

Climate Change Roadmap for Connecticut:

Economic and Environmental Opportunities

by

Environment Northeast

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About the Roadmap

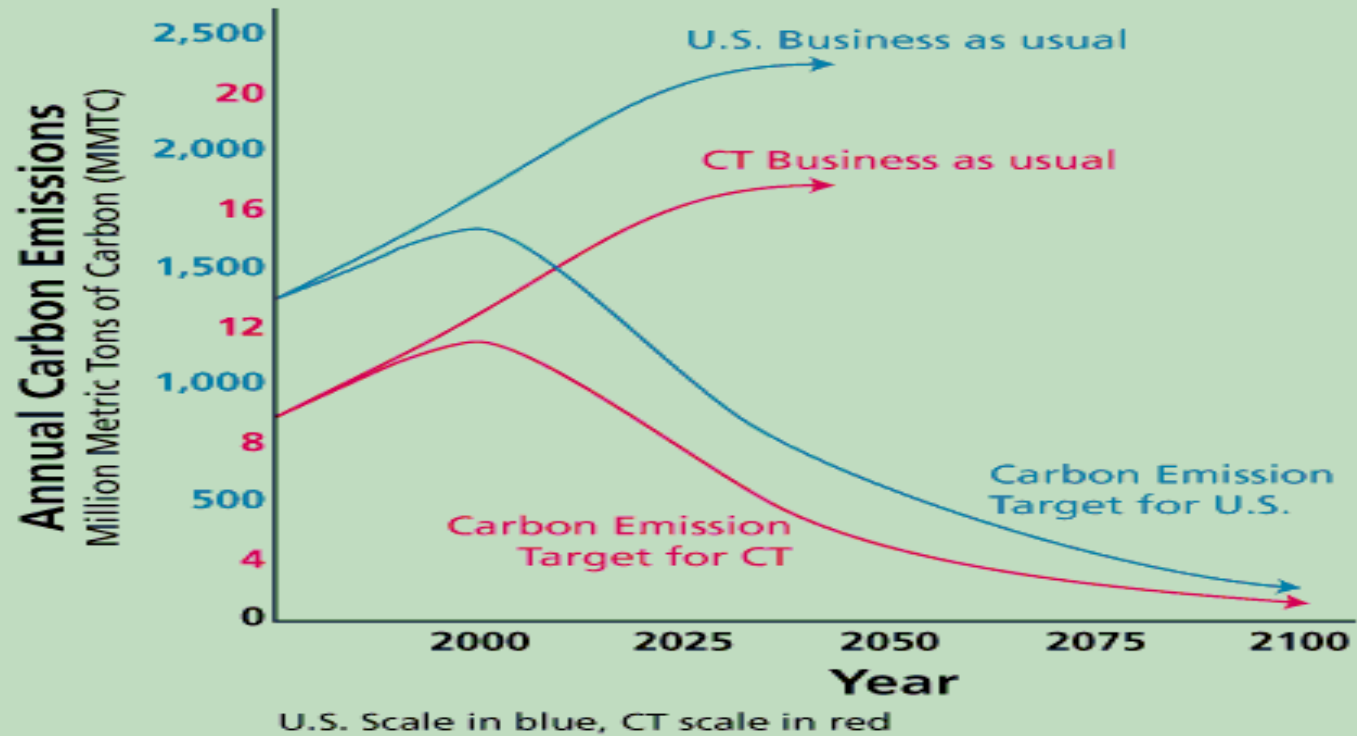
- Part I – Overview
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 - New Private Sector and Gov’t Institutions
 - Modernize Electricity and Energy Systems
 - Transition to New Travel and Freight Systems
 - Reduce Methane Emissions
 - Reconsider Forest Cutting and Land Clearing Practices

Targets – 75% by 2050

- Scientific Community: the most responsible policy for the U.S. is to limit future global temperature increases to the lowest possible level
- An increase of 1-2° C (1.8-3.6° F) is about the lowest level we can achieve over the next century (IPCC)
- The most aggressive policy scenario for meeting these levels assumes that atmospheric concentrations of CO₂ can be kept 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.

75% Reductions by 2050

**TABLE 1.
EMISSION TRAJECTORIES**



Trends and Targets for Connecticut

Year	MMTC/Yr
2000 Baseline (est.)	11-12
2050 Target (75% reduction)	3
2050 Business as Usual	15.7 – 19.9
Amount of Cuts Needed by 2050	12.7 – 16.9

Top Ten Priorities

- Hydrogen Infrastructure
- Diesel Emissions
- Coal and Oil Plants
- Energy Efficiency
- GHG Credit Trading
- Public GHG Purchase
- Light Vehicle Emissions
- Renewable Power
- Terrestrial Carbon Sinks
- VMT

1. 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



2. 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 long after 2020
- 15-20 year phase-in period
- Study cost-benefits of competing alternatives

