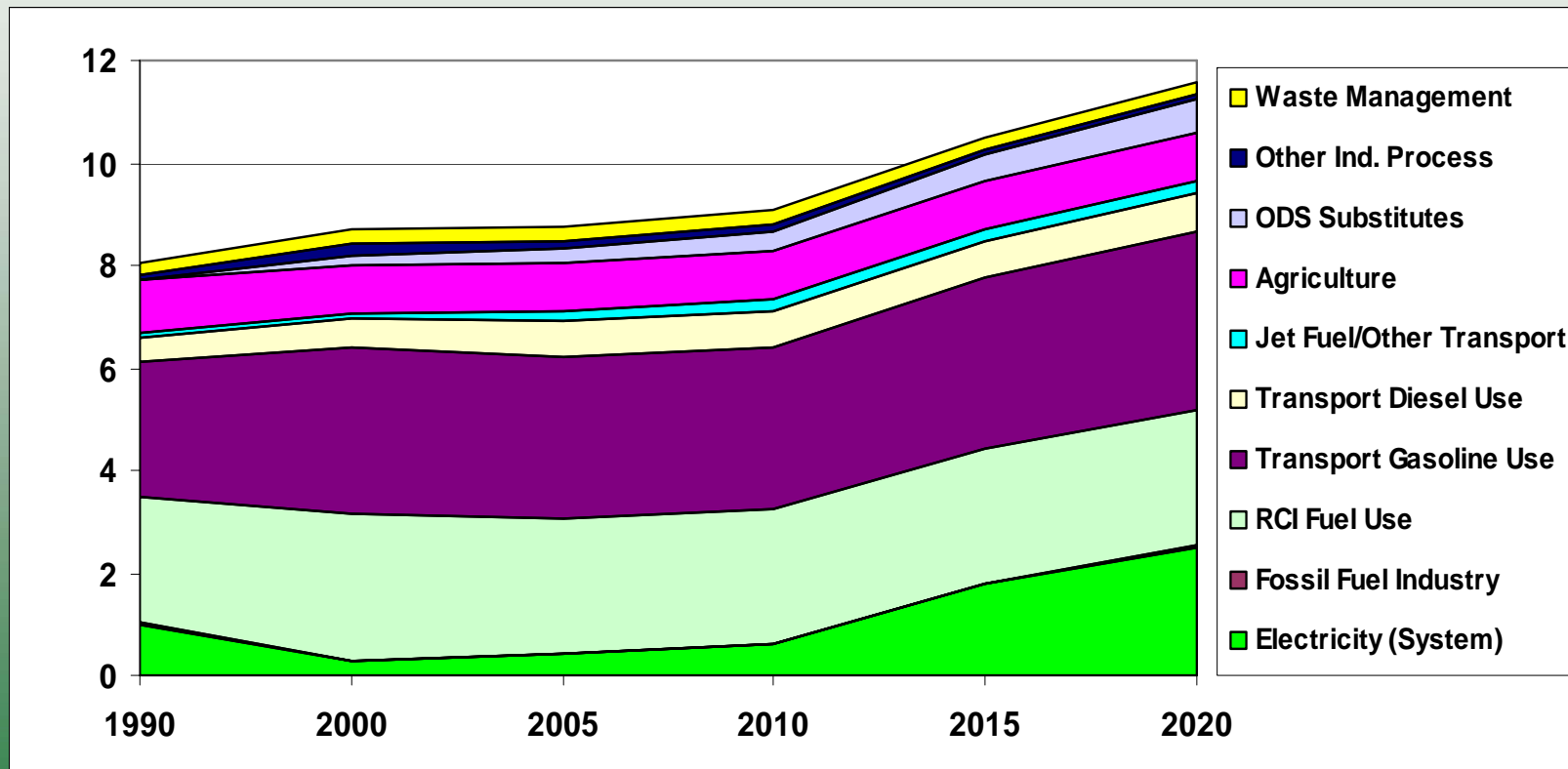
Break



Updates to Inventory and Reference Case Forecast

