

Climate Change Roadmap for Connecticut: Economic and Environmental Opportunities

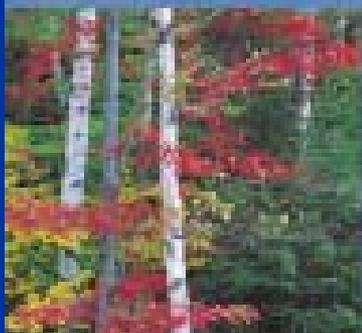
by

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SIPRAC

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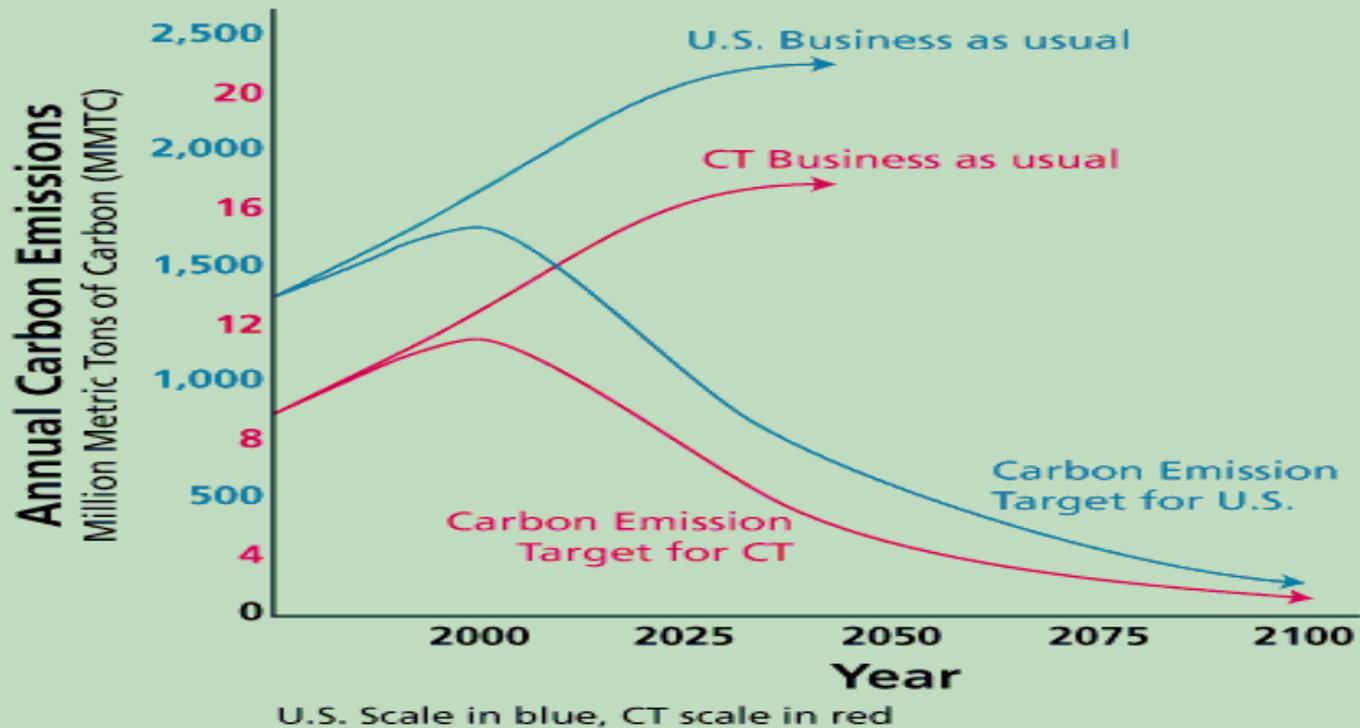
Part I: Overview

Targets – 75% by 2050

- Scientific Community -- most responsible policy is to limit global temperature increases to the lowest possible level
- IPCC -- An increase of 1-2° C (1.8-3.6° F) is about the lowest level we can achieve over the next century
- The most aggressive policy scenario for meeting these levels corresponds to keeping atmospheric concentrations of CO₂ at or under 450 ppm by 2100
- To keep CO₂ concentrations below 450 ppm, global CO₂ emissions must be cut by 50% from current levels by 2050-2060
- Industrial nations share = 75% below current levels by 2050

