Research Report

January 30, 2015

The Economic Impact

of the

Elk River Resource Recovery Project

on

Anoka, Hennepin, and Sherburne Counties and the State of Minnesota

For the

Elk River Resource Recovery Project

Bureau of Business and Economic Research

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Driven to Discover℠

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ABOUT THE PROJECT

Great River Energy's Elk River Resource Recovery Project (ERRRP) consists of two facilities: one that processes municipal solid waste to create a burnable fuel and a power plant that produces renewable energy from the resulting refuse-derived fuel. Waste left over after the generation of electricity is delivered to the Becker landfill. Using waste to generate electricity provides renewable energy for Great River Energy's member cooperatives and helps communities avoid sending garbage to landfills and increase recycling efforts.

Great River Energy contacted the Bureau of Business and Economic Research (BBER) at the University of Minnesota Duluth's Labovitz School of Business and Economics to study its economic impact on the counties it serves—Anoka, Hennepin, and Sherburne counties. Using three scenarios, the study includes the economic impact of operations and maintenance for the three ERRRP facilities (Scenario I) as compared to the economics of alternative waste disposal methods (i.e. landfill) and energy production if the project did not exist (Scenarios II and III). Scenarios II and III were included to show the difference in magnitude of economic impacts from the ERRRP facilities as compared to more traditional waste disposal and energy production methods.

The economic modeling data and software used was IMPLAN 3.1[1] The study used IMPLAN's economic multiplier analysis and input/output modeling. Data was the most recent IMPLAN county data, which is for year 2013. Results of modeling, reflecting 2015 dollars, are presented here as a written report.

SCENARIOS AND RESULTS

The BBER analyzed three scenarios and reported economic impacts on both the three-county region and the State of Minnesota for each scenario.

Scenario I provides findings on the Elk River Resource Recovery Project itself.

Scenario II provides findings of a similar level of waste disposal at a typical waste disposal facility (landfill) and a similar level of electric generation in the region or state.

Scenario III provides findings of equivalent waste disposal at a traditional landfill but with the electricity generated outside the state.

The following table shows the overall total effects of the three scenarios on the three-county region. Scenario I, reflective of the ERRRP results alone, shows the economic benefits of employment and labor income are approximately triple the other scenarios' results. Value added and output impacts are approximately double the other scenarios' results.

Differences in business practices, higher tipping fees, and the ERRRP's nonprofit status all contribute to

[1] IMPLAN is used by state government and federal government agencies, among others. IMPLAN Group LLC, 16740 Birkdale Commons Pkwy, Suite 212, Huntersville, NC 28078. www.implan.com

the difference in economic impacts between Scenario I and the other two scenarios.

Three-County Region (Anoka, Sherburne, and Hennepin) Total Effects

Impact Type	Employment	Labor Income	Value Added	Output
Scenario I	253	$20,238,239	$26,947,155	$56,227,069
Scenario II	89	$5,829,415	$13,128,970	$29,164,592
Scenario III	80	$4,867,490	$9,666,185	$23,717,102

SOURCE: IMPLAN

The following table shows the overall total effects of the three scenarios on the State of Minnesota. For Scenario I, which is reflective of the ERRRP results alone, the state results significantly increase over those of the three-county region. These increases are due to the added expenditure of a contracted maintenance and construction company located in Duluth, MN., and are calculated in state data but not in the local, three-county region data. Scenarios II and III show slight increases over those of the three-county region, which is typical of a larger study area.

State of Minnesota Total Effects

Impact Type	Employment	Labor Income	Value Added	Output
Scenario I	362	$25,100,665	$34,267,054	$70,231,591
Scenario II	101	$5,862,643	$13,706,423	$31,124,232
Scenario III	92	$5,255,791	$10,520,685	$25,640,021

SOURCE: IMPLAN

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The Economic Impact of the Elk River Resource Recovery Project on Anoka, Hennepin, and Sherburne Counties and the State of Minnesota

