STATE OF MINNESOTA
BEFORE THE PUBLIC UTILITIES COMMISSION

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In the Matter of Xcel Energy's 2004 Resource Plan **Docket No. E-002/RP-04-1752**

JOINT COMMENTS OF THE IZAAK WALTON LEAGUE OF AMERICA – MIDWEST OFFICE, MINNESOTANS FOR AN ENERGY-EFFICIENT ECONOMY, THE UNION OF CONCERNED SCIENTISTS, AND MINNESOTA CENTER FOR ENVIRONMENTAL ADVOCACY ON XCEL'S 2004 RESOURCE PLAN

Introduction

It is now evident that the world must respond to the threat of global warming by reducing its greenhouse gases with, to quote global leaders, "resolve and urgency."[1] The science indicating a threat of enormous proportions grows every year, and the political response globally and domestically is gaining momentum. Most importantly, it is now increasingly evident that the effort to contain global warming in the decades ahead will require major cuts in carbon and other greenhouse gas emissions – apparently in the range of 60-80% in developed countries by mid-century – if we are to avoid dangerous interference with the climate. Such cuts cannot be achieved absent a sustained global shift away from existing fossil fuel energy technologies toward climate-neutral ones in the decades ahead, starting as soon as possible.

Xcel Energy's 2004 Resource Plan places squarely before the Commission the hardest planning question it will probably ever face: how can Minnesota continue to meet its electricity needs in the carbon-constrained years that lie ahead? The Commission has considered the issue of global warming before, but never in a context where its decision could so directly affect Minnesota's greenhouse gas trajectory and its vulnerability to future greenhouse gas regulations. The world has changed fundamentally since the last time a Minnesota utility came before the Commission seeking approval for

[1] At the recent G8 summit in Gleneagles, Scotland, world leaders, including President Bush, issued a climate change statement pledging to "act with resolve and urgency now to meet our shared and multiple objectives of reducing greenhouse gas emissions, improving the global environment, enhancing energy security and cutting air pollution in conjunction with our vigorous efforts to reduce poverty." "Climate Change, Energy, and Sustainable Development," Gleneagles Communique, July 2005, available online at: http://www.fco.gov.uk/Files/kfile/PostG8_Gleneagles_Communique.pdf

a large increase in baseload capacity. While Xcel is not explicitly proposing new coal plants to meet that need, it has stated that it expects to meet its anticipated increase in demand with new coal plants. In short, it would meet growing baseload demand much the same way it met that demand in the 70s and 80s – with new coal generation.

Our comments – sponsored jointly by the Izaak Walton League of America – Midwest Office, Minnesotans for an Energy-Efficient Economy, Union of Concerned Scientists, and Minnesota Center for Environmental Advocacy -- begin with a discussion of why this business-as-usual approach is now wholly inappropriate. The world's emerging response to global warming will inevitably transform the regulatory climate in the years ahead. These new laws will in turn change the economics and the technology of electricity production and use, making high-carbon energy sources relatively more expensive, while low-carbon energy sources become better and cheaper through technological advances, economies of scale, and government incentives. As a state that is heavily dependent on coal, but which has vast renewable resources and untapped potential for energy efficiency, it is critical that Xcel's and Minnesota's long-term resource planning anticipate and prepare for these historic changes.

Our comments show that Xcel's 2004 Resource Plan fails to provide the analysis required by the Commission's August 29, 2001 Order approving Xcel's 2000 Resource Plan, that is, to expand carbon dioxide regulation contingency planning "to check the extent to which resource mix changes can lower the cost of meeting customer demand under different forms of regulation." As a result of its faulty contingency planning, Xcel has proposed a high-risk, high-cost short-term Action Plan and long-term Preferred Plan, and both should be rejected. We make specific recommendations for the scope and method of Xcel's future carbon dioxide regulatory planning, including an interim recommendation that a "hedge value" be assigned in Xcel's resource selection processes to reflect the ratepayer costs that are likely under carbon-capped regulatory scenarios.

Against the backdrop of the emerging regulatory responses to global warming, and the rigor of resource planning required in this context, examination of Xcel's commitments to renewable energy resources and DSM become even more important tools to reduce ratepayer costs. These comments show that Xcel's 2004 Resource Plan has understated both the potential for adding wind resources to the Xcel system and the Company's achievable level of DSM.

I. XCEL'S RESOURCE PLANNING MUST PREPARE FOR THE CARBON-CONSTRAINED WORLD AHEAD.

A. Scientific evidence of the global climate change threat grows more compelling every year.

In the mid-1990s, the Commission immersed itself for the first time in the issue of global warming. The so-called externalities case[2] remains, to our knowledge, the only

[2] In the Matter of the Quantification of Environmental Costs Pursuant to Laws of Minnesota 1993, chapter 356, section 3, Docket No. E-999/CI-93-583.

time the science of climate change has ever been considered in a contested legal proceeding, with evidence presented under oath, subjected to cross-examination, and weighed by neutral fact-finders. In that proceeding, the Commission adopted an externalities value for carbon dioxide (CO_2) based primarily on the 1990 report of the Intergovernmental Panel on Climate Change (IPCC). The Commission responded to the uncertainties in the science at that time by adopting a low estimate of future damages and a high discount rate.[3]

Since the externalities proceeding, the science of climate change has become far more certain, both because the science has improved and the warming has increased over time. Global CO_2 levels are higher than they have been in 420,000 years, and probably higher than at any time in the last 20 million years.[4] Global average temperatures rose 0.6° C (1.1° F) in the 20th century, with particularly dramatic warming in the last few years. Reconstructions of earth's temperature history indicate that the present time is warmer than any period in at least the past two millennia.[5] A new NASA study of ocean temperatures confirms that the earth is absorbing more energy than it radiates, providing what a NASA official calls "the 'smoking gun' we have been looking for."[6] Not only are the oceans warming, but a major new report from the U.K.'s Royal Society shows that oceans are acidifying at an alarming rate as they absorb CO_2 from the air, with disturbing implication for the marine food chain.[7]

The impacts of global warming are now evident around the world. Mountain glaciers are in widespread retreat, Arctic permafrost and the north polar ice cap are melting dramatically, and enormous ice shelves in both the Arctic and Antarctica have collapsed with surprising suddenness.[8] Over a thousand new studies document the response of plants and animals to the planet's warming, in aggregate showing widespread ecosystem changes.[9] The speed of these changes is already making adaptation a challenge in many parts of the world, and the National Academy of Sciences warns that there could be far more sudden changes ahead. Evidence of past climate changes show

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[3] We are not asking the Commission to revisit its CO_2 externalities value at this time. Rather, we seek to ensure that the Commission is aware of the scientific, political, and regulatory changes related to climate that have occurred since that proceeding, because these changes promise to alter the legal and economic climate for power production, and ultimately, change the *direct* costs faced by Minnesota ratepayers.

[4] IPCC, Third Assessment Report (2002), [hereafter IPCC TAR] Summary for Policymakers, page 7.

[5] "Global Surface Temperatures over the Past Two Millennia," Michael E.Mann and Philip D. Jones, Geophysical Research Letters, 30(15), Art. No. 1820, August 2003.

[6] "Scientists Confirm Earth's Energy is Out of Balance," April 28, 2005 press release, Earth Institute at Columbia University, online at http://www.earthinstitute.columbia.edu/news/2005/story04-28-05.html.

[7] "Ocean Acidification Due to Increasing Atmospheric Carbon Dioxide," The Royal Society, June 2005, online at http://www.royalsoc.ac.uk/displaypagedoc.asp?id=13314.

[8] IPCC TAR, Summary for Policymakers, page 4; Arctic Climate Impact Assessment. 2004. Impacts of a Warming Arctic. Cambridge University Press, Cambridge, U.K, online at http://amap.no/acia/; Ice shelf collapses described by the National Snow and Ice Data Center, http://nsidc.org/sotc/iceshelves.html.

[9] When the IPCC reviewed the scientific literature on ecosystem changes in response to climate change for their 2001 report, there were 21 papers available to review. A survey of such studies presented at a recent global symposium reports there are now over a thousand papers on the subject, and together they show widespread species range shifts. "Avoiding Dangerous Climate Change," May 2005, Report of the International Scientific Steering Committee, International Symposium on the Stabilisation of Greenhouse Gas Concentrations, page 12.

the earth has a history of quickly lurching from one climate pattern to another in a way that would make it far harder for nature and society to adapt.[10]

The mounting evidence has led the world's scientific community to speak out in unprecedented ways. Less than two months ago – in anticipation of the G8 Summit at which global warming was at the top of the agenda – the national science academies of 11 nations, including our own, spoke with one voice to deliver an unsolicited and remarkably pointed scientific message to the world leaders:

> Climate change is real. There will always be uncertainty in understanding a system as complex as the world's climate. However, there is now strong evidence that significant global warming is occurring. .... The scientific understanding of climate change is now sufficiently clear to justify nations taking prompt action.... We urge all nations .... to take prompt action to reduce the causes of climate change.... We call on world leaders ... to [a]cknowledge that the threat of climate change is clear and increasing."[11]

This message follows a growing number of statements and reports reflecting increasing concern from the Intergovernmental Panel on Climate Change, the National Academy of Sciences, the American Geophysical Union – indeed every independent scientific association that has looked at the issue.[12]

B. Global warming responses are mounting at every level of government, making it highly likely Xcel will face CO_2 emission limits in the years ahead.

Growing scientific concern over climate has spurred on a growing policy response. The Kyoto Protocol -- under which developed nations must reduce their greenhouse gas emissions to levels on average 5 percent below 1990 emissions by the period between 2008-2012 -- went into effect last year despite the fact that the US did not ratify it. Virtually every other developed nation did sign on, and many of those nations, particularly within the European Union (EU), have already adopted mandatory limits to reduce their greenhouse gases. EU's cap-and-trade system for CO_2 allowances began last January. As other developed nations proceed with efforts to reduce their emissions, pressure on the United States to follow suit has intensified, including most recently at the G8 Summit. The climate statement released following the Summit does not commit the U.S. to the binding emission reduction targets that many other G8 countries continue to

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[10] "Abrupt Climate Change: Inevitable Surprises, National Academy Press, online at http://www.nap.edu/catalog/10136.html?onpi_newsdoc121101.

[11] This statement was issued by the US National Academy of Sciences and its counterpart academies in Brazil, Canada, China, France, Germany, India, Italy, Japan, Russia, and the United Kingdom. It is available online at the website of the U.S. National Academies at http://nationalacademies.org/onpi/06072005.pdf.

