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Big Stone II: A Big Mistake



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Union of Concerned Scientists**

**Ortonville Public Meeting
September 28, 2006**



Problems with Big Stone II

- ⊕ **It's destructive: Big Stone II and global warming**
- ⊕ **It's expensive: impact of emerging global warming laws on costs of Big Stone II**
- ⊕ **It's not needed: wind-based alternatives can meet energy needs better**
- ⊕ **It's a lost opportunity: wind power brings far more permanent economic benefits to the region**





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Who says global warming is real ?

- ⊕ “Climate change is real”
- ⊕ “there is now strong evidence that significant global warming is occurring”
- ⊕ “we urge all nations ... to take prompt action to reduce the causes of climate change”

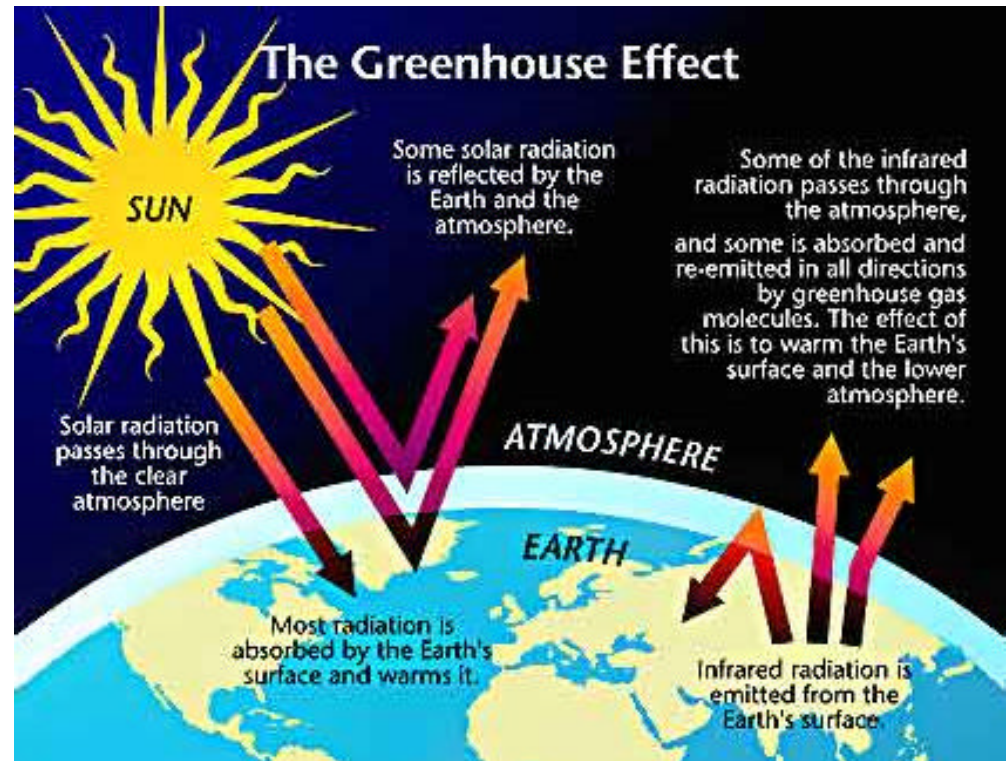
--US National Academy of Sciences
2005 statement with
counterparts in 10 other
nations





Carbon dioxide (CO₂)

- ☙ CO₂ plays critical role in regulating Earth's climate
- ☙ CO₂ levels certainly higher than in 650,000 years
- ☙ CO₂ levels probably higher than in 20 million years
- ☙ CO₂ levels won't drop for century or more





