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# Overview: Renewable energy benefits



**Alan Noguee**  
**Energy Program Director**  
**Union of Concerned Scientists**  
**Renewable Portfolio Standard Workshop**  
**New York Public Service Commission**  
**Albany, NY**  
**April 8, 2003**





## *The barriers are real...*

- \* **Market barriers - renewables and energy efficiency**
  - lack of information, capital, split incentives, transaction costs
- \* **Emerging technologies**
  - competing against heavily subsidized fossil and nuclear generation
- \* **Market inertia: switching likely to grow slowly**
  - 15 years for 50% of telecom customers to switch
- \* **Market rules still very uncertain**
- \* **Market failures - *do not value public goods***
  - environment, diversity, sustainability, security, employment



# *The benefits are shared...*

## **Regional and national benefits**

### **\* Diversity**

- Reduce fuel price volatility and long-term escalation risk
- Competition from renewables reduces fossil fuel prices

### **\* Environment**

- Preserve resources for future generations
- Reduce emissions, drilling and mining, transportation, waste
- Reduce the cost of emission caps

### **\* Employment**

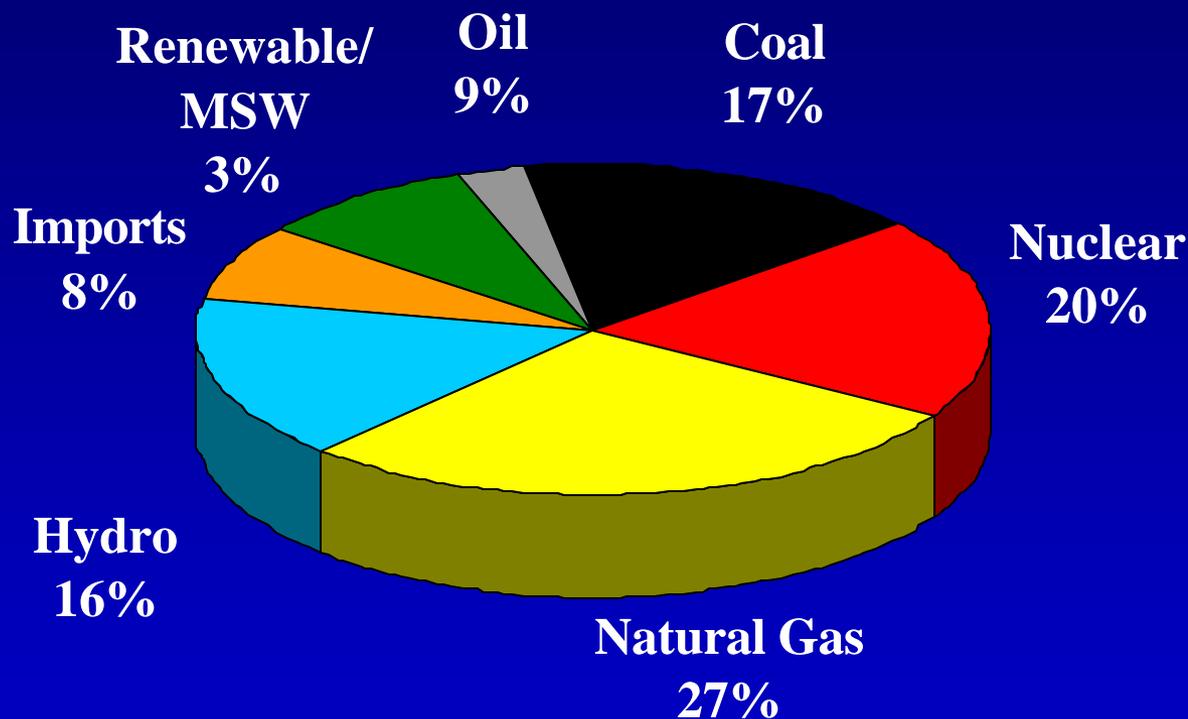
- New jobs, especially in rural areas
- Create export opportunities: \$20 billion international market

### **\* Security**

- Reduce dependence on imported fuels
- Reduce vulnerability of energy system



# NY Electricity Mix (2001)



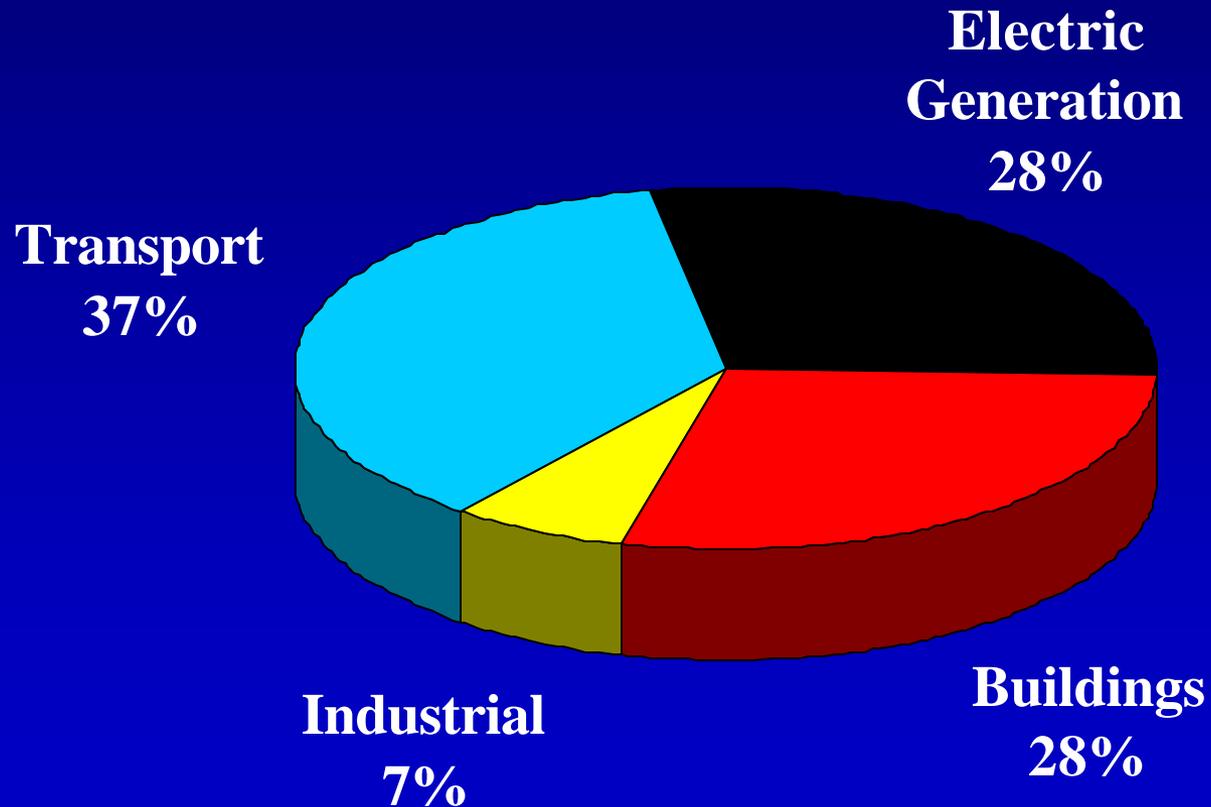
\* All of the coal and nuclear fuel, and most of the oil and natural gas imported into the state