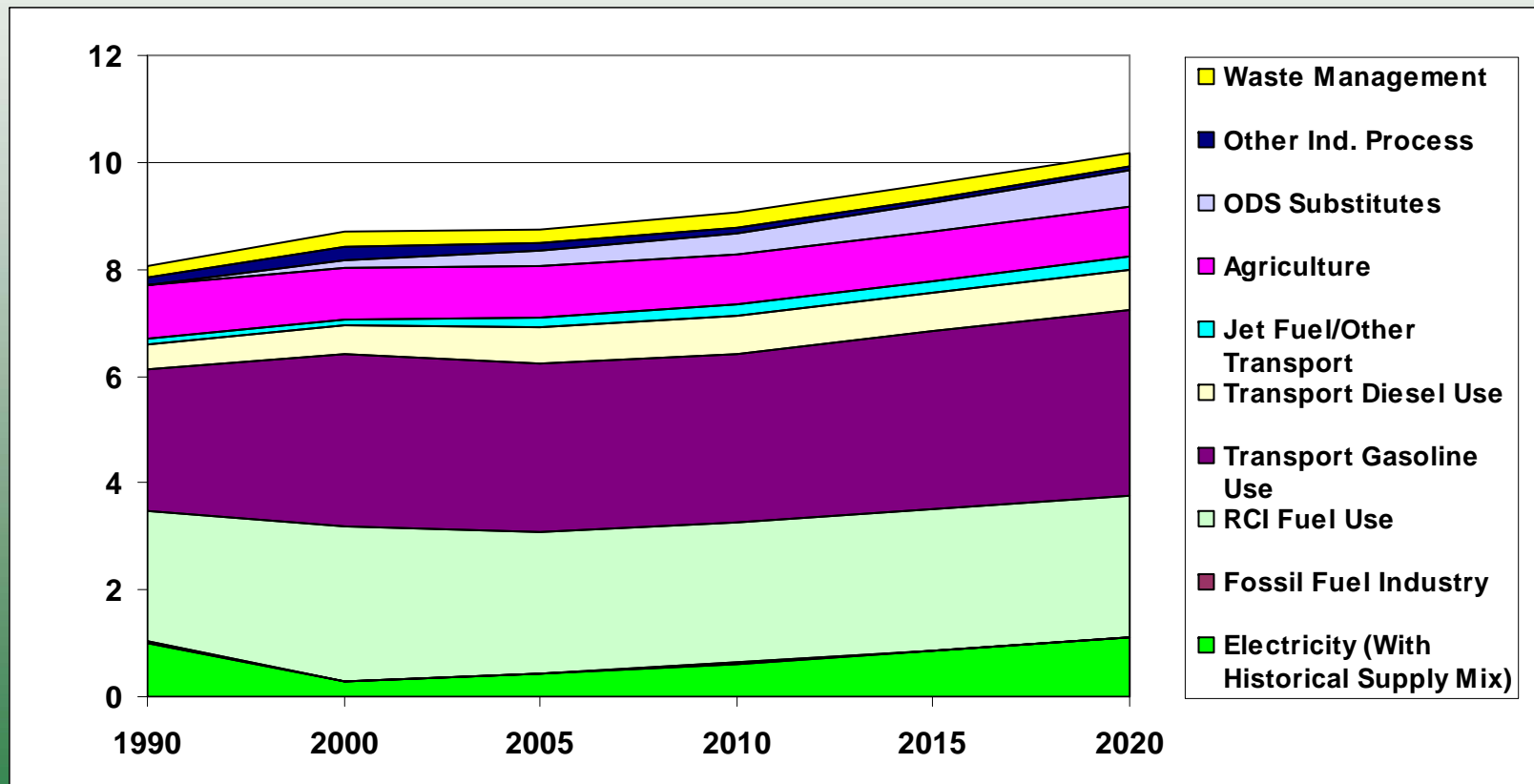
Gross GHG Emissions By Sector, 1990-2020

