



INTERNATIONAL

ADDENDUM

Prepared For:

Partners for Affordable Energy
and a coalition of Minnesota trade associations,
organizations and utilities

Addendum to Economic Analysis of the Impact of a Midwest Regional Climate Policy on Minnesota

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1. INDUSTRY SUMMARIES

This is an Addendum to the report entitled *Economic Analysis of Midwest Regional Climate Policy on Minnesota*, prepared by CRA International (CRA) on behalf of Partners for Affordable Energy (PAE), along with several Minnesota trade associations, organizations and utilities. This Addendum includes short summary impacts on selected industries in Minnesota. For each of the eleven industries reviewed there is a discussion of likely impacts on revenues and costs and the likely impacts on the competitiveness of the respective industry in Minnesota after implementation of the regional climate policy (RCP).¹

The eleven industries included in this report are:

1. Paper manufacturing;
2. Taconite mining/production;
3. Commercial transportation;
4. Agriculture – crops;
5. Agriculture – food processing;
6. Agriculture – ethanol production;
7. Wholesale trade and logistics;
8. Technology manufacturing/biotechnology;
9. Financial services;
10. Corporate management; and
11. Tourism.

The structure of each industry summary is identical. Each begins with a short description of the industry. This background information was primarily prepared by Partners for Affordable Energy (PAE) and its members. Next is a discussion of impacts on costs, revenues and output that is based on the quantitative analysis presented in the main report, *Economic Analysis of Midwest Regional Climate Policy on Minnesota*. The main report summarizes the modeling approach and results. The sectoral detail in the model is more highly aggregated

¹ The regional climate policy is defined and detailed in the main report, *Economic Analysis of Midwest Regional Climate Policy on Minnesota*.

than the sectors presented in this Addendum. The Addendum is primarily a qualitative assessment of the impacts on the different industries that accounts for the economic structure of different industries in Minnesota and this assessment is informed by the modeling results.

The quantitative impacts in Table 1 apply to many of the industry discussions that follow.

Table 1: Quantitative Impacts on Industries and Minnesota Households

	2010	2015	2020	2025	2030	2035	2040	2045	2050
Industrial Customer Electricity Rates (2008¢ per kWh)²									
Baseline	4.99	5.17	5.64	5.56	5.87	5.46	5.46	5.63	7.37
RCP	5.05	6.85	7.83	8.53	8.81	9.50	9.83	10.56	13.60
% Increase over Baseline	1%	33%	39%	53%	50%	74%	80%	87%	84%
Industrial Customer Natural Gas Rates (2008\$/MMBtu)									
Baseline	\$9.12	\$7.78	\$7.97	\$8.50	\$9.48	\$10.08	\$10.73	\$11.44	\$12.19
RCP	\$9.13	\$9.03	\$9.56	\$10.43	\$11.89	\$13.14	\$14.68	\$16.53	\$18.84
% Increase over Baseline	0%	15%	19%	21%	24%	29%	35%	43%	53%
Gasoline (2008\$/gallon)									
Baseline	\$4.17	\$3.78	\$3.85	\$4.07	\$4.28	\$4.44	\$4.63	\$4.83	\$5.06
RCP	\$4.18	\$3.94	\$4.08	\$4.37	\$4.66	\$4.94	\$5.27	\$5.66	\$6.12
% Increase over Baseline	0%	4%	6%	7%	9%	11%	14%	17%	21%
Increased Cost per Household (2008\$, 2010 consumption base)									
RCP	\$374	\$578	\$640	\$696	\$721	\$767	\$804	\$849	\$912
Industrial Output (% change in value)									
Agriculture	0%	-1%	-2%	-2%	-2%	-3%	-3%	-3%	-4%
Commercial Transportation	0%	-2%	-2%	-2%	-2%	-3%	-3%	-4%	-5%
Energy-intensive Sectors	0%	-1%	-1%	-2%	-2%	-2%	-2%	-2%	-2%
Manufacturing	1%	0%	0%	0%	0%	0%	-1%	0%	-1%
Services	0%	0%	0%	0%	0%	0%	0%	0%	0%
Electric Power	0%	-17%	-18%	-22%	-22%	-26%	-32%	-34%	-35%
Refined Petroleum	0%	-2%	-3%	-4%	-4%	-5%	-7%	-8%	-13%

The sectors shown in Table 1 are highly aggregated and may not be indicative of specific sectors within Minnesota.

Not surprisingly, the most energy-intensive industries are the sectors that are projected to experience the most significant consequences of a regional climate policy. The following are a few examples of how some of Minnesota's most critical industries will be affected by the RCP:

² Industrial customer electricity rates are estimated based on wholesale electricity prices.

- Paper Manufacturing – Minnesota's paper manufacturing plants are exposed to the increased electricity and natural gas prices due to their reliance on these inputs and the fact that their products lack differentiation versus the competition. They will likely not be able to pass their increased costs through to customers because of the commodity nature of the products.
- Taconite Mining – Electricity, natural gas and motor fuels combine to represent nearly one-quarter of iron ore production costs. While almost all U.S. taconite production occurs in covered states, there is significant competition from countries that do not plan to have carbon caps soon, and that already enjoy lower production costs. Increased costs for Minnesota companies will place them at a significant competitive disadvantage against foreign competition from countries such as Brazil, China and India.
- Commercial Transportation – The obvious effect on commercial transportation is the increase in the price of motor fuels. High levels of capital will be required to make fleets more fuel efficient and less efficient forms of transportation will lose market share to other forms of transport, such as rail supplanting trucking in some cases.
- Agriculture (crops) – Crop production will be affected by the rise in energy costs, which will be manifested in both planting/harvesting costs and fertilizer/chemical costs. As prices rise, the case for consolidation of farm operations increases to take advantage of economies of scale.
- Agriculture (food processing) – As an energy-intensive industry, food processing operators will face a triple threat: production cost increases (electricity/gas), transportation cost increases (fuels) and raw materials cost increases (crops), significantly altering operations compared to non-covered competitors.

1.1. PAPER MANUFACTURING

Summary of Paper Manufacturing Industry in Minnesota	
Example Companies	Blandin, Boise, Rock Tenn, LDI, Sappi, New Page
General	As a tonnage business, the cost of production is extremely important. To be profitable the plants must produce large volumes at the lowest price. There is little or no opportunity for product differentiation or marketing. Product pricing is very commodity-like.
Competition	<p>In the commercial sheets printing paper business, about 50% of North American consumption is provided by foreign imports. Asia, particularly China, has become a major supplier over the past 10 years, with extremely low production costs and very different forestry and environmental performance requirements.</p> <p>Many competitors get their steam from large, nearby power plants. That is not generally the case in Minnesota. The combined heat and power facilities give a cost advantage to competitors.</p> <p>The Minnesota Governor's Forest Products Industry Task Force has identified two competitive advantages previously held by Minnesota's paper manufacturing industry: a highly-skilled workforce and low-cost energy.</p>
Energy inputs	<p>The critical energy inputs are electricity, renewable (forest-based) fuels, and natural gas.</p> <p>In integrated pulp and paper mills, renewable fuel (biomass and black liquor by product stream from pulping) is the primary energy source, creating steam for thermal energy and electricity through cogeneration turbines. Most Minnesota mills have cooperative agreements with power companies, buy-sell contracts for electricity, and in several cases the power company actually owns the generating turbine.</p>
Transportation	Transportation is important for raw material receipt and product delivery, especially since the Minnesota mills are a long distance from most customers. In some cases, transportation options are limited (e.g., captive rail service), making this cost higher than it would otherwise be.
Market	Some of the mills serve the U.S. market. Others (e.g., Rock Tenn and LDI) serve the Midwest corrugated paper market.