\* Dependency on natural gas expected to increase over next two decades



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# CO<sub>2</sub> Emissions in NY (2001)

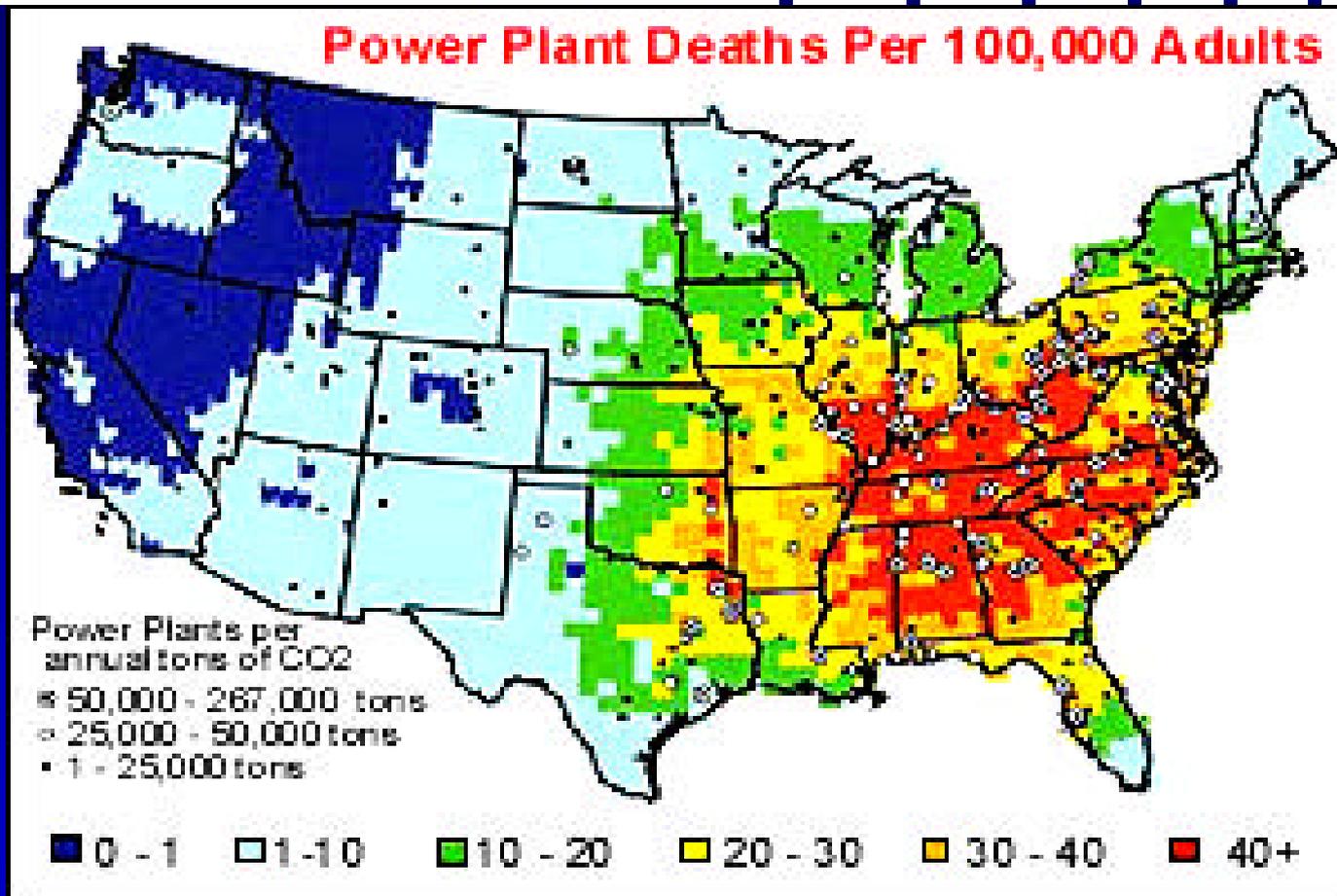


Source: NYSERDA, 2003.



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## *Environmental impacts* **Air pollution harms human health**



\* ~30,000 early U.S. deaths each year from power plant particulates

Smog impacts (all sources):

- \* 6.2 million asthma attacks
- \* 117,300 ER visits
- \* 58,600 hospital admissions

Source: Clean Air Task Force



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*Environmental impacts*

# Mountaintop removal coal mining

- \* 15-25% of southern WV mountain tops removed
- \* 300,000 acres of forests
- \* 1,000 miles of streams buried



Source: Citizens Coal Council

<http://www.citizenscoalcouncil.org/mtr.htm>



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# Coal waste spill Big Sandy River, Kentucky



Normal stream width



- ◆ 250 million gallon spill
- ◆ 75 miles of streams contaminated
- ◆ Arsenic, mercury, lead, copper, chromium

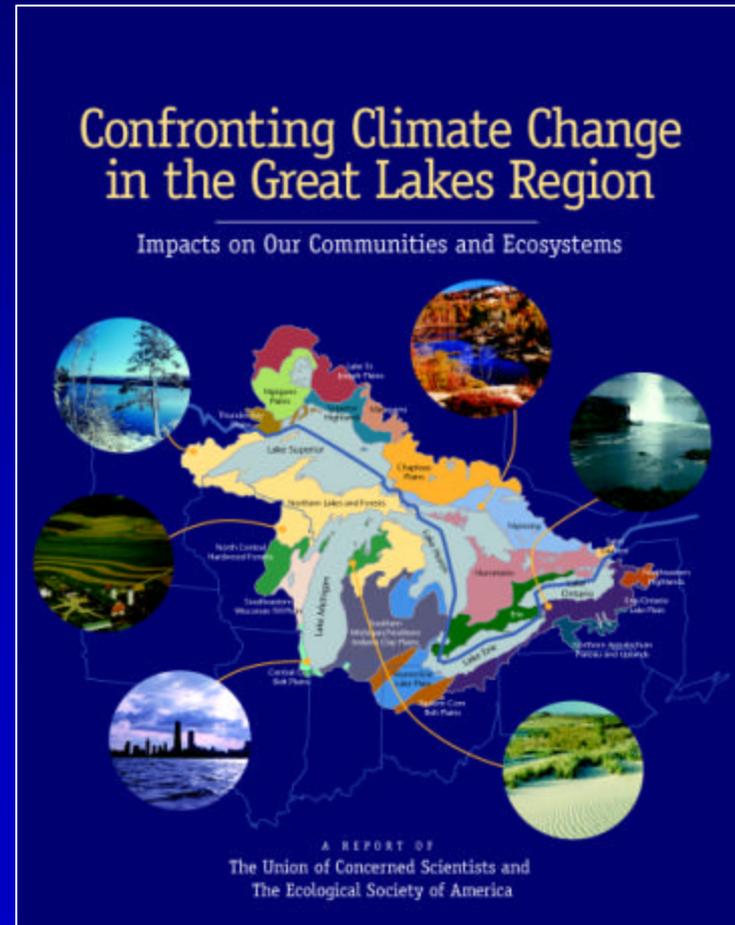
Source: Southern Alliance for Clean Energy



