Chapter 9. Environment

We are submitting this Resource Plan at a time of uncertainty regarding a wide range of federal environmental regulations. Air, water, and solid waste requirements to be promulgated by the U.S. Environmental Protection Agency (EPA) are all in a state of flux. While we can reasonably anticipate some requirements, the exact standards and timing for most cannot be predicted. As a result, we are experiencing a new level of risk surrounding environmental regulation which requires us to maintain significant flexibility in response options.

Due to the proactive measures we have taken to modernize our generation fleet and to otherwise reduce environmental emissions of providing electric service, we are well-positioned to manage the uncertainty associated with these pending federal regulations. These proactive measures include the Metropolitan Emission Reduction Program (MERP, significant actions to add renewables to our system and administration of one of the nation's most successful DSM programs. Building on these actions, our Resource Plan provides a reduction in system CO_2 emissions of over 20% by 2015 and nearly 25% by 2020, compared to a 2005 baseline. It also has the collateral benefit of further reducing SO_2, NOx, mercury and other emissions while improving our overall environmental risk profile. Figure 9.1 shows our projected CO_2 emissions under our proposed plan from 2010 to 2025. Figure 9.2 shows the projected percentage reductions of CO_2 emissions over that same time period.

Figure 9.1
NSP System CO_2 Emissions, 2010-2025

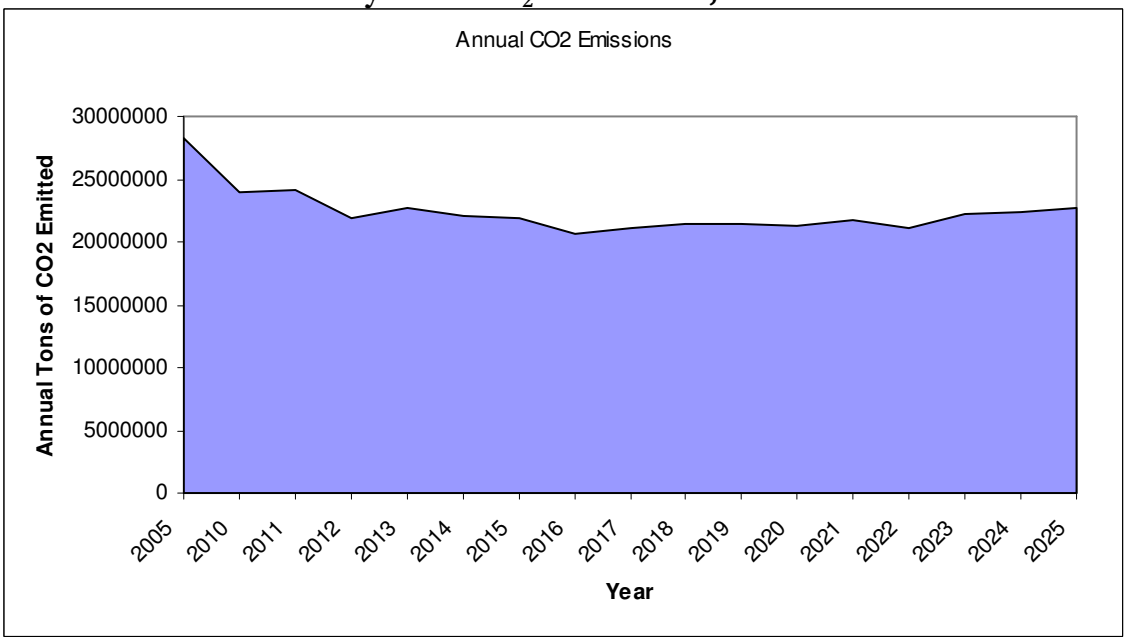
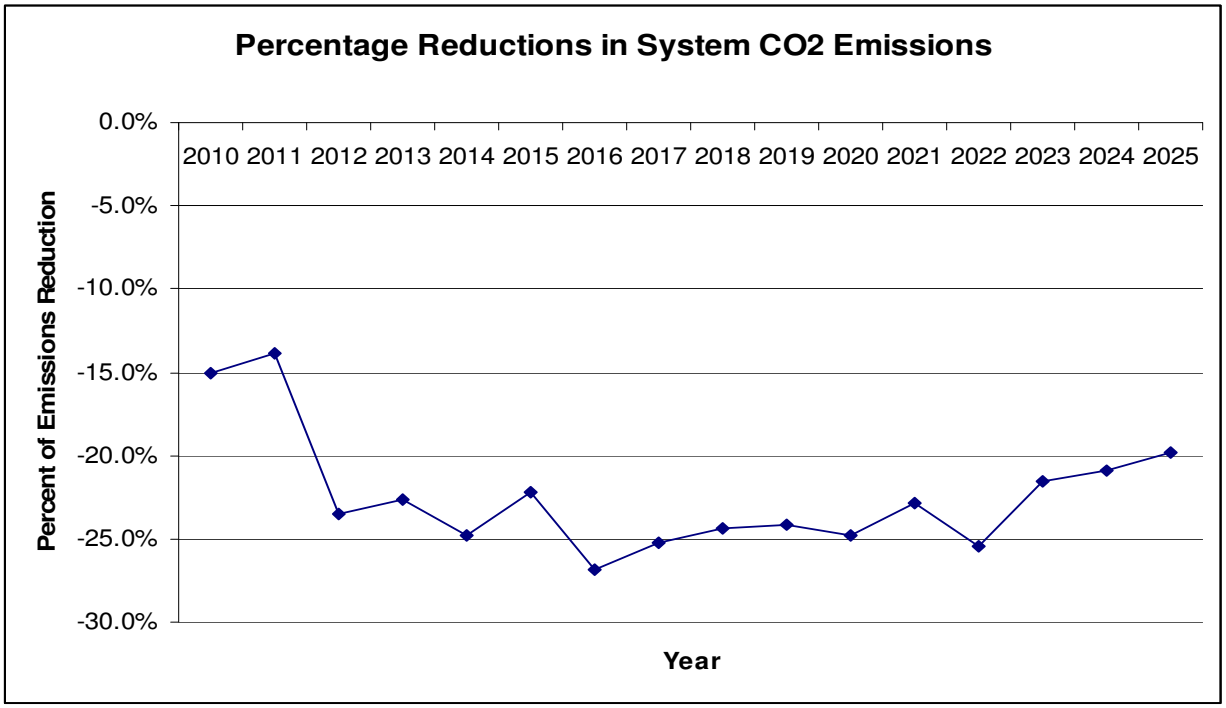