1.1.1. Impacts on the Paper Manufacturing Industry in Minnesota

Primary climate policy concerns are the impact on the price of electricity, natural gas and transportation fuels. Some of these facilities generate their own power and could be affected by limits on their generation fuel(s).

Costs

- The cost of energy (electricity and natural gas) is a key input cost for paper manufacturing. According to 2002 IMPLAN data, electricity represented 2.4% of

direct production costs for the paper manufacturing industry and natural gas represented 1.7% of the direct costs.

- Paper manufacturing plants in Minnesota (and other states covered by the RCP) would see significant increases in their costs of both electricity and natural gas.³ In 2015, electricity rates are expected to be 33% higher under the RCP than in the baseline. Natural gas prices are expected to be 15% higher.
- Paper manufacturing plants outside of the footprint of the RCP would not see similar increases in costs.⁴
- The higher cost of energy would eliminate the relatively low energy costs, which is one of the key competitive advantages held by Minnesota's paper manufacturing industry.⁵
- The integrated mills that source wood directly from the forest will see direct cost increases from transportation of the wood from the logging operation to the mill. Because of the restricted logging activities on federal land (14 to 18% of Minnesota forests), companies must compete with other mills to obtain wood. In a general sense it takes three to four trucks of wood for every truck of finished product leaving the mill (the difference is in the biomass byproduct used for energy generation). Therefore although the distance is not necessarily great, the volume of trucking is high. Railroads are not attracted to log car movement because of the low value and remote stops.
- The increased cost of motor fuels will also increase the delivered cost of the paper products to ultimate customers. Transportation costs of getting the product from production facilities located in Minnesota (and the other covered states) add to the higher delivered cost to the customer. Since Minnesota production is already disadvantaged by the distance from customers, this cost is an even greater issue for customers of Minnesota plants (product is typically sold FOB at the mill). This would provide another incentive to Minnesota's existing customers to purchases from mills not subject to the RCP. Motor fuels prices are expected to be 4% higher under the RCP in 2015 than they would be under the baseline model.
- To the extent that other goods and services used in paper manufacturing are sourced from within the covered states and are energy intensive in their production, these costs will also be markedly higher.

³ Those Minnesota paper manufacturing plants that produce their own power could see higher costs, depending on the fuel used to generate the power and whether or not CO₂ emissions associated with their production of power would ultimately be covered by the CO₂ cap. For example, if natural gas is covered upstream then the self-generators would see higher costs of natural gas even if the emissions output of the self generation were not covered.

⁴ Costs may be increasing over time for all energy users due to rising commodity prices that have nothing to do with the Midwest Governor's proposal, however, processing plants within Minnesota (and the other states covered by the Midwest Governors' proposal would be seeing these cost increases in addition to the incremental costs associated with the price of CO₂ allowances.

⁵ *Governor's Advisory Task Force Report on the Competitiveness of Minnesota's Primary Forest Products Industry*, July 2003, p. 20. Available at http://www.irrb.org/_site_components/documents/user/businessforest64.pdf.

Revenues (Price and Output)

- As sellers of a commodity product, Minnesota paper manufacturing plants are not able to pass along any of the higher costs unique to the region incurred as a result of the policy. Therefore, the Minnesota mills will be forced to operate at a lower margin during full capacity, or if margins drop too low because of low operating rates the Minnesota mills would likely be the first mills to take downtime or permanent closure, with the production shifting to available lower-cost production capacity outside the area. Thus, Minnesota paper manufacturing plants can expect to absorb any additional costs (if they have sufficient profits to cover these losses), or close down.
- If there is not excess capacity, new production could be added outside of the covered states and this lower priced production would displace the higher cost production, again presumably that from Minnesota (and other covered states). New papermaking capacity is built in huge increments (because large machines are required to minimize fixed costs and maximize efficiencies in this low-margin industry), therefore a decision to locate new capacity outside Minnesota can have long-lasting effects on the viability of the Minnesota mills, and could lead quickly to non-competitive cost structures, technically inferior machines and more rapid closure. The nature of the business decisions to build such new capacity usually includes closure of smaller, older, now-noncompetitive machines. This is unlike other industries in which new capacity is almost completely additive capacity.
- If the Minnesota paper manufacturing plants are not able to be competitive and as a result begin to lose some of their sales then their fixed costs will become a much larger burden (per unit of sales), and plant closings would be likely to occur, thereby resulting in the loss of jobs at those plants. As noted above, if the decision is made to build a paper-machine somewhere else (including China) to avoid the burden in Minnesota, that decision will ultimately lead to a Minnesota mill downsizing or closure at some point.
 - Because the paper manufacturing industry is geographically distributed (Boise has mills in both Maine and Minnesota; New Page has mills in Minnesota, Kentucky, Michigan and Maryland; and both Sappi and Verso have mills in Maine, Minnesota and Michigan), and because these mills have widely varying technical ages, dimensions and resulting cost structures, a company might build a paper machine in one state with the very intent of closing a machine or mill of its own in another state.

Potential Opportunities

- Possible offsets projects (those that lead to reductions in CO₂ emissions that are not covered by the cap or those that absorb incremental CO₂) have not been clearly defined as of yet. If certain land use changes such as reforestation become offset opportunities this could have significant impacts on the paper manufacturing industry.
 - If sustainable forestry is allowed by the approved carbon accounting methods for forestry offsets, Minnesota paper firms could actually benefit from offsets. Public and private land owners could conceivably use offsets as another revenue source, thereby decreasing the cost of the policy to paper mills.
 - Conversely, the methods could focus on permanence of sequestered carbon and not allow harvesting. This would increase the value of not cutting down trees for use in pulp and paper, thereby increasing the costs of a key input of the paper manufacturing plants.
 - If forestry offset projects were only allowed within the covered states and assuming Minnesota paper manufacturing plants source their pulp inputs from within the covered states this could be an additional cost they would bear that competitors outside of the covered states

would not have to bear. Otherwise, this would likely be a cost increase across the industry.

- If the Minnesota paper manufacturing plants cannot be cost competitive they could seek out alternative strategies focused on niche markets or attempt to compete based on superior customer service. However, both of these strategies can also be undertaken by lower cost rivals and have limited effectiveness in today's markets.

Summary

- Minnesota paper manufacturing plants do not appear to have any sustainable advantages over their competitors on the national scale and regional markets are not large enough to support the existing paper manufacturing industry in the region. Shifting to niche markets does not provide the necessary margins and focusing on improved operations, such as customer service, is not seen as a viable differentiator in an industry focused on price. Therefore, the firms are faced with several vulnerabilities to higher energy costs under the RCP and will likely lose profitability. If the decision to move operations out of the state is made, the industry might not come back due to the high costs of new mills and tendency to shut down old mills when new ones are brought online.

General Caveats

- The impacts on the Minnesota paper manufacturing industry described above do not include any consideration of the impacts of allowances that may or may not be given out to industry. However, even if allowances are given out in an efficient manner (*e.g.*, not based on future output), the allowances would be unlikely to prevent job losses or declines in industrial output.⁶ Allowances could, however, improve the profitability of Minnesota paper manufacturing plants relative to not receiving any allowances. It is also quite possible that industry will not receive any allowances as the policy could include provisions for the auction of all (or most) of the allowances.
- Consideration was not given to any additional future policy that might force electric generators to focus on the use of biomass and biofuels. If such a policy were created, which would be additional to the existing RPS and a climate policy, it would increase competition for forest products and thus drive up the price of raw materials for the paper manufacturing industry.