# Climate Change in New York

## New UCS Report:

- ✦ **Already seeing signs of climate change throughout Great Lakes region**
- ✦ **Climate projections:**
  - 7-14° rise over next 100 years  
~ change from last ice age
  - Increased precipitation in winter, decrease in summer
  - More extreme weather events
  - Decline in ice cover on Great Lakes and inland lakes





# Potential Climate Change Impacts in NY

## \* Water supply and pollution

- Decreased lake and groundwater levels
- Reduced hydropower capacity – 15% by 2050

## \* Human Health

- Heat and air pollution - related illness & mortality
- Infectious diseases

## \* Property & Infrastructure

- Increased flooding

## \* Agriculture

- Longer growing season offset by weather extremes and higher ozone concentrations
- Decline in maple syrup production

## \* Recreation & Tourism

- Changes in fish populations
- Increased risk of dead zones
- Challenges to wetlands, loss of habitat

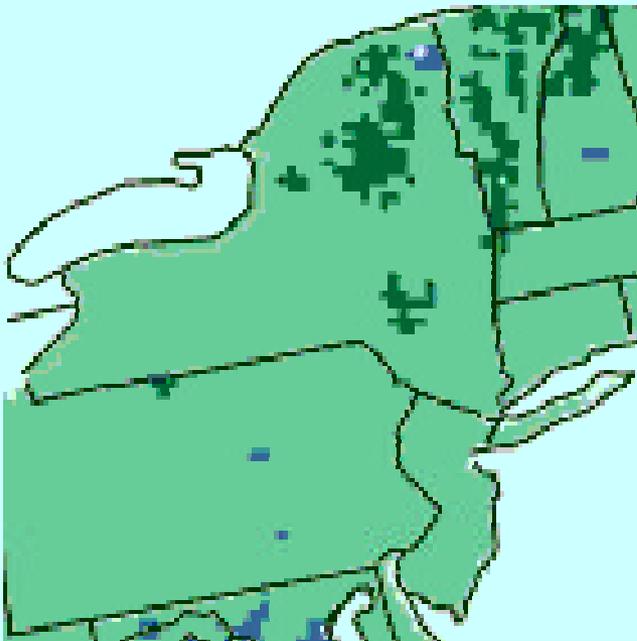




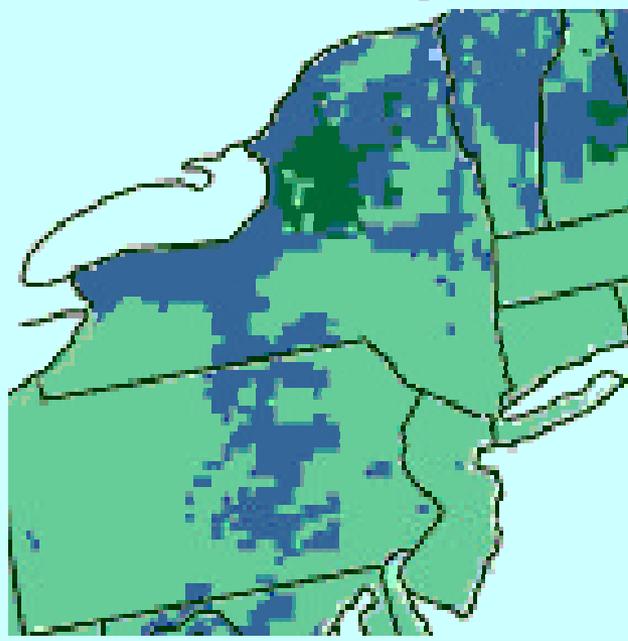
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# Northeast forest - significant change to savanna/woodland

Current



+10°F, +13% Precipitation



Conifer Forest

Savanna/Woodland

Broadleaf Forest

Grassland

\*Maple forests -  
> oaks, conifers

\*35-60% of  
hardwood  
forests replaced  
by mix of pines  
and hardwoods,  
grasslands and  
pasture

\*40-50%  
reduction in  
high-altitude  
spruce and fir  
forests -  
songbird habitat

Source: VEMAP Participants (1995); Neilson (1995).



# RPS Reduces Power Plant Emissions

## \* EIA national RPS

- 20% by 2020 RPS
  - » C emissions <18% (137 MMT) from BAU by 2020
  - » NO<sub>x</sub> emissions < 8%
- 10% by 2020
  - » C emissions <7% (56 MMT)

## \* UCS national RPS

- 20% by 2020
  - » C emissions <19% (147 MMT)
  - » NO<sub>x</sub> emissions <6%