Figure 9.2
Percentage Reductions in NSP System CO_2 Reductions over 2005 Baseline, 2010-2025



Xcel Energy is widely recognized for its commitment to environmental leadership. We are: the number one wind provider in the country and have been for the past five years; in the top ten for solar capacity on our system; on track to meet some of the most aggressive state renewable requirements in the country; implementing industry-leading voluntary emission reductions; administering one of the nation's most successful DSM programs; and supporting and pursuing a myriad of innovative energy technologies such as smart grid technologies, energy storage, and electric vehicles.

Using this variety of strategies, we continue to reduce environmental impacts of our thermal generation while maintaining a robust and diverse supply portfolio, a high level of reliability and reasonable rates. Our annual Corporate Responsibility Report contains much more detail on these issues and our achievements.[1]

In our previous Resource Plan, the potential for federal legislation requiring reduction of greenhouse gas emissions dominated the discussion and analysis in this chapter. That potential is still significant and we provide a status report on that issue. However, of as much import and impact over the next few years are the unprecedented number of pending and potential federal environmental regulations with which we will need to comply. These regulations include:

- Maximum Achievable Control Technology (MACT) requirements for mercury and other hazardous air pollutants such as acid gases and trace metals
- National Ambient Air Quality Standards for NO_2, SO_2, PM2.5, ozone
- Clean Air Interstate Rule ("CAIR") Replacement Rule (otherwise known as the "Transport Rule") – controlling for NOx and SO_2
- Regional Haze Rule
- Coal Combustion Residuals Management
- Cooling Water Intake and Thermal Discharge

[1] This report is available at www.xcelenergy.com/SiteCollectionDocuments/docs/2010-CRR/index.aspx.

