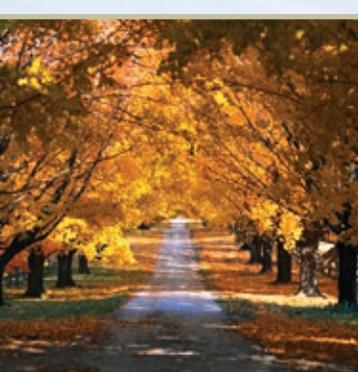


Global Warming in New Hampshire

OUR CLIMATE, ECONOMY, AND HEALTH



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Brilliant fall foliage stretches from the Merrimack Valley to the Great North Woods. Deep winter snows blanket the Presidential Range. Hikers and skiers flock to the White Mountains, while boating and fishing provide family recreation in the Lakes Region. The people of New Hampshire derive their sense of place

from the Granite State's unique landscapes and the rhythms of its climate.

However, changes in New Hampshire's climate brought about by global warming are beginning to affect New Hampshire's way of life—from tourism to economic opportunity and health care costs. To help ensure our children inherit a state that supports a high quality of life and rich opportunities, it is important to understand the causes and direction of climate trends, as well as the practical and responsible steps New Hampshire can take in the next few years to help avoid many of the unfavorable consequences of global warming.

Global warming is already affecting New Hampshire's climate.

Climate Trends

In New England everyone jokes about the fickle weather. Although there is some natural variation in the weather every year, over longer time periods we see climate trends emerge. If you grew up in New Hampshire, you probably remember winters being longer and snowier. In the northeast United States, the average annual temperature has increased by 1.8°F over the last century. Even more striking, New England's average winter (December to February) temperature has increased 4.4°F over the last 30 years.

These temperature changes are affecting the region's plants, animals, and environment. For example, the average snow cover season has decreased by more than 15 days compared with 30 years ago, and the New Hampshire state flower, the purple lilac, now blooms four days earlier.

Much of this warming is caused by emissions, primarily carbon dioxide (CO₂), that blanket the earth and trap heat. The main source of excess CO₂ is the burning of coal, oil, and natural gas to generate electricity

Warming Trend Consequences

	Indicator	Trends	Years Observed
	Days with Snow on the Ground*	16 fewer days	31
	Snowfall†	Decreased 10–60 inches	30
	River Ice Breakup*	11 days earlier	64
	Lake Winnepesaukee Ice Breakup†	8 days earlier	204
	Lilac Bloom Date*	4 days earlier	36
	Precipitation*	8% increase	100
	Growing Season Length*	8 days longer	101

*New England †New Hampshire

and drive our cars. If we continue to generate large quantities of CO₂ and other heat-trapping gases, we can expect an average temperature increase for the northeastern United States of between five and nine degrees Fahrenheit by 2100. To place these projections in perspective, the average global temperature has increased 1.1°F over the last century. Fortunately there are sensible and affordable solutions available today to help us reduce our heat-trapping emissions and preserve our quality of life.

What's at Stake

Ski Industry

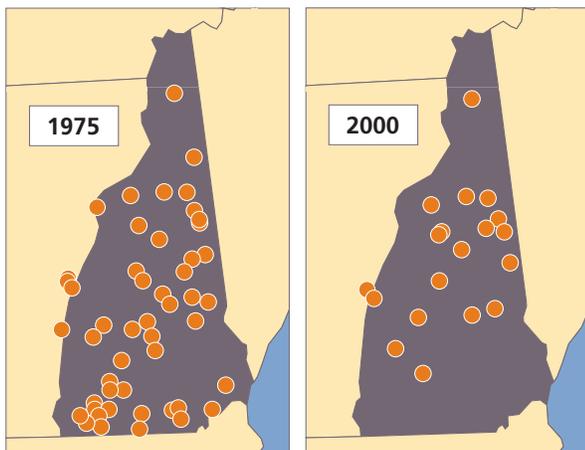


Since 1930 the ski industry has been an important part of New Hampshire's economy. Skiing provides critical jobs in small towns and pumps more than \$650 million into the New Hampshire economy. The ski industry is already

suffering from shorter ski seasons and increased operating costs attributable to the warming of the past few decades. Since 1970 the number of New Hampshire ski areas dropped steeply, with many southern and lower-elevation resorts closest to population centers going out of business.

In order to survive today, New Hampshire ski areas must produce artificial snow on more than 90 percent of their trails. Snowmaking requires freezing temperatures, access to large local water sources, and intensive infrastructure investments. Rising temperatures mean increased snowmaking, leading to higher operating costs.

New Hampshire Downhill Ski Areas



Hamilton et al., 2003

The effects of global warming are already being felt, as many ski areas (indicated by circles) have gone out of business.

Tourism associated with cross-country skiing, snowshoeing, and snowmobiling will see the earliest effects from global warming because these activities depend on natural snowfall and do not have the option of artificial snowmaking.