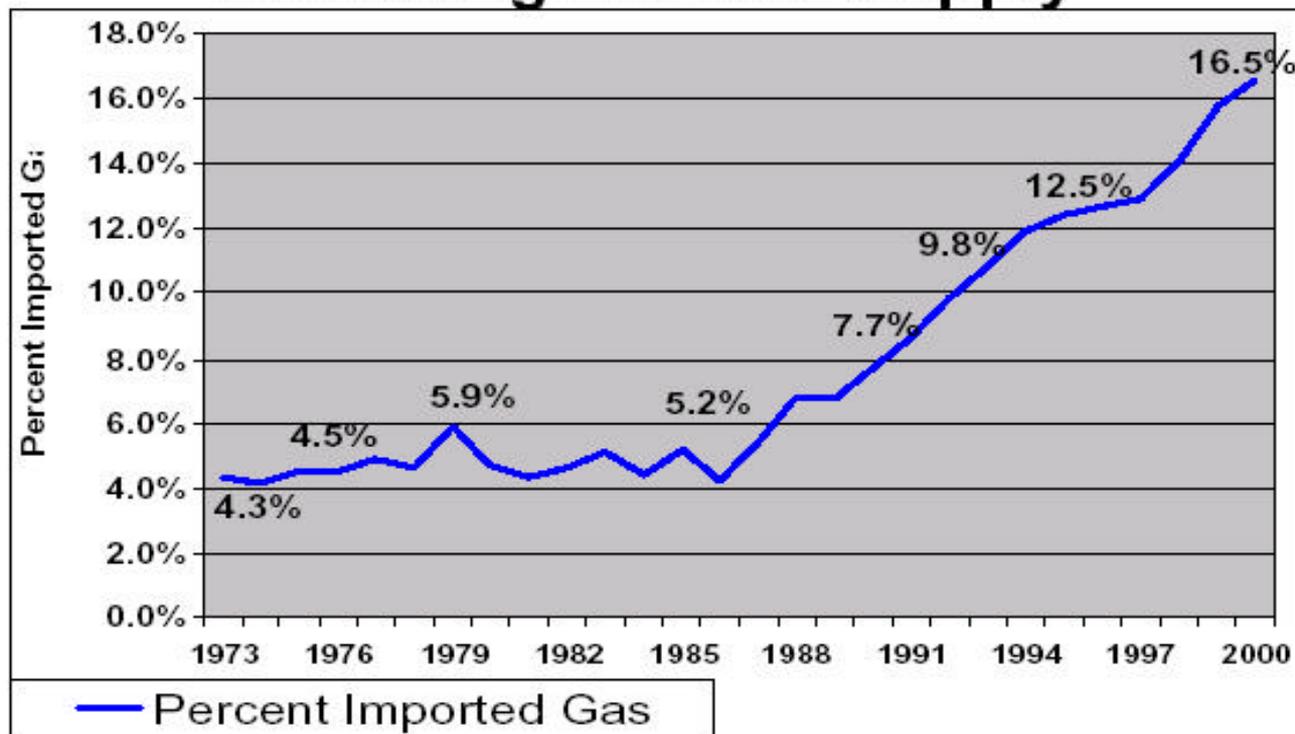
## \* UCS CA RPS

- 20% by 2010
  - » C emissions reduced 6.4 MMT from BAU



# Natural gas imports increasing

## Natural Gas Imports Percentage of U.S. Supply

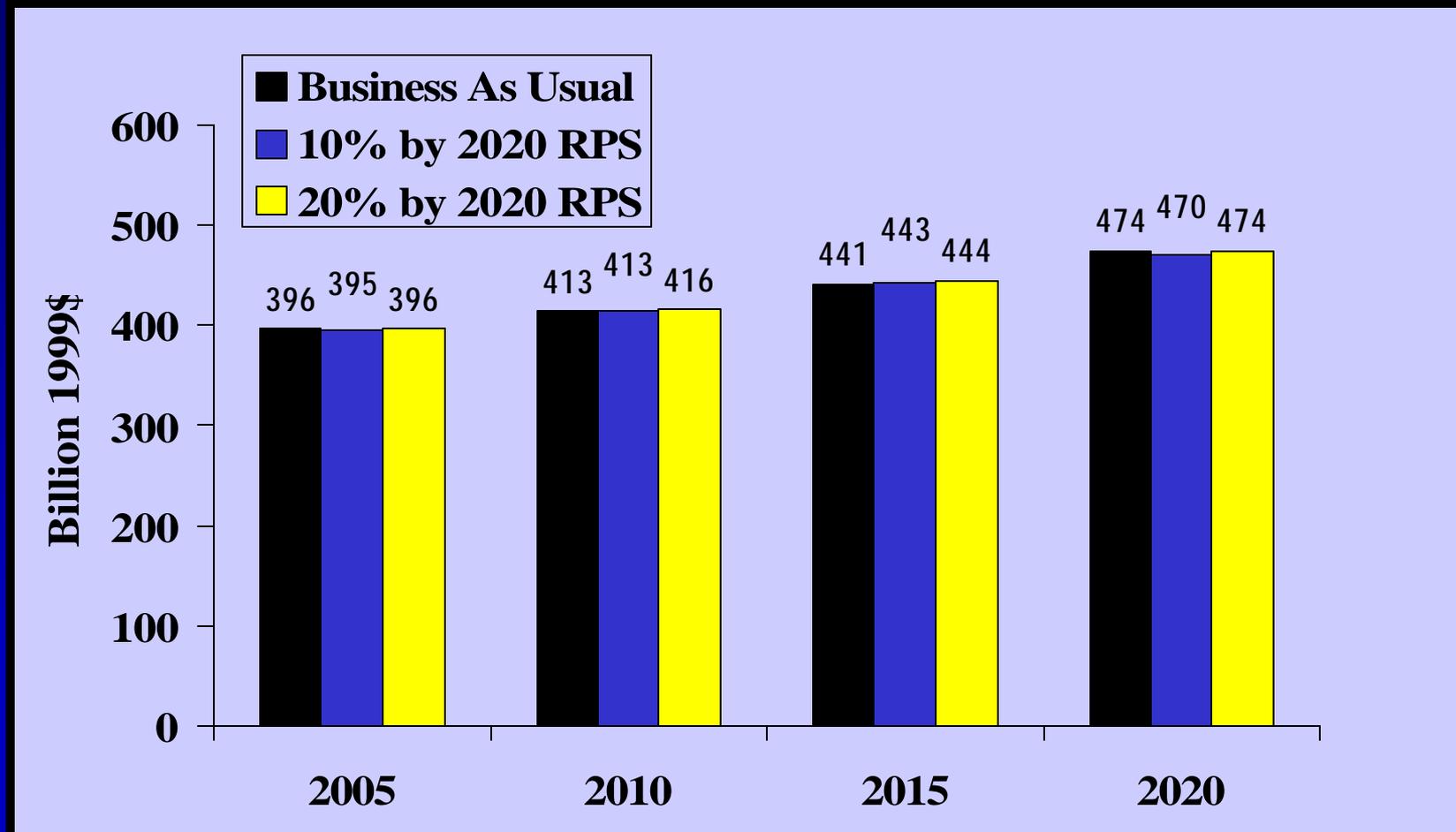




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# EIA analysis: Renewable energy standard costs almost nothing

Total Consumer Energy Bills (excluding transportation)