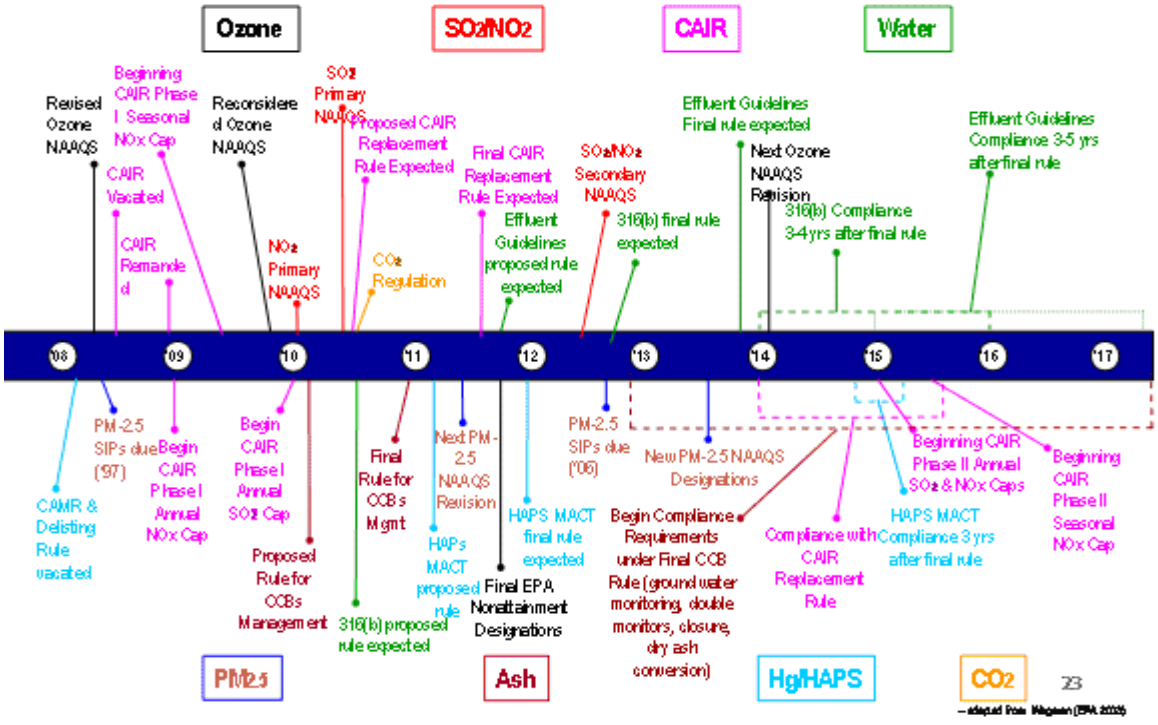
- EPA Regulation of CO_2 and Other Greenhouse Gases – controlling for greenhouse gas emissions
- EPA revision of Liquid Effluent Limitation Guidelines – changes to waste water treatment and discharge standards.

We will summarize these environmental regulations and discuss the potential impacts on our thermal generation, and then provide an update on federal energy legislation.

Pending and Potential Federal Environmental Regulations

The following, titled Figure 9.3 New EPA Challenges for Coal-Fired Plants and taken from a presentation by attorney Peter Glaser at an SNL Webinar on June 10, 2010 is very instructive as to the complexity and comprehensive nature of the federal environmental regulations that will be impacting thermal generation in the coming years.

Figure 9.3
New EPA Challenges for Coal-Fired Plants



Mercury and Other Hazardous Air Pollutants ("HAPs")

In 2008, the U.S. Court of Appeals for the D.C. Circuit vacated the Clean Air Mercury Rule ("CAMR") in its entirety.[2] This changed the regulatory landscape by removing certainty for facilities. Under CAMR, owners of facilities knew they had to implement mercury-specific control technologies or buy enough allowances to demonstrate compliance. Upon the vacatur of CAMR, facility owners no longer had clear direction on federal mercury control standards and did not have a mercury allowance market to fall back on.