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Warming already

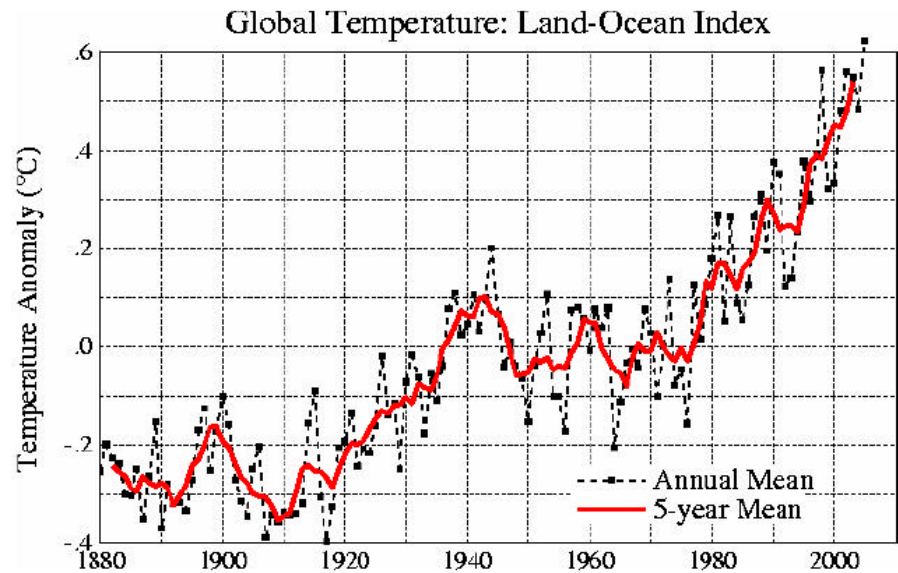
- 19 of 20 hottest years all since 1980
- no natural explanation
- Arctic sea ice melting 9%/decade



