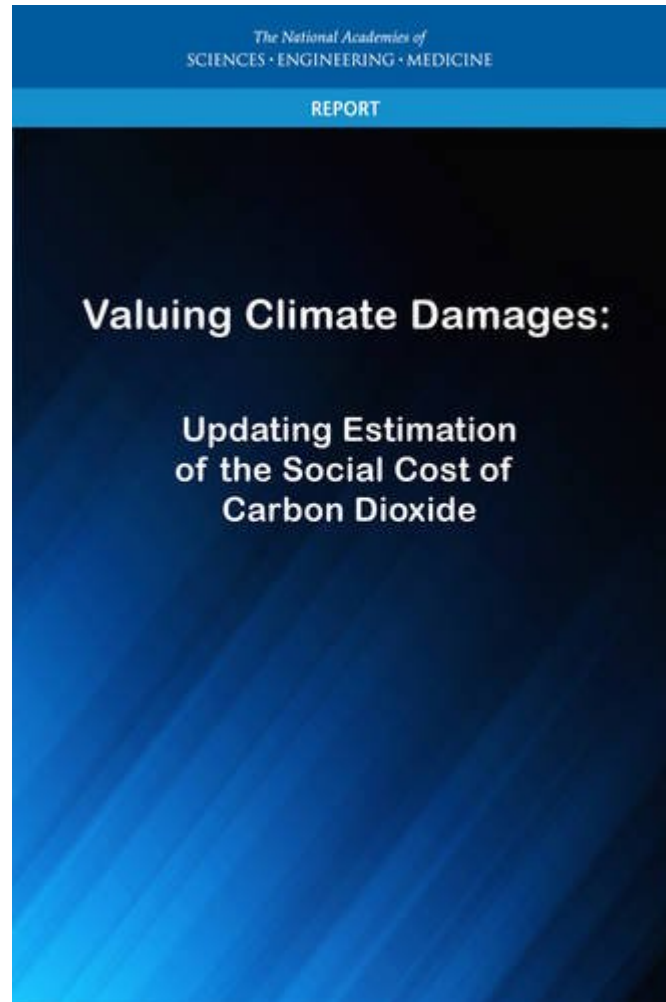


Using the Social Cost of Carbon to Value Climate Damages in Minnesota

David Bael | Economic Policy Analyst

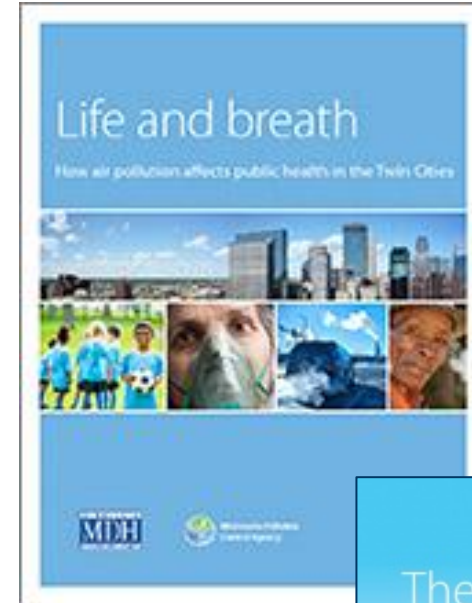
June 14, 2017

Minnesota supports use of SCC as a policy tool now and into the future



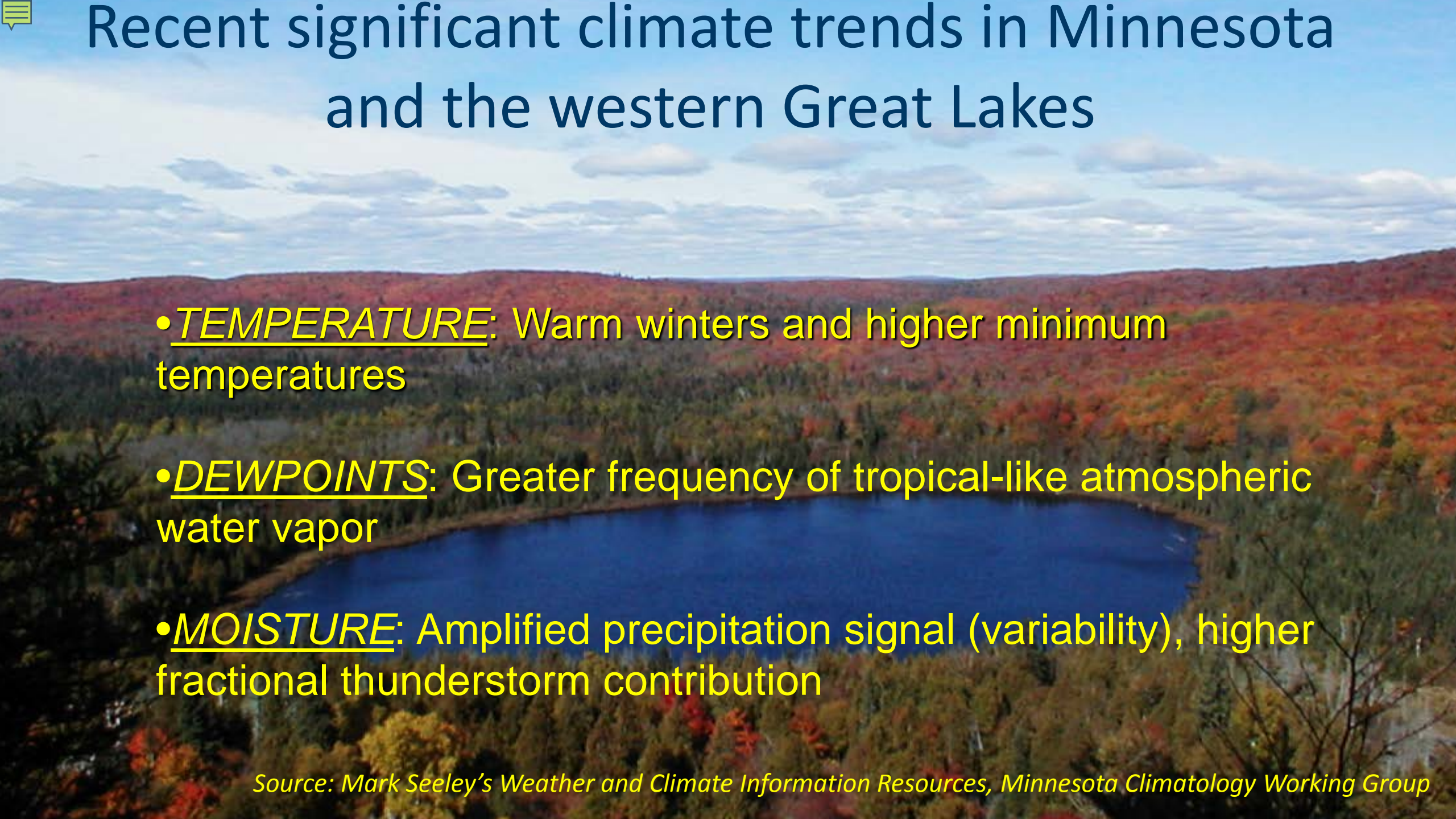
Damage costs and regulatory analysis

- Impacts and damages of criteria pollutants
 - Life and breath report
 - Reports to Minnesota legislature on economic impacts of air pollution
 - Criteria pollutant externality values for power plant emissions
- Impacts and damages of GHGs





Recent significant climate trends in Minnesota and the western Great Lakes

- 
- TEMPERATURE: Warm winters and higher minimum temperatures
 - DEWPOINTS: Greater frequency of tropical-like atmospheric water vapor
 - MOISTURE: Amplified precipitation signal (variability), higher fractional thunderstorm contribution



Some consequences of climate change in Minnesota

- Changes in over-winter survival rates and population dynamics of insect pests, parasites, plant pathogens and soil microbes
- Opportunities for invasive species (insects, pathogens, etc.)
- Change in Plant Hardiness Zones, longer growing seasons
- Shorter duration of soil and lake freezing
- Longer mold and allergen season (health care)
- Change in fisheries management
- Increased number of freeze/thaw cycles (damaged roads)
- More tile drainage, irrigation management
- More heat advisories and heat warnings (health care/livestock)
- Increased risk of soil erosion
- Work on flood mitigation and storm sewer runoff
- Growing list of impaired waters
- Change in insurance rates/risk (large hail, flooding)