As a result of the vacatur and a subsequent lawsuit, EPA has been tasked with developing National Emission Standards for Hazardous Air Pollutants ("NESHAP") for Electric Utility Steam Generating Units ("EUSGUs").[3] One of the key differences between CAMR and the NESHAP is that EPA has stated that they are expanding the field of regulated HAPs in this NESHAP from mercury alone to include emissions of non-mercury metallics, acid gases, dioxin/furan organics, and non-dioxin/furan organics. EPA is under a consent decree to issue the NESHAP by no later than November 2011. We anticipate that the NESHAP will require affected facilities to demonstrate compliance within 36 months thereafter. Thus, a multi-HAP NESHAP could be finalized in 2011 and affected facilities, such as Sherburne County ("Sherco") Units 1 and 2, would need to have multi-HAP control equipment that meets the requirements in place and operational by the end of 2014. The anticipated deadline would match the Minnesota compliance date for mercury control at wet-scrubbed units, as described below.

Minnesota Mercury Emissions Reduction

On May 2, 2006, the Minnesota Legislature passed the Minnesota Mercury Emissions Reduction Act ("MMERA"), Minn. Stat. §§ 216B.68 through 216B.688, which provides a process for plans, implementation and cost recovery for utility efforts to reduce mercury emissions at certain power plants. The MMERA covers units at our

[2] N.J. et al. v. EPA, 517 F.3d 574 (D.C. Cir. 2008).
[3] American Nurse Association, et al., v. Jackson, D.D.C. Civ. Case No. 1:08-CV-02198.

A. S. King and Sherco generating facilities. Under the MMERA, we have installed and will maintain and operate continuous mercury emission monitoring systems. The information obtained will be used to establish a baseline from which to measure mercury emission reductions. We filed mercury emission reduction plans for our dry scrubbed units, Sherco Unit 3 and A.S. King in December, 2007. Controls were installed and became operational in 2009 for Sherco Unit 3. We anticipate that the installation of controls will be completed at A.S. King by the end of 2010. We filed plans for mercury controls at our wet scrubbed units, Sherco Units 1 and 2 in December 2009. Because of the uncertainties around federal requirements, our plan proposes that we continue to test technologies and install by December 31, 2014 either a sorbent injection system similar to that installed at Sherco Unit 3 and being installed at A.S. King or one of the emerging technologies we are now testing. Our plans for Sherco Units 1 and 2 have been reviewed and approved by the Minnesota Pollution Control Agency ("MPCA").[4] The MPCA recommendations will be reviewed by the Commission as part of the Commission's decision-making process on the project.[5]

Expected Impact

The overall impact of mercury and HAPs requirements on the NSP system remains unclear. At this time we are evaluating the effectiveness of existing controls for their suitability for potential new HAPs requirements. Most of the NSP units have emission controls that may be able to meet these limits, and in combination with our MMERA plans and Black Dog and Bay Front retirement/repowering plans the additional impacts may not be significant. However, the suitability of sorbent injection for mercury control at Sherco Units 1 and 2 must now be evaluated in tandem with potential multi-pollutant control systems that could be more cost-effective.

[4] See MPCA Review of Xcel Energy's Sherco Units 1 and 2 Mercury Reduction Plan (June 15, 2010).
[5] In the Matter of Northern States Power Company, a Minnesota corporation for Approval of the Proposed Mercury Emissions Reduction Plan for the Sherburne County Generating Facility's Units 1 and 2, MPUC Docket No. E002/M-09-1456.

Sulfur and Nitrogen Oxides ("SO_2 and NO_X")

Clean Air Interstate Rule ("CAIR") Replacement Rule

The EPA's proposed replacement of the court-vacated Clean Air Interstate Rule ("CAIR"), now referred to as the "Transport Rule", was promulgated in July of 2010. Aimed primarily at the control of regional emissions to address acid rain, ground-level ozone and particulate matter precursors, the Transport Rule would set tonnage limits for states included in the rule at levels deemed necessary for the protection of downwind states. It also could allow for flexible compliance mechanisms, such as a limited form of emissions trading, similar in form to the Acid Rain Program established twenty years ago. The rule was proposed on July 6, 2010, to be finalized by mid-2011. Its implementation is to be phased-in, with implementation dates of 2012 and 2014.