⁶ Allowances based on historical emissions would not mitigate job losses because firms can cut production and jobs in response to increased costs and still receive the same value in allowances. Allowances based on updated emissions numbers are another possibility, but one that can cause distorting incentives. Some policy discussions have included distributing allowances based on job retention, even though this policy mechanism may lead to uneconomic behavior.

1.2. TACONITE MINING/PRODUCTION

Quick Summary of Taconite Mining/Production Industry in Minnesota	
Example Companies	U.S. Steel, Steel Dynamics, Essar Steel, ArcelorMital Steel, Cliffs Natural Resources, Gerdau-Ameristeel (steel maker from scrap)
General	Taconite is an upstream source of iron ore in the ultimate production of steel. These are all commodity goods. Several substitutes exist, including foreign sources of iron ore and regionally recycled scrap iron. Steel producers will minimize production costs by choosing the least expensive input form of raw material.
Competition	Primary competitors are other sources of iron ore products, chiefly from Canada, Brazil, India, Russia, China and Australia. Secondary competitors include the scrap iron market which supplies smaller steel mills across the U.S.
Energy inputs	Critical energy inputs include electricity and natural gas. Mining and processing taconite is very energy intensive, requiring a large amount of electricity, natural gas, coal and biomass; non-ferrous operations are similarly energy intensive. Mills that produce from scrap iron mostly require electricity.
Transportation	Transportation costs are critical because mining and steel production facilities are sited at a distance. The ore, in the form of taconite pellets, is generally transported to other locations on the Great Lakes and especially to steelmaking facilities along Lake Erie. Both rail transport and Great Lakes freighter transport are required for product delivery.
Market	Taconite mining and production in Minnesota serves steelmaking facilities in the Midwest and Eastern U.S. and accounts for over 75% of iron ore mined in the United States. 6

1.2.1. Impacts on the Taconite Mining/Production Industry in Minnesota

Primary climate policy concerns for the taconite mining/production industry are the impact on the price of electricity and fuels in Minnesota. Demand for taconite is sensitive to the economics of its substitutability; a climate policy increases the delivered cost per ton which reduces competitiveness. Additionally, if the steelmaking facilities are also located in covered states the policy would negatively impact their demand for raw materials by imposing greater energy costs and costs on plant emissions.

Costs

- Mining and processing minerals to metals is an energy-intensive process that requires significant outlay for fuel energy inputs and electricity. The cost of all fossil-fuel based energy inputs to the mining process will increase under a climate policy.
 - Natural gas, coal and biomass are important fuel sources for the furnaces.
 - Under the RCP, natural gas prices are expected to increase 15% over the baseline by 2015.
 - Another major cost input to the taconite mining process is the cost of purchased electricity.
 - The 2015 price of electricity in Minnesota is expected to be 33% higher than the price in the baseline as a result of the RCP. This represents a significant cost increase for a commodity competing in

- a market where prices are set globally and costs are absorbed rather than passed through to the steelmaker.
- Other fuels, such as diesel, are also important costs to mining operations as they are used to run machinery.
 - Motor fuel prices are expected to be 4% higher by 2015.
 - Another important cost for taconite mining is the transportation fuel required to deliver the product.
 - Fossil fuels used in transportation are also subject to the RCP. Fuels used to transport taconite via truck, rail and lakers will experience price increases. The cost of motor fuel to haul ore from the mine to the crushers is projected to increase 4% in 2015 under the RCP.
 - A discussion of the impact on commercial transportation, which is frequently used to transport taconite to customers, is included in the next section of this Addendum.
 - Delivered cost per ton is critical for steelmakers as that price influences the profitability of steel production. Increased transportation costs impose an additional incremental cost on the delivery of taconite-derived iron ore that will not be experienced by competitors.
 - To the extent that other goods and services used in the taconite mining process are sourced from within the covered states and are energy-intensive in their production, these costs will also be markedly higher.

Revenues (Price and Output)

- Taconite mining and production is concentrated to the Minnesota and Upper Peninsula of Michigan regions of the U.S. Cost pass-through is limited due to the commodity nature of iron ore. Steelmakers will act in an economically-efficient manner and minimize delivered cost of the ores they purchase. Therefore, cost pass-through is only possible to the extent that taconite-produced ore remains competitive with other types of ore. An environment where foreign sources of iron ore exhibit higher delivered costs (e.g., high global fuel prices), would allow for greater pass-through. A tighter competitive environment would force taconite miners to absorb costs and sacrifice margin to maintain volume, if that is even possible for the tight margin industry. The end result might be U.S. iron ore and steel is displaced by steel produced from Brazil, Russia, India, or China where there are no emissions caps.
- The global price of steel affects the output of taconite production because its buyers are steel producers in the Eastern U.S. Other nations such as Brazil, China, and India have become larger steel producers; each of these nations has a lower average cost of production than U.S. companies. Low steel prices would make U.S.-produced steel uneconomic and force these companies to reduce output or close down. Relatively high steel prices are necessary for U.S. steel production to remain economic and maintain demand for taconite.
- Cost pass-through is not likely in this industry due to the commodity nature of the products. Added costs would have to be absorbed rather than passed through to the consumer.
 - Vertical integration is a characteristic of this industry; many steel producers own the taconite mining and processing facilities as the raw material for steel production. The vertically-integrated firms cannot pass through cost increases because steel is a commodity product and prices are set in global markets.
 - Where the firms are not vertically integrated, it is common to find long-term supply contracts between taconite-based iron ore suppliers and steel producers. Most of these contracts are fixed price and may require taconite producers to sell at a loss until renegotiation. Leverage in contracting is

- limited by the availability of substitutes, thus pass-through will not be achieved in this model, either.
- Some customers of Minnesota-mined taconite are located in the covered region. As such they incur higher costs on their manufacturing processes and could potentially become uncompetitive with lower-cost competitors. If demand for steel from these plants were to decline this could negatively impact the demand for taconite.
 - Steel mills sited within the states covered by the RCP could potentially be shut down or moved outside the covered region. If buyers of Minnesota taconite move outside of the covered region this would likely mean a move farther from the Minnesota mines, resulting in increased transportation costs of Minnesota taconite.
 - The majority of taconite-derived steel production takes place outside the states covered by the RCP.
 - A steel mill in Minnesota would face both higher materials costs, transportation costs, and higher operations costs.

Summary

- The taconite mining and production industry will likely be adversely affected by the RCP because increased electricity, heating energy sources, and transportation costs disadvantage the product's competitiveness relative to other commodity substitutes such as other sources of iron ore. Moreover, the commodity nature of the end product, steel, and structured supply arrangements negate the potential for cost pass-through; companies are likely to respond by reducing production or shutting down.

General Caveats

- As with all energy-intensive industries, taconite mining and production could experience significant hardship from policies that increase energy costs significantly on Minnesota steel plants while not impacting other domestic and/or global competitors. However, this analysis did not consider the potential impact of allowances distributed to the industry. The decision to shut down or continue operating can be sensitive to the potential distribution of allowances (if any) if allowance allocations update over time.