[12] See, e.g., IPCC TAR; "Climate Change Science: An Analysis of Some Key Questions," 2001, National Academy of Sciences, http://books.nap.edu/books/0309075742/html/; and "Human Impacts on Climate," December 2003 statement by the American Geophysical Union, http://www.agu.org/sci_soc/policy/climate_change_position.html.

press for, but it does reflect a new recognition by the White House that global warming is an urgent threat, and it represents a new promise that the U.S. will once again work toward climate solutions on the international stage.[13]

Concern over climate change has also mounted in Congress in recent years. Just this summer, the Senate adopted a bipartisan resolution finding that greenhouse gases are warming the planet and posing substantial risks. For the first time, a significant majority of Senators called for "a comprehensive and effective national program of mandatory, market-based limits and incentives on emissions of greenhouse gases."[14] One of the sponsors of this resolution was Senator Pete Domenici (R-N.M), Chair of the Senate Energy and Natural Resources Committee, who issued a statement saying that "it has become clear to me that we need to do something to address climate change." He said that he was impressed by the tradeable CO_2 permits proposal contained in legislation by the Committee's ranking Democrat, Senator Jeff Bingaman (N.M.), but the Committee ran out of time to develop program details before this year's energy bill came to a vote in the Senate. He pledged to hold hearings on the cap-and-trade proposal this summer and work toward consensus.[15]

In the absence of federal greenhouse gas emission limits in the last few years, the primary policy response has occurred at the state level. In addition to the 20 states that have adopted renewable energy standards[16], partly in response to global warming, many have now adopted policies directly intended to limit greenhouse gas emissions. Several northeastern and mid-Atlantic states are moving ahead with their own regional cap-and-trade system, called the Regional Greenhouse Gas Initiative, that will impose mandatory limits on CO_2 emissions from their power sector.[17] Massachusetts, New Hampshire, Washington, and Oregon have already passed laws limiting power plant CO_2 emissions or requiring them to purchase offsets.[18] Washington, Oregon and California have combined to form the West Coast Governors' Global Warming Initiative, which involves a variety of steps to reduce greenhouse emissions from those states.[19]

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[13] "Climate Change, Energy, and Sustainable Development," Gleneagles Communique, July 2005, available online at: http://www.fco.gov.uk/Files/kfile/PostG8_Gleneagles_Communique.pdf

[14] Sense of the Senate on Climate Change, H.R.6 §1612, Energy Policy Act of 2005. This resolution passed by voice vote after a measure to table it failed by a vote o 54-43.

[15] See Statement by Senator Domenici, released June 20, 2005 by Marnie Funk, Communications Director of the Senate Energy and Natural Resources Committee.

[16] Twenty states and the District of Columbia now have Renewable Energy Standards, including those most recently adopted in Montana, Illinois and Delaware. Minnesota also has a renewable energy requirement for one utility, Xcel Energy. See, http://www.ucsusa.org/clean_energy/renewable_energy/page.cfm?pageID=47

[17] The website for this initiative, the Regional Greenhouse Gas Initiative, is at www.rggi.org. Members include Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. In addition, Maryland, the District of Columbia, Pennsylvania, the Eastern Canadian Provinces, and New Brunswick are participating as observers.

[18] "Emissions Standards for Power Plants," Massachusetts Department of Environmental Protection, 310 CMR 7.29; "Multiple Pollutant Reduction Program," New Hampshire Revised Statutes Ann. ch. 125-O; "Carbon Dioxide Mitigation," Washington Revised Code, ch.80.70; Carbon Dioxide Emissions Standard, Oregon Revised Statutes § 469.503.

[19] West Coast Governors' Global Warming Initiative, website at http://www.ef.org/westcoastclimate/

The global warming policies emerging from the state of California are the most dramatic. In 2004, California adopted regulations requiring automobiles to reduce their CO_2 emissions by an average of 29% by 2016, and several other states on both coasts have stated or suggested that they too will adopt California's standards.[20] In June, Governor Schwarzenegger issued an executive order announcing the target of reducing greenhouse gas emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80% below 1990 levels by 2050.[21] The following week, the governor of New Mexico set similarly ambitious reduction targets to reach: 2000 emission levels by 2012, 10% below 2000 emissions by 2020, and 75% below 2000 levels by 2050.[22] As we discuss more in section IIIB of these comments, California is also taking the lead in integrating anticipated CO_2 regulations into energy planning, requiring utilities to explicitly factor estimated future CO_2 allowance prices into their resource plans and bidding.

There is a widespread consensus that the most efficient way to impose limits on CO_2 emissions is through a cap-and-trade system similar to the one pioneered under the Clean Air Act's acid rain program. This regulatory approach has been adopted by the European Union, and it is under development by the east coast Regional Greenhouse Gas Initiative. It is the centerpiece of legislation sponsored by Senators McCain and Lieberman, which gained substantial support in the Senate last year. Moreover, the recent Senate resolution endorsing "market-based limits" on CO_2 shows widespread Senate support for some kind of cap-and-trade system.

C. Industry Leaders Increasingly Accept the Inevitability of Future Carbon Constraints.

In the last few years, there has been a distinct shift in the way the power industry views climate change and the need to respond. Earlier arguments minimizing the problem have in many cases been replaced by a recognition that some sort of carbon restrictions are inevitable, even necessary. Some industry leaders openly support new emission limits, if they are in the form of a cap-and-trade system, and even the idea of a carbon tax has gained surprising support within the industry.

American Electric Power (AEP), the largest electric generator in the country, initially fought the idea of carbon limits. It shifted its approach in the late 1990s toward preparing for those limits. "We felt it was inevitable that we were going to live in a carbon-constrained world," says Dale E. Heydlauff, AEP's senior vice-president for environmental affairs.[23]

In June, the head of Duke Energy, Paul Anderson, delivered a speech to energy industry leaders at the Houston Forum calling for an economy-wide federal carbon tax in

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[20] "Much of Coastal U.S. May Follow California on Car Emissions," New York Times, June 11, 2004.
[21] Executive Order S-3-05, June 1, 2005.
[22] "Governor Bill Richardson Announces Historic Effort to Combat Climate Change," Press release from the State of New Mexico, Office of the Governor, June 9, 2005, online at http://www.governor.state.nm.us/press/2005/june/060905_3.pdf .
[23] "Global Warming," Business Week, August 16, 2004, cover story.

response to global warming. "My real point today," Anderson said, "is that global climate change is not an issue that is going away. And if we don't take constructive action, others will." He was concerned about the competitive advantage Japanese and European competitors, in countries with mandatory emission reductions, were gaining over the U.S. "We have great faith in American innovation. The mandate to become less carbon intensive will spur the kind of technology innovation that we saw in the last century. Innovation that propelled us to become the world's leading economy. Set the right goals, and Americans can and will lead the way."[24]

Duke Energy may be alone within the industry in advocating a carbon tax, but not in calling for a major new federal response to climate change. AEP and Southern Company are both members of the working group looking at the future of coal under the Energy Future Coalition. This Coalition of industry, environmental groups, and labor issued a report in 2003 calling for cutting US carbon emissions by a third from current levels over 25 years. While not supporting mandatory limits, the coalition urges American leadership, innovation, and investment to deploy the "next generation of energy solutions," and believes that action should be immediate. "Because of the enormous inertia in energy systems, we recognize that these goals will be extremely difficult to reach. The proposals in this report will not get us there by themselves. But we have to begin now if we are to get there at all."[25]

Whether or not they support a drive for major carbon reductions like those supported by the Energy Future Coalition, many companies accept the likelihood of some carbon restrictions. The head of Cinergy, James E. Rogers, recently said , "we are planning the future of our company around our belief that we will eventually be required to operate in a carbon-constrained world."[26] Xcel Energy's own former CEO Wayne Brunetti has said that the US will likely impose carbon dioxide emission regulations "in one form or another" on the power industry in the near future,[27] and he is quoted in Business Week as saying, "Give us a date, tell us how much we need to cut, give us the flexibility to meet the goals, and we'll get it done."[28]

As in the political realm, it is widely assumed that future carbon regulations will come in the form of a CO_2 cap-and-trade approach. Cinergy worked with shareholder groups to prepare a report addressing the potential impact of climate regulations, which assumes a cap-and-trade system. Cinergy has announced its support for a carbon cap-and-trade system with an escalating cap on carbon allowance prices.[29] As we discuss

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[24] "Climate Change – Act or React," speech by Paul Anderson, CEO and Chairman, Duke Energy, to the Houston Forum, June 15, 2005. Online at http://www.duke-energy.com/news/mediainfo/viewpoint/act_or_react_climchange.pdf.

[25] "Challenge and Opportunity: Charting a New Energy Future," Report of the Energy Future Coalition, available online at http://www.energyfuturecoalition.org/pubs/EFC%20Report.pdf

[26] "Cinergy Releases Report on Potential Impact of Greenhouse Gas Regulation," Cinergy New Release, December 1, 2004. Available online at www.cinergy.com.

[27] "Xcel Energy expects US carbon regulations," Point Carbon, Sept. 9, 2004. www.pointcarbon.com.

[28] "Global Warming," ," Business Week, August 16, 2004, cover story

[29] "Cinergy Releases Report on Potential Impact of Greenhouse Gas Regulation," Cinergy New Release, December 1, 2004. Available online at www.cinergy.com.

below in section IIIB, Pacificorp and Idaho Power expect to have to purchase CO_2 allowances in the future, and have gone to some effort to predict their cost. And, of course, in Xcel's own modeling, four out of the five future carbon regulation scenarios explored assume a CO_2 cap-and-trade approach and project allowance prices. Xcel states in its response to one information request that it does indeed believe that carbon dioxide regulation in the US is "likely prior to 2033" and that "the most likely form of CO_2 regulatory limits will be in the form of a carbon tax or a cap and trade program with a safety valve."[30] Xcel has not submitted for Commission consideration any regulatory scenarios involving carbon taxes, suggesting that Xcel considers a cap-and-trade system more likely than a carbon tax, and we would agree (though in either case, there would be a new cost associated with future CO_2 emissions).

We must now assume that in the years ahead, Xcel and other Minnesota utilities will be required to pay for the right to emit carbon dioxide.[31] While mandatory limits in the U.S. may be some years away, it is now highly probable that such limits will be established well within the working lifetime of any coal plant built to meet the demand identified in Xcel's Resource Plan. Indeed, such limits could be in place before such a plant generates its first kilowatt-hour of energy.

The likely price range of these allowances is discussed further in section IIIB of these comments. Ultimately, of course, the price will depend on supply and demand and the availability of cost-effective alternatives. The supply side of that equation will be determined by how deeply emissions need to be cut.

D. Deep reductions in global greenhouse gas emissions may be needed to avoid dangerous climate change impacts.

While it is now broadly recognized that global warming is a real and urgent problem, the magnitude of commitments that the international community is likely to make in the post-Kyoto period has not yet been determined. Based on the most recent scientific evidence, however, the consensus emerging within the European Union is that long-run cuts as deep as 60-80% may be needed to meet the goal of avoiding "dangerous anthropogenic interference with the climate system." The world has been treaty-bound to work toward that goal since the Framework Convention on Climate Change, adopted in 1992 following the Earth Summit, and ratified by 188 nations including the United States. [32]

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[30] Xcel's response to IWLA/ME3/UCS/MCEA Information Request 20.

[31] It is possible that Xcel will *also* be required to reduce its CO2 emissions outside a cap-and-trade scheme. For example, Xcel is among the five utilities, the nations' largest, currently being sued in federal court by eight states over their contribution to global warming. These states are seeking from the utilities a substantial and sustained reduction in greenhouse gas emissions – on the order of 3% annually for ten years.