Forests



Because forests cover most of New Hampshire, projected changes in forest species will change the character of the state. Sugar maples (*Acer saccharum*), for example, occur exclusively in the northeastern United States and

southeastern Canada. Maple sugar production depends on prolonged cold temperatures with freezing nights and warm daytime temperatures to create the optimal sugar content and sap production. With warming under way, the maple sugar industry long associated with New England has already felt some impact. Over the last two decades, the center of maple sugar production has shifted from the United States into Canada.

Global climate models project a substantial northward shift in maple tree distribution. Such shifts in forest vegetation could cause lower elevations in New Hampshire to lose their brilliant fall foliage and resemble instead the brown autumns currently experienced in southern Pennsylvania.

Health Trends Linked to Climate



Today summer storms tracking across Canada clear away pollution in the northeast United States. A recent study looking specifically at global warming and its impact on air quality found that storm

frequency is projected to decrease in the region, resulting in air stagnation over much of New England. If future emissions of carbon monoxide and black carbon remain at today's levels, the study showed air stagnation will result in hazardous smog episodes that will increase in both severity and duration by mid-century.

Studies for Boston and Portland already show increases in emergency room visits for respiratory and asthma incidents that correlate with bad air pollution days (specifically, ground-level ozone events). In addition to asthma and respiratory ailments, poor air quality is also harmful to New Hampshire residents with cardiovascular disease.

Currently poor air quality in New Hampshire results in the premature death of more than 100 residents each year, costing the state one billion dollars annually. If global warming increases the frequency and/or severity of dangerous



Asthma, other respiratory ailments, and cardiovascular incidents are linked with bad air pollution days, which are likely to increase as temperatures rise.

air pollution, then air pollution-related health problems will likely increase, compromising the health of many New Hampshire citizens and increasing the state's public health care expenses.

Choices for New Hampshire

There is a great deal that state, regional, and national policy makers can do today to address the root causes of global warming and reduce its effect on New Hampshire's economy, public health, and environment.

A "Model" Region



New Hampshire has already taken the lead by joining other northeastern states in the Regional Greenhouse Gas Initiative (RGGI)—a cooperative effort to establish a program that will reduce CO₂ emissions from power plants

much the same way we successfully and quickly reduced acid rain pollution in the 1990s. This flexible "cap and trade" program harnesses the efficiency of the marketplace to achieve pollution reductions in the most cost-effective manner. A successful program for the Northeast not only benefits the region but can serve as a national model for federal policy.

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Renewable Energy



Renewable energy resources including wind, solar, and bioenergy are now affordable alternatives to the burning of fossil fuels. Policies such as a federal renewable electricity standard, which requires utilities to generate a portion of their electricity from renewable sources, would create jobs and other in-state economic development while reducing air pollution and global warming emissions.

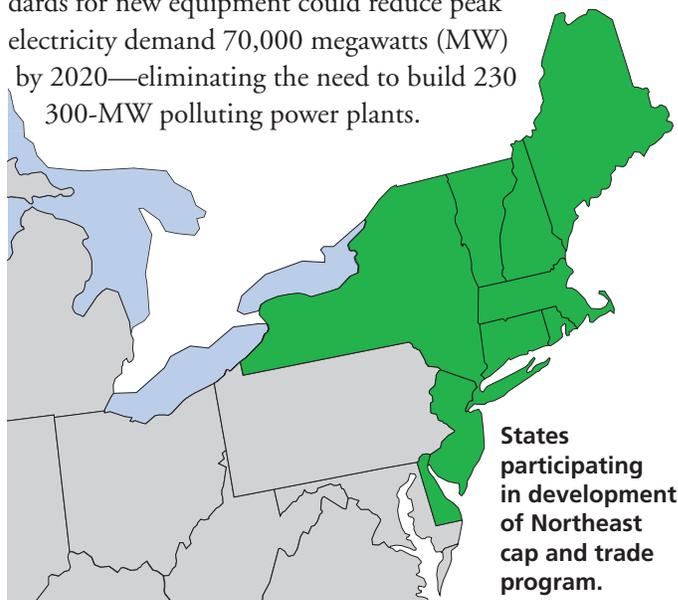
For example, a 10 percent standard—similar to the standard that has passed the U.S. Senate three times—would generate an estimated \$12 million in new income for rural landowners and \$42 million in new property tax revenue. In addition, New Hampshire consumers would save \$70 million on their electricity and natural gas bills by 2020 under a 10 percent standard.

Energy Efficiency



The old "waste not, want not" adage has guided New Englanders for years. Nationally, energy efficiency improvements have helped us keep our per capita energy use almost identical to that of 1973, even though our economic output increased 74 percent in the intervening 30-plus years. These improvements saved consumers at least \$430 billion.

But there remains enormous potential for additional cost-effective energy savings. The U.S. Department of Energy (DOE) estimates that energy efficiency solutions are available now to cut national energy use 10 percent by 2010. For example, simply extending tax incentives for energy-efficient equipment and buildings and setting new efficiency standards for new equipment could reduce peak electricity demand 70,000 megawatts (MW) by 2020—eliminating the need to build 230 300-MW polluting power plants.



States participating in development of Northeast cap and trade program.

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