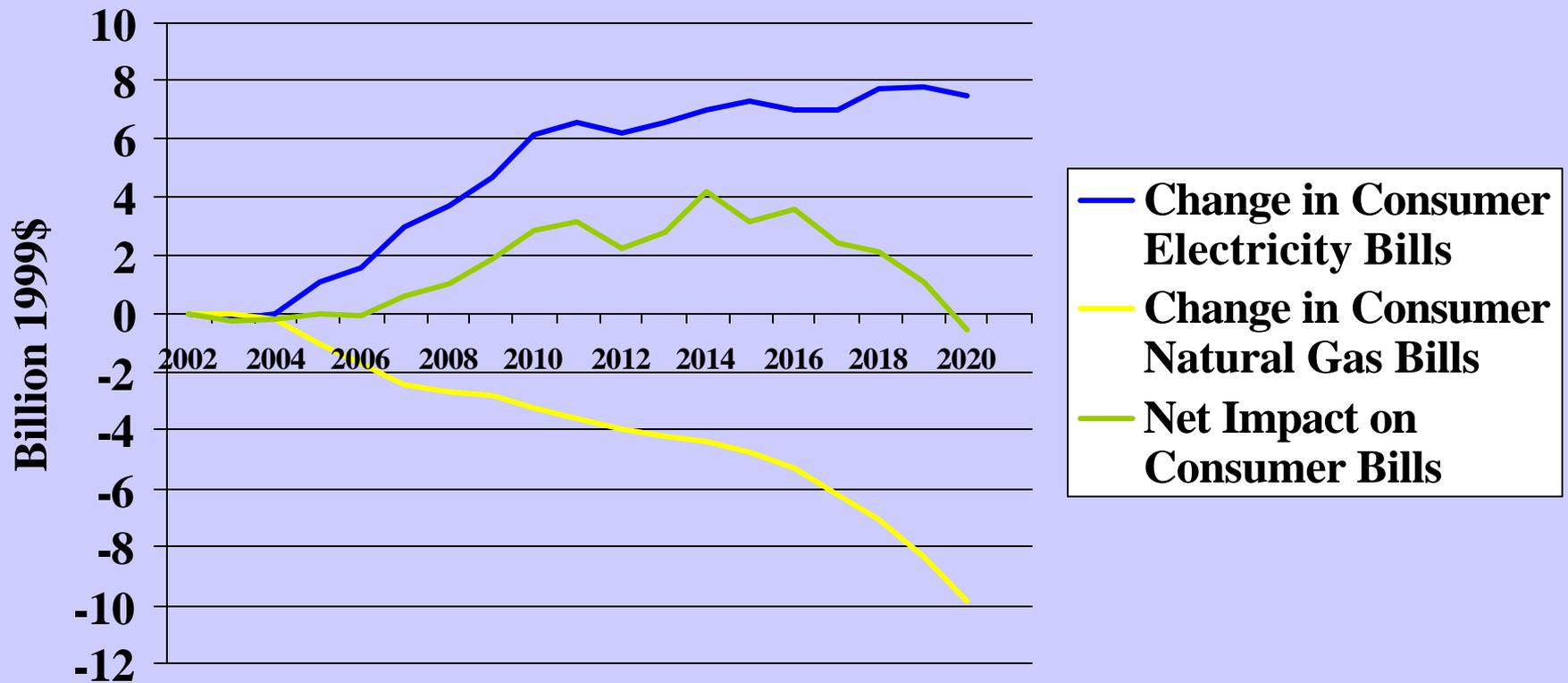
Source: EIA, *Strategies for Reducing Multiple Emissions...* July 2001, Table E3.



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# EIA: 20% renewable standard

## Lower gas prices offset higher electricity prices



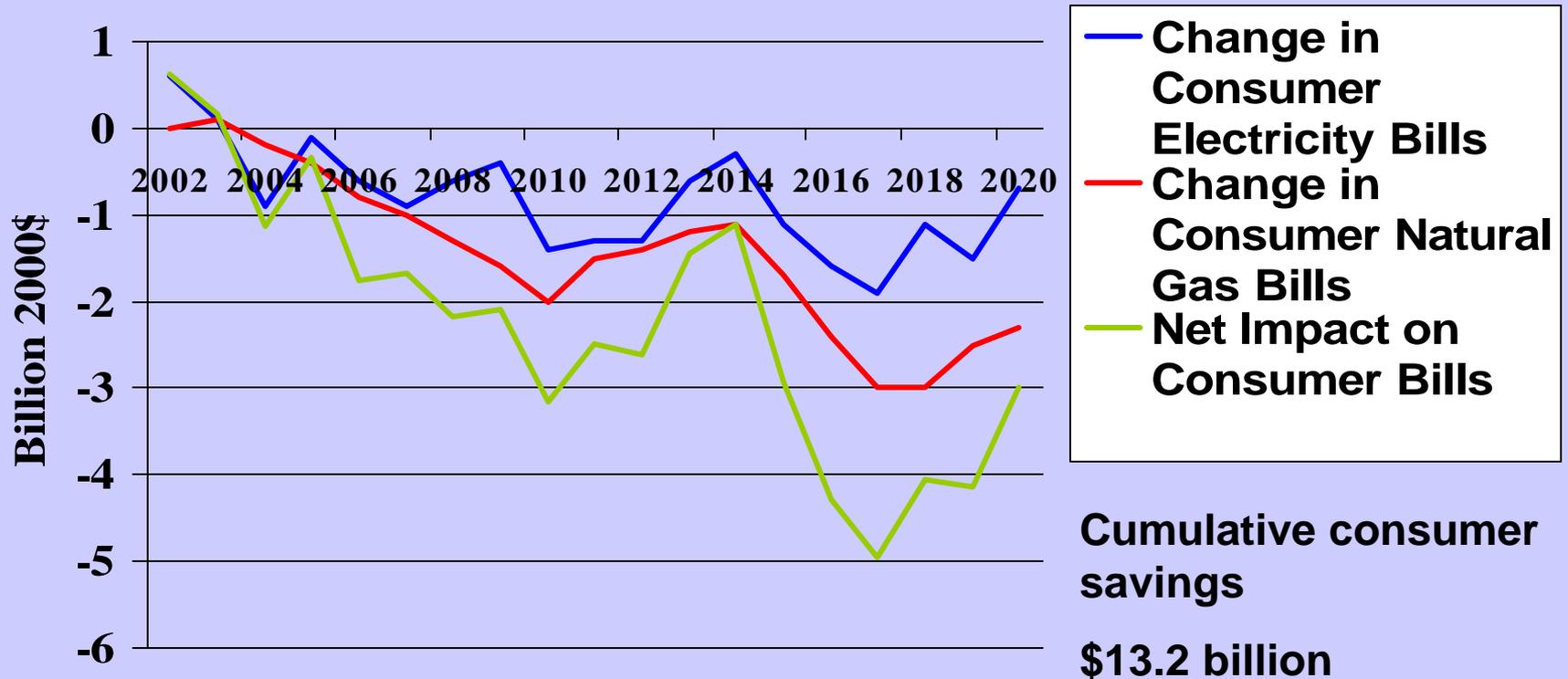
Source: EIA, *Analysis of Strategies for Reducing Multiple Emissions...*, July 2001, Tables E2 and E3, not including refinery energy consumption or transportation.