[32] "Framework Convention on Climate Change, Article 2, available online at http://unfccc.int/resource/docs/convkp/conveng.pdf

Determining what levels of greenhouse emissions and concentrations are dangerous has been the subject of much analysis since 1992, and there is a growing sense that those levels could be reached much sooner than previously thought.[33] The risk of dangerous impacts from climate change (particularly temperature increases) on both human and natural systems appears to increase greatly if the planet warms more than about 2° C (3.5° F) above pre-industrial levels, and we have already warmed 0.6° C (1.1° F) above pre-industrial levels). Evidence that warming greater than 2° C would be dangerous has been compelling enough to persuade the European Union to adopt the goal of limiting planetary warming to that level.[34]

Studies show that to have a reasonable chance of limiting warming to 2° C, net greenhouse gas emissions for both developed and developing countries must be cut by at least 15% to 50% by 2050 as compared with 1990 levels.[35] In March of 2005, the environmental ministers of the EU nations adopted the goal of reducing developed nation emissions by 15-30% by 2020 and by 60-80% by 2050.[36]

The U.K. adopted a similar target to the EU's in 2003, when the British government formally put itself on a path to reduce the nation's greenhouse gas emissions by 60% by 2050, with an internal goal of 20% reductions by 2010. At the same time, the U.K. pledged to push for a broader international consensus to get all developed nations to make the same cuts.[37] Britain has focused particularly on moving the United States toward emission reductions. As stated above, California recently adopted a target to reduce greenhouse gas emissions 80% below 1990 levels by 2050, and New Mexico has set a similar target to reduce emissions 75% below 2000 levels by 2050.

All these government leaders know that achieving such ambitious emission cuts represents a regulatory, economic, and technological challenge of historic proportions, and yet they are all moving forward with policies designed to achieve their targets. This is because staying on our current energy path is far too dangerous. It is also because we do have attractive energy alternatives, offering the prospect of vast economic opportunities along the path toward climate stabilization.

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[33] "Avoiding Dangerous Climate Change," May 2005, Report of the International Scientific Steering Committee, International Symposium on the Stabilisation of Greenhouse Gas Concentration; and Meinshausen, M. 2004. On the Risk of Overshooting 2°C. Proceedings of the UK DEFRA Symposium on Avoiding Dangerous Climate Change (in press).

[34] "Climate Change and a European Low-Carbon Energy System," European Environment Agency, Copenhagen 2005, page 10, online at http://reports.eea.eu.int/eea_report_2005_1/en/Climate_change-FINAL-web.pdf

[35] "Climate Change and a European Low-Carbon Energy System," supra, p. 7 and chapter 3.

[36] "Climate Change: Medium and longer term emissions reduction strategies, including targets. Council conclusions." Adopted by the Environment Council of the EU on March 10, 2005. Available from the EU website at http://ue.eu.int/uedocs/cmsUpload/st07242.en05.pdf . See also, "Lucien Lux welcomes the 'Environment' Council's agreement on climate change," Press release from the Luxembourg Presidency of the Council of the European Union 2005, March 10, 2005, online at http://www.eu2005.lu/en/actualites/communiques/2005/03/10Envircons/ ; and "Climate Change and a European Low-Carbon Energy System," supra.

[37] "Our Energy Future – Creating a Low Carbon Economy," U.K. Department of Trade and Industry, 2003, page 25, available online at http://www.dti.gov.uk/energy/whitepaper/ourenergyfuture.pdf .

While Minnesota may not become subject to a similarly ambitious emission reductions pathway in the very near future, we do believe that the same factors that have driven other governments to take up this challenge could eventually drive our state and our nation to do the same. Indeed, given the mounting scientific evidence and political momentum pointing in this direction, Minnesota energy planners should not assume otherwise.

II. XCEL'S RESOURCE PLAN FUNDAMENTALLY FAILS TO PLAN FOR THE CLIMATE-CONSTRAINED ERA AHEAD.

As the greatest challenge facing the power industry in the years ahead, climate change should be at the very center of Xcel's – and every utility's – long-term resource planning and decision-making. We commend Xcel for taking an extra-long perspective in its Resource Plan, looking forward thirty years rather than the required fifteen. However, the Resource Plan fails markedly to give future carbon limits the attention they deserve. Xcel fails to give the Commission and the public the information they need to determine how future regulations would drive shifts in the resource mix, in violation of the Commission's 2001 Order on the subject. This is a critical failing, because ***Xcel's own modeling shows that even under the scenarios with the lowest CO_2 allowance prices additional coal generation is uneconomical***.[38] Not only does Xcel's plan fail to highlight this important point, but it actually seems to state otherwise.

A. Xcel's resource plan violates the Commission's 2001 order by failing to provide the information necessary to compare how different resource mixes would fare under future regulations.

In accepting with modifications Xcel's 2000 Resource Plan, the Commission required Xcel in its next resource plan to provide:

> after discussions with the Department, an expansion of its CO_2 contingency planning to check the extent to which resource mix changes can lower the cost of meeting customer demand under different forms of regulation.[39]

Xcel does analyze five alternative CO_2 regulatory approaches, but it presents its analysis in a way that does not allow the Commission or the public to "check the extent to which resource mix changes" could lower costs under these alternative scenarios.

Xcel uses its SIAM model to calculate four different trajectories of possible CO_2 allowances prices, under different regulatory scenarios. Then the SIAM model goes well

[38] See the resource mix charts provided in Xcel's response to IWLA/ME3/UCS/MCEA Information Request 7d.

[39] In the Matter of Northern States Power Company's Application for Approval of its 2000-2014 Resource Plan, "Order Approving Xcel Energy's 2000-2014 Resource Plan, As Modified," August 29, 2001, Docket No. E-002/RP-00-787.

beyond that already complex calculation and estimates the effect that the allowance prices would have on various sectors of the state economy (though SIAM is apparently incapable of calculating any benefit to Minnesota's economy based on increased DSM, in-state wind or biomass production).[40] For each regulatory scenario, the model projected an economic slowdown and a resulting drop in demand for electricity. When the allowance and demand numbers were run through the Strategist model, the savings due to the drop in demand are greater than the costs of new regulations, creating the paradoxical result that even though all the projected CO_2 laws would impose new regulatory costs on Xcel, they all ultimately lead to reduced PVRRs.

Xcel's approach to this issue of future regulations adds a whole new layer of uncertainty into its analysis, depending as it does on a large new set of unstated but debatable assumptions about how society as a whole will respond to such regulations.[41] Trying to calculate the relative overall economic impact of different regulations might be relevant to those debating the best regulatory approach to climate change, but it is not helpful if your goal is to compare resource options in a CO_2-regulated world. In order to do that, you need to at least know the regulatory costs faced by different resource mixes under one or more regulatory scenarios. Unfortunately, the resource plan does not isolate those regulatory costs; they are buried deep within the PVRRs for each scenario (see Table 10-6 of the resource plan). The result is a discussion that defies any attempt to "check the extent to which resource mix changes" could lower the financial exposure of Xcel and Minnesota ratepayers to carbon regulations.

B. Xcel's resource plan fails to disclose that, under Xcel's modeling, even the lowest CO_2 allowance prices analyzed would drive an immediate shift away from coal to meet growth in demand.

Xcel's resource plan states the following, on page 10-24:

> [O]ur analysis of these five carbon control strategies suggests that an international trading program that allows the most cost-effective reductions in CO_2 emissions to be made first would minimize the effect on Minnesota's GSP, Xcel Energy's electricity demand *and not result in any significant changes to the Reference Case expansion plan.*

We are mystified by this statement, because we have learned through discovery that Xcel's own modeling shows that even the smallest CO_2 allowance prices that the company analyzed leads to a dramatic change in future resource expansion plans.

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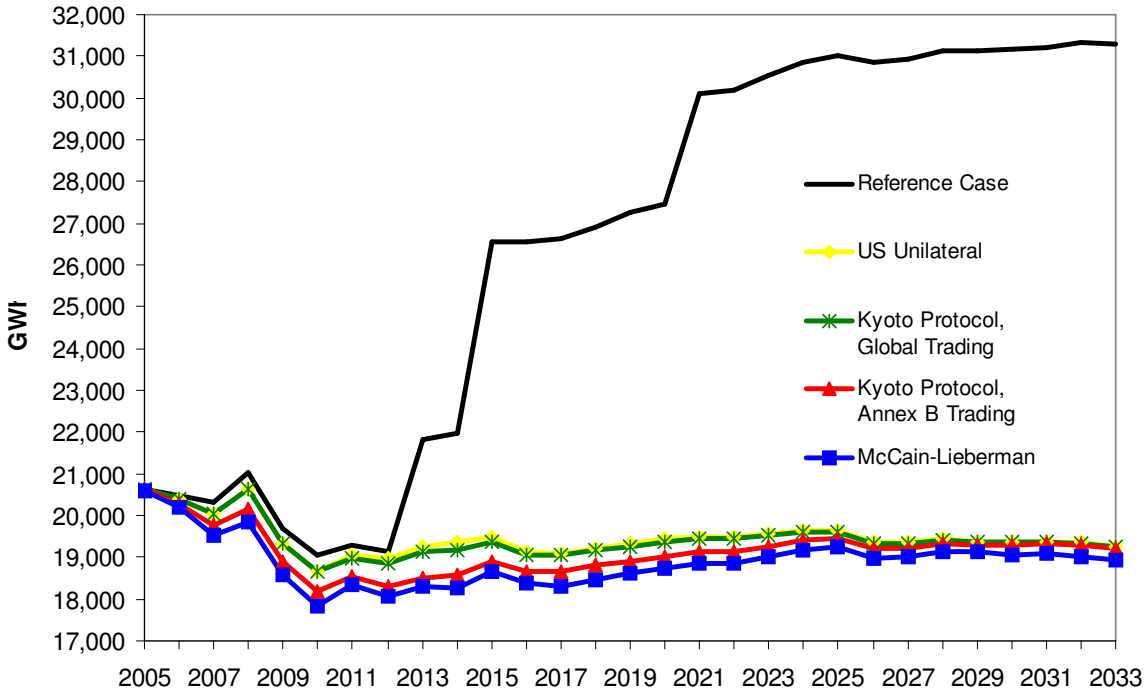
[40] See Xcel response to IWLA/ME3/UCS/MCEA Information Request 13c and 13f.

[41] We note that the makers of SIAM, Charles River Associates (CRA), has been criticized for using assumptions that exaggerate the economic impact of future CO2 allowances; for example, CRA's analysis of the McCain-Lieberman legislation predicts a much greater decline in GDP than a study of the same legislation by MIT, even though both studies assumed similar allowance prices. See, "Critique of the CRA Analysis of Lieberman-McCain Climate Stewardship Act (S.139)," by the Pew Center on Climate Change, October, 2003. Online at http://www.pewclimate.org/policy_center/analyses/cra_s_139_critique.cfm.