With System Average Electricity Forecast

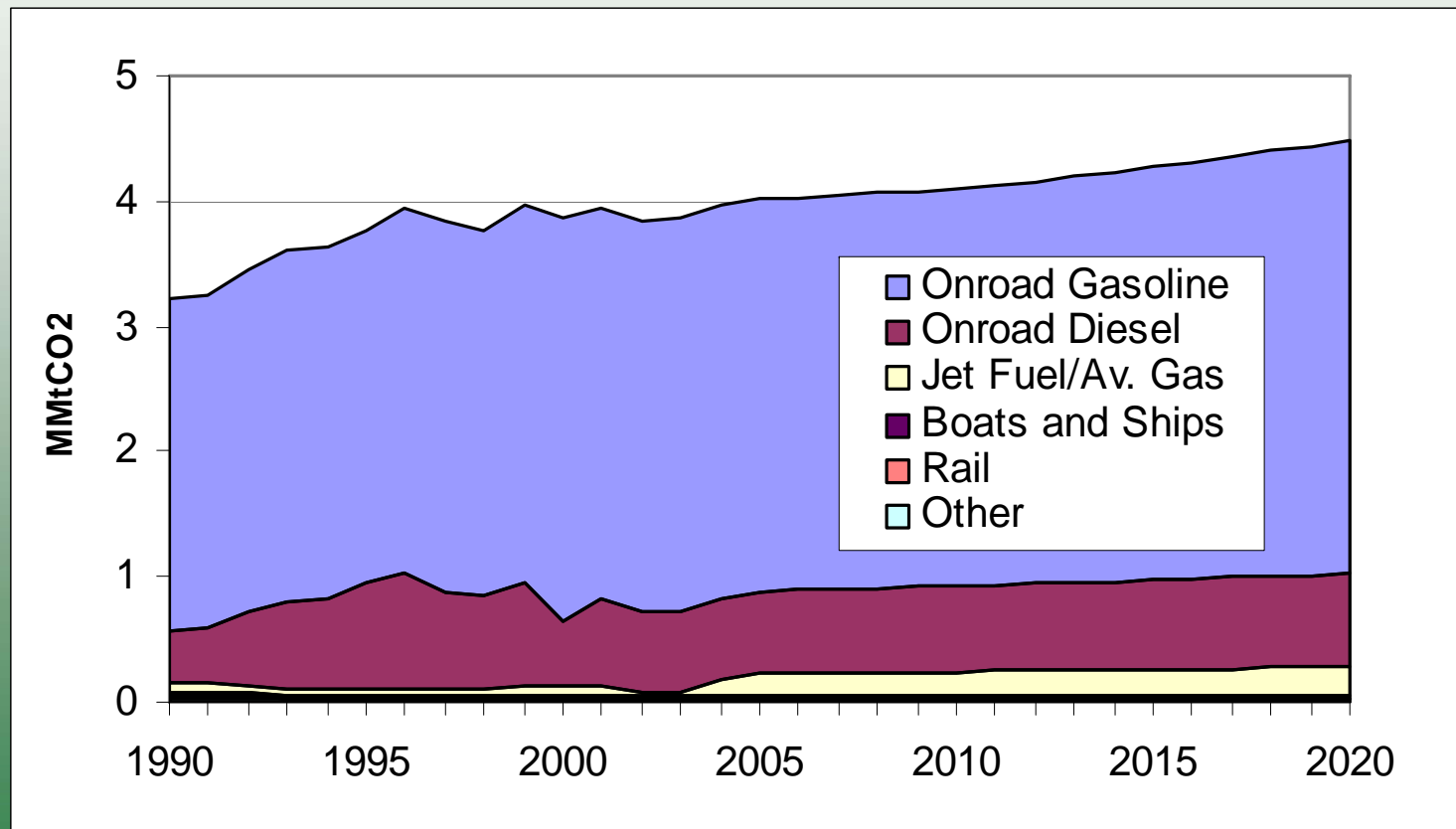


Gross GHG Emissions By Sector, 1990-2020

With Hypothetical Historical Electricity Mix Forecast



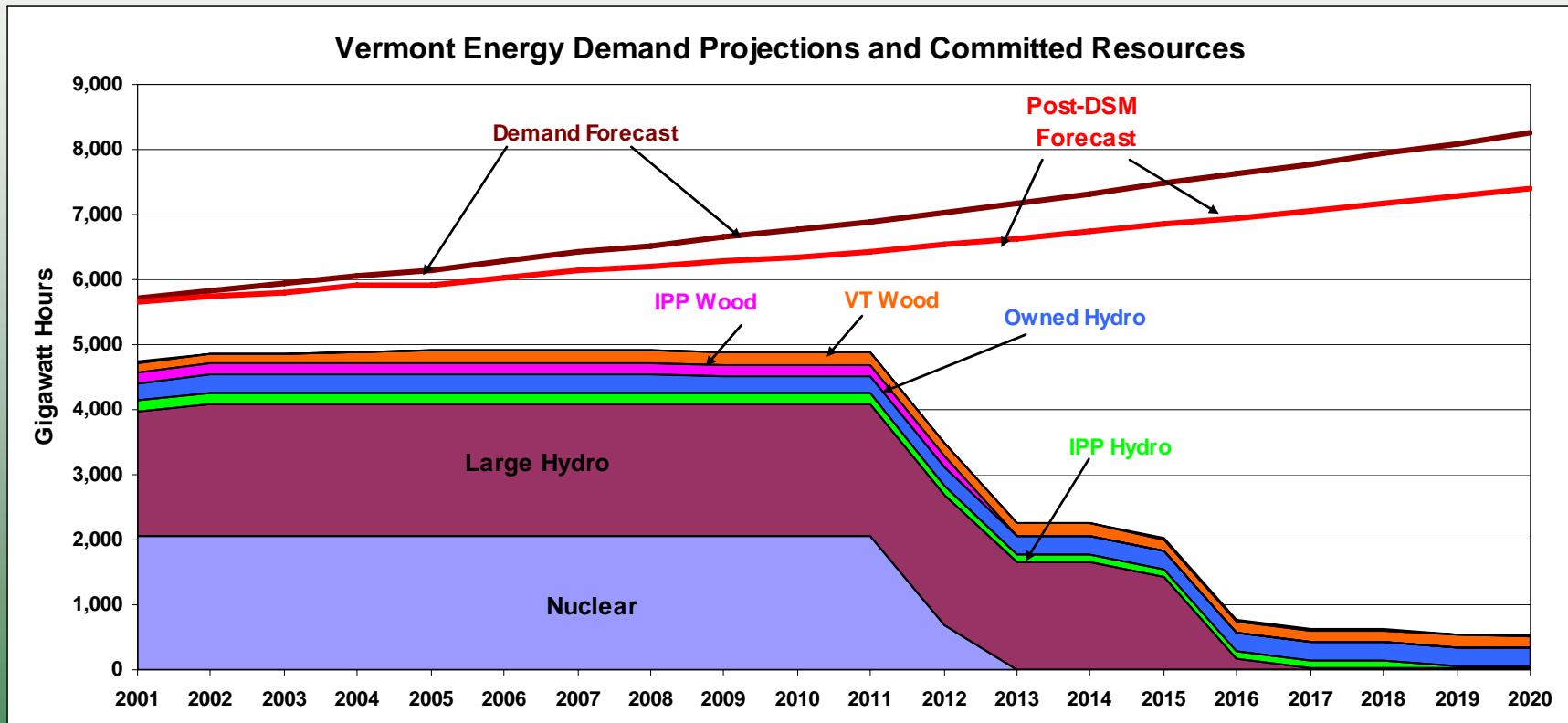