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# EIA: 10% renewable standard lowers electricity & gas bills

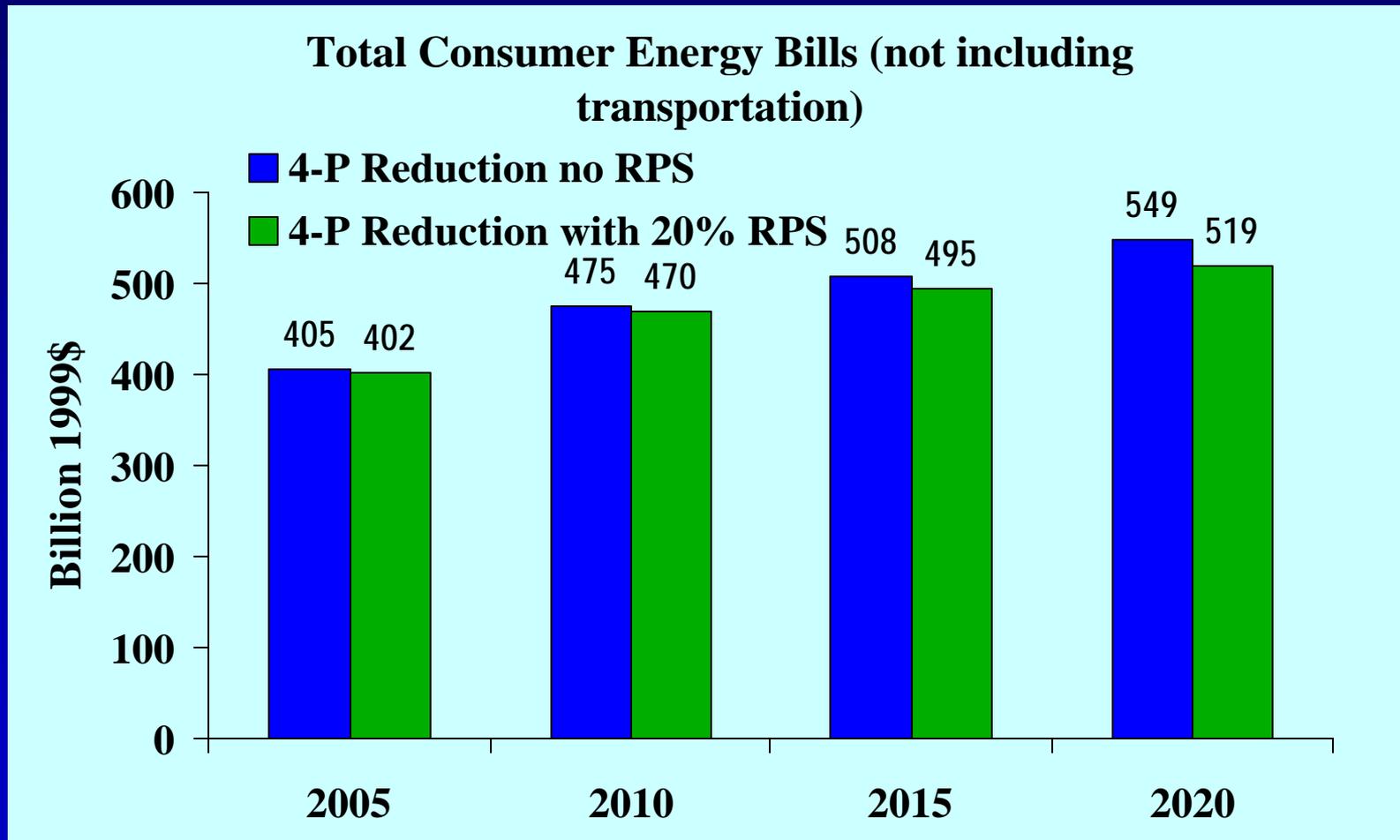
\* No sunset case



Source: Energy Information Administration, *Impacts of a 10% Renewable Portfolio Standard*, SR/OIAF/2002-03. February 2002. National Energy Modeling System Runs: Reference, aeo2002.d102001brps; RPS 10 No Sunset, 1766ns.d013002a.



# EIA: RPS Lowers Cost of 4-Pollutant Reductions



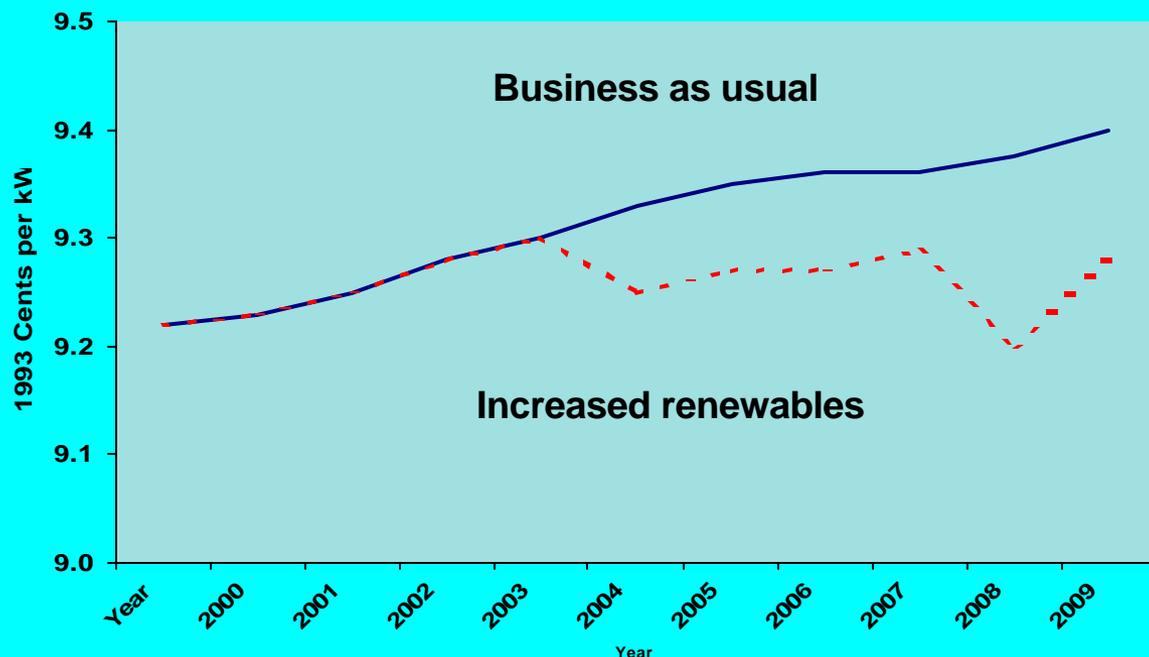
Source: EIA, *Strategies for Reducing Multiple Emissions from Electric Power Plants*, July 2001, Table H3.