Under the Kyoto Protocol, Global Trading scenario, which is the most modest of the four allowance scenarios, Strategist shows that generation from coal peaks at 20,639 GWh in 2005, just before the allowance costs begin in 2006. Thereafter coal generation remains at a somewhat lower level throughout the period modeled. Similar results are obtained for coal from Strategist under every one of the CO_2 allowance scenarios.[42] In stark contrast, under the Reference Case, which assumes no CO_2 regulations, coal generation increases by over 50% over the next 30 years, including leaps in 2013 and 2015 that presumably represent new coal plants built to meet the new baseload Xcel says it needs in this Resource Plan.[43]

We present in graphic form below the impact that the four CO_2 allowance scenarios Xcel modeled have on the future of coal generation in Minnesota compared to coal generation under the Reference Case, which assumes no CO_2 regulations (as calculated by Strategist and provided by Xcel in responses to our information requests):

Figure 1. Coal Generation under Xcel's Preferred Plan (Reference Case) and Carbon Reduction Regulatory Scenarios (GWh)



Source: Xcel responses to IWLA/ME3/UCS/MCEA Information Requests 7d and 19b.

Far from not resulting in "any significant changes to the Reference Case expansion plan," it is plain that even the lowest CO_2 allowance costs analyzed effectively eliminate the growth of coal generation throughout the model period. Instead of turning to coal to meet demand growth, Strategist models a dramatic, thirty-year-long shift

[42] See Xcel's response to IWLA/ME3/UCS/MCEA Information Request 7d (pages 7, 8, 10, and 11)
[43] See Xcel response to IWLA/ME3/UCS/MCEA Information Request 19b.

toward gas generation. This shift toward gas generation as the preferred option under Strategist appears to occur even with the changes in natural gas prices SIAM predicts to occur under CO_2 regulations.[44]

The Commission and the public would not know this important fact from reading Xcel's Resource Plan. Indeed, they would be left with precisely the opposite impression – that future allowances would not cause any significant change in resource decisions.

We do not draw attention to the Strategist model runs produced in discovery because we think they model the optimal future. We note that they include some highly counter-intuitive results. For example, wind power rises for several years and then mysteriously begins to fall, and "other renewables" fall under most of the scenarios throughout the decades. These reductions in wind and other renewables occur despite the relative advantage such carbon neutral energy sources would enjoy under a CO_2 regulatory scheme, along with the REO, wind and biomass mandates, and the cost improvements likely to emerge as these industries mature. In contrast to Strategist's results, we are confident that the least-cost course of action in a carbon-constrained future would involve steadily increasing use of renewables. We also believe that rising CO_2 costs and technology advances will make greater levels of DSM economic and achievable, reducing energy demand in ways not reflected by Strategist.

The Strategist runs may not illustrate the optimal future, but they do vividly illustrate some important things. They show that factoring CO_2 regulations into resource planning completely changes the least-cost resource mix. They show that Xcel's plan to add new coal plants in 2013 and 2015 is the least-cost plan only if one assumes those plants will not have to pay even modest allowance prices for their CO_2 emissions – a no longer reasonable assumption. And, they show that factoring in CO_2 regulations demands a thorough, public, and transparent analysis consistent with the vital purpose of resource planning.

C. Xcel's analysis fails to calculate the impact of CO_2 regulations on its Preferred Plan.

Xcel's plan fails to answer the single most important question it should have addressed – under carbon-constrained regulatory scenarios, what new costs would Xcel and potentially its ratepayers[45] face if Xcel does what it currently proposes in its Resource Plan? The discussion of future CO_2 regulatory scenarios in Chapter 10 purports to present a "Reference Case Analysis" (p. 10-21). In introducing Table 10-6, Xcel says that it:

[44] See Xcel's response to IWLA/ME3/UCS/MCEA Information Request 8, comparing natural gas prices under the CO2 regulatory scenarios with those assumed in the absence of CO2 regulation [Non-Public Document – Contains Trade Secret Data.]

[45] As we discuss in part IIIC below, we believe that unreasonably-incurred CO2 costs should be incurred by Xcel's shareholders, and not be passed on to ratepayers.

> presents the effect of the five CO_2 scenarios on resource planning costs. For each scenario, Xcel Energy changed the Reference Case's electric demand and carbon emission costs in accordance with SIAM's outputs for the five SIAM trading scenarios.

What the text does not say is that in addition to changing the CO_2 costs and the demand levels, Xcel allowed Strategist to completely change the resource mix to strip out the 1125 MW of new coal from all the allowance scenarios (and, as discussed above, replace it with new gas). In other words, Xcel did not "hardwire" the Reference Case resource mix into Strategist so that the costs to ratepayers of the Reference Case resource mix – subject to various types of CO_2 cost scenarios – could be calculated.

In our discovery requests we asked Xcel to model the impact of three of the four regulatory scenarios on its Preferred Plan. In responding to our requests, Xcel once again "optimized" Strategist, which allows it to replace the resource mix of the Preferred Plan with a completely different one of its own choosing (which, like with the other scenarios described in Table 10-6 of the Resource Plan, replaces new coal with new gas, and results in a significant reduction of total generation, which lowers revenue requirements)).[46] Following subsequent communications with Xcel, the company agreed to run the models again, this time forcing Strategist to accept the two new coal plants included in its Preferred Plan, though Strategist was allowed to optimize other aspects of the plan, resulting in substantially less actual use of coal than under CO2-unregulated circumstances. Xcel reintroduced into these model runs the reduced demand numbers from SIAM (which projects an overall economic decline that other, more independent economic studies do not project). This had the effect of substantially reducing the overall PVRR, just as it did in the Resource Plan, since so much less energy needs to be produced. As a result, the revised model runs still fail to show the full financial risk of Xcel's coal-heavy path under the various CO2-cost scenarios if the economy fails to decline in the way SIAM projects.

However, it is possible to make a straightforward projection of the CO2 regulatory costs that would be faced under the Reference Case by simply multiplying the projected CO_2 allowance costs (calculated by SIAM) by the CO_2 emissions Xcel quantified for its Reference Case in response to our information requests. This analysis shows that using the CO2 allowance prices that SIAM projects under a McCain-Lieberman regulatory scenario, the PVRR of the Reference Case increases by $2.9 billion, or by a substantial 9.8% . Under SIAM's *lowest* CO_2 Cost scenario, this calculation results in a 3.4% higher PVRR for the ReferenceCase, and under SIAM's highest CO2 Cost scenario, the Reference Case PVRR increases by almost 20%.[47]

These substantial CO_2 costs are not reflected in the PVRR for the Preferred Plan that Xcel has put before the Commission for consideration; indeed, no CO2 costs of any size are reflected in that PVRR, one can calculate the PVRR for the Reference Case under the CO_2 Cost scenarios.

[46] Xcel responses to IWLA/ME3/UCS/MCEA Information Request 21a, 22a, and 23a.
[47] See, calculations contained in attached Exhibit 1, prepared by IWLA/ME3/UCS/MCEA.

This is a remarkable oversight given that, as Xcel stated in response to our Information Request, "Xcel Energy believes that mandatory carbon dioxide regulation in some form in the United States is likely prior to 2033."[48]

The fact that Strategist prefers a no-new-coal resource plan when CO_2 regulations are factored in is further evidence that Xcel's Preferred Plan is not a reasonable choice. Xcel discusses the risk of future CO_2 regulation and employs a computer model to calculate possible allowance costs, yet its Preferred Plan does not reflect the likelihood of future CO_2 regulations.

III. THE COMMISSION SHOULD REQUIRE XCEL TO MAKE FUTURE CARBON CONSTRAINTS A CENTRAL FEATURE OF ITS LONG-TERM ENERGY PLANNING, FULLY AND OPENLY ANALYZING ALL RELEVANT FACTORS AND BUILDING A CO_2 "HEDGE VALUE" INTO DECISION-MAKING.

The Commission should respond to the failure of Xcel's resource plan to actually *plan* for climate constraints by explicitly outlining the elements of planning that are necessary to give this critical issue an airing sufficient to allow the Commission and the public to play a role in charting Xcel's long-term course. There are, of course, significant uncertainties regarding the type of regulations that lie ahead, the timing of their establishment, and the size of regulatory costs faced. However, these uncertainties do not reduce the need for transparent, long-term planning; they increase that need – particularly when a utility is proposing to make a multi-decadal commitment to new, high-carbon baseload.

Minnesota's resource planning statute requires the Commission to approve, reject, or modify a resource plan "consistent with the public interest." Minn. Stat. § 216B.2422, subd. 2. The Commission's rules elaborate on the factors that go into that determination, including whether the resource plans "keep ... rates as low as practicable given regulatory and other constraints," "minimize ... adverse effects upon the environment," "enhance the utility's ability to respond to changes in the financial, social, and technological factors affecting its operations," and "limit the risk of adverse effects on the utility and its customers from financial, social, and technological factors that the utility cannot control." Minn. R. 7843.0500, subp. 3(B) through (E). The Commission cannot make a decision supported by substantial evidence on any of these factors given the failure of the resource plan currently before it to address future carbon constraints in a way that enables a clear comparison of financial risk under different resource expansion plans.

Minnesota's statute also states that the Commission "shall not approve a new or refurbished nonrenewable energy facility in an integrated resource plan or a certificate of need ... for a nonrenewable energy facility, unless the utility has demonstrated that a renewable energy facility is not in the public interest." Minn. Stat. § 216B.2422, subd. 4. The Certificate of Need statute makes clear that any such determination of public interest

[48] Xcel response to IWLA/ME3/UCS/MCEA Information Request 20a.

for a nonrenewable energy facility must include the consideration of "environmental costs." Minn. Stat. § 216B.243, subd. 3a. In the past legislative session, the legislature adopted new language emphasizing the importance of factoring future environmental regulations into the review of new energy facilities:

> if the applicant is proposing a nonrenewable generating plant, [the commission shall evaluate] the applicant's assessment of the risk of environmental costs and regulation on that proposed facility over the expected useful life of the plant, including a proposed means of allocating costs associated with that risk.

S.F. No. 1368, 3rd Engrossment, Art. 1, section 5 (amending Minn. Stat. § 216B.243, subd. 3). These laws and others establish a legislative preference for renewable power over nonrenewable plants, representing an increasingly high burden of proof a utility has to meet to show that nonrenewable plants are in the public interest.

While Xcel is not proposing specific new coal plants in this resource plan, new pulverized coal plants are nonetheless the central feature of its plan for meeting future customer demand, its short-term Action Plan resource acquisition efforts, and the cost projections for Xcel's preferred plan -- against which all other alternatives are compared. Assessing the wisdom of Xcel's resource plan, as the Commission now must do, therefore requires a focused consideration of future carbon costs.

A. Xcel should be required to conduct a thorough and transparent analysis of the impact of future carbon constraints in its next resource plan or in any Certificate of Need proceeding.

The Commission acknowledged the importance of planning for CO_2 regulations in its 2001 Order. Since then four important things have happened: (1) the need for regulations that achieve deep long-term cuts in CO_2 has become much more apparent, (2) Xcel has proposed a substantial amount of new coal-fired baseload, (3) the legislature has adopted explicit language requiring an analysis of future environmental regulations before approving any nonrenewable energy facility, and (4) Xcel has failed to comply with the Commission's 2001 Order. The time is ripe for the Commission to insist that far more serious attention be paid to future carbon limits. We urge the Commission to order Xcel to conduct detailed planning by explicitly identifying the planning components needed to enable the Commission to make the findings required under the resource planning statute and rules.

