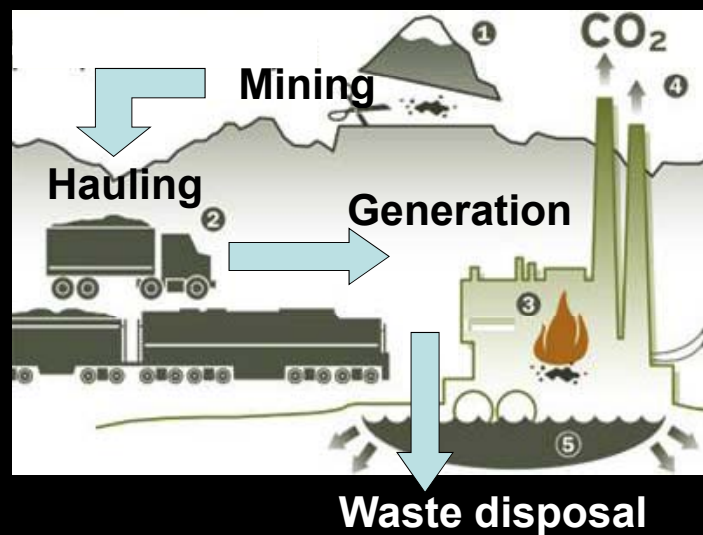


# Power Plants & Human Health

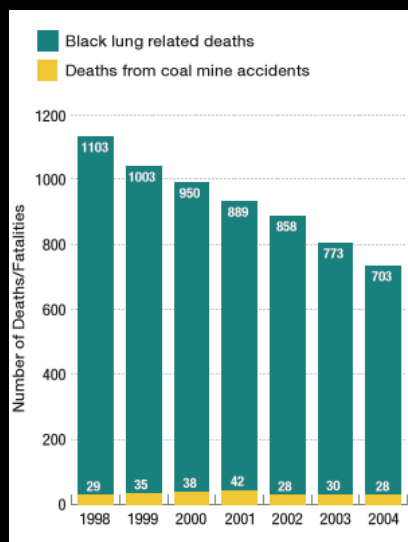
Alan Nogee  
Director, Climate & Energy Policy  
& Strategy  
Union of Concerned Scientists  
  
Massachusetts Medical Society  
Waltham, Mass.  
April 28, 2010



## Coal impacts from every stage of fuel cycle



## Coal mining



<http://www.npr.org/templates/story/story.php?storyId=126021059&ft=1&f=1001>



- Typically 30-40 accident deaths/year
- 2<sup>nd</sup> highest fatal injury rate of any occupation, 2008
- Black lung: total deaths declining
- But rate increasing over last 5 years; younger workers

Sources: NIOSH 2007 Report for CDC  
BLS, <http://www.bls.gov/iif/oshwc/cfoi/cfch0007.pdf>

## Mining environmental impacts

- Subsidence
- Abandoned mine fires
- Methane leakage
- Acid mine drainage has polluted
  - 5,000 - 10,000 miles of Western streams
  - 4,000 - 11,000 miles of Eastern streams



Mountaintop removal mining

"Coal mining... significantly associated with ecological disintegrity and higher cancer mortality." (prelim., correlation only)

"Ecological Integrity of Streams Related to Human Cancer Mortality Rates," *EcoHealth*, 4/2/10

<http://www.springerlink.com/content/lu7wgk595v1hnm64/?p=88410a34adb64810a01c45aa7546d3a2&pi=0>