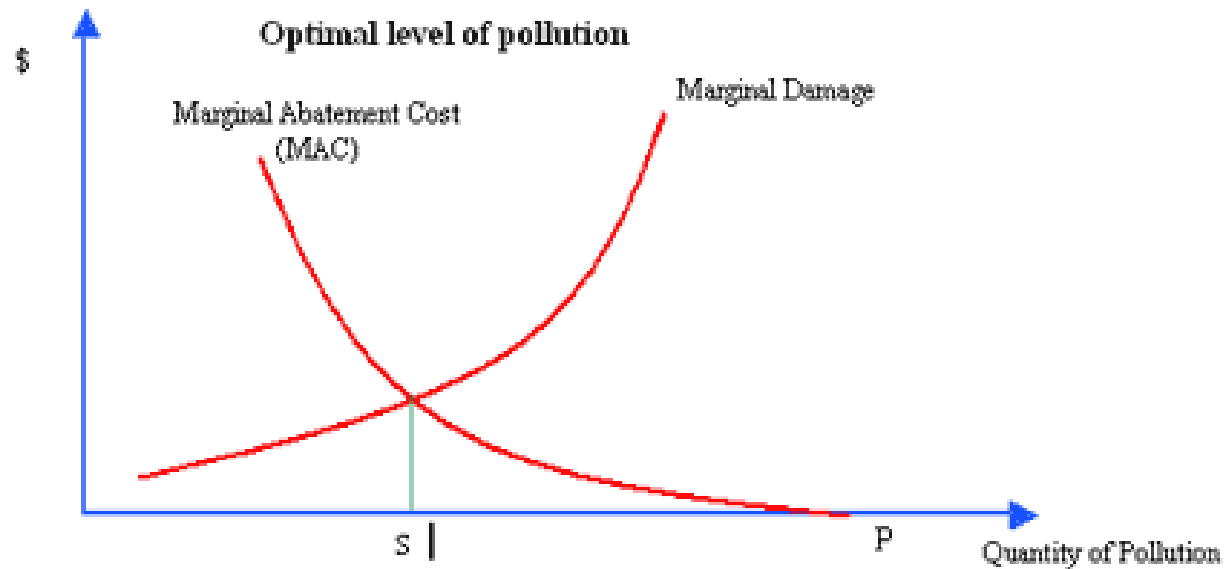
Source: Mark Seeley's Weather and Climate Information Resources, Minnesota Climatology Working Group

Social cost of carbon policy context: power generation

- Social cost of carbon and electricity generation:
 - Minnesota Value of Solar: Includes the avoided environmental cost of solar power relative to other power sources
 - Environmental and Socioeconomic Costs Associated with Electricity Generation (a.k.a. “Externality Values”): Includes the external (social) costs of emissions in cost-benefit analysis for utilities’ resource plans and in all resource planning decisions
- Two ways to price carbon from electricity generation in Minnesota:
 - Regulatory cost value (currently \$9 - \$34 per ton of CO₂)
 - Externality cost/Damage cost value (currently \$0.42 to \$4.37 per ton of CO₂)



Externality costs of carbon emissions, summary



Negative externality leads to over-production of emissions and electricity production using more polluting methods.

CO₂ externality proceeding, history

- 1993: Minnesota enacts statute to quantify and establish a range of environmental costs of CO₂ and criteria pollutants associated with each method of electricity generation
- 1997: first CO₂ externality values established based on estimation of global GDP that would be impacted by climate change: \$0.30-\$3.10/ton of CO₂
 - Damage-cost approach
 - Consideration of global damages
- 1997 to present: CO₂ externality values only adjusted for inflation
- 2013: petition to Public Utilities Commission to update values in light of current science and modeling tools
- 2014: PUC defers case to legal proceeding to determine if the federal SCC is the most reasonable and best available measure



CO₂ externality proceeding, stakeholder positions

- Range of positions:
 - Climate change denial: anthropogenic climate change is not occurring (Peabody Energy Corp)
 - Climate change is real but there are serious flaws in the IWG's decision making (Minnesota utilities and industrial groups)
 - The federal SCC is the best available metric (Minnesota Pollution Control Agency, Minnesota Dept of Commerce, environmental advocacy organizations)