I. Project Description

Great River Energy provides wholesale power to 28 distribution cooperatives in Minnesota, who serve more than 655,000 member-consumers. The organization uses a diverse mix of resource to generate more than 2,800 megawatts of electricity, including wind energy, hydropower, and natural gas, biomass and coal power plants. Great River Energy owns more than 4,660 miles of transmission lines across the state. Great River Energy employs over 880 employees.[2]

Great River Energy's Elk River Resource Recovery Project (ERRRP) consists of two facilities: the Elk River Resource Processing Plant, which processes municipal solid waste into a burnable fuel and a power plant, the Elk River Energy Recovery Station, which produces renewable energy from the resulting refuse-derived fuel. Any waste left over electricity is generated is delivered to the Becker landfill. Using waste to generate electricity provides renewable energy for Great River Energy's member cooperatives and helps communities avoid sending garbage to landfills and increase recycling efforts. Approximately 1,000 tons of waste is brought to the Elk River processing facility each day. The use of this biomass fuel reduces landfill waste by as much as 300,000 tons per year, avoiding as much as 150,000 tons of CO_2 emissions and producing nearly 170,000-megawatt-hours of energy each year. When the Elk River power plant began generating electricity from RDF, only 83 percent of the waste that came into the facility could be turned into RDF. Since that time, the ERRRP has reduced the amount of waste it landfills to nearly zero percent.[3]

The ERRRP contacted the Bureau of Business and Economic Research (BBER) at the University of Minnesota Duluth's Labovitz School of Business and Economics to study its economic impact on the region it serves—Anoka, Hennepin, and Sherburne counties. The study includes the economic impact of operations and maintenance for the three ERRRP facilities—the processing plant, power plant and Becker Landfill (including operating costs, waste services, power generation and employment) as compared to the economics of alternative waste disposal methods (i.e. landfill) and electric generation if the project did not exist. This is shown below with three scenarios—Scenario I representative of the ERRRP's economic impact on the three-county region and the state of Minnesota and Scenarios II and III showing estimated comparative results should the ERRRP not exist. Scenarios II and III were included in the analysis because they represent alternative waste disposal and energy production methods and provide a benchmark upon which to compare the magnitude of ERRRP's economic impacts.

[2] http://www.greatriverenergy.com/aboutus/whoweare/
[3] http://www.greatriverenergy.com/

The economic modeling data and software used for the analysis was IMPLAN 3.1[4] The study used IMPLAN's economic multiplier analysis and input/output modeling. Data was the most recent IMPLAN county data, which is for year 2013. Results of modeling, reflecting 2015 dollars, are presented here as a written report.

The research objectives of this study included the following:

- To model the direct, indirect, and induced economic impacts of the operations of the Elk River Resource Recovery Project, as compared with the economics of alternative waste disposal and electric generation methods.
- To describe how the findings impact the study area.
- To draft the findings of this analysis into a report.

Study Area

The geographic scope for this economic impact analysis is the Minnesota counties of Anoka, Hennepin, and Sherburne (see Figure 1). Additionally, results were modeled at the state level.

Figure 1. Anoka, Hennepin, Sherburne Counties.

SOURCE: WIKIPEDIA.ORG

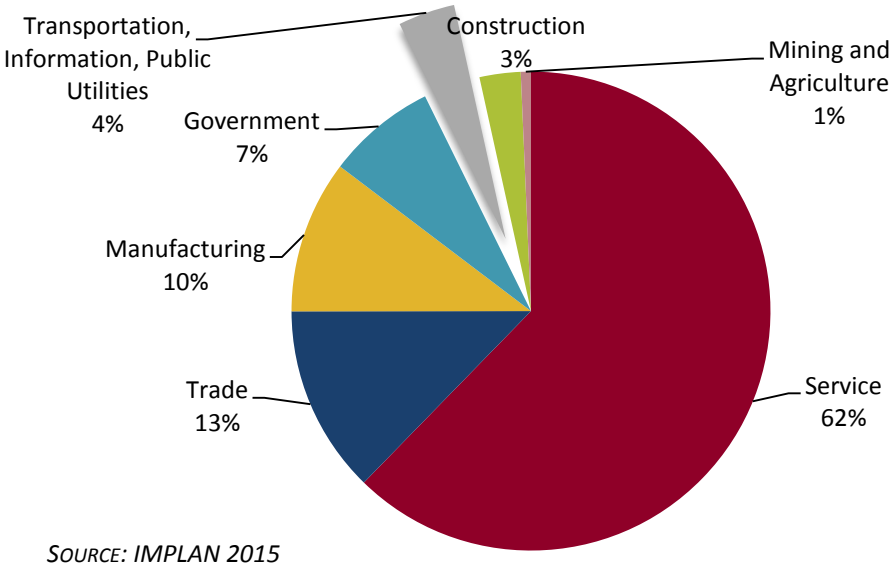
[4] IMPLAN is used by state government and federal government agencies, among others. IMPLAN Group LLC, 16740 Birkdale Commons Pkwy, Suite 212, Huntersville, NC 28078. www.implan.com