## Impacts of coal transport



Annual U.S. coal use = line of train cars circling the Earth 4.3 times

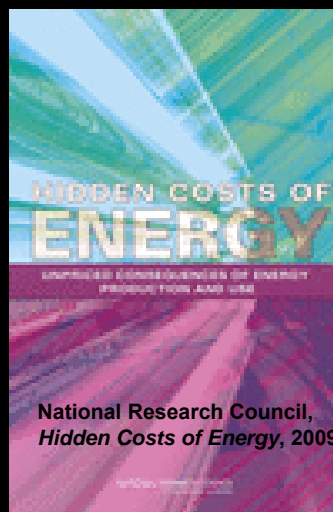
- 70% of coal transported by rail
  - 24% of rail cars; 44% of tonnage
  - **571 fatalities; 4,867 injuries in 2008**
    - Down 48% and 76% from 1990
- (Source: NRC, 2009)

Transport emissions =

- 600,000 tons NO<sub>x</sub>
  - 50,000 tons PM
  - Coal dust
- (Source: NRDC, 2007)

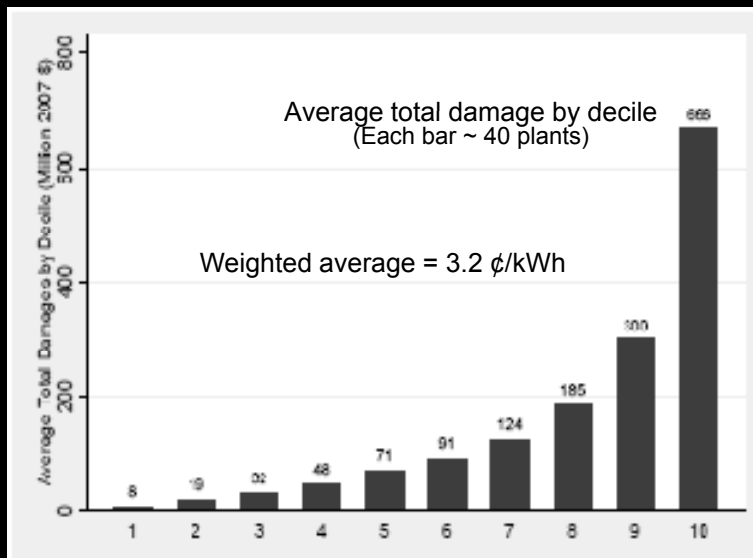
## NRC/NAS: Hidden Cost of Energy - Health Damages

- \$120 billion/year from power plants, transportation
- \$6m/premature death
- **\$62 billion for coal**
- Avg. \$156 m per plant
- Doesn't count mercury, other toxics, global warming



Source, National Research Council, 2009

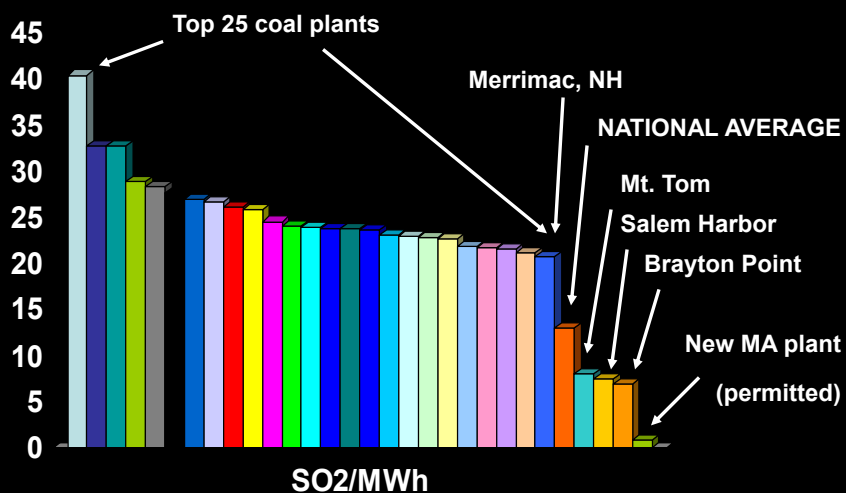
## Worst 10% of plants produce 43% of damage