Transportation



Transportation

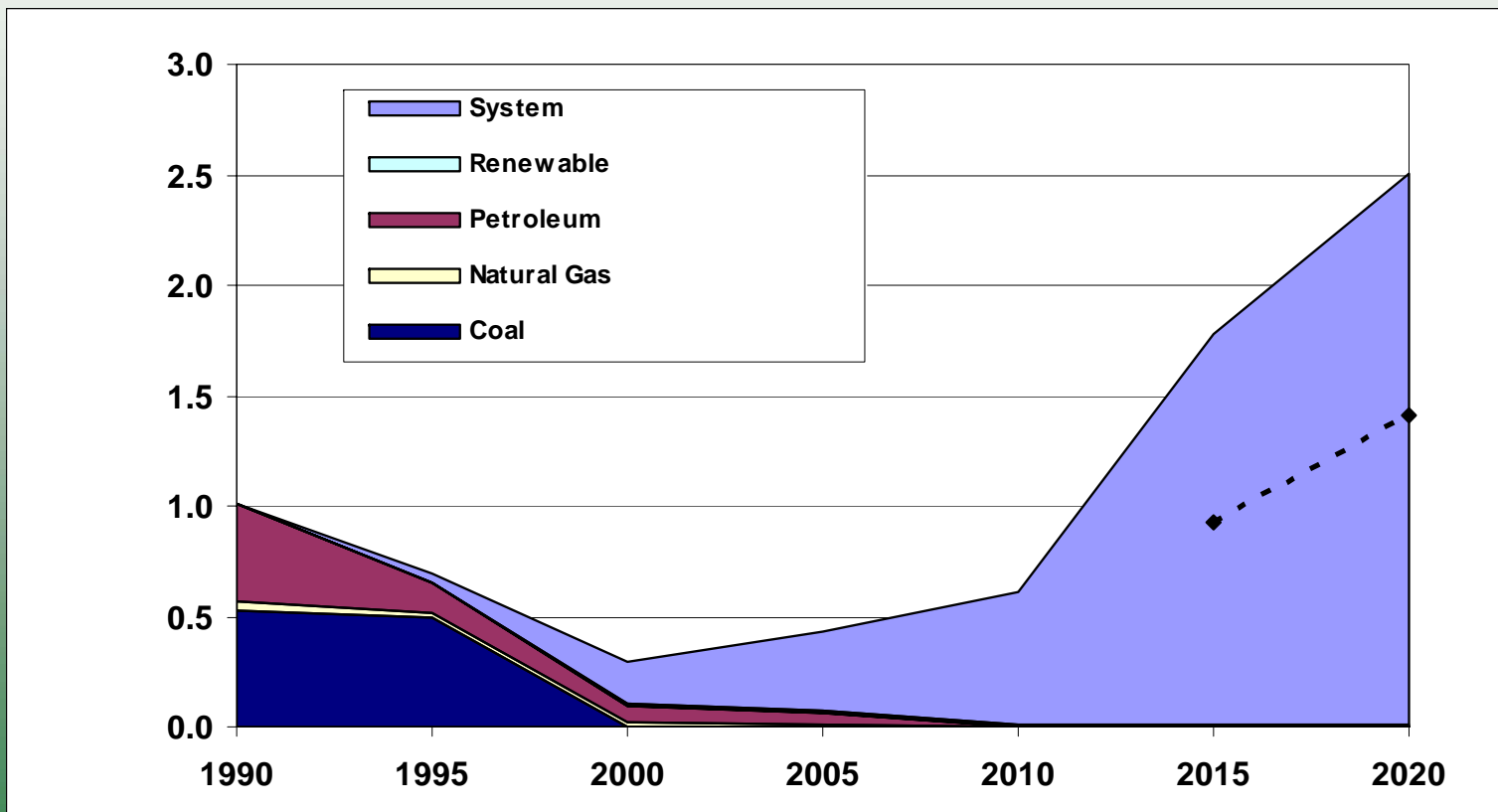
- Revisions
 - Growth rates for on-road gasoline and diesel emission estimates
 - Growth rates for aircraft emissions
 - Ongoing review by TWG