Figure 2. Location of Elk River Resource Recovery Program in Elk River, MN

SOURCE: MAPQUEST

Figure 3 shows the Gross Regional Product (GRP) for Anoka, Hennepin, and Sherburne counties. The Service and Trade industries represent the largest share of GRP. The Transportation, Information, and Public Utilities sector (the industry in which the Elk River Resource Recovery Project would be classified) represents about 4% of the total economy in the region.

Figure 3. Gross Regional Product for Anoka, Hennepin, and Sherburne Counties (2013)



SOURCE: IMPLAN 2015

Definitions Used in This Report

- **Analysis by Parts**: The process of splitting or parsing an impact analysis issue into smaller and more specific parts. This technique allows the user to specify the amount of commodity inputs, the proportion of local labor income, and the proportion of local purchases.

- **Direct Effect**: Initial new spending in the study area resulting from the project.
- **Employment**: Estimates (from U.S. Department of Commerce secondary data) are in terms of jobs, not in terms of full-time equivalent employees. Therefore, these jobs may be temporary, part-time, or short-term jobs.
- **Gross Output**: The value of local production required to sustain activities.
- **Indirect Effect**: The additional inter-industry spending from the direct impact.
- **Induced Effect**: The impact of additional household expenditures resulting from the direct and indirect impact.
- **Labor Income**: All forms of employment income, including employee compensation (wages and benefits) and proprietor income.
- **Leakages**: Any payments made to imports or value added sectors that do not in turn re-spend the dollars within the region.
- **Refuse-derived fuel (RDF**): The product of processing municipal solid waste to separate the noncombustible from the combustible portion and preparing the combustible portion into a form that can be effectively fired in an existing or new boiler.
- **Tipping Fees**: A charge levied upon a given quantity of waste received at a waste processing facility. In the case of a landfill, it is generally levied to offset the cost of opening, maintaining, and eventually closing the site.
- **Value Added**: A measure of the impacting industry's contribution to the local community; it includes wages, rents, interest, and profits.

II. Impact Procedures and Input Assumptions

Input/Output Analysis

Input/Output analysis is a type of applied economic analysis that tracks the interdependence among various producing and consuming sectors of an economy[5]. Specifically, it depicts inter-industry relations and shows how each industry is dependent on all the others in the economy, both as a consumer of outputs and as a supplier of inputs. Input/Output analysis has been used to study regional economies within a nation and as a tool for national and regional economic planning. It predicts the effect of changes in one industry on the others and on consumers, government, and suppliers. In addition, a common use of input/output analysis is to estimate the economic impact of an industry or firm. It is this technique that is enacted in this study.

[5] Bureau of Economic Analysis

This study uses the IMPLAN Group's input/output modeling data and software (IMPLAN version 3.1). The IMPLAN database contains county, state, zip code, and federal economic statistics, which are specialized by region, not estimated from national averages. Using classic input/output analysis in combination with regional-specific Social Accounting Matrices and Multiplier Models, IMPLAN provides a highly accurate and adaptable model for its users.

IMPLAN Data and Assumptions

IMPLAN data files use the following federal government data sources.