CO₂ externality proceeding: key issues of the federal SCC

- The way the three IAMs were used
- Choice of equilibrium sensitivity value
- Discount rates
- Global scope of damages
- Time horizon
- Marginal ton of emissions: first ton, last ton, or average ton approach
- Accounting for leakage of emissions outside the jurisdiction
- Accounting for uncertainty
- Incorporation of adaptation and mitigation into damage estimates
- Use of federal SCC as a tool for state resource planning, outside the specific context for which it was developed



CO₂ externality proceeding, current status

- April 2016: presiding Minnesota Administrative Law Judge issues recommendation to adopt the federal SCC with modifications:
 - Shorten time horizon to 2200
 - Exclude value derived from the 95th percentile at a 3% discount rate
 - Open separate investigation into how best to measure and account for leakage
- July 2017: Minnesota Public Utilities Commission to reconvene with all the parties from the proceeding to determine state policy



Potential impacts of adopting SCC as externality value

Current externality values have been too low to be impactful in resource planning decisions and not a driver for GHG emissions policy

- Market forces (e.g., declining cost of wind, natural gas) have had far more effect
- Externality value generally swamped by regulatory cost value
- Other Minnesota regulatory policies (e.g. state renewable energy standards) have had far greater effects
- With the adoption of the SCC as a metric for valuing climate change impacts and applying this value in planning decisions, this may change

Persevering in the current regulatory landscape

Politics **The New York Times**
**Without Much Straining, Minnesota Reins
In Its Utilities' Carbon Emissions**
By [MICHAEL WINES](#) JULY 17, 2014



 **StarTribune**

**After Trump announcement, Minnesota will
proceed with its own climate change strategy**
By JOSEPHINE MARCOTTY Jun 2, 2017