National Ambient Air Quality Standards (NAAQS)

The revisions to the National Ambient Air Quality Standards ("NAAQS") tend to affect state planning more than utility resource planning. The EPA recently finalized NAAQS revisions for NO_2 and SO_2 and is moving forward on revising the ozone, carbon monoxide and PM 2.5 NAAQS. For electric utilities, more stringent NAAQS represent another set of regulatory drivers for NOx and SO_2 emissions reductions.

Regional Haze

Under the Clean Air Act, the EPA promulgated the Regional Haze rule in 1999 designed to improve visibility in our nation's national parks and wilderness areas ("Class I areas"). Under the Regional Haze rule, states are responsible for developing a Regional Haze State Implementation Plan (SIP) that identifies sources causing or contributing to visibility impairment, includes control strategies for those sources and Best Available Retrofit Technology (BART) determinations for certain older emission sources, and makes a demonstration of reasonable progress toward reaching visibility

goals. The MPCA evaluated visibility impacts from sources on three Federal Class I areas, the Boundary Waters Canoe Area Wilderness in Minnesota, Voyageurs National Park, located along the state's border with Canada, and Michigan's Isle Royale National Park. The Minnesota Regional Haze SIP was submitted to the EPA on December 30, 2009, for EPA review. It was designed to reduce haze and help meet the goal of no man-made visibility impairment in the Class I areas by 2064. To control the main pollutants that contribute to visibility impairment in the three affected Class I areas, the MPCA chose to focus control measures on the anthropogenic emissions of NOx and SO_2. The main contributors of SO_2 are thermal electric generation facilities referred to in the regulations as "electric generating units" or "EGUs," while the main contributors of NOx are motor vehicles, both on and off road. To control emissions from EGUs under the Regional Haze SIP, Minnesota will be requiring certain EGUs to meet BART requirements. The EGUs on the NSP system that are impacted by the BART requirements are Sherco Units 1 and 2. Other combustion units may eventually become subject to these requirements as the MPCA develops its plans for demonstrating reasonable progress. This is expected to occur in the 2018 timeframe.

Expected Impact

Although each of our existing fossil-fuel resources will be impacted by these pending environmental regulations, the overall impact of the additional SO_2 and NOx regulation on the NSP system could be modest, if the changes are incremental to the limits that we have been meeting for many years. However, if the changes are more significant, the impact on individual units on our system could be more substantial. All plants will be impacted by the NAAQS for SO_2, NOx, particulate matter, carbon monoxide and ozone. The NAAQS standards may directly impact facilities through new air quality dispersion modeling requirements or ambient air quality monitoring. These facilities could also become subject to ambient air quality non-attainment status requirements if regulators determine that the local air quality planning area does not meet the new standards. In such a case, regulators would work with individual facilities to make changes to bring the local areas into compliance with NAAQS.

Pricing of emissions in trading programs has been useful for our planning and we will continue to evaluate specific emission reduction options against expected market prices for SO_2 and NOx. When economically efficient, we will take additional investments in environmental controls, as in the MERP project at the King plant and the selective non-catalytic reduction systems recently installed at Bay Front Units 1 and 2. In addition, we will continue to take SO_2 and NOx impacts into account as we consider the overall implications of GHG, HAPs and other environmental regulatory requirements at specific plants.

Land and Water Issues

Coal Combustion Residual Regulations

Coal Combustion Residuals, often referred to as coal ash, are currently considered exempt wastes under the federal Resource Conservation and Recovery Act. Coal ash is residue from the combustion of coal in power plants. Generally, these are captured by pollution control equipment and either recycled for beneficial reuse or disposed of appropriately as non-hazardous industrial waste. Environmental issues involving coal ash derive from concerns regarding structural failure of large surface impoundments (i.e. the 2008 TVA Kingston ash pond failure), allegations of inconsistent oversight by the states, and the potential for releases from unlined ash impoundments and landfills to impact drinking water sources.