Electricity



Source: Vermont DPS

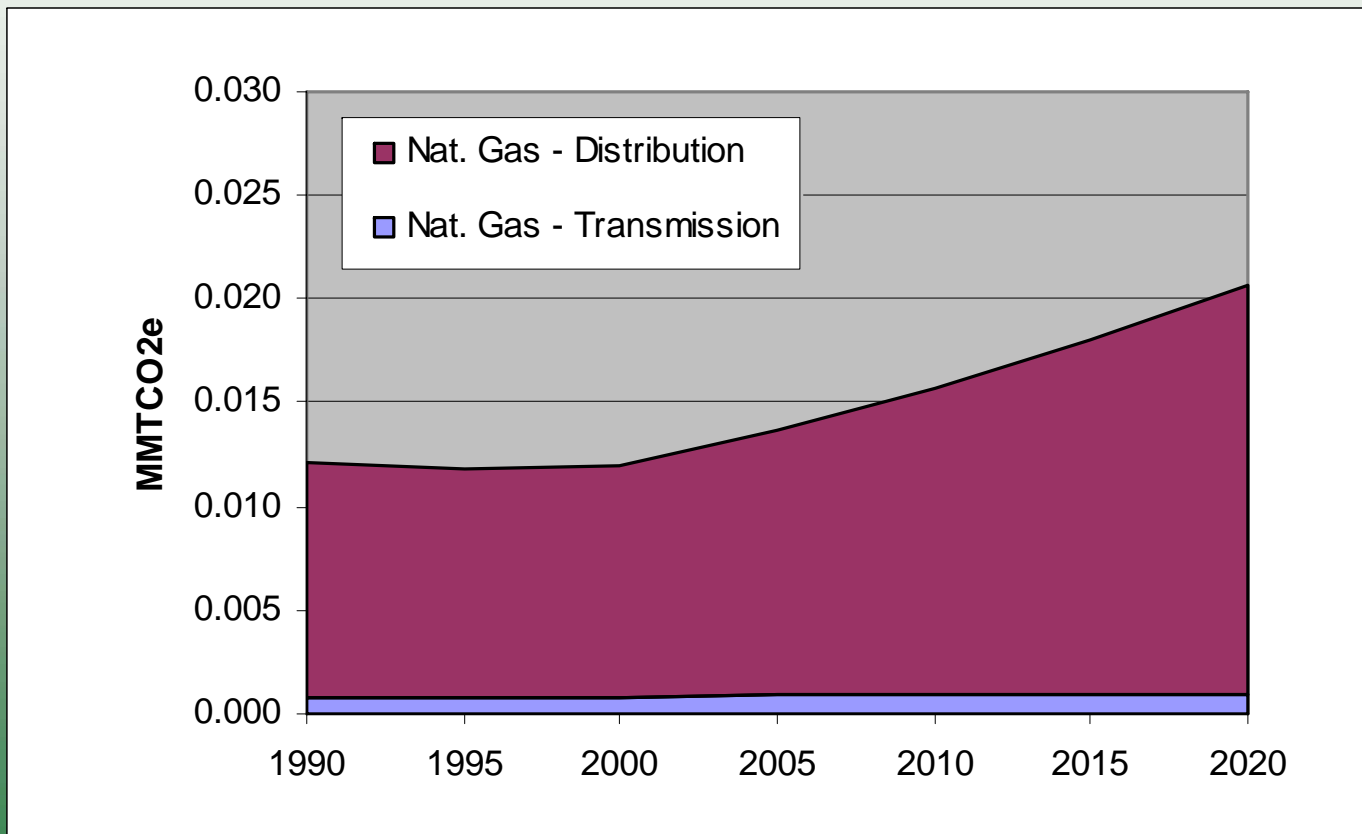
Electricity (Consumption Based)



Electricity

- Revisions
 - Historical data:
 - New VT DPS data
 - Production and consumption-based estimates
 - In-state and imported energy consumption by fuel type
 - System purchases (fuel type unknown)
 - Forecast data:
 - New VT DPS data
 - Production and consumption-based estimates
 - Without DSM = 2.0% annual growth
 - With DSM = 1.5% annual growth
 - Key Forecast Issues:
 - Assumptions about replacement power (system average or historical mix)
 - Possible changes in fuel system mix going forward

Natural Gas Transmission and Distribution



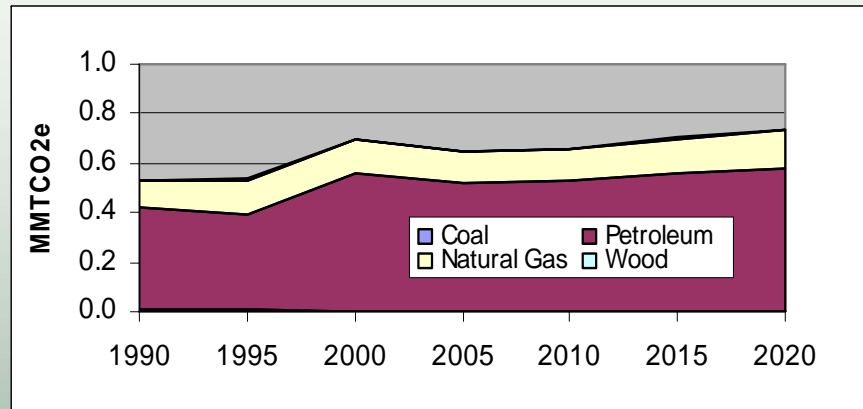
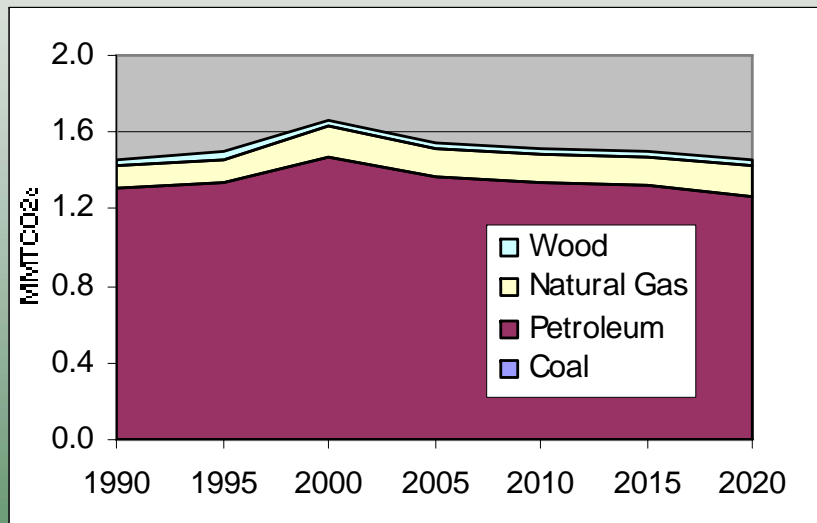
Natural Gas Transmission and Distribution