Source: NRC, 2009

## Power plants SO<sub>2</sub> lbs./MWh

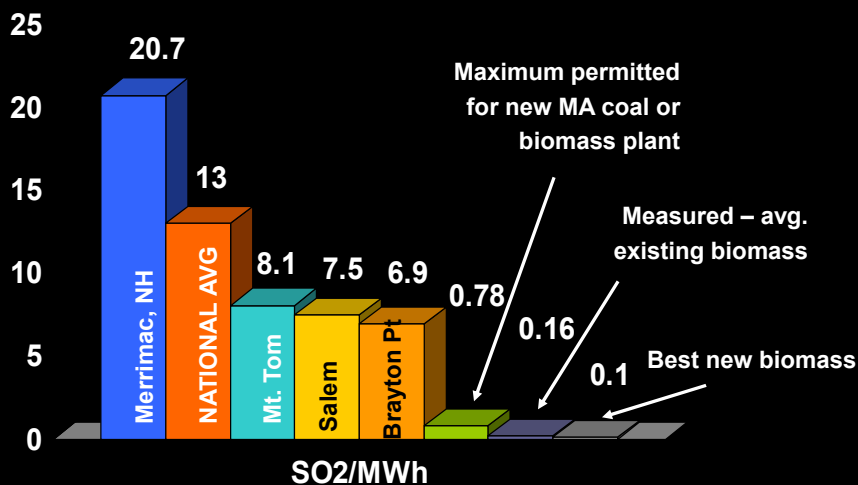
SO<sub>2</sub> → secondary particulates = 85% of health damage



Source: Environmental Integrity Project search engine, based on U.S. EPA E-Grid Data base.

## Mass./NH power plants - SO<sub>2</sub> lbs./MWh

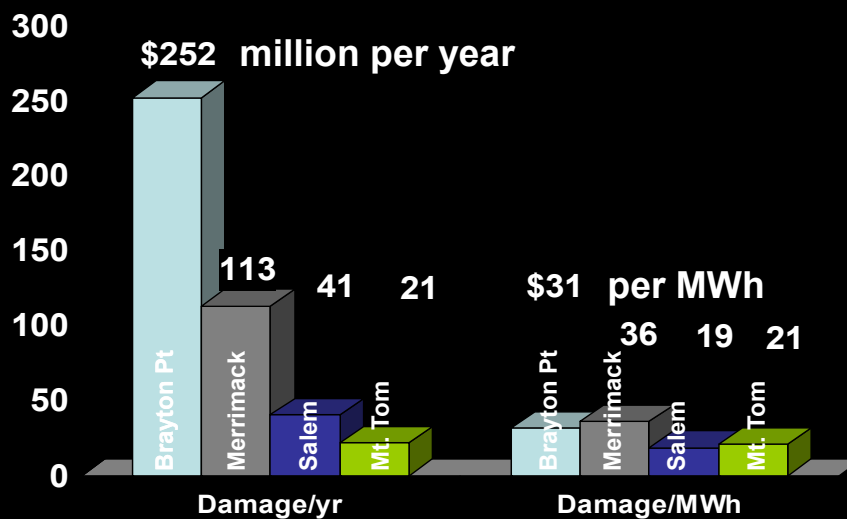
NRC: SO<sub>2</sub> → secondary particulates = 85% of health damage



Source: Environmental Integrity Project search engine, based on U.S. EPA E-Grid Data base.

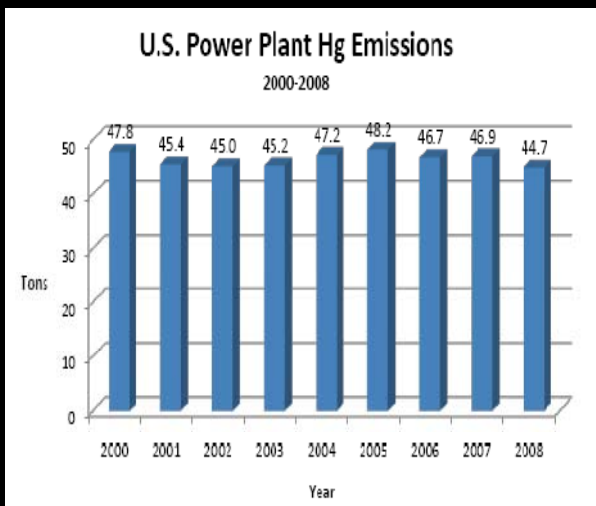
Biomass plants: Antares Consulting Group