Arctic sea ice 1979

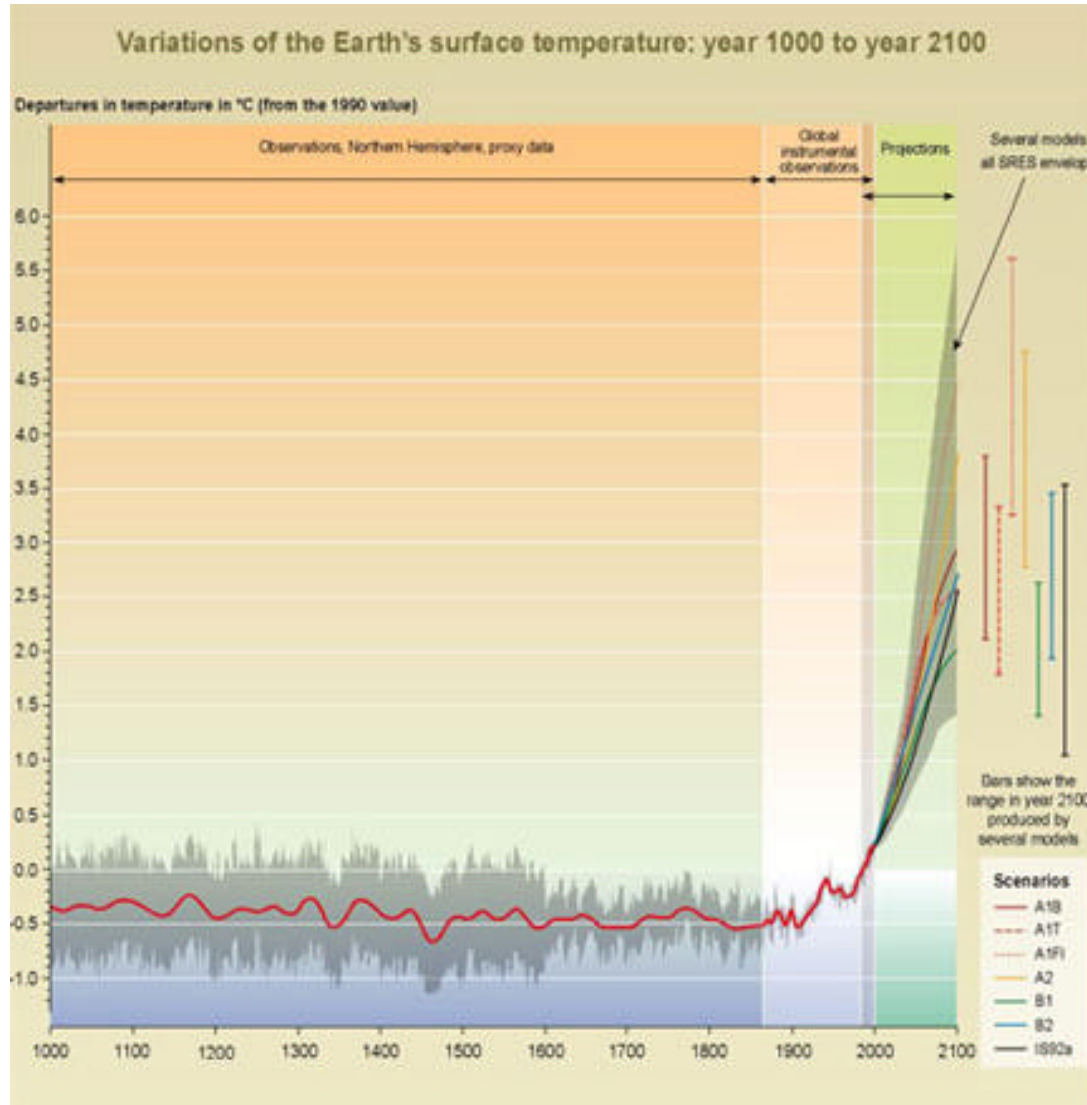


Arctic sea ice 2003





Much worse ahead

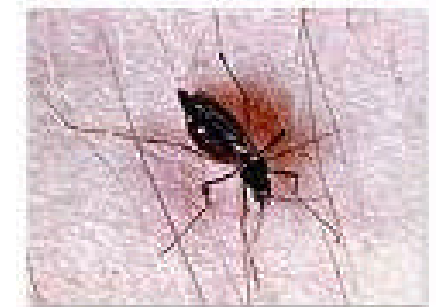


- ✚ Expect to warm another 1.5-5.8 degrees C. by 2100 (compared to 0.6 degrees in 20th century)
- ✚ Danger of abrupt changes if we hit tipping points
- ✚ At high end comparable to warming since last ice age



Global impacts...

- ⊕ more heat waves, droughts and fires
- ⊕ more intense precipitation, flooding and erosion
- ⊕ shifting ecosystems/faster extinction rate
- ⊕ reduced crop yields in continental interiors
- ⊕ reduced water availability and quality
- ⊕ spread of pests and diseases





Global impacts continued

⊕ stronger hurricanes

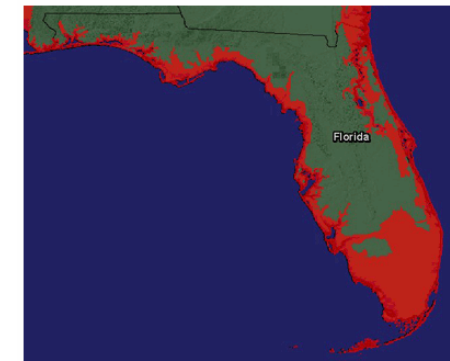
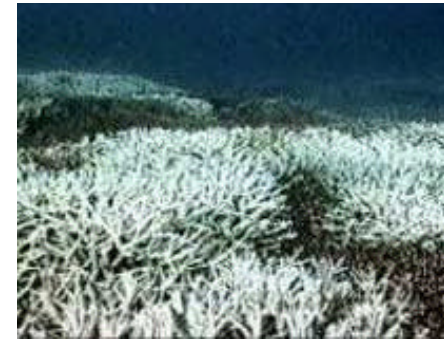
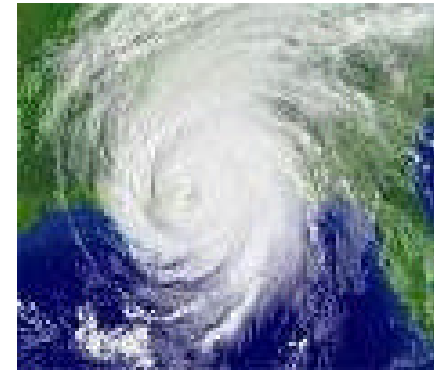
⊕ coral reef bleaching