1.3. COMMERCIAL TRANSPORTATION

Quick Summary of Commercial Transportation Industry in Minnesota	
Example Companies	Northwest Airlines (Delta), Sun Country, Mesaba, Monson Trucking, Transport America, Smith Trucking
General	The key drivers in commercial transportation include fuel cost and fleet utilization levels. The two main sectors within the commercial transportation industry in Minnesota are airlines and trucking companies. There is also considerable shipping via waterways and rail.
Competition	The airlines and trucking companies compete with firms in their respective industries, as well as other modes of transportation. The main points of competition include price, availability and service quality.
Energy inputs	Commercial transportation margins are very dependent on energy prices, particularly the costs of diesel and jet fuel. This is even truer in today's environment of higher oil prices. The International Air Transportation Association estimated that fuel will rise to 36% of airline operating costs in 2008, versus 13% in 2002. Electricity is generally not a major cost for commercial transportation in Minnesota, though it is for the one light rail line in the state.
Market	Minnesota's commercial transportation industry includes companies that operate on regional and national levels. At least one major airline in Minnesota (Northwest) also competes on the global level.

1.3.1. Impacts on the Commercial Transportation Industry in Minnesota

The primary climate policy concern is the impact on the cost of fuel and how that would affect margins. The industry is also concerned that it may need to make capital investments and change business practices to lower emissions.

Costs

- The policy impact on the cost of fuel is extremely important to the commercial transportation industry. The price of motor fuel is expected to be 4% higher in 2015 under the RCP than in the baseline. Jet fuel prices follow similar price paths as motor fuel prices.
 - Airline transportation
 - As an indication of the importance of fuel prices to airlines, Northwest Airline's fuel costs represented 27% of its operating expenses from 2005 to 2007.⁷
 - Regional routes will face the greatest threats as they tend to be low margin and would include higher-priced tank refills at both locations. These routes may be at risk because the higher prices that would need to be charged on these routes could erode demand making the routes uneconomical.
 - Airlines could add surcharges and increase other fees, but will likely see decreased margins on routes through Minnesota. They would be

⁷ NORTHWEST AIRLINES C, 10-K, February 29, 2008.

- replaced by other modes of transportation (e.g., driving) or there would likely be less travel.
- The increased costs for airline transportation would not be unique to airline transportation companies based in Minnesota, but instead these costs would be borne by each flight into or out of Minnesota. As such these costs would likely be passed through to customers. The higher costs would likely lead to lower demand for airline transportation into and out of Minnesota.
 - Trucking companies will face the challenge of maintaining or achieving profitability with higher diesel fuel costs.
 - As an indication of the importance of fuel prices to trucking companies, JB Hunt, one of the largest American trucking companies, reported its fuel costs as 15% of its operating expenses from 2005 to 2007.⁸
 - In the short-term, efficiency measures will be employed, as they have been with rising oil prices. Alternative fuels may be a solution in the mid-term for fleets that are capable of fuel switching. However, in the long-term, the sector will likely shift to new truck fleets designed for lower fossil fuel use. This decision could result in a significant cost increase if less-efficient trucks are replaced before the end of their useful life.
 - The possibility of switching to natural gas powered trucking fleets is complicated by the expected 15% rise in natural gas prices in 2015 versus the baseline.
 - The increased costs for trucking transportation would also not be unique to trucking companies based in Minnesota, but instead these costs would be borne by each all trucks driving into or out of Minnesota. As such these costs would likely be passed through to customers. The higher costs would likely lead to lower demand for trucking transportation into and out of Minnesota.
 - Coal and fuel prices for rail and ships will lead to higher costs and possible rerouting around the state if those costs are high enough.
 - General infrastructure issues may arise in the region as material costs increase and the energy costs for building highways and railroads impact infrastructure construction costs.
 - Gasoline taxes tend to benefit highway maintenance. Reduced fuel consumption and the resulting reduced tax revenue earmarked for highway maintenance could further erode infrastructure.
 - To the extent that other goods and services used in commercial transportation are sourced from within the covered states and are energy intensive in their production, these costs will also be markedly higher.

Revenues (Price and Output)

- As the general economic impacts of the RCP and the associated increases in costs of transportation hit Minnesota, there will be decreased demand for regional shipping and traveling.
- As mentioned, some regional routes and services may be cancelled if margins cannot be maintained (or increased, in many cases). The possibility of Minneapolis-

⁸ JB HUNT TRANSPORT SERVICES, INC, 10-K, February 29, 2008.

St. Paul losing its designation as a hub for its major carriers would be an unlikely, but possible, outcome.

- A similar outcome is possible if there are any trucking hubs located in Minnesota that could be moved to other states.

Potential Opportunities

- Firms that are best at managing rising fuel costs may actually see opportunities increased nationally as efficiency is rewarded regardless of whether there is a climate policy in place.
- Higher costs of fuels could shift some transport towards more efficient modes, such as the commercial rail industry.

Summary

- Minnesota's commercial transportation industry is highly exposed to the impacts of a climate policy due to the large share of operating costs dependent on fuel prices. The highest exposure is among regional carriers and routes, but all transportation firms with any operations in Minnesota will be affected. The long-term response of companies may be to cancel routes or make expensive changes to equipment and fleets. The price of transportation services will increase within the region, affecting the companies and customers that rely upon these services.

1.4. AGRICULTURE – CROPS

Quick Summary of Agriculture (Crops) Industry in Minnesota	
Types of Crops	Row crops and grain, e.g., corn, soy beans, wheat, sugarbeets, alfalfa
General	The profitability of Minnesota's crop industry is primarily determined by cost of production, volume produced and market demand for the products produced in the state. Federal agriculture-related policies are also a key profitability driver.
Competition	Minnesota crop growers face direct competition from growers of the same crops in other states in the grain belt. Minnesota's export crops also face competition from international sources. The growers can also face competition from substitute crops, such as using sugarcane for ethanol instead of corn.
Energy inputs	Fuel for field equipment is the most critical energy input to crop growing, although the production of agricultural chemicals is also energy intensive. Electricity could also be a critical component for some farms, especially if it is used for water pumping.
Transportation	Transportation cost is critical for an industry that produces its goods in many disparate locations, aggregates and processes the products, and then transports them long distances to the consumers.
Market	The industry sells products all over the U.S. and, to a limited extent, internationally.

1.4.1. Impacts on the Agriculture (Crops) Industry in Minnesota

The primary climate policy concerns include impacts on the cost of fuel and agricultural chemicals. Another area of interest related to climate policy is how the policy impacts the demand for biofuels. Biofuels are discussed as a separate industry.

Costs

- The policy impact on the cost of fuel is relevant for growers due to the fuel-intensive planting, harvesting and transporting processes. A 2008 crop budget for Northwest Minnesota predicted that 8% of corn production costs would come from fuel, and that was before the recent fuel price volatility.⁹
 - The additional cost cuts directly into the margins of the growers in a commodity market where a price is set based on national or global supply/demand. This is less true for a crop that is predominantly grown in the Minnesota region for soil and climate reasons (e.g., sugarbeets). Those crops may be price setters instead of price takers.
 - Changing from existing farm equipment to a more fuel efficient fleet will be a costly endeavor, especially if equipment must be retired before the end of its natural life.
- Agricultural chemicals (if produced in the covered states) will increase in price due to the high energy use in their production process and the use of natural gas in

⁹ 2008 Crop Budget, University of Minnesota Extension: Norman. Dec 2007. Available at: <http://www.co.norman.mn.us/vertical/Sites/%7B17EFE025-9D71-46FD-846D-2278EEE0F6D0%7D/uploads/%7BFD92DA50-211F-4EBD-B2CE-BE6E0E65170E%7D.PDF>.

producing nitrogen fertilizers. The previously mentioned study estimated that fertilizer represents 27% of the corn production operating costs.¹⁰

- Natural gas is the greatest cost input to the production of nitrogen fertilizer and is expected to be 15% higher than the baseline in 2015 in the covered states.
- The use of fertilizer could be more costly due to its release of N₂O once it is applied to soils.
- The cost of cropland may increase if biosequestration becomes a competing use. The climate policy may allow biosequestration offsets for reforestation or afforestation. Growers with low margins on their land may convert their lands for the revenue associated with carbon reduction.¹¹
- To the extent that other goods and services used in crop growing are sourced from within the covered states and are energy intensive in their production, these costs will also be markedly higher.