- Revisions
 - Growth assumptions
 - Transmission pipeline system: 1% annual
 - Previous preliminary estimate held emissions constant at 2005 levels

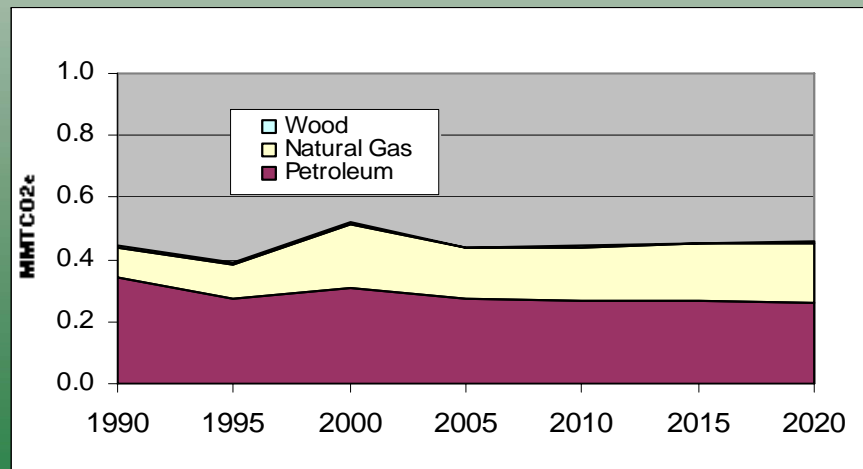
RCI

Commercial Sector

Residential Sector



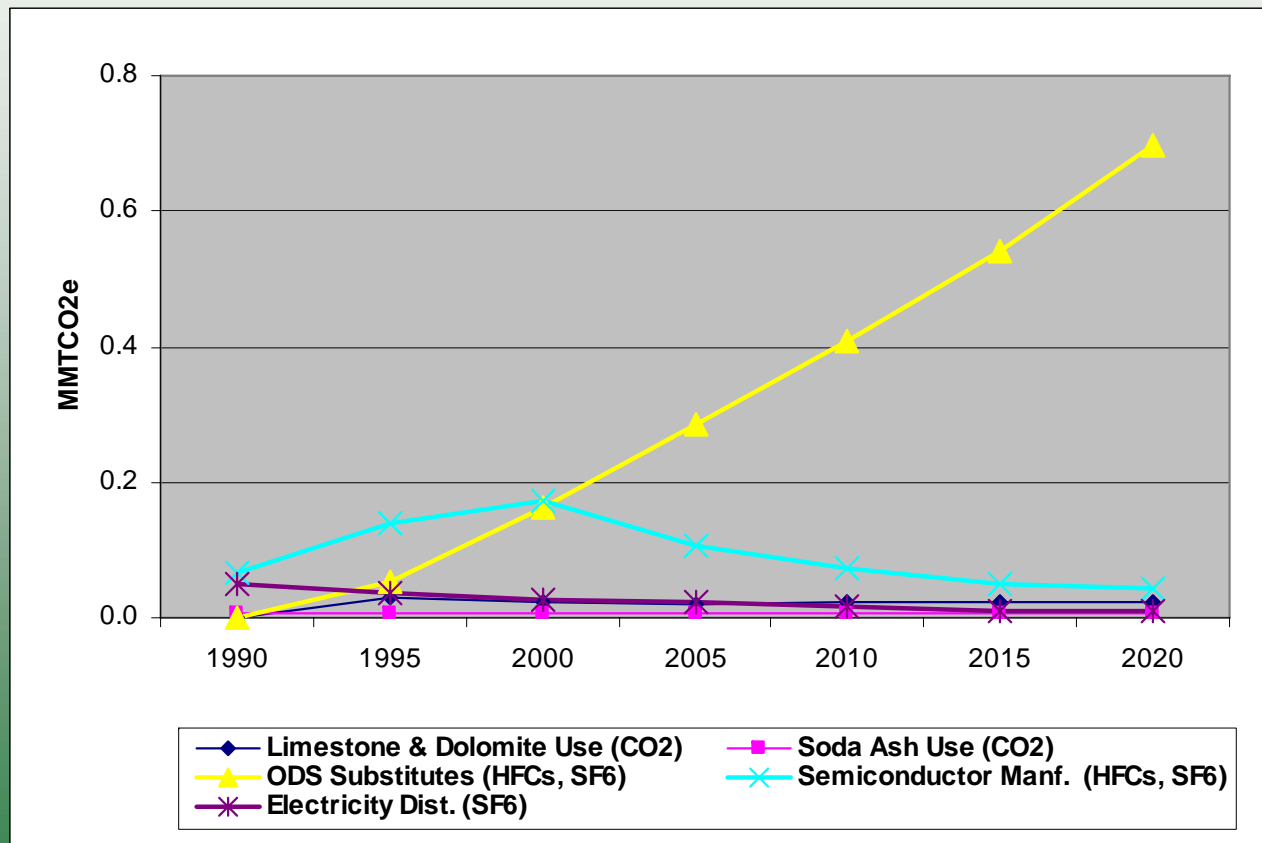
Industrial Sector



RCI

- Revisions
 - None identified