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## *N.E. Governors' Conference study* **New renewables reduce electricity prices**

**Average Electricity Prices**



\* Renewables =  
50% of new  
generation

\* Increased  
competition  
and reduced  
demand for  
fossil fuels  
lowers  
electricity  
prices

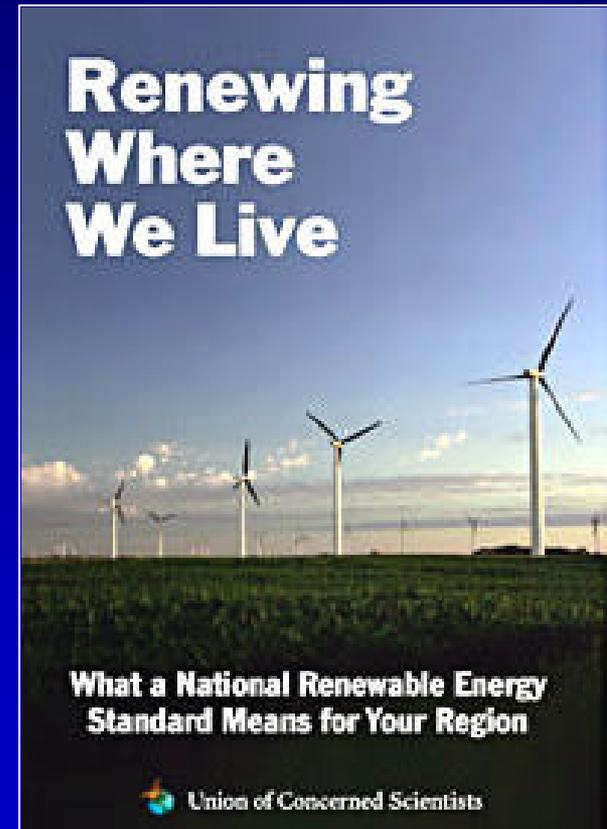
Source: Assessing New England's Energy Future, New England  
Governors' Conference, December 11, 1996, p. V-6



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# US Economic Benefits 20% by 2020

- \* Nearly \$80 billion in new capital investment
- \* Nearly \$5 billion in new property tax revenue for local communities
- \* \$1.2 billion in lease payments to farmers, ranchers, and rural landowners from wind power alone
- \* Save consumers \$4.5 billion between 2002 and 2020
- \* Hedge against higher gas prices

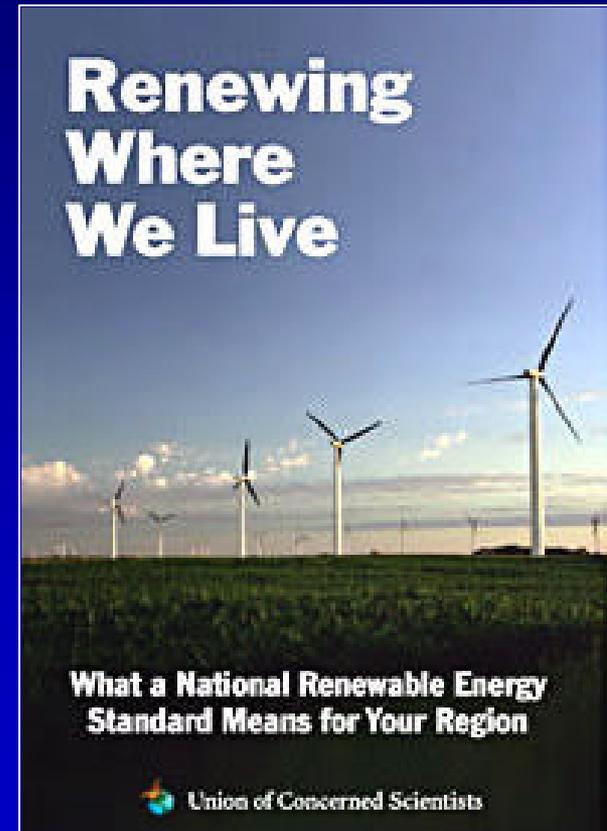




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# US Economic Benefits 10% by 2020

- \* **\$17 billion in new capital investment**
- \* **\$1.2 billion in new property tax revenue for local communities**
- \* **\$410 million in lease payments to farmers, ranchers, and rural landowners from wind power alone**
- \* **Save consumers \$7.8 billion between 2002 and 2020**
- \* **Hedge against higher gas prices**