Revenues (Price and Output)

- Some crops may no longer be cost competitive to grow in Minnesota because the increased costs of production would not be able to be passed along to customers. This could result in switching to other crops or farm consolidation to achieve a lower cost structure.
- Some land currently used for agriculture could shift away to other uses such as reforestation, which could potentially provide offsets and the revenues associated with those offsets.
- Minnesota farmers may use the increased chemical costs to shift production to organically grown crops. This would only be considered an opportunity if sufficient demand exists to cover the higher prices.

Potential Opportunities

- The cost of transporting goods into Minnesota will also increase, which may provide a small advantage for local growers. This will likely be outweighed by the negative impacts on transportation costs for exporting crops.
- Some crop growers may make more money by converting their land for biosequestration or growing feedstocks for biofuels. Crop prices may also increase across the board due to increased demand for biofuel feedstocks.

Summary

- Minnesota's crop growing industry is exposed to increases in fuel prices and agricultural chemicals that would result from a climate policy. The increased costs will not be passed-through in a commodity-based sector. Therefore, margins in the industry would decrease and growers would face decisions of whether to convert lands for biosequestration or biofuels or to consolidate with other growers to achieve greater economies of scale. If the cost increases are high enough and emissions

¹⁰ Ibid.

¹¹ Although very unlikely, conservation tillage or no-till farming could become a requirement to manage carbon levels. New seeding equipment may be required to drive seeds through crop residue. More likely, this action would be available as an offset or serve as an offsetting cost.

from the sector are covered, Minnesota growers may simply not be able to compete with growers in uncovered regions.

General Caveats

- Biofuels are a major consideration when examining the impacts of climate policy on the agricultural sector. A separate section is devoted to this discussion.

1.5. AGRICULTURE – FOOD PROCESSING

Quick Summary of Agriculture (Food Processing) Industry in Minnesota	
Example Companies	Hormel, Swift & Co., American Crystal Sugar, Seneca, Del Monte, Lakeside, Rosen's, Gold n' Plump, Davigco
General	The profitability of Minnesota's food processing industry is primarily determined by the cost of production. Federal agriculture-related policies are also a key profitability driver. Products from the food processing industry in Minnesota range from commodity-like goods that compete on price to specialty goods that focus on quality differentiation.
Competition	Minnesota food processors compete with other food processors in the U.S., and increasingly with global food processors.
Energy inputs	Electricity to run the process and assembly equipment is a critical energy input for food processors. Most large facilities also use natural gas for powering boilers and cogeneration, so they are also exposed to natural gas prices.
Transportation	Transportation cost is critical for both the procurement of raw materials from disparate locations and the shipping of products to customers all over the continent.
Market	The industry sells products all over the U.S. There is a regional focus for some of the processors.

1.5.1. Impacts on the Agriculture (Food Processing) Industry in Minnesota

Primary climate policy concerns include impacts on the cost of electricity and natural gas used in processing. There is also concern over the rise in prices of the agricultural products due to rising fuel costs and competing uses for land that may arise.

Costs

- The policy impact on the cost of electricity and natural gas is of concern to food processors, which are generally energy-intensive. In 2015, electricity rates are expected to be 33% higher under the climate policy than in the baseline and natural gas prices are expected to be 15% higher.
 - The additional cost cuts directly into the margins of processors that sell into a commodity market where a price is set based on national or global supply/demand.
 - Energy efficiency could be a solution, but re-machining facilities may be costly. The concept of establishing facilities outside the state is not likely in this industry as there are very significant cost advantages to being close to the agricultural production areas. The transportation cost of shipping the raw materials to a farther location is likely to outweigh the increased cost of energy inputs to food processing.
- The many different types of foods that are processed in Minnesota will see different cost impacts of a climate policy based on the type of raw materials they use. The different impacts will be based on the energy intensity, greenhouse gas emissions levels, and location of the raw material production processes.
 - Processors with crop inputs will see raw materials increase in price due to increased fuel costs and competing uses of land in the production of those crops (such as from biofuels or biosequestration).

- Processors with livestock inputs will see raw materials increase in price due to rising fuel costs, potential coverage of emissions from enteric fermentation, and rising feed costs as crop prices increase and corn is diverted to the energy sector for biofuels.
- Transportation costs will increase as a result of the climate policy. In 2015, fuel costs are expected to be 4% higher under the climate policy than in the baseline.
- To the extent that other goods and services used in food processing are sourced from within the covered states and are energy intensive in their production, these costs will also be markedly higher.

Revenues (Price and Output)

- Some food processors selling higher end food products in Minnesota will see a drop in sales as consumers have less disposable income. However, some processors could actually see demand increase if they sell low-cost products.

Summary

- Minnesota's food processing industry is exposed to increases in prices of electricity used for powering processing activities, natural gas used in boilers and cogeneration facilities, and fuel used for transporting both raw materials and finished goods. The increased costs will not be passed-through in a commodity-based sector. Therefore, margins in most sections of the industry would decrease. If the cost increases are high enough, Minnesota producers may simply not be able to compete with producers in uncovered regions.

1.6. AGRICULTURE – ETHANOL PRODUCTION

Quick Summary of Ethanol Industry in Minnesota	
Types of Companies	Approximately 19 active ethanol plants and several under construction
General	The profitability of Minnesota's ethanol industry is primarily determined by national and regional demand factors, such as government subsidies and mandates, oil prices, penetration of ethanol-burning cars, and the distribution infrastructure. Minnesota has been very supportive of ethanol production, which has led to 19 active ethanol plants and 3 plants under construction for a combined capacity of 1.3 billion gallons per year, which is almost 10% of the total capacity in the U.S. ¹² On the consumption side, the state boasts the most E85 stations in the country.
Competition	Minnesota ethanol producers face competition from ethanol produced in other nearby states, from other forms of motor fuel, and from other forms of ethanol that are not produced in Minnesota, such as sugar ethanol produced in Brazil.
Energy inputs	One of the largest operating expenses for an ethanol plant is the energy required to run the equipment. Most facilities also use natural gas for power needs, such as driving the energy-intensive distillation process.
Transportation	Transportation cost is critical for both the procurement of feedstocks from disparate locations around the state and the shipping of ethanol to ultimate customers.
Market	Despite relatively high demand in the state, Minnesota ethanol producers create enough ethanol to ship more than half of their output out of the state.

1.6.1. Impacts on the Ethanol Production Industry in Minnesota

Primary climate policy concerns include impacts on the cost of electricity and natural gas. There is also concern over the rise in prices of the agricultural inputs due to the rising fuel costs and competing uses for land that may arise.