Expected Impact

Currently the ash that results from the combustion of coal at Sherco Units 1 and 2 is discharged and stored or disposed of wet in storage ponds as a non-hazardous industrial waste. EPA is considering new regulation for coal combustion byproducts that could fundamentally change ash handling and disposal practices. The new regulation could impact the manner in which ash is handled at Sherco Units 1 and 2, and possibly designate some of these materials as hazardous. If the current practice at Sherco Units 1 and 2 was restricted as a part of new federal regulations, we would be required to implement a new handling and management process. In addition, the

regulatory changes regarding coal ash management could influence and possibly dictate the type of multi-pollutant emissions control system that is ultimately selected for Sherco Units 1 and 2. For example, if all ash is required to be dry handled and disposed of in a landfill, then dry processes may be more cost effective than a wet system. Unfortunately, this issue is unlikely to be resolved in the time frame in which we will be required to select the emissions control system to deploy at that facility. As a result, we and other utilities may be forced to make emissions control technology decisions before the regulatory landscape is completely defined. In sum, while we incorporate ash disposal and management in all of our unit planning, we anticipate new requirements leading to incremental cost increases that are difficult to quantify at this time.

Cooling Water Intake

EPA continues to develop national regulations governing the design, maintenance and operation of cooling water intake structures pursuant to Clean Water Act Section 316(b). The contents of the new rules are not known but we expect that many of our existing plants will be impacted by the regulations when they are promulgated. Estimating the costs and impacts to power plant operations is not possible until the new rules are issued.

Expected Impact

Until new rules are issued by EPA, states have the authority to assess existing cooling water intake structures and determine if they provide appropriate protections for aquatic wildlife (called a "Best Professional Judgment" or BPJ determination). Minnesota and Wisconsin regulatory agencies have begun to assess facilities and issue BPJ determinations regarding individual plant intake systems. However, the BPJ decisions will not guarantee compliance with future regulations. Additionally, since BPJ determinations are done on a site-by-site basis, it is not possible to anticipate the potential cost or impact to power plant operations until the BPJ determination is made.

Thermal Discharge

EPA continues to regulate the impacts of heated cooling water discharge from power plants under Clean Water Act Section 316(a). States with authority to implement and enforce Clean Water Act programs (e.g. Minnesota, Wisconsin) have state-specific water quality criteria including thermal discharge temperature parameters to protect aquatic biota. Plants must operate in compliance with the thermal discharge temperature parameters. In Minnesota, the thermal discharge temperature parameters have not changed. Wisconsin recently issued thermal discharge temperature rules that must be translated into plant-specific temperature limits. The new thermal discharge limits will be included in facility Wisconsin Pollutant Discharge Elimination System (WPDES) permits for Bay Front and French Island. The impacts of the new limits will not be known until new permits are issued for each plant.

EPA revision of Liquid Effluent Limitation Guidelines

On June 18, 2010, EPA forwarded an Information Collection Request (ICR) to all coal-fired power plants and certain other plants, including nuclear. The purpose of the ICR is to collect information on waste water treatment technologies currently in use. Responses to the ICR are due in late summer or early fall of 2010. EPA's timeline for publishing revisions to the guidelines is unknown.

Impact

The ICR information will be used to evaluate the need for changes to the effluent limit guidelines established under the Clean Water Act. The guidelines are periodically reviewed and, if warranted, changed to reflect improved water treatment technology performance.

EPA Regulation of CO_2 and other GHGs

Regulation of greenhouse gas emissions (GHGs) under existing federal statutes is likely if new legislation does not supplant and/or preempt EPA. Since the US Supreme Court decision in *Massachusetts V. EPA*,[6] regulation of CO_2 and other GHGs under the Clean Air Act has been a high priority for the EPA. There are several simultaneous regulatory tracks that are or may become actively engaged in GHG emissions management:

Endangerment Finding

In December of 2009, EPA published two findings: that GHGs threaten public health and welfare, and that emissions from motors and motor vehicles cause or contribute to these hazards. These findings act as triggers in certain parts of the Clean Air Act and require further regulatory actions, particularly for the transportation sector.

GHG Reporting Rule

On October 31, 2009, EPA published new mandatory reporting rules for GHGs, and has continued to amend these requirements.

Tailoring Rule

On June 3, 2010, EPA published a final rule on the emission thresholds and applicability of GHG requirements for the permitting of new and existing industrial sources.[7] GHG rules subject more facilities to permit requirements under the New Source Review Prevention of Significant Deterioration ("PSD") and Title V operating permit programs. The tailoring rule changes the emissions thresholds to higher GHG emissions levels, resulting in far fewer facilities with permitting requirements than would be the case without the tailoring rule.