The Commission should order Xcel to provide in its plan at least the following elements:

1. Information necessary to project the likely level of future CO_2 allowance prices over the next 30 years, including:

a. projected CO_2 allowance prices for at least three potential cap-and-trade regulatory scenarios representing the company's best-estimate projection bounded by high and low projections, based on a survey of international and national proposals and peer-reviewed scientific projections of emission reductions needed by 2050 on a global and national basis;

b. at least one projection estimating the regulatory costs that would result from a national effort to achieve emission reductions in the range of 60-80% by the year 2050;

c. an analysis of the relative likelihood of each regulatory scenario considered;

d. a description of the critical components of each regulatory scenario considered, including the level of the CO_2 cap, the schedule of emission reductions, the availability of domestic and international trading and its impact on allowance prices, the industry sectors covered by the regulations, the means by which allowances are allocated or auctioned off, and any "grandfathered" emissions for which allowances need not be bought;

e. all assumptions that went into the calculation of likely allowance costs required above, including those related to improvements in renewable, coal, gas, nuclear and efficiency technologies, the impact of efficiency and conservation, and major shifts in the national energy mix; and

f. a survey of allowance projections put forth by state and federal regulatory bodies, by peer-reviewed literature, by other utilities (or by Xcel in other regulatory contexts), and by other industry sources.

2. Information necessary to assess the financial exposure of Xcel and Minnesota ratepayers to future CO_2 regulations, and to assess the comparative impact of future regulations on Xcel's preferred plan and several other resource mixes, including those required by law or by Commission order to be included in the plan (hereafter, "each considered resource mix"), over the next 30 years:

a. Xcel's current CO_2 emissions profile;

b. the projected CO_2 emissions profile for each considered resource mix;

c. how high, best-estimate, and low projections of CO_2 allowances prices change the least-cost resource mix modeled by Xcel's Strategist computer model (or Strategist's successors);

d. for each considered resource mix, the incremental resource additions, the annual energy mix, the costs associated with each incremental addition (including high, best-estimate, and low regulatory costs), total system regulatory costs, and the PVRR; and

e. the impact of high, best-estimate, and low CO_2 price projections on DSM and efficiency investments for each considered resource mix.

3. A discussion of the status of existing and new technologies that might assist Xcel in shifting to low- or no-carbon energy and improve efficiency, and any projected technological and price improvements.

4. Information necessary to compare Xcel's preferred plan to alternative approaches explicitly designed to reduce exposure to future CO_2 costs, including:

a. Xcel's plan for meeting Minnesota demand over the next 15 years if the company's CO_2 emissions were capped at existing levels;

b. Xcel's plan for meeting Minnesota demand if it were required to reduce its CO_2 emissions by 1 % per year (on average) for the next 15 years;

c. Xcel's plan for meeting Minnesota demand if it were required to reduce its CO_2 emissions by 3% per year (on average) for the next 10 years.

We recognize that requiring this level of detail in utility plans is unprecedented, but the enormous planning challenge posed by climate change and the climate constraints ahead is also unprecedented. Information required in items (1) and (2) is directly related to estimating environmental costs over the life of the plant as required by recent legislation, and to conducting the kind of resource mix comparison the Commission required in its 2001 Order. Item (3) ensures that the fast-changing technological landscape is kept firmly in mind during the planning process so that Xcel and Minnesota can take advantage of emerging opportunities. Item (4) requires prudent contingency planning in the event that future CO_2 regulations do not allow allowance trading, or if Xcel is required by court order to reduce its CO_2 emissions based on the current federal lawsuit by 8 states against Xcel and other utilities ("8-state litigation") or by other lawsuits in the future. The 8-state litigation seeks an order requiring Xcel to substantially reduce its CO_2 emissions on the order of 3% annually for ten years.

We recommend that the Commission reject that portion of Xcel's resource plan that deals with future risks of carbon regulation, and order it to either redo that section as specified above, or include the necessary analysis in its next Resource Plan or Certificate of Need application, whichever comes first. In addition, the Commission should reject Xcel's Action Plan and Preferred Plan because they are based on Xcel's failed analysis of the future risks of carbon regulation.

Because the necessary analysis will take some time to complete and for other reasons discussed below, we additionally urge the Commission to adopt a "CO_2 hedge value" as described in the next section. This hedge value would be used in bidding, non-competitively bid resource acquisition, and DSM decision-making in the meantime, and would stand as the default "best-estimate" of future CO_2 allowance prices in resource planning and certificate of need proceedings, unless the utility shows that another estimate of CO_2 allowance prices is more reliable.

B. The Commission should adopt a "CO_2 hedge value" of $8/ton-$CO_2$ to immediately begin protecting Minnesota ratepayers from the risks of future CO_2 costs.

Utilities and state PUCs looking for ways to immediately hedge against the substantial financial risk posed by high carbon resource mixes under future CO_2 regulations are increasingly turning to the same approach -- estimating future CO_2 costs and factoring the resulting numbers into current resource decision-making. Once future costs are estimated, they can be factored into resource acquisition decisions, into the setting of DSM targets, and used in resource planning.

Representatives of three utilities recently published an article in a trade journal explaining the need for hedging this financial risk:

> The financial risk associated with likely future regulation of carbon dioxide emissions is becoming a focus of utilities' and regulators' risk management efforts, as they recognize the imprudence of assuming that carbon dioxide emissions will not cost anything over the 30-year or longer lifetime of new investments. Utilities can help protect their customers and shareholders from this financial risk by integrating an estimated cost of carbon dioxide emissions into their evaluation of resource options, and selecting the overall least-cost portfolio of resources. Utilities can learn from the experience that some utilities have gained at managing this risk to ensure that today's investments do not lock customers or shareholders into much higher costs tomorrow if greenhouse gases are regulated.[49]

Pacificorp[50] and Idaho Power[51] quantify future CO_2 costs as part of the risk analyses in their resource plans as a way to assess and limit the very foreseeable financial risk of CO_2 regulation. Pacific Gas and Electric was developing the same method internally when California ordered all state utilities to impute future CO_2 costs in bidding, resource

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[49] Karl Bokenkamp [Idaho Power], Hal LaFlash [Pacific Gas & Electric], Virinder Singh [Pacificorp], Devra Bachrach Wang, "Hedging Carbon Risk: Protecting Customers and Shareholders from the Financial Risk Associated with Carbon Dioxide Emissions," The Electricity Journal, July 2005, Vol. 18, Issue 6, pp. 11-24.

[50] See Pacificorp's 2003 Integrated Resource Plan, pages 121-124, and its 2004 Integrated Resource Plan, pages 155-160, available online at http://www.pacificorp.com/Navigation/Navigation23807.html.

[51] See Idaho Power's 2004 Integrated Resource Plan, pages 71-72. www.idahopower.com/pdfs/energycenter/irp/2004_IRP_final.pdf.

planning, and DSM evaluation.[52] And Xcel itself is using such a value in evaluating bids under a settlement agreement approved by the Colorado PUC.[53]

These estimates of future CO_2 regulatory costs that are built into current resource decision-making go by different names. They are called "CO_2 proxy costs" in the Colorado order approving the settlement under which Xcel agrees to use them when evaluating resource bids. Idaho Power uses the term "carbon tax risk," while Pacificorp refers to "CO_2 allowance costs." The California PUC calls them "CO_2 Adders." We use the term "CO_2 hedge value," because it most accurately reflects the purpose and impact of the value – hedging against a foreseeable financial risk.

A hedge value is not an externality value. It does not seek to quantify costs that fall outside the system, but rather to estimate real expected costs that will fall upon utilities and their ratepayers when future CO_2 limits are in place. The goal of a hedge value, therefore, is not to reduce costs to the environment, but to avoid future costs to ratepayers. In its 2004 Integrated Resource Plan, Idaho Power explains that "it is prudent to incorporate reasonable estimates for the cost of carbon dioxide emissions into the IRP resource modeling and analysis, and to thereby actively seek to lessen the Company's and customers' exposure to the financial risk associated with carbon emissions."[54]

Minnesota ratepayers depend more heavily on coal power than most of the customers of utilities currently using hedge values. That added dependency on coal makes us more vulnerable to future CO_2 regulatory costs, and even more in need of a hedge value to use in assessing resource alternatives today.

While hedge values have now been calculated by several parties, by far the most well-supported value is that adopted by California, following an elaborate and inclusive process, complete with written testimony, hearings, briefing and argument by multiple parties, and a comprehensive economic study commissioned for the purpose. Based on this process, the California PUC adopted in April a final CO_2 value with a net present value of $8 per ton CO_2, based on a cost stream of $5 per ton CO_2 in the near term, $12.50 per ton CO_2 by 2008, and $17.50 per ton CO_2 by 2013 (using a 8.15% discount rate).[55]

The basis of these numbers is a report prepared for the California PUC by Energy and Environmental Economics, Inc. and the Rocky Mountain Institute (hereafter, the "E3 report").[56] The E3 Report analyzed the growing literature estimating future CO_2 costs. It noted that the literature fell into two categories – technical-economic (bottom-up)

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[52] California PUC, "Order Adopting Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas and Electric Company's Long Term Procurement Plans," Decision 04-12-048, Proceeding R.04-04-003, December 16, 2004, pages 146-154.
[53] Colorado PUC Decision No. C05-0049, January 21, 2005.
[54] Idaho Power's 2004 Integrated Resource Plan, page 71.
[55] California PUC, "Interim Opinion on E3 Avoided Cost Methodology," Decision 05-04-024, Proceeding 04-04-025, p. 29 (adopting adders calculation in E3 report, p. 89).
[56] "Methodology and Forecast of Long-Term Avoided Cost(s) for the Evaluation of California Energy Efficiency Programs," October 25, 2004, available online at www.ethree.com/cpuc_avoidedcosts.html.

models, which tend to project lower costs, and macroeconomic (top-down) models that tend to project higher costs. E3 analyzed studies in both categories to establish "robust estimates of future CO_2 cost implications."[57]

E3's projections are just as applicable to Minnesota as they are to California, based as they are on national studies. We urge the Commission to take official notice of the E3 study and the California PUC decisions, and to follow California's lead in adopting the same value.

We note that the California hedge value is consistent with the range of values calculated and used in other contexts. Pacificorp uses a base case value of \$8/ton-CO_2, assuming a 50% probability of an \$8/ton allowance cost starting in 2010, increasing to a 100% probability of occurrence by 2012. In its 2004 resource planning it also evaluates the impact of \$0, \$10, \$25, and \$40 per ton values to more fully assess risk to ratepayers.[58] (In its 2003 resource plan Pacificorp also looked at a \$2/ton value, but replaced that scenario with the \$10/ton value in 2004).[59] Idaho Power's base case scenario assumes a \$12.30/ton-CO_2 value beginning in 2008, but also analyzed a no cost scenario and a high cost scenario of \$49.21/ton-CO_2, stating that "these costs represent reasonable estimates of the risk that IPC and its customers face due to potential future regulation of carbon dioxide emissions."[60] In testimony submitted to the Colorado Public Utilities Commission, Xcel claims that for political reasons, the upper bound costs for a CO2 policy would likely be in the range of \$10-\$15 per ton of CO2.[61] Meanwhile, Xcel has agreed to use a cost of \$9 per ton of CO2 for evaluating the costs of new resources in the competitive solicitation process, under a settlement agreement on its least cost plan in Colorado.[62]

The hedge value is an important supplement to the CO_2 planning process outlined above. It gives an immediate, transparent, and automatic way to build the consideration of future CO_2 regulations into the resource acquisition decision-making process.[63] It also establishes a default best-estimate of future allowance costs, based on the most thorough analysis of the issue that we are aware of, and the only analysis that has been adopted by another utilities commission. This gives Xcel and the Commission a solid base from which to conduct additional projections.