 - Ongoing review by TWG

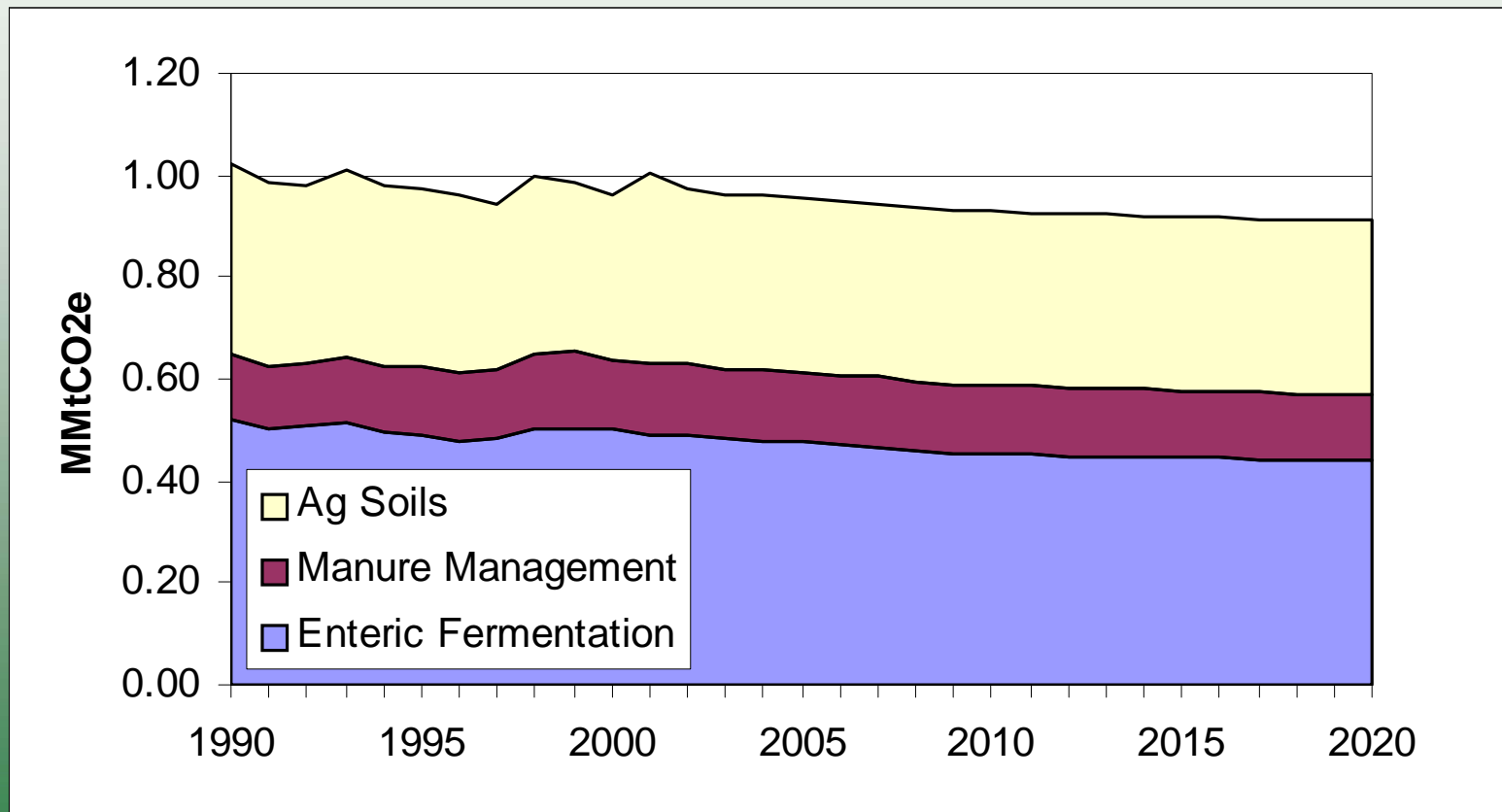
Industrial Process



Industrial Process

- Revisions
 - None identified
 - Ongoing review by TWG

Agriculture



Agriculture

- Revisions
 - CCS to incorporate USDA estimates of emissions from changes in agricultural practices leading to soil carbon change
= -0.19 MMtCO₂e/yr