Costs

- The climate policy's impact on the cost of electricity and natural gas is of concern to ethanol producers. In 2015, electricity rates are expected to be 33% higher under the climate policy than in the baseline and natural gas prices are expected to be 15% higher.
 - Most of the existing ethanol plants employ energy efficiency standards, but there will still be incentives to improve upon this. There will also be added incentive to move production processes away from grid electricity and on-site fossil fuel-based power to biomass gasification or other low-emissions sources of power. This shift requires costly investment.
- The feedstock prices will rise as the cost of growing and transporting agricultural products increases.

¹² See <http://www.neo.ne.gov/statsthtml/121.htm>.

- This rise is a result of increased fuel costs, increased fertilizer costs, and competing uses of land.
- To the extent that other goods and services used in ethanol production are sourced from within the covered states and are energy-intensive in their production, these costs will also be markedly higher.

Revenues (Price and Output)

- Ethanol plants located outside of Minnesota and sourcing from feedstocks in a non-covered region will not experience the same cost impacts.
 - Thus, increased demand in Minnesota may be met by ethanol imported from outside the region. The amount imported would be impacted, however, by higher transportation costs to deliver the product within Minnesota.
 - If a large decrease in ethanol demand is experienced in the future, it will most likely be caused by a biofuels policy change. For example, lower subsidies would increase costs and the removal of tariffs on foreign ethanol sources would lead to increased competition and lower prices.

Potential Opportunities

- The greatest opportunity for ethanol under a climate policy might be the increased demand resulting from ethanol substituting for higher-emitting motor fuels. This may not result as a market response to a price on carbon, but instead may be in the form of increased mandates supporting biofuels.

Summary

- Minnesota's ethanol industry stands to gain from a climate policy, but the policy details and the continuance of state and federal incentives are extremely important factors. While demand for the lower-emitting fuel will increase, costs for energy and feedstocks will also increase. If the cost increases are high enough, Minnesota producers may simply not be able to compete with producers in uncovered regions. A policy outcome that favors in-state ethanol production would change this dynamic.

General Caveats

- While a regional climate policy will have an effect on ethanol demand, mandates and subsidies will have a greater impact. Minnesota's position in the ethanol industry has been driven by state production incentives and assistance for farm-based facilities. These state programs were recently complemented by federal support for ethanol (national renewable fuels standard). If there is a reversal in governmental support for ethanol, the entire market landscape would change.
- The amount by which ethanol demand will increase under a climate policy depends on the carbon accounting applied by legislation. If biofuels are included in a way that makes them an emissions reduction option, demand will increase even more than under the scenario where they simply have lower production emissions than standard motor fuels.

1.7. WHOLESALE TRADE AND LOGISTICS

Quick Summary of Wholesale Trade and Logistics Industry in Minnesota	
Example Companies	Supervalu, CH Robinson, Warner Electric, Nash Finch
General	Companies in the industry must manage and deliver goods at low cost with high reliability and responsive service. Economies of scale are key to profitability, as is access to technology and advanced logistics.
Competition	Primary competitors are similar logistics and warehousing firms located throughout the U.S.
Energy inputs	Critical energy inputs are electricity and motor fuel. Large warehousing operations require significant electricity, especially those that involve the refrigeration of perishables. Distributing and delivering goods requires motor fuel and the need for refrigerated trucks further increases motor fuel consumption.
Transportation	Transportation is critical for an industry that manages the storing and timely delivery of goods. Some companies (Supervalu, Nash Finch) manage their own distribution network in addition to warehousing.
Market	Logistics operations are sold globally. Warehousing can be used for goods sold locally, regionally, nationally or globally.

1.7.1. Impacts on the Wholesale Trade and Logistics Industry in Minnesota

Primary climate policy concerns are the impact on electricity rates and transportation fuel prices. Managing food and perishable goods requires refrigeration at both the storage and transport level.

Costs

- The cost of electricity for the operation of warehouse facilities, including lighting and refrigeration, is important to companies that own warehouses.
 - Warehousing and distribution centers located in Minnesota (and other states covered by the policy) would experience significant increases in electricity costs. Their facilities rely on large-scale refrigeration to manage perishable goods such as food and would see large increases in their overhead expenses for energy use. In 2015, electricity rates are expected to be 33% higher under the climate policy than in the baseline.
- The cost of motor fuel for transportation and refrigeration is a key to cost-effective distribution networks.
 - Transportation and distribution networks would see significant cost increases as motor fuel purchased in Minnesota (and other covered states) becomes more expensive. Transportation services rely on motor fuel for both ground transport and refrigeration in trucks that transport perishable goods; food distributors would be the most adversely affected. Motor fuels prices are expected to be 4% higher under a climate policy in 2015 than they would be under the baseline model.
- To the extent that other goods and services used in the wholesale trade and logistics industry are sourced from within the covered states and are energy-intensive in their production, these costs will also be markedly higher.

Revenues (Price and Output)

- Where the wholesaler/distributor is vertically integrated and owns the retail stores as subsidiaries (Supervalu) the policy would create higher prices for the goods that allow pass-through to the consumer and decreased margins for goods that cannot increase in price. The higher prices would result in a decline in demand for the goods and services.
- For warehouses that sell to retailers, the ability to pass down the additional costs will depend on the type of product. In either case, retailers will have the option of switching to a supplier/distributor based in an uncovered region in order to potentially reduce costs. However, retailers that rely on suppliers/distributors in an uncovered region could face increased transportation costs if re-fueling is to take place in Minnesota. This could offset any potential gains from switching to out-of-state warehousing.
- Certain industries would require local warehousing and logistics facilities (such as grocery stores and small businesses). Demand for localized services could insulate sales against competition; costs would be passed on to consumers and the higher prices would result in a decline in demand for those goods and services.
- For firms that warehouse goods sold within Minnesota, higher consumer prices coupled with diminished disposable income as a result of the policy would reduce total demand for warehousing.

Potential Opportunities

- For those firms that do not move operations outside the state, there will be greater incentive for consolidation (increased economies of scale) and investing in energy efficiency.
 - Warehouses may actually find that their investments in energy efficiency decrease electricity or fuel costs below what they would have been under the baseline. However, these investments require the redirection of capital from other, possibly more productive uses.
 - Logistics consulting firms may actually see an increase in business related to energy efficiency. The expertise gained in helping regional firms adjust to a carbon price could then be marketed to national and global clients.
 - The value of warehousing and distribution technology increases under the climate policy.
- Wholesale trading and logistics is a national business that transcends Minnesota and the states covered by the RCP. Operations wholly outside the covered region will not be affected and operations wholly inside the covered region will experience similar incremental costs, if they manage energy efficiency similarly. Potential loss of market share and business would likely occur along fringe areas where wholesalers within Minnesota compete with wholesalers in neighboring, uncovered states. These fringe areas will highlight the competitive disadvantage of incremental electricity costs on a large, energy-intensive operation. Minnesota companies will need to provide superior reliability and customer service to remain competitive.

Summary

- Minnesota wholesale trade and logistics providers will face higher electricity rates and fuel costs, and will attempt to pass these costs through to retailers (though it may not always be possible). As an industry driven by efficiency gains and economies of scale, Minnesota companies could face greater incremental costs than competitors and be forced to streamline costs in covered regions. Business may be affected most adversely where warehousing centers compete with other warehousing centers located outside the covered region.

General Caveats

- The impacts on trucking operations are discussed in the Commercial Transportation section of this report.