However, the hedge value is not an adequate substitute for the planning process described above, or even for the part of the process devoted to projecting future allowances. Prudent long-term resource planning -- especially as it relates to high-cost,

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[57] Id., p. 86.
[58] Pacificorp 2004 Resource Plan, page 155.
[59] Compare to Pacificorp 2003 Resource Plan, page 122.
[60] Idaho Power 2004 IRP, at 71.
[61] See, attachment to Xcel Response to IWLA/ME3/UCS/MCEA Information Request No. 20d.
[62] See, Xcel Response to IWLA/ME3/UCS/MCEA Information Request No. 20.
[63] We emphasize that when a hedge value is used in resource acquisition, it is not paid to any party. It is simply used in selecting the resource likely to have the least impact on rates when future costs are considered.

high-carbon baseload additions -- must more fully capture the range of uncertainty associated with the size of future CO_2 allowances. That uncertainty should be bounded by high- and low-cost estimates, such as those used by Pacificorp and Idaho Power, based on plausible worst- and best-case scenarios. That would give Xcel, regulators and the public an idea of the full range of financial risks in a way that a single best-estimate cannot.

It is particularly important to require planning based on long-term cost estimates higher than the hedge value, because the E3 cost projections are based on allowance prices needed to achieve Kyoto (or less ambitious) targets. As a result, the E3 cost projections are most reasonably seen as medium-term cost estimates. Truly assessing the regulatory risk faced by new coal plants involves factoring in the very real possibility that those plants will operate under a national cap designed to achieve CO_2 cuts in the 60-80% range by mid-century.

C. Xcel should not be allowed to shift the unreasonably-incurred risk of future CO_2 regulations onto ratepayers.

In its recent amendments to the Certificate of Need statute, the Minnesota legislature required those wishing to build nonrenewable plants to assess the risk of environmental regulation during the life of the plant, and went on to require them to include "a proposed means of allocating costs associated with that risk." S.F. No. 1368, 3rd Engrossment, Art. 1, section 5 (amending Minn. Stat. § 216B.243, subd. 3). In other words, no utility can assume that regulatory costs associated with nonrenewable plants will be automatically passed through to ratepayers. They must propose a means of allocating those costs between ratepayers and the utility shareholders, and the Commission must decide how those costs should be allocated.

This is consistent with another law where the legislature has set a somewhat higher bar for rate recovery of costs associated with nonrenewable power. Under the resource planning statute the Commission must deny rate recovery for new nonrenewable energy facilities unless the utility has demonstrated that a renewable facility was not in the public interest. Minn. Stat. § 216B.2422, subd. 4. And of course, the Commission has a standing duty to ensure that rates are reasonable and to only allow recovery of reasonably-incurred costs.[64]

There are tremendous financial dangers associated with building costly and long-lived coal plants when the world is mobilizing to reduce CO_2 emissions. If Xcel or any utility believes that those regulatory costs can be automatically passed-through to ratepayers, they will have no incentive to minimize those costs. The Commission should

[64] See, Minn. Stat. §216B.03; *Petition of Interstate Power Co.*, 416 N.W.2d 800, 806-807 (Minn. Ct. App. 1987) ("Prudency of investment is a fundamental consideration in determining whether a utility's proposed rates are just and reasonable. . . . Implied within the Commission's entire analysis is a finding that the costs following the preliminary planning stage were 'imprudent.' We believe the Commission properly disallowed amortization of imprudent costs.").

warn Xcel that, consistent with Minnesota law and ratemaking principles, the future costs of CO2 regulations will be borne by Xcel shareholders and not by ratepayers if the Commission determines that it was unreasonable to incur those costs.

The need to make that reasonableness determination is additional reason for insisting that Xcel thoroughly explore the risk of future CO_2 limits. It establishes a record on which to judge whether it was reasonable to plan new coal plants given the mounting evidence that the battle against climate change would make fossil fuel generation and especially coal-fired generation considerably more expensive in the decades ahead.

IV. XCEL'S PROPOSED DSM GOALS SHOULD BE INCREASED TO 123 MWS AND 255 GWHS ANNUALLY FOR THE RESOURCE PLAN PERIOD.

As the Commission is well-aware, the resource planning process is predicated on the idea of meeting the energy needs of utility customers at the lowest total cost to ratepayers, while taking into account environmental and socioeconomic costs. In other words, the goal is to meet customers' needs with the lowest utility revenue requirements, with environmental costs monetized to the extent practicable. When Xcel Energy runs its resource planning models to select supply side resources, the model selects the mix of resources with the lowest revenue requirement and thus the lowest total customer cost.

Because Xcel's models were developed to evaluate supply side resources, DSM is treated differently. Because DSM is so low cost, unless adjusted, Xcel's model would select only DSM to meet future needs. Consequently, Xcel has to limit the amount of DSM selected so that additional supply side resources can be selected to fill out the entire portfolio of resources.

To determine this limit, Xcel has conducted extensive studies to determine the amount of achievable DSM. Xcel begins by estimating the technical potential of DSM regardless of cost, and then estimates how much of this technical potential can be achieved economically. Finally, Xcel estimates how much of this economic potential is actually achievable.

In spite of careful and thorough analysis, the final estimate of achievable potential is just that, an estimate. In fact, what Xcel actually achieved over the past ten years is considerably more it thought it could achieve.

With a resource plan that proposes additional base load resources, and the potential for additional future costs imposed by a surcharge on carbon emissions, the economics of DSM relative to supply side resources become even more impressive. For example, in Xcel's most recent Conservation Improvement Plan (CIP), the cost of conserved energy was approximately 1.4 cents per kilowatt-hour (¢ / kWh). Recently, the Energy Information Administration, a division of the U.S. Department of Energy, estimated that the cost for a new coal plant in the United States, levelized over the

lifetime of the plant, is just over 5¢ / kWh.[65] Including a carbon "hedge value" in the range of $8 per ton of CO_2 would add about 0.8 ¢ / kWh increasing the total price of a coal plant to approximately 5.8¢ / kWh. Comparing this to Xcel Energy's projected cost of its overall CIP over the next two years at 1.4¢ / kWh, one can see the obvious economic benefits to ratepayers of energy efficiency. In fact, if one looks at only that portion of Xcel Energy's CIP plan that is focused exclusively on energy conservation programs (i.e., the energy savings that most closely relate to the performance of a baseload coal plant) the actual cost to ratepayers is even lower at 0.9¢ / kWh.

Of course, if a great deal more energy efficiency were achieved, the incremental cost of energy efficiency would certainly increase. But even if it doubled or tripled over current levels it would likely result in lower revenue requirements for Xcel than any new supply side option.

The reason we do not fully utilize DSM to minimize total revenue requirements in Minnesota is because of our method of ratemaking. Like many states, Minnesota begins its ratemaking process by determining a utility's total revenue requirement. The revenue requirements are then apportioned to different customer classes and are collected through rates based on each kWh that is sold. Once rates are set, utilities have a strong incentive to sell as much energy as possible. Each kWh sold that exceeds the revenue requirement becomes tremendously profitable for the utility. Conversely, each kWh saved looks like a very significant revenue loss to the utility. Also, if DSM slows or eliminates the growth in energy sales, utilities will often say conservation is increasing rates since revenue requirements are prorated over fewer kWh.

There are methods of adjusting rates that "decouple" utility sales from the collection of their revenue requirements. These decoupling strategies make minor adjustments to rates annually to ensure that utilities neither over-earn nor under-earn their revenue requirements. This eliminates a utility's incentive to increase its sales and eliminates a utility's disincentive to promote energy efficiency. In fact, decoupling can facilitate the provision of utility financial incentives for significant achievement in efficiency or in otherwise meeting public policy objectives.

But for now, Minnesota has not decoupled revenue requirements from energy sales. Thus, our following recommendation on DSM recognizes the inherent biases against DSM in our current ratemaking method. Within the context of our current ratemaking method, Xcel Energy, to its credit, has taken the lead in this state on aggressively pursuing energy efficiency efforts.

In this 2004 Resource Plan, Xcel Energy has proposed to increase its DSM goals by 16.8% over its 2000 Resource Plan goal. Although it is encouraging to see Xcel increase its commitment to DSM activities beyond its Resource Plan from four years ago, Xcel can, and has, done better. Recent performance by Xcel Energy has shown that it has greatly outperformed its 2000 Resource Plan goals.

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[65] *Annual Energy Outlook 2005,* Energy Information Administration.

Table 1: Xcel Energy DSM Performance						
Year	2000 IRP Demand Goal	Actual Demand Savings (MWs)	% of Goal	IRP Energy Goal	Actual Energy Savings (GWhs)	% of Goal
2000	84	116	138.1%	182	246	135.2%
2001	84	139	165.5%	176	254	144.3%
2002	108	121	112.0%	244	267	109.4%
2003	90	110	122.2%	231	245	106.1%
2004	83	128	154.2%	224	265	118.3%
Average	89.8	123	138.4%	211.4	255	122.7%

These numbers from Table 6.1 in Xcel Energy's 2004 Resource Plan have been updated based on its 2004 Status Report in Docket No. E,G002/CIP-02-854. The result is that, on average, Xcel Energy has saved 123 MWs and 255 GWhs annually for the last five years. It has exceeded its 2000 Resource Plan demand goal by an average of 38.4%, significantly more than Xcel's proposed DSM goal increase of 16.8%.

This performance has been achieved under the direct oversight of the Department of Commerce, which ensures that utility expenditures are in the interest of society, ratepayers, and the utility. If compounded over the entire term of the Resource Plan, Xcel could realistically save 1,845 MW, considerably more than Xcel's preferred plan of 1,063 MWs.

Xcel Energy ran several different DSM scenarios and calculated the PVRR of each plan. These results, from Table 3-5, page 3-10 of the 2004 Resource Plan, indicate the actual PVRRs for each scenario.

Table 2: DSM PVRR Results				
DSM Scenario	Low Externalities	High Externalities	Low Externalities (difference from Xcel's preferred plan)	High Externalities (difference from Xcel's preferred plan)
1063 MW (Xcel's Preferred Plan)	29,180	30,980	0.000%	0.000%
1156 MW	29,165	30,955	0.051%	0.081%
1205 MW	29,195	30,985	-0.051%	-0.016%

This indicates that the variation in PVRR among the different scenarios is less than 1% when compared to Xcel Energy's Preferred Plan. Given the large number of assumptions in a fifteen-year planning activity and the uncertainty involved in many of the projections, a less than 1% variability is insignificant and therefore all of the scenarios are equally valid. The result is that the PVRR analysis is not accurate enough to distinguish between the different DSM scenarios, and should not be the sole criterion for determining the appropriate level of DSM that Xcel should undertake in its Resource Plan.