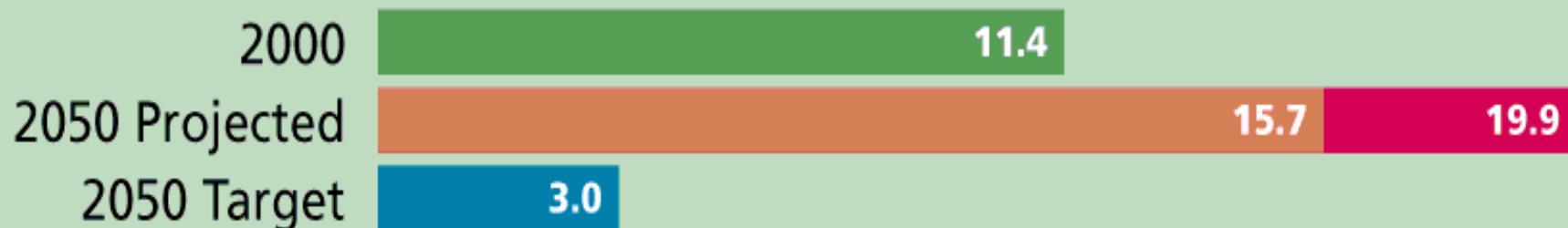
75% Reductions by 2050

**TABLE 1.
EMISSION TRAJECTORIES**



Trends and Targets for Connecticut

TABLE 2. CONNECTICUT GHG EMISSION LEVELS



Cuts Needed by 2050: 12.7 – 16.9 MMTC/yr

Where is it from? Where can we cut?

Category	2000	2050	% Increase
Electric Power	2.5	3.8 – 8	52 – 220
Mobility	4.1	6.7	63
Residential	2.2	2.2	0
Commercial	1.5	1.9	27
Industrial	1.1	1.1	0
TOTAL	11.4	15.7-19.9	38-75

DEP *GHG Inventory (1999)*; EPRI Study (2000) using DOE NEMS model

Findings and Recommendations

- **Targets – CT should adopt long-term goal of cutting global warming emissions by 75% by 2050.**
- **Start Implementation Now**
 - Address ALL relevant pollutants
 - Focus on “two-fers” for conventional pollutants and GHGs
- **Roadmap Part II -- Implementation Strategies**
 - Descriptions of 17 Measures
 - Reduction Estimates
 - Implementation Next Steps



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Part II: Strategies

I. - New Private Sector and Gov't Institutions

Measures	Potential Reductions (MMTC/yr)	% of Target
I-1 GHG Trading	n/e	n/e
I-2 Public GHG Purchase Program	2.4 - 4.5	18-34%
I-3 Comprehensive Clean Air Program	0.9 – 1.5	7-11%
I-4 Hydrogen Infrastructure Development	7.8 – 13.2	60-100%
I-5 Strategic Procurement Plan	n/e	n/e

I-1 GHG Credit Trading

- Goal 1: build experience and confidence in accounting and trading systems
- Goal 2: establish financial incentive system for emission reductions



I-2 Public GHG Purchase

- 0.5-4.5 MMTC
- Cost - \$10 – 50 million/year
- Pure incentive system for reductions
- Most cost-effective reductions get funded first
- Potential funding sources:
 - fuel tax
 - \$10 million = 2% incremental on existing gas and diesel taxes
 - coal, residual oil appear not to be taxed currently

GHG Reduction Estimates at Different Funding Levels
(millions of metric tons of carbon equivalent)

Funding Level	Low Reductions	High Reductions
\$1,000,000	0.05	0.09
\$10,000,000	0.50	0.90
\$50,000,000	2.40	4.50
\$100,000,000	4.80	9.00

I-3 Comprehensive Clean Air Initiative

- Announce a sweeping “clean air” campaign for Connecticut
- Integrate NAAQS, health, and climate objectives in cohesive policy framework
- Recognize global warming impacts of ALL emissions, including CH₄, VOCs, NO_x, black carbon (in PM), CO

I-4 Hydrogen: Build Infrastructure and Technology Development

- 7.8 – 13.2 MMTC annual reduction potential
- Hydrogen Economy Research and Development Program
 - Demo Projects
 - safety
 - centralized storage and fueling system
 - propulsion systems
 - advanced fossil H₂ production for mobility use w/ CCS potential
 - Implement safety codes



II. Modernize our Electricity and Energy Systems

Measures	Potential Reductions (MMTC/yr)	% of Target
E-1 – Retire Coal and Oil Plants by 2015	2.3	17%
E-2 -- Maintain and Expand Energy Efficiency	2 – 3.9	15-30%
E-3 -- Reform Ratemaking and Regulation	n/e	n/e
E-4 -- Renewable Power	1.4	10%

E-1 Coal & Oil Power Plants

- 1.35-2.3 MMTC annual reduction = 83% of 2050 target
 - CT CO2 emission targets CANNOT BE MET if these plants are still running as currently fueled long after 2020
- 15-20 year phase-out period
- Study cost-benefits of options
- Work with owners and towns to develop appropriate plan