⊕ ocean acidification

⊕ rising sea levels

⊕ melting permafrost
and ice sheets

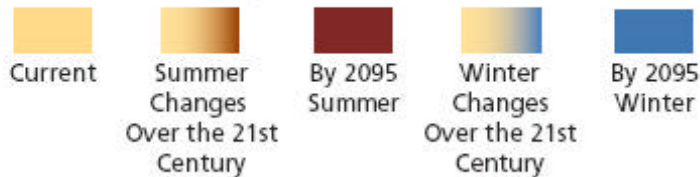
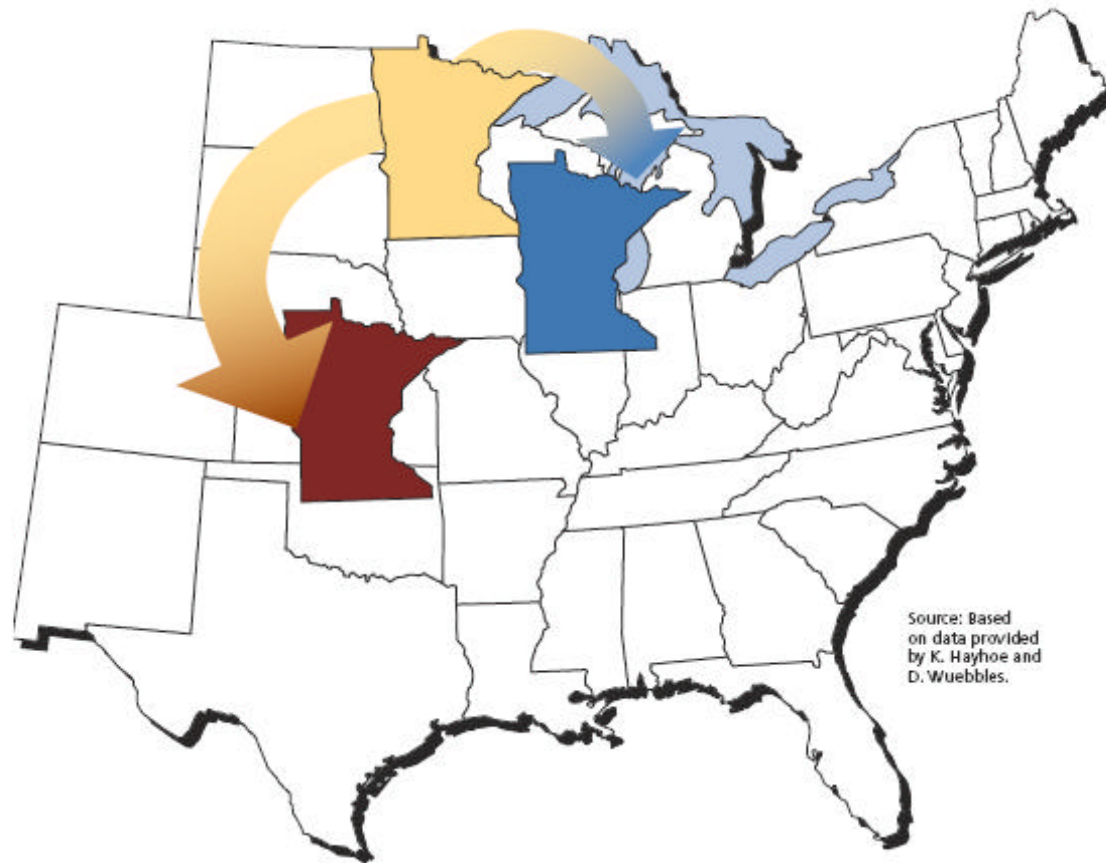
- IF Greenland or West Antarctic Ice sheets melt, coastlines will eventually be transformed (image shows Florida after 6m rise)





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Changes to Minnesota by 2095



- winters to feel like Wisconsin/ Illinois
- summers to feel like Kansas
- considerably warmer, probably dryer
- threat to lakes, wetlands, waterfowl
- more extreme events, flooding



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An Unprecedented Threat

- ⊕ **Global warming threatens to profoundly change our world**
- ⊕ **Abrupt warming is distinctly possible**
 - **abrupt climate shifts in earth's past**
 - **“The climate is like a drunk. Left alone, it sits. Forced to move, it staggers.”**
- ⊕ **Natural feedbacks amplify human impact**
- ⊕ **Every year of delay increases risk of triggering dangerous changes and requires more drastic action later to stabilize climate**





What do we need to do?