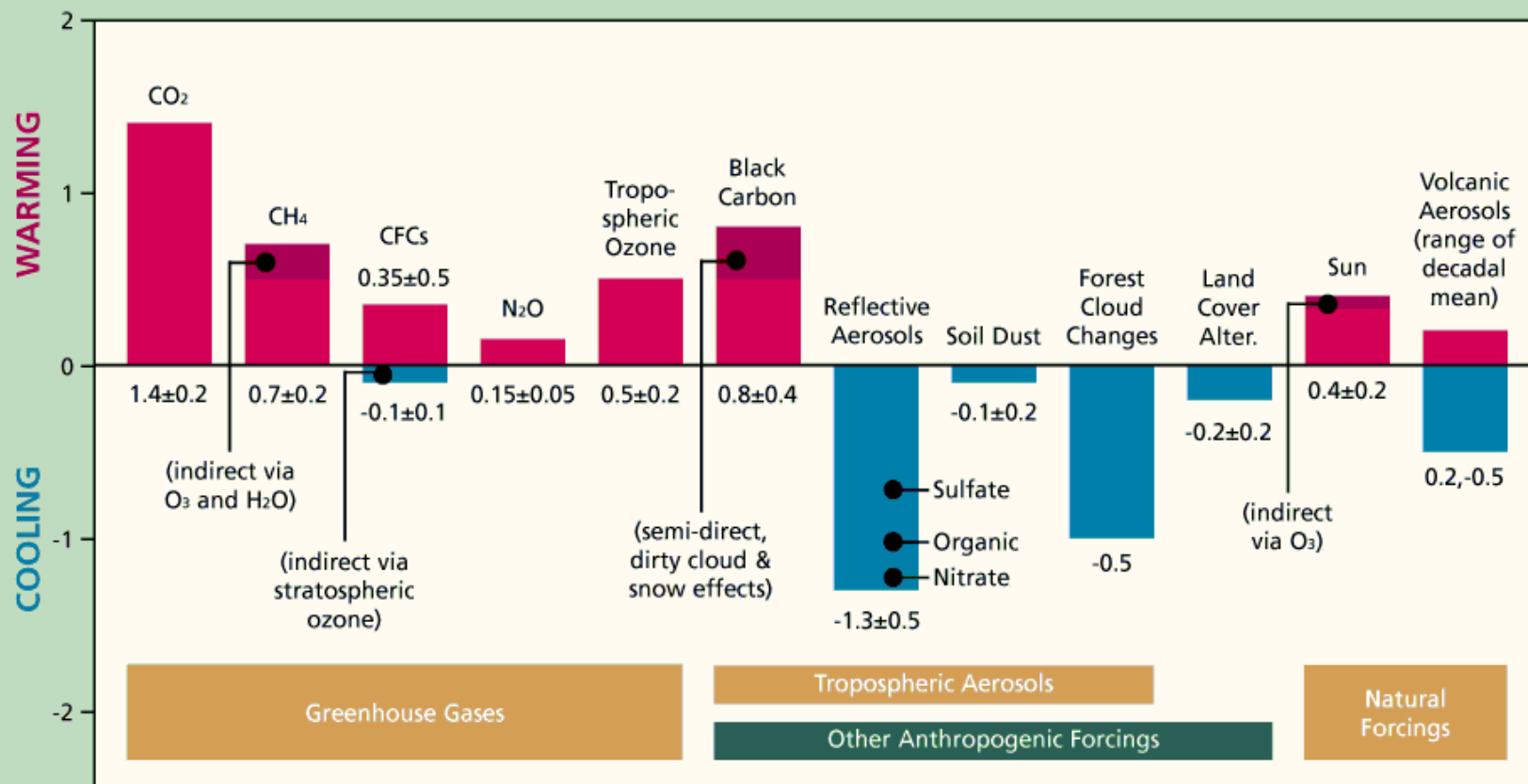


3. Diesel Emissions

- **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.



TABLE 5. CLIMATE FORCINGS (W/M²) 1850-2000



Source: James E. Hansen and Makiko Sato (2001)

4. Energy Efficiency

- 2.6 – 4.5 MMTC annual reduction
- Maintain and expand Conservation and Load Management 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



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%

5. GHG Credit Trading

- Goal 1: build experience and confidence in trading systems
- Goal 2: establish financial incentive system for emission reductions
- Starting Place – Chicago Climate Exchange
 - voluntary, monitored by stock exchange
 - most “rules of the game” already established
 - good publicity, outreach
- Potential participants
 - State and municipal gov’t (landfills, waste treatment facilities, public lands)
 - Universities
 - Large Industrial Businesses
 - Forest managers



6. 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

7. Light Vehicle Emissions

- 0.68 MMTC by 2020
 - 17% reduction assumes current technology and extensive market penetration
- 0.9 MMTC by 2050
- State procurement policy
 - best achievable efficiency by class
 - Golden Carrot procurement w/ NE states and other fleets

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%)

8. Increase Supply of Renewable Energy

- 1.4 MMTC/year by between 2025-2050
- R&D and commercialization of new technologies
- State procurement policies
- Improved RPS
- Better market rules