E-2 Energy Efficiency

- 2.6 – 4.5 MMTC/yr reductions
- Maintain and expand Conservation and Load Mgt Fund
- Adopt and enforce efficiency standards for appliances and electrical equipment
- Adopt and enforce building energy codes
- Establish conservation funds for oil and natural gas
- Nationally by 2012
 - Codes and Stds cut 42 to 67 MMTC/ yr ; save \$10.8 - 21.0 billion/yr.
 - CHP cuts 14 MMTC per year and saves about \$150 million per year



Potential Electrical Energy Efficiency Carbon Emission Savings (millions of metric tons of carbon equivalent)

Actions	2050 Savings	% of Target Reductions
Maintain ECMB Programs	2.0	12–16%
CHP	0.6	4–5%
Comprehensive Programs	2.6–4.6	15–36%

E-3 Reform Ratemaking and Regulation

- **Goal: Remove ratemaking and regulatory barriers to market penetration of energy efficiency and clean DG**
- **Establish collaborative to develop new policies for:**
 - **T&D rates (to reflect actual costs for delivery of electricity and natural gas)**
 - **TOU rates**
 - **Back-up tariffs**
 - **Interconnection standards for DG, and**
 - **Rewarding utilities for helping consumers reduce consumption**

E-4 Increase Supply of Renewable Energy

- 1.4 MMTC/year by between 2025-2050
- R&D and commercialization of new technologies
- State procurement policies (20% by 2010)
- Improved RPS



III. Transition to New Travel and Freight Systems

Measures	Potential Reductions (MMTC/yr)	% of Target
M-1 Reduce Diesel Emissions by 90%	0.9 – 1.5	7-11%
M-2 Regulate GHG Emissions	n/e	n/e
M-3 Improve Light Vehicle Efficiency	0.9	7%
M-4 Reduce VMT (vehicle miles traveled)	0.5	4%

M-1 Diesel Emissions

- 0.9 – 1.5 MMTC annual reduction
- Goal: reduce emissions of black carbon in PM 80-90% by 2015
- State regulations and programs for in-use engines and anti-idling
 - Retrofit emission controls
 - low sulfur fuel
- **Black Carbon is fast-acting on climate.**
 - 90% cuts in BC from 2004-2009 would contribute as much cooling by the year 2100 as an annual 8-13% cut in CO2 for the next 100 years.



M-2&3 Light Vehicle Emissions

- 0.68 MMTC by 2020

- 17% reduction
 - very conservative

- 0.9 MMTC by 2050

- Cal. GHG Tailpipe Regulation

OR

- State procurement policy

- best achievable efficiency by class
- Golden Carrot procurement w/ NE states and other fleets, “cost-effective” test

State	Total # Fleets 10+ Vehicles	Fleet Autos (% total autos)	Fleet Light Trucks (% total lt. trucks)
CT	2,252	62,000	82,000
ME	937	19,000	32,000
MA	3,366	81,000	123,000
NH	864	18,000	29,000
RI	557	14,000	18,000
VT	454	8,500	17,000
NY	6,824	229,000	271,000
TOTAL	15,254	432,000 (2.7%)	573,000 (11%)

M-4 Reduce VMT

- 0.5 MMTC/year
- Activities:
 - public transportation
 - ridesharing/HOV incentives
 - road user fees
 - High-efficiency through-state transport systems for goods and passengers



IV. Reduce Methane Emissions

Measures	Potential Reductions (MMTC/yr)	% of Target
ME-1 Facilitate Methane Purchase/Trading	n/e	n/e
ME-2 Reduce Landfill Methane Emissions	0.2	2%
ME-3 Reduce Natural Gas Pipe Leakage	0.00006	*

ME 1-3 Methane Measures

- **Buy/Trade Reductions**
 - Develop a regional system (e.g., cap and trade, or gov't funded purchase) that would incentivize methane reductions;
- **Reduce Landfill Emissions**
 - Very near-term potential for reductions
 - Incentivize increased CH₄ capture efficacy
 - Promote increase conversion to energy
- **Reduce pipeline leakage**
 - Initiate statewide campaign to enroll CT gas utilities and other large users into EPA Gas Star Program

V. Reconsider Forest Cutting and Land Clearing Practices

Measures	Potential Reductions (MMTC/yr)	% of Target
S - 1 Expand Terrestrial Carbon Sinks	0.7	5%

■ Activities:

- reforestation
- conservation of carbon on de-forested sites
- modified forest management practices
 - increase growth rate of trees
 - harvest dead trees/biomass
- conserve/expand carbon content in agr. soil

■ Regional and sectoral politics

Further Information and Copies



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