## Mass./NH coal plant health damage = \$427 million per year



Source: NRC, personal communication, 2010

## Coal plants are the largest source of mercury emissions (~40%)



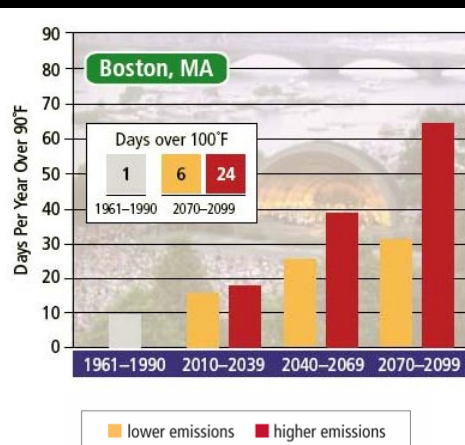
8% of U.S. women of child-bearing age has Hg in blood above EPA-recommended levels

NESCAUM, 2003, citing EPA,  
<http://www.nescaum.org/documents/rpt031104mercury.pdf/>

Source: Environmental Integrity Project, from EPA data  
[http://www.environmentalintegrity.org/news\\_reports/documents/DirtyKilowatts-Top50MercuryPowerPlantReport.pdf](http://www.environmentalintegrity.org/news_reports/documents/DirtyKilowatts-Top50MercuryPowerPlantReport.pdf)

**Global warming/climate change**  
**Coal = more CO<sub>2</sub> emissions than all ground transport sources combined**

## Increases in Extreme Heat in Northeast Cities



AP Photo/Michael Kim

Source: NECA/UCS, 2007 (see: [www.climatechange.org/](http://www.climatechange.org/))





**WHO: 166,000 premature deaths per year globally already attributable to climate change**

Source: Campbell-Lendrum, D. et al. environmental Burden of Disease series, ed. a Pruss-Ustun, et al. 2007. Geneva: World Health Organization. 66.

## Global warming impacts on Human Health

- Extreme Heat
- Air Quality
- Pollen Allergens
- Vector-borne disease

AP Photo/Michael Dwyer

## 130 million tons of waste per year


### Air pollution → water pollution

- Ash and scrubber chemicals → slurry pond or injected into abandoned mines
- Thousands of violations of Safe Drinking Water Act standards for arsenic, lead, chromium, beryllium or nickel...

<http://www.nytimes.com/2009/09/13/us/13water.html?pagewanted=all>

➤ Inez KT, 2000: 306 million gallons of sludge from a coal slurry leaked into nearby creeks