1.8. TECHNOLOGY MANUFACTURING/BIOTECHNOLOGY

Quick Summary of Technology Manufacturing/Biotech Industry in Minnesota	
Example Companies	Medtronic, St. Jude's, Ecolab, Boston Scientific, Seagate
General	<p>In the technology industry the key driver is maintaining a continuous pipeline of quality products. Products must continue to be more efficient, low cost, and (for medical devices) provide protection against the expiring patents of older products. Moreover, as it is necessary to recoup expensive research and development costs, products must be eligible for patents and insurance reimbursement.</p> <p>The Minnesota technology manufacturing/biotech industry produces highly differentiated goods which rely on a strong R&D pipeline; products must offer unique competitive advantage and at low cost to compete with less expensive overseas manufacturing of similar products.</p>
Competition	Technology competitors are research and manufacturing firms located primarily in Asia and, to a limited extent, in California and Massachusetts. Within the medical devices market, competition includes other biotechnology firms that are concentrated along corridors of intellectual capital in California and Massachusetts. North Carolina and Ohio are also emerging in this industry.
Energy inputs	Electricity is a significant cost of production for some processes in the industry. Both quality and reliability are important given the sensitivity of technology manufacturing equipment.
Transportation	Transportation cost is not critical for the industry. The cost per unit transported is typically very minimal.
Market	The industry sells products globally.

1.8.1. Impacts on the Technology Manufacturing/Biotechnology Industry in Minnesota

Primary climate policy concerns include the price of electricity and potentially the quality of electricity if higher renewable generation (specifically wind) were to result in less consistent voltage for sensitive manufacturing processes.

Costs

- The most important direct cost is intellectual capital (i.e., highly-skilled labor). Electricity is an important cost in the manufacturing process.
 - Strong intellectual capital is critical for maintaining a pipeline of new products. Patent protection expires and technology products quickly become obsolete, necessitating continuous research and development. Minnesota is currently able to offer a lower cost of living to sought-after individuals; that advantage in recruitment may become more diminished under the RCP as cost of living increases. The cost per household of the climate policy is a measure of the impacts on the cost of living in the state. Cost per household is projected to be increased by \$575 in 2015.
 - Production facilities in Minnesota (and other covered states) would experience significant increases in their cost of electricity. It is expected that

by 2015 the cost of electricity will be 33% higher under the climate policy than in the baseline.

- To the extent that other goods and services used in technology manufacturing and biotechnology are sourced from within the covered states and are energy intensive in their production, these costs will also be markedly higher.

Revenues (Price and Output)

- Technology and medical devices are highly differentiated products that theoretically allow pass-through of costs. However, the ability to pass costs through depends on the type of technology product.
 - Consumers of medical devices are generally willing to pay more for higher quality products assuming patent barriers are high and cost increases do not price the products out of insurance coverage. For those medical products sold to consumers and covered by insurance, the actual cost is largely invisible. However, higher cost products risk becoming not fully reimbursable and without full insurance coverage consumers might choose substitutes.
 - Non-medical technology products compete in a global marketplace that a) tends to view some products (i.e., electronic devices) as commodities and b) that experiences fierce price competition. As such, technology manufacturers will have the option to trade competitive cost advantage for cost pass-through. Likely considerations include moving production facilities to states uncovered by the RCP or possibly moving facilities overseas.
- If companies choose to absorb costs they will have fewer funds available to be reinvested into research and development. Decreased research and development would likely impair the long-term pipeline of products and profitability of firms.

Potential Opportunities

- If Minnesota firms cannot be competitive in a higher cost environment they could look to separate their manufacturing facilities from R&D and management. The global nature of the industry would allow Minnesota companies to move manufacturing facilities to another state not covered by the Minnesota Governors' policy or even overseas without significant impairment of its distribution networks.
- Increased electricity costs could increase demand for energy-efficient technology products. Minnesota technology firms could benefit from developing solutions for local businesses seeking energy cost reduction.

Summary

- Minnesota technology and medical devices manufacturing firms compete with companies in California, Massachusetts, and Asia. Firms in California and Massachusetts have greater regional costs but excellent access to intellectual capital for advanced technologies; firms in Asia have production and labor cost advantages. Minnesota's current position between those extremes allows it to have good access to highly skilled labor and incur lower production costs than its domestic rivals; the RCP would increase production costs. Overall, this sector is less likely to experience overt negative effects from the policy than the other manufacturing sectors considered.

1.9. FINANCIAL SERVICES

Quick Summary of Financial Services Industry in Minnesota	
Example Companies	Wells Fargo, US Bancorp, Travelers, TCF Financial, Allianz, Ameriprise
General	<p>The profitability of firms operating in the Financial Services sector in Minnesota is primarily driven by the health of the economy at the national and world levels. Regional banks may be more prone to local economic conditions, but the industry as a whole competes with and sells to the rest of the country and world, and thus is less concerned with local impacts on demand for services.</p> <p>The Minnesota financial services industry provides financial products and services that compete on customer service, efficient access to capital markets and ability to meet consumer demand for innovative products Types of firms in Minnesota's financial service industry include: banks, insurance companies, credit card companies, consumer finance corporations, and investment firms.</p>
Competition	Competition exists from financial services companies worldwide. Even regionally-focused entities compete with local presences of national and multinational firms.
Energy inputs	Electricity is a minor cost of production for financial services firms in comparison to firms in energy-intensive sectors. However, many financial services firms have back offices in Minnesota and thus would see impacts from any electricity price increases or reduction in quality.
Transportation	Transportation cost is not critical for the industry.
Market	The industry sells products all over the US and, in some cases, internationally.

1.9.1. Impacts on the Financial Services Industry in Minnesota

Primary climate policy concerns include the health of the global and national economy and, to a lesser extent, regional conditions and costs. The main concern of financial services firms would be a nationwide policy, but there are definitely localized economic impacts of a regional policy that could affect businesses in this sector in Minnesota.

Costs

- The policy impact on the cost of electricity is most relevant to firms operating their back offices in Minnesota. It is expected that by 2015 the cost of electricity will be 33% higher under the climate policy than in the scenario.
 - This effect is amplified by the industry's shift to increasing reliance on advanced technology supported by data centers.
 - A large increase in electricity prices could encourage these data centers to be relocated to other regions of the country since location does not really matter given current networking capabilities. Some back office activities could even be moved offshore.
- Minnesota offers financial sector jobs with a relatively low cost of living. This competitive advantage will decrease with increased energy prices to households. The cost per household of the climate policy is a measure of the impacts on the cost

of living in the state. Cost per household is projected to be increased by \$575 in 2015.

Revenues (Price and Output)

- Increased electricity prices would not have a major impact on the price of financial products both because of the minimal impacts on costs and the inability to pass through increases in a nationally and globally competitive industry.
- Revenues from most traditional financial services within the covered region will likely decrease as a result of the generally negative economic impacts of the policy. Job loss and declines in disposable income as a direct result of the RCP would negatively affect Minnesota financial services companies. Suppliers of capital to energy-intensive local sectors will be hardest hit as industries may move or curtail plans for expansion.

Potential Opportunities

- There may be new opportunities in financing carbon mitigation projects, such as offsets, or providing financial and risk management to regional market participants under a cap and trade regime.
- It is unlikely that the climate policy will lead to financial services firms shifting headquarters out of Minnesota, but several back office activities that are relatively energy-intensive could be moved.
- Demand may actually increase for new types of financial products. The shift to a less carbon-intensive infrastructure must be supported with significant capital investments supported by commercial lending. Residential energy efficiency improvements may be supported by new home equity lines. Consumers buying higher fuel mileage vehicles will need new car loans. These are just several examples of some potential opportunities.