- ✦ **Science suggests that to avoid dangerous changes, developed nations need to reduce emissions dramatically by 2050 (60-80%)**
- ✦ **Governments have adopted long-term targets in this range:**
 - California
 - New Mexico
 - Northeastern Governors and Eastern Canadian premiers (no date set)
 - European Union
 - United Kingdom
- ✦ **Requires a decades-long shift away from conventional coal plants like Big Stone II occurring during the operating lifetime of the plant**



Impact of Big Stone on global warming

- ✦ will emit over 4.5 million tons of CO₂ yearly
- ✦ equivalent to the emissions of over 660,000 cars
- ✦ increases emissions of entire state of SD by 34%
- ✦ biggest new source of CO₂ built in SD or MN since 1980s (last coal plant)
- ✦ SD PUC staff: plant's share of total global warming damages ranges from \$50 million to \$5 billion, depending on which damage estimates you use and how much you value the future
- ✦ No pollution controls for CO₂





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Costs to Ratepayers: global warming laws are coming

- ✦ **2005 Senate Resolution (passed by 54 Senators):**
 - found that increases greenhouse gases are warming the planet beyond natural variability and posing substantial risks
 - called for “mandatory, market-based limits” on emissions
- ✦ **Several bills under consideration, hearings underway**
- ✦ **law widely expected by 2010**





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CO2 “cap-and-trade” law has widespread support

- ✦ Many major US corporations
- ✦ Five of the nation’s ten biggest power companies (and 3 others oppose law but admit its coming)
- ✦ Dozens of evangelical Christian leaders
- ✦ Big Stone II partners dismiss the risk as “speculative”





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Coal plants will be targeted by climate laws

- ✦ **America's coal plants emit more CO₂ than all our cars, trucks, planes and trains**
- ✦ **Coal plants are easier to regulate than millions of small sources because we have alternative ways to generate electricity**
- ✦ **Federal studies show that a disproportionate share of CO₂ reductions will come from the power sector by moving away from conventional coal**
- ✦ **Current CO₂ bills all cover coal plants**





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CO2 laws make Big Stone II financially risky

⊕ MN PUC recognizes:

“the possibility that the cost of coal-fired generation – even in dollars, as opposed to environmental impact – may skyrocket over the approximately 30-year life of any plant built today”

“it is widely believed that the growing need to control carbon emissions ... may well make [coal power] very expensive in the future”

MN PUC July 28, 2006 Order, Docket NO. E-002/RP-04-1752



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Financial Risk to Big Stone II

Future CO2 “allowance” prices	Impact on cost of energy from Big Stone II
High	increases 59-73%
Medium (most likely)	increases 37-46%
Low	increases 15-19%