BACT for PSD

[6] 549 U.S. 497, 127 S.Ct. 1438 (2007).
[7] 75 Fed. Reg. 31,514 (June 3, 2010).

As a result of the endangerment finding for GHGs, EPA must evaluate GHG Best Available Control Technology ("BACT") and BACT suitability for application to proposed new facilities covered by the PSD program. The Clean Air Act Advisory Committee has been unable to agree on a unified recommendation for BACT, and EPA is expected to propose a determination in the near future.

NAAQS or MACT Standards

One of the most important determinations yet to be made by EPA is whether GHGs warrant a NAAQS. It may be difficult to establish a concentration standard given the global and long term nature of the climate change issue. If there is not a NAAQS the EPA will likely consider regulation under the "other hazardous air pollutant" section of the Clean Air Act. This would entail determining MACT for GHGs, a far more stringent technology standard than BACT. The NAAQS/MACT determinations will be key to the potential regulation of GHGs from existing power plants.

New Source Performance Standards (NSPS)

NSPS are set by EPA to address new and modified facilities in a number of regulatory contexts. An NSPS determination for GHGs is likely to be influenced by the BACT determination process but will have a wider applicability.

Expected Impact

National GHG legislation or regulation is expected to occur in the future and will impact each facility differently. However, it is premature to estimate the impact to individual facilities without knowing more about the form of the legislation or regulation. We are closely following all of these developments and will take potential EPA regulatory requirements into account as we implement this and future resource plans. It is still premature to make changes to our plans to account for GHG regulation under existing statutes. The potential for new national legislation and the wide range of opinions about technology and emission standards create significant uncertainty. However, the use of CO_2 planning values required by the MPUC in our modeling provides a meaningful way to take these risks into account.

Impacts on Our Existing Fossil-Fuel Generation

In addition to the foregoing, the following facility-specific impacts are based on known environmental regulatory changes:

Allen S. King Plant

The Allen S. King Plant is currently a well-controlled coal fired unit. As such, drastic changes to plant operations are not expected in the near term as a result of environmental regulatory changes. Long-term challenges could be associated with EUSGU MACT, regional haze requirements, the new Transport Rule, multi-pollutant legislation or regulation, and federal ash rule changes.

Black Dog Plant

Chapter 6 of this Resource Plan describes future operations at the Black Dog Plant. Future changes at this facility are at least in part due to federal MACT implementation deadlines for mercury and other HAPs expected by the end of 2014 as described earlier in this section. The planned conversion to natural gas generation for the remaining coal-fired units at this site is a key component of our plan.

High Bridge and Riverside Plants

These two facilities were recently converted from coal-fired generating plants to combined cycle, natural-gas fueled generating plants in 2008 and 2009. As a result, these resources are well positioned for future environmental regulation.

Sherco

In the discussion above regarding federal and state mercury control requirements, we described our mercury emissions control projects at our Sherco units. Xcel Energy continues to evaluate regulatory changes in order to select the best project components for long-term environmental compliance at the Sherco Plant. These

requirements will be clearer in 2012, which will aid in the decision-making process. The environmental regulatory changes that potentially impact the Sherco Plant are the EUSGU MACT, regional haze requirements, the new Transport Rule, multi-pollutant legislation or regulation, and federal ash rule changes.

The impact of these various federal environmental regulations may be much more significant on Sherco Units 1 and 2 than on Sherco Unit 3. These units were built in the 1970's (Unit 3 was placed in service in 1987) and share a common stack and emission controls consisting of low NO_X burners, a wet venturi scrubber for SO2 and particulate matter control, , and electrostatic precipitators for particulate matter control. These units currently employ once-through water for steam and cooling, and ash from the coal combustion at these units is stored wet in storage ponds.