Summary

- Minnesota's financial services industry is not as exposed to the impacts of a climate policy as energy-intensive sectors. Most firms in the sector have a national scope and thus are more dependent on the national and global economies than on regional impacts. However, certain firms within the sector have activities within Minnesota that may be moved to other states or countries if energy prices increase. There are both threats and opportunities for regional sales of financial products as a result of the policy.

General Caveats

- Impacts will vary between firms within the industry. Those with a more regional focus will likely see the greatest impact, but even the direction of those impacts is not obvious at this time.

1.10. CORPORATE MANAGEMENT

Quick Summary of Corporate Management Industry in Minnesota	
Example Companies	Target Corporation, Thomson Reuters, Supervalu, General Mills, Carlson Companies
General	Professional and corporate services rely on attracting talented personnel. Quality of life is a key driver in recruitment and aided by local amenities and characteristics such as universities, parks, airport and culture. Additional considerations are income taxes and cost of living.
Competition	Primary competitors are other metropolitan areas featuring corporate jobs and attractive amenities. Within Minnesota, corporations compete with each other for managers.
Energy inputs	No critical energy inputs for the sector other than use of electricity for office space, etc.
Transportation	Transportation is not important for the sector; product is intellectual capital.
Market	Minnesota is home to corporate offices for both regional companies and large, multinational firms.

1.10.1. Impacts on the Corporate Management Industry in Minnesota

Primary climate policy concerns for corporations operating offices in Minnesota are the effects on regional cost of living, the price of electricity, and the ability to use the policy as a means of demonstrating environmental responsibility at the corporate level.

Costs

- The primary costs of corporate management are salary and amenities.
 - A loss of disposable income under the policy could require improved compensation packages to maintain the attractiveness of Minnesota as a corporate locale. The increased cost per household of the policy is projected to be \$575 in 2015, which may be a relatively small effect for individuals employed in this sector.
 - The general amenities of living and working in Minnesota will not change significantly under the RCP—the state will maintain its parks, lakes, airport, and culture. In the long term, infrastructure and amenities may suffer from relatively weaker economic conditions.
- The cost of electricity for heating, cooling and lighting corporate headquarters, as well as for data centers if they're collocated, is also of concern. It is expected that by 2015 the cost of electricity will be 33% higher under the climate policy than in the baseline.
- To the extent that other goods and services used in office management are sourced from within the covered states and are energy-intensive in their production, these costs will also be markedly higher.

Revenues (Price and Output)

- Output in corporate management can be measured as potential to attract talented managers and support staff.
 - Midwestern cities are attractive due to their lower cost of living and greater quality of life. Diminished disposable income could make Minnesota somewhat less attractive relative to other Midwestern cities when recruiting

for top managers, but it is not likely to fully offset their existing lower-cost status nationally.

- Overall the effect of the policy on hiring corporate management will be minimal or negligible. Significant changes in corporate management will only be seen if energy-intensive Minnesota companies choose to relocate operations and management outside of the region covered by policy.

Potential Opportunities

- A perception of greater environmental responsibility may attract some qualified individuals who are environmentally conscious to the area who might not otherwise come.

Summary

- The effect of a climate policy on corporate management in Minnesota will be negligible or at most minimal.

1.11. TOURISM

Quick Summary of Tourism Industry in Minnesota	
Example Companies	Hundreds of Minnesota resorts
General	<p>Overall economic conditions, both regional and national, drive tourism in Minnesota. A strong national economy enables more conventions and in-person corporate functions. Low unemployment, stable income, and low fuel prices encourage family vacations.</p> <p>A substantial portion of Minnesota's tourism is based on its outdoor recreational activities that leverage its lakes, forests, and rural settings.</p>
Competition	Primary competitors are other forms of entertainment and vacation options outside Minnesota.
Energy inputs	The critical energy inputs are fuel prices, including motor fuel (gasoline and diesel) and jet fuel. Tourists to Minnesota are heavily dependent on transportation and especially driving. Tourist activities tend to involve ground transportation and boating; visitors from outside Minnesota will rely more heavily on air travel. Price of travel is the largest factor in demand for travel.
Transportation	Conventions are impacted by national fuels prices, as well as local prices. Regional tourism is most impacted by transportation costs. Destinations located farther from population centers are the most exposed to transportation cost changes.
Market	For conventions and corporate functions customers are national. Resort visitors are more localized and primarily come from Minnesota and other Midwestern states.

1.11.1. Impacts on the Tourism Industry in Minnesota

Primary climate policy concerns are the impact on cost of transportation fuels. Higher fuel prices can be expected to deter local tourism as Minnesota residents choose other entertainment options that require less travel. Higher fuel prices likewise may deter interstate tourism as visitors seek out lower cost non-Minnesota travel destinations. Corporate and convention tourists may be discouraged, possibly being replaced in some cases by telecommunications alternatives.

Costs

- Electricity prices will increase for resorts and convention centers. It is projected that by 2015 the cost of electricity will be between 17% and 33% higher (depending on whether the resorts pay residential or industrial rates) under the climate policy than in the baseline. The increase, percentage wise, is greater for the tourism companies that pay commercial or industrial rates for their electricity.
- An increase in the cost of fuel causes an increase in price for many of the recreational activities offered at resorts in Minnesota, such as boating in any of the state's 4,500 lakes. Motor fuels prices are expected to be 4% higher under a climate policy in 2015 than they would be under the baseline model.
- To the extent that other goods and services used in the tourism industry are sourced from within the covered states and are energy-intensive in their production, these costs will also be markedly higher.

Revenues (Price and Output)

- The tourism industry depends on consumers being willing to travel to destinations in rural or remote parts of Minnesota. Motor fuel and jet fuel price increases will increase transportation costs for consumers. Tourists from within the region will face higher costs for driving to the resorts. Those traveling from elsewhere in the country could see higher air travel costs, as discussed in the Commercial Transportation sector analysis.
- Tourism by Minnesota residents could decrease as a result of diminished disposable income compared to the baseline. The increased cost per household of the policy is projected to be \$575 in 2015. The cost of the policy, which will be exhibited as increased costs of goods and services in Minnesota, may selectively reduce household entertainment spending. Families may forego vacations and instead select lower cost entertainment options.
- Increased costs would be passed through to customers as a result of the policy. Lodging may exhibit modest price increases as higher electricity costs are passed through.

Potential Opportunities

- Some forms of tourism could benefit from the policy.
 - Some degree of lost tourism may be offset as environmental tourism becomes more attractive. There is a growing market for recreation perceived as environmentally responsible and sustainable in nature. The implementation of the RCP might enhance Minnesota's reputation as an environmentally responsible tourist destination and attract a niche market. Some consumers may be willing to pay for "greener" vacations in Minnesota over comparable, less-expensive substitutes in uncovered states. Whether this effect could be larger than the cost-driven loss in tourism is unknown at present.
 - Resorts with low energy costs and located closer to population centers may actually experience higher demand as consumers scale back their vacation budgets and willingness to drive long distances. Thus, there may be a reallocation of tourism within the state, and this effect could be more apparent than a small net change in total statewide tourism spending. More Minnesota families could choose vacations within the state over leaving the state because of their decline in disposable income. This could increase demand for tourism options within Minnesota at the expense of more costly vacations outside of the state (e.g., spending a three-day weekend at a Minnesota resort instead of flying the family to Disney World). Similarly, corporate outings, association meetings and other business gatherings are major portions of Minnesota's resort business. With higher airline fares, Minnesota companies could opt for in-state destinations for these events.