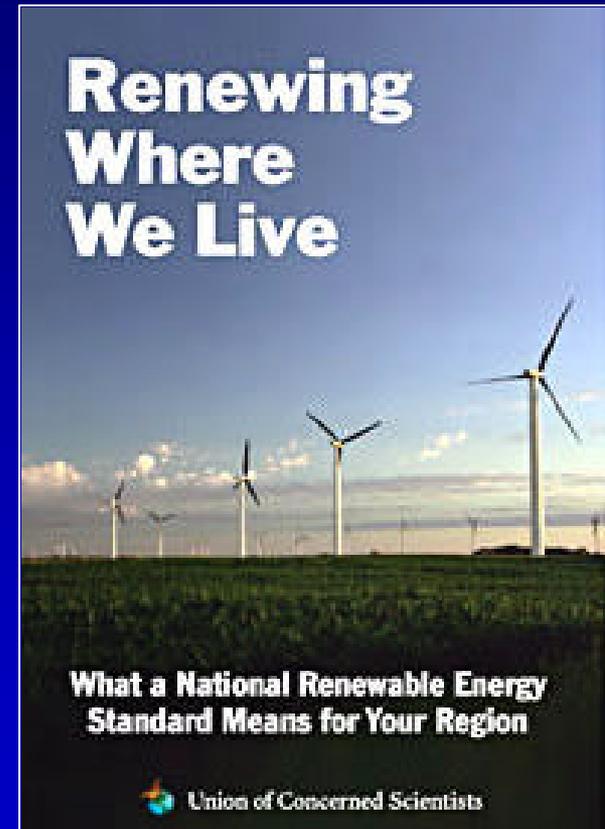


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# Economic Benefits in NY

## 10% by 2020

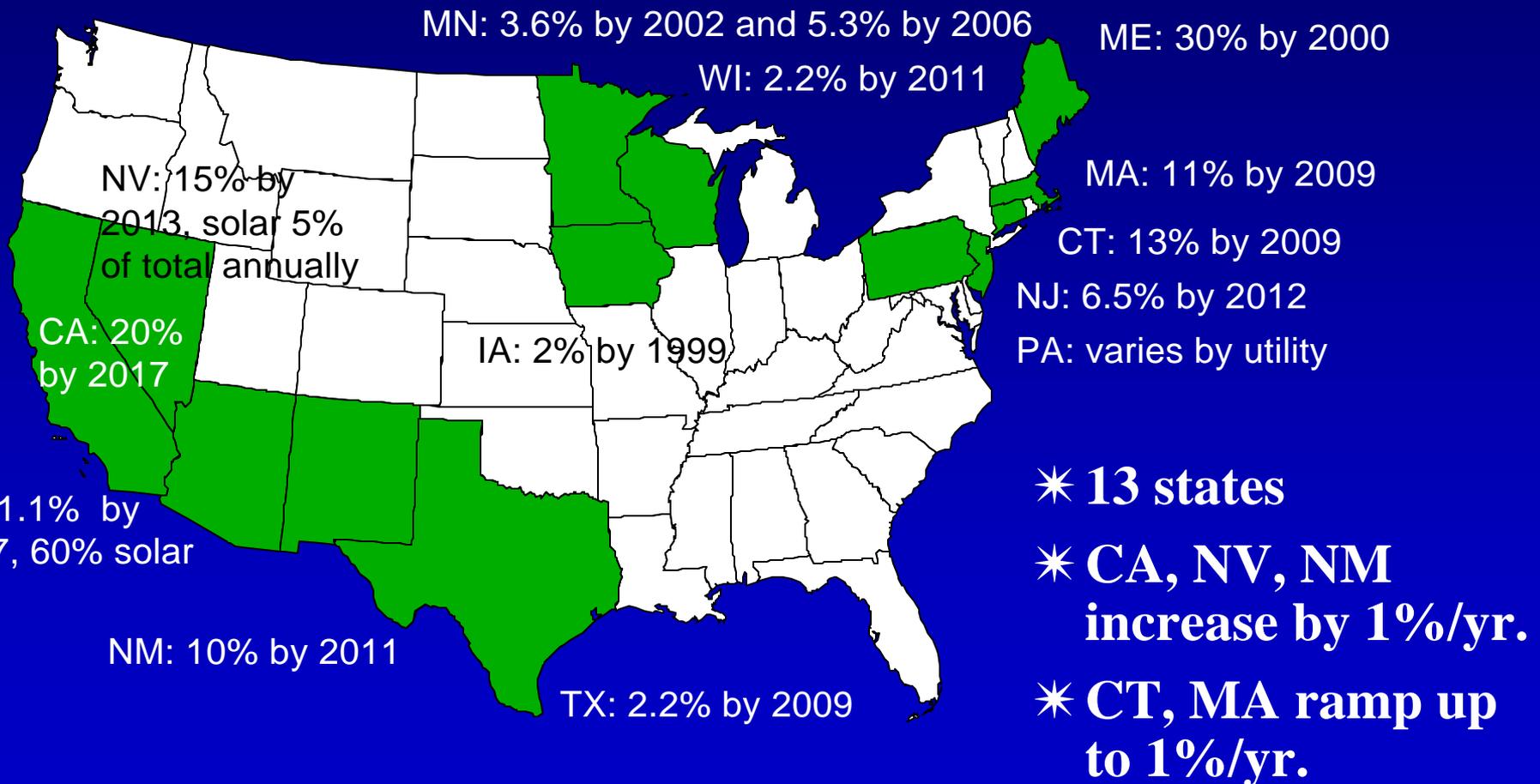
- \* **\$390 million in new capital investment**
- \* **\$17 million in new property tax revenue for local communities**
- \* **\$6 million in lease payments to farmers, ranchers, and rural landowners from wind power alone**
- \* **Save energy consumers \$670 million between 2002 and 2020**
- \* **Consumer energy savings would increase if natural gas prices increase**





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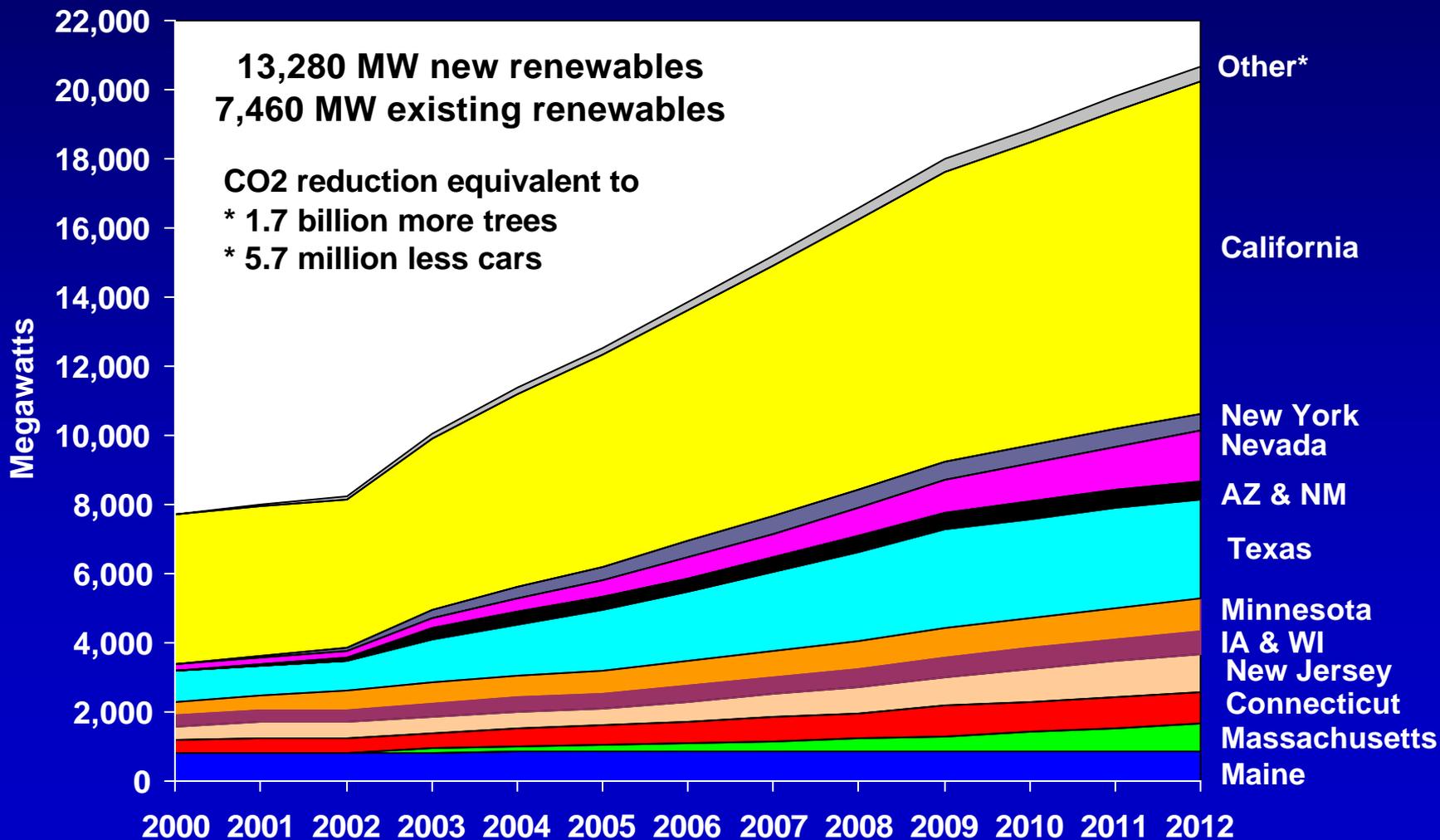
# Renewable energy standards





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# Renewables Expected From State Standards and Funds



\*Includes Illinois, Montana, Oregon, Pennsylvania and Rhode Island.



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Citizens and Scientists for Environmental Solutions

[www.ucsususa.org](http://www.ucsususa.org)