The important criterion to consider is what Xcel Energy can achieve cost-effectively. Xcel has consistently shown that it can acquire much higher levels of DSM. The most recent five-year average has shown that Xcel has saved 123 MWs a year. Xcel should be ordered to at least maintain its current level of *achieved* commitment to DSM activities, resulting in a total DSM impact over the planning horizon of 1,845 MWs. This has been achieved in a cost-effective manner that has captured significant benefits for ratepayers, the utility, and the society in general. Xcel Energy's 2004 CIP Status Report states that in 2004 it achieved demand savings totaling 128 MWs (slightly more than what we are proposing). Xcel's most recent cost-effectiveness results included benefit-cost ratios of 2.60 and 2.56 to society, and 4.23 and 4.76 to the utility, in 2003 and 2004 respectively. This means that it was over four times more cost-effective for the utility to pursue these DSM efforts than supply-side activities.

We expect Xcel to raise concerns about uncertainty in achieving higher goals and added costs of such an endeavor.[66] Yet the Company has a strong record of achieving savings substantially higher than its established goals, while spending only slightly more than its minimum statutory requirement. Given Xcel's past achievements with minimal costs, an increase in its proposed DSM goal is warranted.

We recommend that Xcel Energy be ordered to maintain their current level of DSM performance (123 MWs and 255 GWhs annually) resulting in a total DSM impact of 1,845 MWs and 3,825 GWhs. As the Commission determined in its April 26, 2004 Order Approving Great River Energy's 2003 Resource Plan, a utility's "current achievements in managing demand to avoid or delay the need for additional capacity provides an adequate basis for concluding that [the utility] could continue these achievements in the future." [67] The Commission should not allow Xcel to use its past success as an excuse to diminish its future DSM efforts.

V. THE RECORD SUPPORTS ADDING GREATER AMOUNTS OF WIND GENERATION TO THE XCEL SYSTEM.

Xcel's 2004 Resource Plan and responses to Information Requests support a total of at least 2,000 to 3,000 MW of wind power serving Xcel customers over the next fifteen years. Xcel understates the potential for wind power in its Resource Plan, recommending a total of 1,685 MW of wind power by 2016, by making several unjustified assumptions. The record supports a greater commitment to wind power.

A. Xcel's conclusions regarding wind power understate the resource's potential.

We recognize that the integration of wind power plants into the power system can present challenges to power system planners and operators. These challenges are due to

[66] Xcel has made similar arguments in past resource plan dockets. For example, see Xcel Energy's Minnesota 2000 Resource Plan Reply Comments, Docket No. E002/RP-00-787, March 5, 2001.
[67] April 26, 2004, Order Approving Great River Energy's 2003 Resource Plan, Docket No. ET-2/RP-03-974, p. 9.

the natural characteristics of wind plants and the fact that wind power is relatively new. However, a number of recent rigorous, peer-reviewed, technical studies of the integration of wind power into the power system have dispelled popular misconceptions about wind power.[68]

Using traditional power system tools and analysis, we now know that wind plant output is significantly smoothed by multiple wind turbines within a wind plant and by wind plants at multiple locations;[69] we now know that wind plants can enhance and improve power system reliability;[70] we now know that wind power does not require backup by a similar amount of conventional generation (studies have shown that only a small amount, relative to the size of the wind plant, of additional regulation or load following capability may be needed)[71]; and we now know, from studies to date, that at moderate penetrations (e.g., up to 20%, nameplate wind to peak system load) the cost impacts of wind's variability are small (under one-half cent per kWh of wind energy).[72]

In 2004, a study was completed of the operating and reliability impacts of 1500 MW of wind generation serving the Xcel system (15% penetration in 2010).[73] The Xcel / Minnesota Department of Commerce (DOC) Wind Integration Study found no reliability issues and identified an Effective Load Carrying Capability (a rigorous, reliability-based method to calculate the capacity value of a generator) of about 27% of the rated wind power (400 MW of the nameplate 1500 MW of wind generation that was studied). The study found that the costs of integrating the wind generation into the Xcel control area are "no higher than $4.60/MWh of wind generation."[74] The study noted that these cost impacts are "considered to be quite conservative" and are potentially "overstated since little in the way of new strategies or changes to practices for short term planning and scheduling were included."[75] Sensitivity runs indicated that the developing day-ahead and real-time regional markets can reduce integration costs by providing access to additional resources for balancing of wind generation.

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[68] See, Utility Wind Interest Group (www.uwig.org/operatingimpacts.html)

[69] Wan, Y. "Wind Power Plant Behaviors: Analysis of Long-Term Wind Power Data." National Renewable Energy Laboratory, August 2004. (www.nrel.gov/docs/fy04osti/36551.pdf)

[70] GE Energy Consulting. "The Effects of Integrating Wind Power on Transmission System Planning, Reliability, and Operations, Report on Phase 2: System Performance Evaluations." Prepared for New York State Energy Research and Development Authority, March 2005. (www.nyserda.org/publications/wind_integration_report.pdf, www.nyserda.org/publications/wind_integration_apps.pdf)

[71] Smith, J., DeMeo, E., Parsons, B., Milligan, M.; "Wind Power Impacts on Electric Power System Operating Costs: Summary and Perspective on Work to Date." AWEA Global WindPower Conference, March 2004. (http://www.uwig.org/operatingimpacts.html)

[72] *Id*.

[73] Zavadil, R., King, J., Xiadong, L., Ahlstrom, M., Lee, B., Moon, D., Finley, C., Alnes, L., Jones, L., Hudry, F., Monstream, M., Lai, S., Smith, J.; *Xcel Energy and the Minnesota Department of Commerce, Wind Integration Study - Final Report*. EnerNex Corporation and Wind Logics, Inc., September 2004. (http://www.state.mn.us/cgi-bin/portal/mn/jsp/content.do?subchannel=-536881736&programid=536905849&sc3=null&sc2=-536887792&id=-536881351&agency=Commerce)

[74] *Id*. Task 4 - Summary and Conclusions, page 134.

[75] *Id.*

While Xcel's Preferred Plan includes 1,685 MW of wind power (1,125 MW by 2010 plus an additional 560 MW by 2016),[76] Xcel's 75% Renewables Case includes 3,365 MW of wind power (1,125 MW by 2010 plus an additional 2,240 MW by 2019) with only marginal change in the PVRR.[77] The modeling cases requested by the DOC include up to 3,605 MW of wind (1,125 MW by 2010 plus an additional 2,480 MW by 2019). For example, the DOC case with natural gas prices increased by 15% and low externalities includes a total of 2,805 MW of wind power (1,125 MW by 2010 plus an additional 1,680 MW by 2019) at a *reduced* PVRR, compared to Xcel's Preferred Plan.[78] And, as discussed in detail above, this cost comparison does not even take into consideration the higher costs that should be attributed to the high-carbon Preferred Plan.

The costs in Xcel's Resource Plan are further skewed because it arbitrarily and inappropriately inflated the ancillary services costs of wind power to $5.00 per MWh of wind generation. The recently completed Xcel / DOC Wind Integration Study clearly found that the ancillary services costs are "*no higher than* $4.60/MWh of wind generation."[79] While the study focused on 1500 MW of wind on the Xcel system, the study also concluded that these results are conservative and identified potential for reducing the costs in the future.

Additionally, Xcel's Resource Plan inappropriately prejudices wind generation because wind generation is the only component of the power system that was assigned ancillary service costs,[80] while other generators as well as loads (particularly nonconforming industrial loads) also contribute to some portion of system ancillary service requirements and costs.

Xcel's application of "a 15% maximum penetration factor for wind, determined by the amount of nameplate wind generation divided by the annual peak load"[81] is also arbitrary and inappropriate. There is no rationale nor analytical support for this limit on the amount of wind generation.

Wind integration study work to date has illustrate the importance of quantify the hourly production of wind generation, throughout the year, relative to system load and to other generators. The Strategist software tool that Xcel used to select generation resources is not an hourly dispatch model and thus fails to accurately model wind generation[82] and its contributions to load throughout the year. As an example of resource planning with full hourly dispatch modeling of wind generation, PacifiCorp has used the software tool ProSYM.[83]

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[76] 2004 Resource Plan, Pages 3-18 and 9-5.
[77] *Application for Resource Plan Approval 2005-2019*, Xcel Energy, November 2004. Pages 9-20 and 9-16.
[78] Xcel Response to DOC Information Request No. 87.
[79] Zavadil, R., King, J., et al., "Task 4 Summary and Conclusions", page 134 (http://www.state.mn.us/cgi-bin/portal/mn/jsp/content.do?subchannel=-536881736&programid=536905849&sc3=null&sc2=-536887792&id=-536881351&agency=Commerce) (Emphasis added).
[80] Xcel Response to IWLA/ME3/UCS/MCEA Information Request No. 4.
[81] 2004 Resource Plan, Page 3-4.
[82] Xcel Response to DOC Information Request No. 52; response to DOC Information Request No. 16.
[83] PacifiCorp 2004 Integrated Resource Plan, http://www.pacificorp.com/Navigation/Navigation23807.html

Finally, the representation of capacity value for wind power in Xcel's Resource Plan fails to accurately reflect the reliability modeling in the recently completed wind integration study, the projected reduction in transmission curtailments, and the new regional day ahead and real time markets. Xcel's modeling of wind needs to be corrected prior to deviating (either up or down) from the 2,000 to 3,000 MW range of supported wind power in this Resource Plan.

B. Xcel must improve its transmission planning to facilitate wind power development.

Effective solutions for the delivery of wind energy to Xcel customers must be forward-looking, aggregated, and integrated into regional transmission planning. Substantial new transmission requires at least 8 years to develop (e.g., 2-3 years study, 3-4 years certificate of need and siting and routing, and 3-4 years construction) in contrast to wind plant development which can take less than 12 months. Cost-effective and land-efficient approaches to transmission service for wind are not possible through the traditional approach of analyzing one wind plant at a time. Projected wind development needs to be aggregated ahead of purchase agreements for use in transmission planning.

A recent example of success in this approach is the group of new transmission lines that are now under construction by Xcel in southwest Minnesota for delivery of 825 MW of wind power to Twin Cities markets when the lines become operational in 2007. The initial study (for an aggregate 825 MW of wind) for these lines began 1999 and were approved by the Commission in 2003; both dates were ahead of power purchase agreements. Unfortunately, these new lines are already oversubscribed.

The needed commitments, in the form of filed Certificates of Need, for new transmission for wind generation must be made in parallel with the commitments for the new wind generation in this Plan. Of particular near term importance are the transmission improvements outlined in the recently completed Xcel study for an additional 400 to 600 MW of wind generation (above 825 MW)[84] and the recently initiated study of 345 kV transmission from southwest Minnesota for wind generation outlet.

C. The Commission should encourage Xcel to pursue wind energy storage technologies as an additional means to advance wind generation

Clearly, wind can produce energy at relatively low cost. Because wind energy is not dispatchable, it has been assigned relatively low accredited capacity at the time of system peaks, reducing the sales price and revenue generated per unit of capacity. If wind-powered electricity could be stored, then its economic and environmental benefits could be expanded.