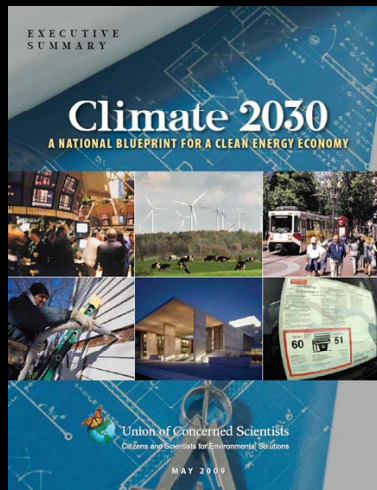
—30x more liquid than Exxon Valdez



Duke Energy's Gibson Generating Station

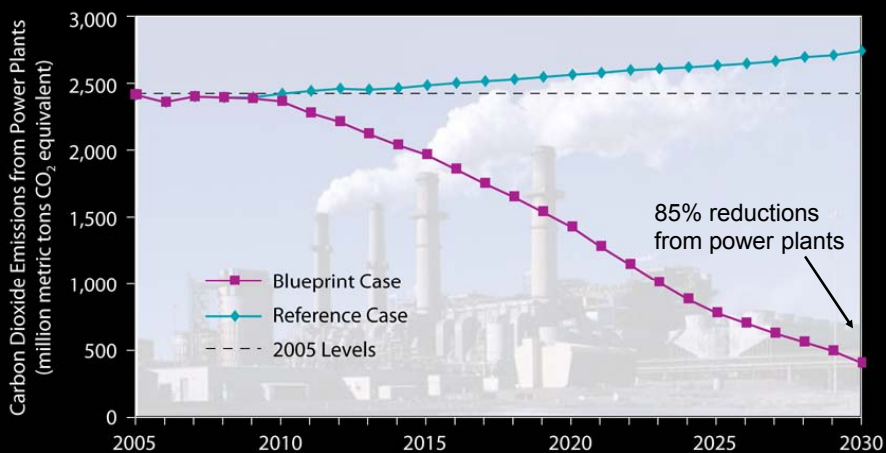
## UCS Climate 2030 Blueprint policies

- Cap carbon –
  - Economy-wide reductions of
    - 20% by 2020
    - 57% by 2030
    - 80% by 2050
- Energy efficiency standards, incentives
- Renewable energy standards, incentives



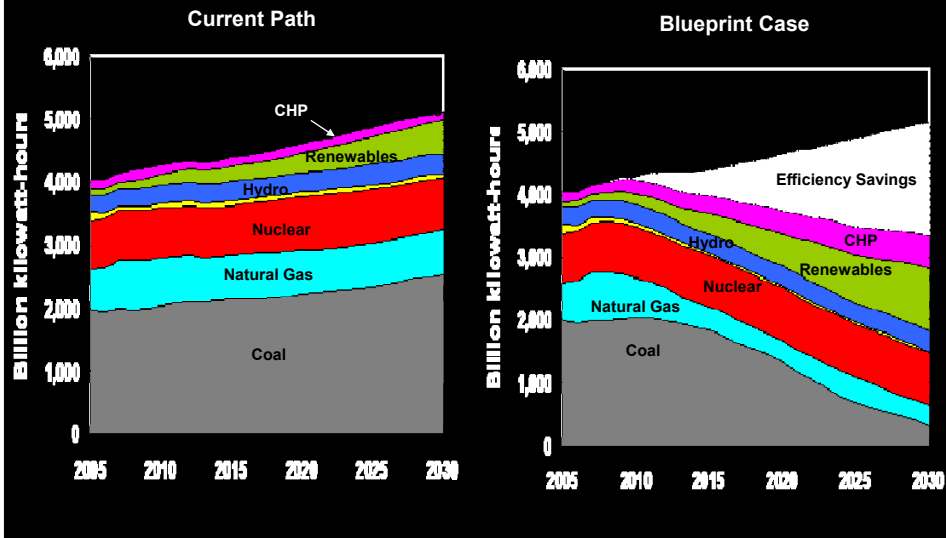
## The Blueprint nearly decarbonizes electricity sector by 2030

Reduces cumulative energy bills by 1.6 trillion





## Biggest reduction: improving energy efficiency



## What can we do?

- ✓ As citizens – support legislation
  - ✓ Cap & trade – 80%+ reductions by 2050
  - ✓ Efficiency and renewable energy standards
  - ✓ Coal mining, waste disposal, emission regulations
  - ✓ Phase out coal as rapidly as possible



## What can we do?



- ✓ As consumers
  - ✓ Efficiency audits and investments
  - ✓ Install or buy renewable energy
  - ✓ To calculate benefits:



<http://www.eichealth.org>



- Thank you. Any questions?



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