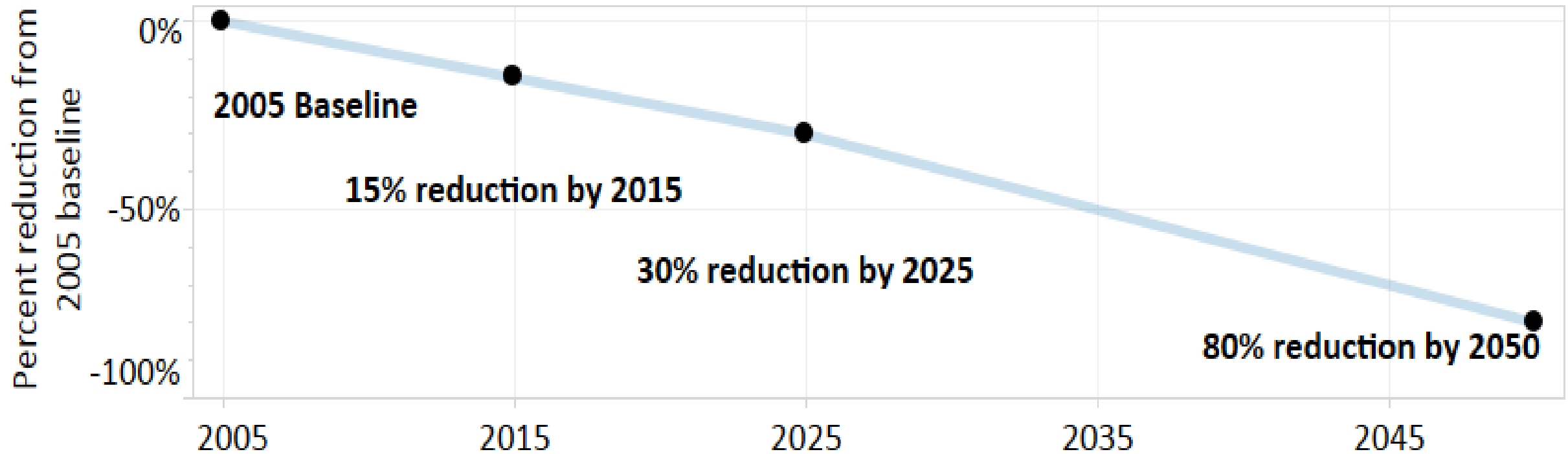
MPRnews

**Minnesota joins 'Climate Alliance' to uphold
Paris pact**
[Environment](#) [Cody Nelson](#) · St. Paul · Jun 5, 2017



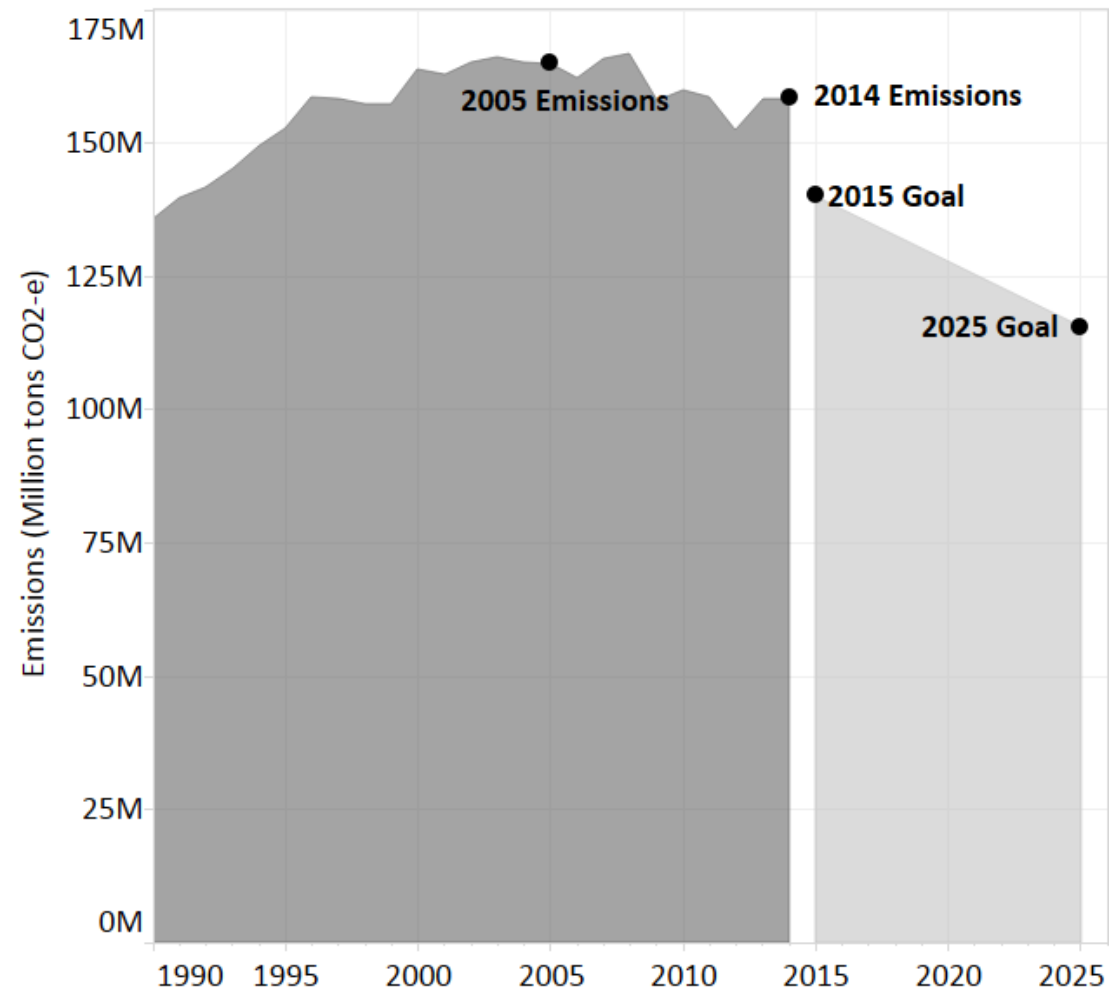
Minnesota's Next Generation Energy Act

Next Generation Energy Act goals (Minn. Stat. § 216H.02)



Progress thus far ... And looking ahead

Minnesota's GHG emissions 1990-2014 and Next Generation Energy Act goals





Final thoughts

- Minnesota is committed to use the best available tools to do our part to mitigate climate change, including the social cost of carbon
- With lack of federal guidance, a national dialog is essential
- Minnesota hopes to be a key participant in these efforts