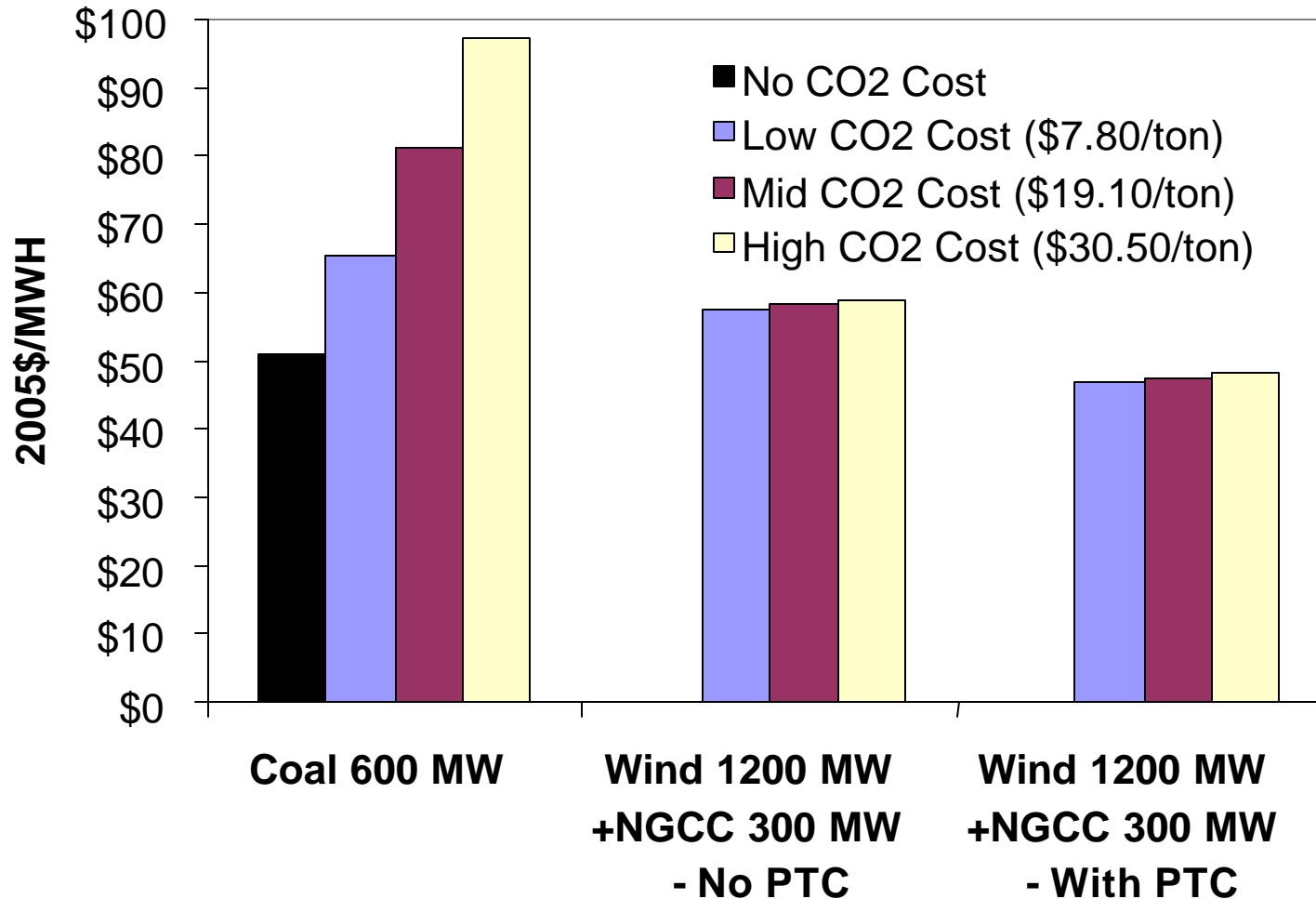
Source: Direct Testimony of David A. Schlissel and Anna Sommer, Synapse Energy Economics, Application by Otter Tail Power Company on behalf of the Big Stone II Co-owners for a Energy Facility Siting Permit, Case No EL05-022, South Dakota Public Utilities Commission, May 19, 2006.



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Wind-gas alternatives cheaper than Big Stone II

Levelized Cost of Electricity



Source: Direct Testimony of David A. Schlissel and Anna Sommer, Synapse Energy Economics, Application by Otter Tail Power Company on behalf of the Big Stone II Co-owners for a Energy Facility Siting Permit, Case No EL05-022, South Dakota Public Utilities Commission, May 26, 2006.



Other Big Stone II costs rising too

- ✦ **In July Big Stone II announced 50% rise in construction costs from \$1.2 billion to \$1.8 billion**
 - **Big Stone II partners announced they were cruising along business as usual**
 - **MN PUC has required them to redo their cost comparisons with other supply options and conservation investments**

- ✦ **New cost estimates submitted so far still do not include CO2 expenses**





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Fewer new jobs with Big Stone II

⊕ Permanent jobs (direct and indirect):

- Big Stone II: 64*
- Comparable Wind: 483

⊕ Annual contribution to state economy (SD):

- Big Stone: \$ 6.8 million*
- Comparable Wind: \$34.9 million

⊕ Construction jobs (4 year period):

- Big Stone II: 1210 avg. annually*
- Comparable Wind: 1002 avg. annually



*Assumes 50% construction costs spent in-state

Source: Direct Testimony of Marshall R. Goldberg, Application by Otter Tail Power Company on behalf of the Big Stone II Co-owners for a Energy Facility Siting Permit, Case No EL05-022, South Dakota Public Utilities Commission, May 19, 2006.



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More sustainable economic growth from wind:

- ⊕ **Big Stone II numbers unrealistically assume 50% of expenditures spent in-state (wind modeling conservatively assumes 12% in-state)**
- ⊕ **Big Stone II brings boom/bust cycle**
- ⊕ **Wind would bring \$3.5 million/year in land-lease payments**
- ⊕ **Wind could bring more turbine manufacturing to area**



Photo: Big Stone Lake Area Chamber of Commerce



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More information

**See the Clean Energy and Global
Warming pages of the UCS website at:**

www.ucsusa.org