9. Carbon Sinks: Forests and Land Use

- 0.7 MMTC/year increased storage
 - current sequestration about 0.9 MMTC/year
 - current land conversion releasing about 0.44 MMTC/year
 - could be much larger regionally
- **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

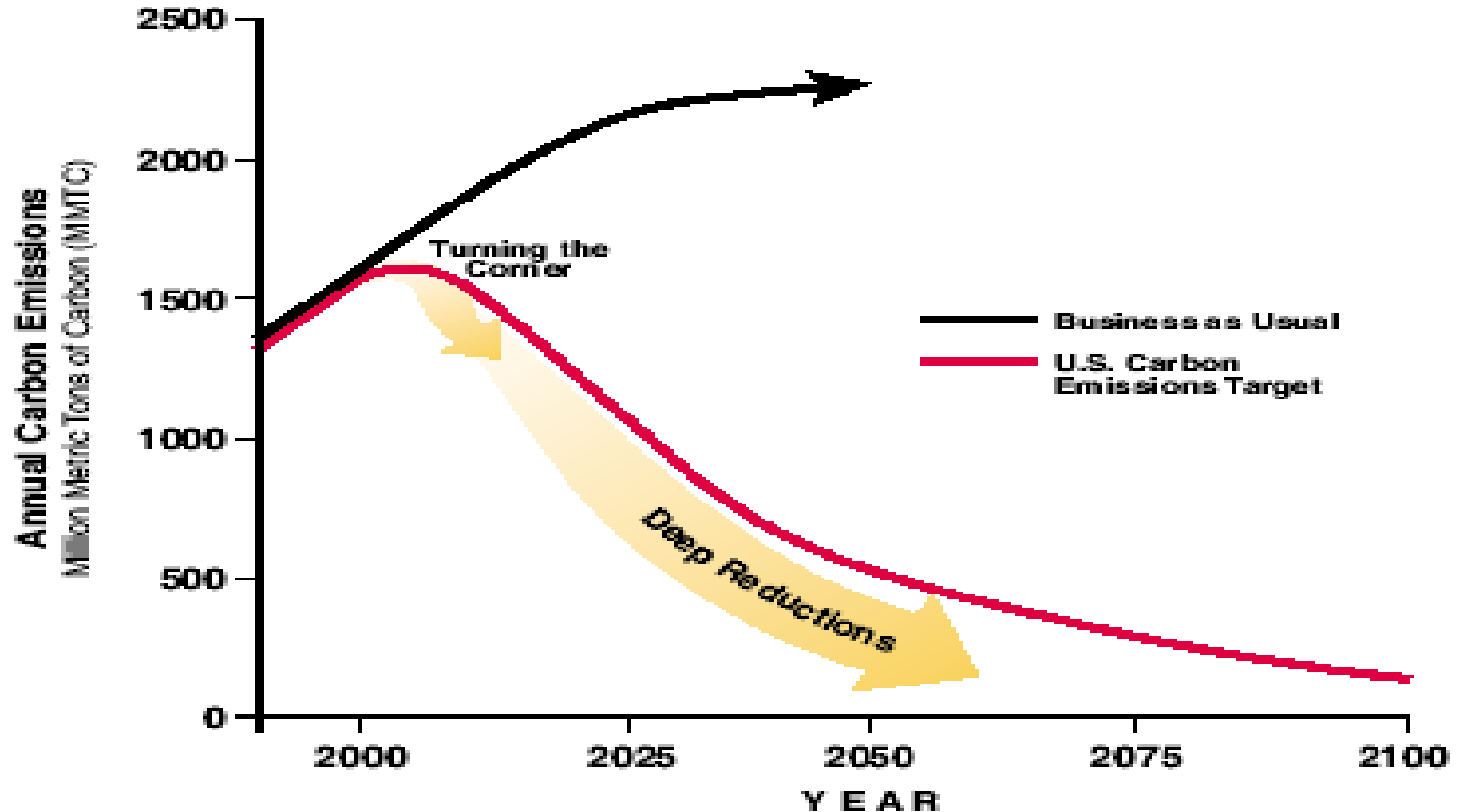
10. VMT

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



The Road to 2050

Turning the Corner on U.S. Carbon Emissions: Impact of the Plan of Action



Summary of Reduction Potential for 5 Strategies

- **Some of these measures overlap, and thus are mutually exclusive**
- **5 Strategy areas**
 - **Modernize our Electricity and Energy Systems**
 - **Transition to New Travel and Freight Systems**
 - **Reduce Methane Emissions**
 - **Reconsider Forest Cutting and Land Clearing Practices**
 - **Cross-Cutting Measures -- New Private Sector and Gov't Institutions**

1. 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%

2. 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%

3. 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	

4. Reconsider Forest Cutting and Land Clearing Practices

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

5. 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

The "Ask"

- **Build Consensus around 75% Target by 2050**
- **Start implementation now**
- **Educate and Listen to the Public and Decisionmakers**

Further Information and Copies

- Contact Environment Northeast
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