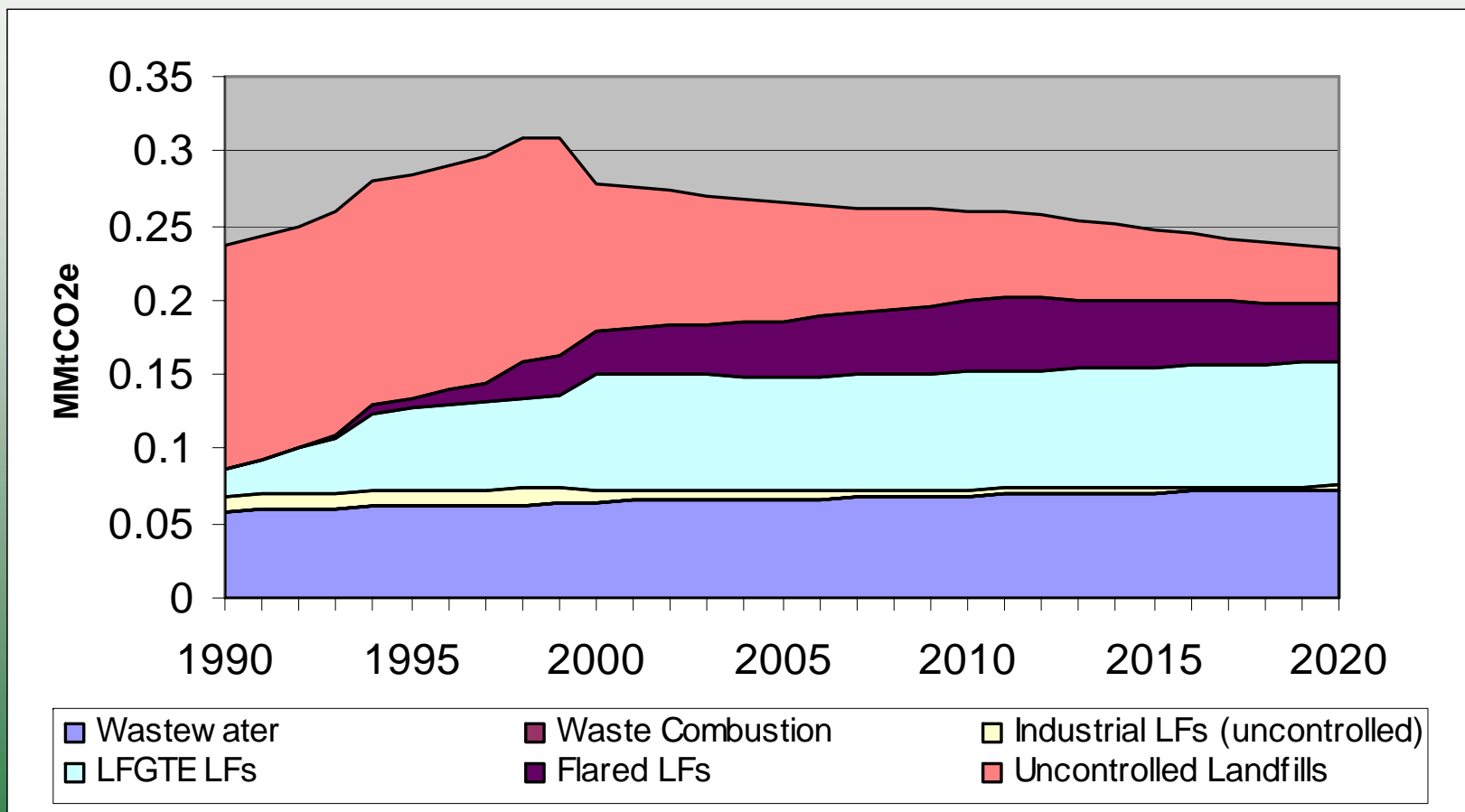
Forestry

Carbon Pool	MMtCO₂e/yr
Live Trees	-6.3
Standing Dead Trees	-0.3
Live Understory	-0.03
Down and Dead Trees	-0.4
Forest Floor	-0.5
Soils	-0.7
Harvested Wood Products	-1.4
Total	-9.7

Forestry

- Revisions
 - None identified
 - Ongoing review by TWG
 - Harvested wood products estimates
 - Wildfire effects on N₂O and CH₄ emissions

Waste/Resource Management



Waste Management

- Revisions
 - None identified
 - Ongoing review by TWG

Black Carbon Emissions

- 2002
 - 0.65 MMtCO₂e
 - Primary Contributors:
 - Nonroad Diesel (46%)
 - Onroad Diesel (40%)
 - RCI Oil (6%)
 - Onroad Gasoline (3%)
 - Aircraft (2%)
- 2018
 - 0.24 MMtCO₂e
 - Primary Contributors:
 - Nonroad Diesel (42%)
 - Onroad Diesel (14%)
 - RCI Oil (20%)
 - Onroad Gasoline (9%)
 - Aircraft (5%)

Break

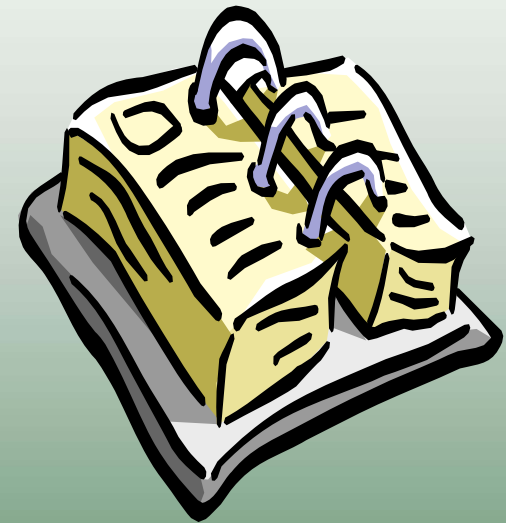


TWG Next Steps

- Identify recommended “priorities for analysis” from Catalog of State Actions
 - Add new options as needed
 - Rank and screen options
- Revision of Vermont GHG inventory and forecast, as needed

Next PG Meeting

- Agenda:
 - Review TWG suggested priorities for analysis of policy options
 - Review TWG suggested updates to the Vermont emissions inventory and projection
 - Discuss policy design issues and next steps for policy options
- January 18, 2006



Public Input, Announcements