At this point in time, there is great uncertainty as to how significant the changes in the environmental air, water, and combustion byproduct regulations that are occurring or are anticipated to occur will be. That uncertainty should be resolved over the course of the next few years. Depending on how those regulations are changed over the coming years, the total investments in pollution control and ash handling methods that may be required for these units range from under $100 million at the low end to up to $1 billion at the high end. We will continue to monitor the changes in federal regulations and study their impacts on our generation units. We will provide an update on these impacts along with results of the life extension evaluation for these units described in the Thermal Generation and Contingency Plan chapter of this Resource Plan.

Bay Front Plant

The Bay Front Units 1 and 2 will be directly impacted by the proposed Industrial Boiler MACT requirements. Xcel Energy is reviewing these proposed requirements which are expected to become final by the end of 2010. Xcel Energy will have three years to comply with the final MACT standard for these units. This rule coupled with

other new environmental requirements will influence the decision-making process for these units.

Xcel Energy currently is working with the Wisconsin Commission on review of the proposed Bay Front unit 5 gasification project. This review coupled with other new environmental requirements will influence the decision-making process for this unit.

Red Wing and Wilmarth Plants

The Red Wing and Wilmarth Plants are regulated under Minnesota Municipal Waste Combustor (MWC) rules. These state rules will be revised once changes to the Federal MWC rules are finalized. The impacts of these new rules on the Red Wing and Wilmarth Plants will be determined once they are issued for comment.

French Island Plant

Units 1 and 2 at the French Island Plant are regulated under the Federal Municipal Waste Combustor rules. Revisions to the Federal MWC rules are currently being drafted. The impacts of these new rules on the French Island Plant will be determined once they are issued for comment.

Peaking Units

The peaking units within the generating fleet are generally natural-gas fueled peaking units or dual fuel units, which utilize natural gas or distillate fuel oil. Typically these units are simple-cycle combustion turbines. Generally, these resources are well positioned for future environmental regulation.

Federal Climate and Energy Legislation & Climate Policy

Global climate change and the likelihood of future GHG regulation continue to be important considerations in this Resource Plan. Global climate change is a complex issue that affects the Company in many ways. This discussion touches on the major

aspects of global climate change as a resource planning factor, beginning with federal, state and regional policy initiatives, continuing with the impacts of climate policy on our business landscape and concluding with the implications for this Resource Plan.

While Congress continues to look at climate change legislation, chances for Senate passage in 2010 have diminished despite the adoption of the American Clean Energy and Security Act by the House of Representatives in 2009. The draft bill calls for a 17% reduction in U.S. emissions of carbon dioxide and other greenhouse gases below 2005 levels by 2020, pre-emption of state/regional and EPA regulation of CO_2 emissions, substantial allocations of emission allowances to regulated parties, and enhanced support for R&D, nuclear and clean coal power, and offshore oil production. The bill has not passed in the Senate, however, and final passage remains uncertain.

In the face of this uncertainty, Xcel Energy, our regulators and the rest of the electric utility industry will need to make critical decisions and undertake significant changes in order to manage these environmental regulatory risks while continuing to provide reasonably priced, reliable energy service to customers. There are three important points that will guide these actions.

First, because of the long planning periods that must be employed in the utility industry, we need to act early and make decisions about our resources despite the fact that climate change regulation has not yet been implemented.

Second, there is today no single "solution" that will allow the Company to achieve significant GHG reductions while meeting our obligations to our customers. The Company must rely on a diverse portfolio of clean resources available today to bridge the gap to a clean energy future. Integrated transmission planning will be a critical component of this strategy because it can link utility customers to the clean energy supplies (e.g. renewable energy resources and areas with good geologic sequestration opportunities).

Third, as these technologies evolve, we must have the flexibility to adjust our strategies. It is highly likely that investment in research, development and deployment will need to be reconsidered in order to meet the challenges of the new energy landscape. Today's programs may be supplanted by new approaches to innovative technology in the regulated utility context.

Conclusion

Environmental considerations have always been of critical importance in our planning process. Today, we face unprecedented uncertainty in a wide range of environmental requirements, from climate change to water discharge. Xcel Energy continues to make the environment a high priority and to incorporate our values into our decision-making. But uncertainty also demands flexibility and options. Our recent achievements in emission reduction, DSM, renewable energy, and major generating plant improvements have better positioned us and our customers to adjust to future conditions. This Resource Plan builds on and continues those recent actions.