[84] Xcel Energy, *Buffalo Ridge Incremental Generation Outlet Electric Transmission Study*, June 2005.

Electricity storage is often assumed to be impractical and/or dependent upon some new and exotic technology that has not yet been developed, but that is not necessarily the case. For example, Compressed Air Energy Storage (CAES) is an approach in which wind energy is used to compress and store air in natural geologic formations. Then, at the appropriate time, the air is released through a gas turbine or steam-derivative turbine to generate electricity. Through a storage strategy such as CAES, off-peak wind power can be used to compress air and store it to produce electricity at times of peak demand. Conversely, wind turbine output that is greater than the capacity of the transmission system can be stored and transmitted at a later time, essentially levelizing the power output from wind resources. In effect, CAES can convert wind into a dispatchable resource.

CAES is the only technology other than pumped hydro that is recognized by the Electricity Storage Association as capable of storage in the gigawatt size range and discharge times that are many hours long. CAES is a proven technology, with two commercial plants in operation. A CAES plant in Alabama can produce 100 MW continuously for 26 hours and is the Alabama Electric Cooperative's lowest cost resource. A CAES plant in Germany can deliver 290 MW for 4 hours. Both of these plants use old gas turbine technologies that fail to take advantage of the substantial improvements in turbine technology over the past two decades. Because these plants store compressed air in geologic formations not available in Minnesota, further development work will be needed to evaluate suitable local geologic formations for CAES, as well as optimum turbomachinery train designs, and the economics of integrating CAES wind plants in Minnesota and the region.

At this time, it is our understanding that Xcel is somewhat reluctant to investigate CAES and other storage options in Minnesota for fear that regulators may disallow recovery of the research and development costs through rates. A positive indication from the Commission that this research and development is a welcome investment intended to maximize potential for renewable energy may enable such work to be undertaken.

There may be other practical energy storage technologies that should also be considered in the longer term. The Commission should direct Xcel to review various wind storage technologies and select the most promising short and long term technologies about which to conduct in-depth research and analysis. Xcel should report its findings to the Commission.

VI. XCEL'S RENEWABLE ENERGY OBJECTIVE

A. Xcel's mandate differs from other utilities' "good faith effort" requirement.

The Commission has asked that parties in the Xcel Energy 2004 Resource Plan docket to address the question of whether there are specific standards or criteria that apply to Xcel Energy's Renewable Energy Objective ("REO"), as compared to the standards and criteria that the Commission has adopted for other utilities that are subject

to the REO Statute. The 2003 Legislature determined that Xcel would be subject to a more stringent standard than a "good faith effort" REO; rather, the REO for Xcel is a "requirement".[85] The 2003 Legislature's primary energy policy focus was whether to approve additional dry cask storage at the Prairie Island nuclear plant. Many provisions of the 2003 Omnibus Energy bill, which was debated in Special Session, were developed to "condition" the approval of additional dry cask storage. Amendments to the REO Statute that are specific to a nuclear generation utility were among the conditions attached to continued dry cask storage. In other words, the REO became a new Prairie Island mandate for Xcel.

The statement in Xcel's 2004 Resource Plan that its REO Mandate is "more like the 'good-faith' objective required of other utilities within the State" is not accurate.[86] Utilities that do not own nuclear generation facilities need to demonstrate good faith efforts toward meeting annual renewable energy objectives; we expect that such good faith efforts are very likely to result in steady, increased annual sales from eligible renewable energy sources. Xcel, however, must demonstrate actual increased annual retail sales from eligible renewable energy sources, not good faith efforts. The REO Mandate language in Minn. Stat. §216B.1691 Subd. 6 would be meaningless if it simply made Xcel subject to the same standard as the non-nuclear utilities in Minnesota.

The REO Statute asks the Commission to establish standards and criteria *for measuring electric utilities' good faith efforts* to meet the REO, and the Commission did so in its June 1, 2004 Order in the REO Docket. Because Xcel is not subject to the "good faith effort" language of the REO Statute, however, these standards and criteria do not apply to Xcel – there are no "good faith efforts" to measure. The Commission must measure only whether Xcel has reached the REO targets, i.e., that Xcel has actually delivered increased renewable energy to its retail customers. If Xcel fails to reach the required REO targets – or makes a filing that states Xcel will not reach the required REO targets -- the REO Statute directs the Commission to conduct the same type of analysis that was required for Xcel's other Prairie Island mandates.

As with an earlier Prairie Island mandate – enacted in 1994 – requiring the Commission to order Xcel to purchase "an additional 400 megawatts" of installed capacity from wind energy facilities, the 2003 Legislature made the REO mandate "subject to resource planning and least cost planning requirements in section 216B.2422." The Commission has already interpreted this language in its February 17, 1999 Order in Docket No. E-002/RP-98-32, that required Xcel to purchase an additional 400 megawatts of wind to satisfy the 1994 Prairie Island mandates. According to that 1999 Order, when a renewable energy mandate is qualified with language subjecting it to resource planning and least cost planning requirements, the Commission nevertheless starts with a *presumption* that the renewable energy procurement is in the public interest, and examines the record to determine whether this presumption has been disproved.[87]

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[85] Minn. Stat. §216B.1691 Subd. 6.
[86] See, 2004 Resource Plan, p. 9-4
[87] February 17, 1999, Order Modifying Resource Plan, Requiring Additional Wind Generation, Requiring Further Findings, and Setting Standards for Next Resource Plan, Docket No. E-002/RP-98-32, at 8-9.

The Commission found this presumption necessary because of the express limitation in Minn. Stat. §216B.2422 that new generation be from renewable fuel sources unless the utility demonstrates that it is not in the public interest. In the 1999 Order, the Commission rejected the only argument offered in that docket to show that the additional wind was not in the public interest – that the additional wind generation would allegedly cost more than other generation alternatives. "The Commission finds that [the] cost differential, if it exists, is not large enough to overcome the strong public policies favoring the development of this wind resource."[88] The Commission further specified that it was imperative to examine cost questions in the context of environmental and socioeconomic costs, since "a major purpose of the resource planning statute is to highlight these costs as serious public policy concerns".[89] For example, in addition to the quantified externality values for environmental costs, and other non-quantified environmental and socioeconomic costs, the Commission should consider the costs to ratepayers that can be anticipated for a high-carbon resource mix, as compared to the lack of such costs for carbon-neutral renewable energy sources.

In evaluating any forecasted noncompliance with Xcel's REO targets, the Commission must therefore start with the presumption that Xcel must make the annual investments to increase the amount of renewable energy in their generation portfolio, from 2006 to 2015. The existence of a simple cost differential will not be sufficient to overcome the presumption that the REO shall be met.[90]

B. Xcel appears to be counting more of its Wisconsin renewables than is permitted under the Commission's REO Orders.

Xcel states in response to information requests that it apportions 50% of its hydroelectric and biomass facilities located in Wisconsin to its claim for an exemption from the Wisconsin RPS, and the other 50% of its Wisconsin renewables to the Minnesota REO.[91] Under the Commission's REO Docket orders, Xcel should not be able to count 100% of the output from half of its Wisconsin hydroelectric and biomass facilities toward the REO, but rather, only 75% of that output. It is unclear from the current record whether Xcel is properly discounting by 25% the "eligible half" of its Wisconsin renewables.

The Commission's October 19, 2004 Order in the REO Docket permits multi-jurisdictional utilities with preexisting renewables to allocate the output from such facilities to the REO according to the percent of Minnesota customers served by the multi-jurisdictional utility. In the case of Xcel, 75% of its customer base is Minnesota customers, so 75% of the output from preexisting eligible renewables on the Xcel system

[88] Id. at 9.
[89] Id.
[90] By contrast, the 2003 Legislature provided that if a party carried the burden of demonstrating that Xcel's implementation of the REO will actually jeopardize the reliability of the electric system, the public interest presumption could be overcome.
[91] Xcel Response to IWLA/ME3/UCS/MCEA Information Request Nos. 26 and 27.

may count toward the REO.[92] If all of Xcel's preexisting Wisconsin hydroelectric and biomass resources were eligible for the REO, Xcel could count 75% of the output from those resources to meet the REO requirement. Due to Xcel's "apportionment" of half of its Wisconsin renewable energy capacity to the Wisconsin RPS exemption, however, not all of Xcel's Wisconsin hydroelectric and biomass resources are eligible to be counted toward the REO. For the half that is unencumbered by this competing renewable energy requirement, only 75% of that output can be assigned to Minnesota's REO.

CONCLUSION

The written record in this resource plan proceeding is scheduled to close shortly before an Xcel electric rate case is to begin. Common to both dockets is the central issue of ensuring the prudent use of ratepayer funds – in historic terms for a rate case, and in prospective terms for the Resource Plan. Given the widespread consensus in the scientific and regulatory arenas that carbon constraints are necessary and inevitable, prudent planning cannot ignore the costs of a carbon-constrained regulatory future.

These comments have focused on Xcel's failure in its 2004 Resource Plan to disclose the financial risks inherent in its proposed Preferred Plan, which relies on high-carbon technologies the Company could not reasonably propose if carbon dioxide emissions were subject to even modest regulation. Independent of Xcel's failure to conduct and disclose an adequate CO2 regulatory analysis, the 2004 Resource Plan underestimates potential for DSM savings and wind power.

Therefore, we make the following recommendations:

- The Commission should reject Xcel's carbon cost analysis and direct Xcel to conduct the type of thorough carbon cost analysis that is described in Section IIIA of these comments. Such analysis should also be carried out for future Resource Plans, certificate of need proceedings, and other resource acquisition processes.
- Because portions of the short-term Action Plan and Preferred Plan rely on a faulty analysis of future carbon costs, both should be rejected.
- A "hedge value" of $8 per ton CO_2 (net present value) should be used to evaluate resource options in planning and resource selection processes, as an interim tool until Xcel successfully and thoroughly incorporates CO_2 regulatory risk into its resource planning and selection.
- The Commission should increase Xcel's DSM goal to 1845 MW over the planning period – an amount that has been demonstrated achievable and cost-effective.
- The Commission should not accept Xcel's use of a 15% wind penetration cap since use of such a cap is unsupported by the record. In addition, the Commission should find that the record supports a total of 2,000-3,000 MW of wind power.
- Xcel should be ordered to improve modeling for wind power, utilizing modeling tools that are capable of effectively evaluating wind generation and tools that include capability to model hourly dispatch of resources.

[92] See, Xcel Resource Plan, p. 9-11.

- The Commission should encourage Xcel to investigate and pursue options for Compressed Air Energy Storage technology applications for wind generation projects.
- Finally, the Commission should find that Xcel is subject to a more stringent REO requirement than other electric utilities, such that there is a presumption that it is in the public interest for Xcel to reach the mandated renewable energy targets, which cannot be overcome by cost differentials alone. To evaluate Xcel's compliance with this mandate, the Commission need not examine indicia of "good faith efforts" but instead must verify that Xcel has sold the required annual amount of eligible renewable energy set forth in the REO Statute.

Dated: August 1, 2005

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