- US Bureau of Economic Analysis Benchmark I/O Accounts of the US
- US Bureau of Economic Analysis Output Estimates
- US Bureau of Economic Analysis Regional Economic Information Systems (REIS) Program
- US Bureau of Labor Statistics Covered Employment and Wages (CEW) Program
- US Bureau of Labor Statistics Consumer Expenditure Survey
- US Census Bureau County Business Patterns
- US Census Bureau Decennial Census and Population Surveys
- US Census Bureau Economic Censuses and Surveys
- US Department of Agriculture Census

IMPLAN data files consist of the following components: employment, industry output, value added, institutional demands, national structural matrices, and inter-institutional transfers.

The data used was the most recent IMPLAN data available, which is for the year 2013. All data is reported in 2015 dollars.

Economic impacts are made up of direct, indirect, and induced impacts. The following are suggested assumptions for accepting the impact model: IMPLAN input/output is a production-based model, and employment numbers (from U.S. Department of Commerce secondary data) treat both full- and part-time individuals as being employed.

Inputs Provided for Impact Modeling

The BBER worked closely with Great River Energy's Elk River Resource Recovery Project in the development of the IMPLAN models to ensure accuracy of results. Operating assumptions required for the models include employment estimates, estimates of local purchases, and operations dollar value of sales or output production. Great River Energy provided the BBER with all company expenditures required for the analysis of Scenario I. The data used in the analysis of Scenarios II and III was estimated using IMPLAN datasets and combined with data collected from external data sources. The validity of all estimates was confirmed by Great River Energy officials.

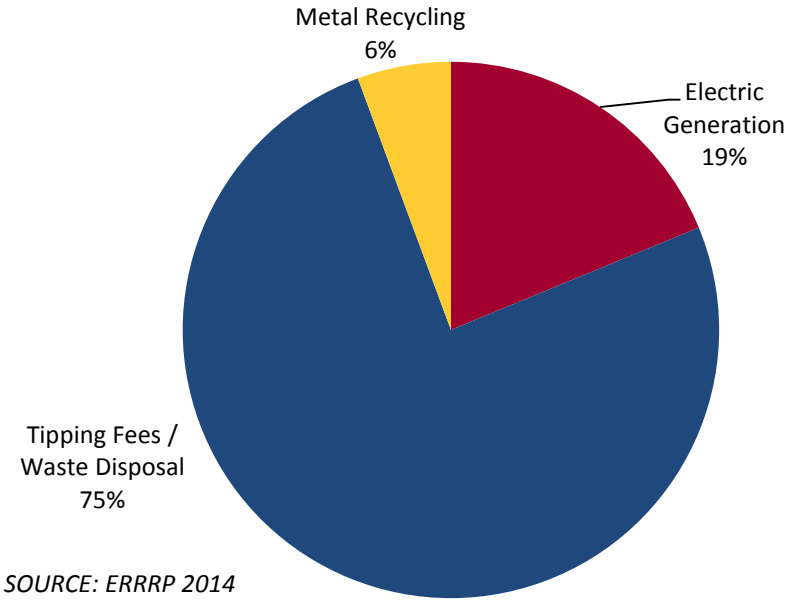
Operations: Detailed company budget reports were provided for the years 2013 and 2014. However, the full year's expenditures for 2014 were unavailable at the time of this analysis, so 2013 expenditures

were used for all models. These reports included information on annual expenditures, revenue sources, large contracts with other companies, and large local[6] purchases. Figures 4 and 5 provide further detail on the ERRRP's revenue sources and expenditures.

Employment: Employment levels and labor costs at the Elk River Resource Recovery Project were provided by the ERRRP. Employment estimates for an equivalent level of waste disposal at a regional landfill were based on an average of approximately 20 landfills with similar sales revenue from the 2014 Reference USA database. Employee compensation was adjusted to remain consistent with IMPLAN's estimates for the Waste Management and Remediation sector. All other employment levels and labor costs were provided by IMPLAN.

Tipping Fees: For analysis in Scenarios II and III, an estimated range of tipping fees for the three-county region ($25-$55) was provided by the ERRRP and confirmed using information from Sherburne County officials. We used a value on the high end of the range to provide a more appropriate comparison. Additionally, the ERRRP provided its own tipping fee rate for this report.

Figure 4. ERRRP Share of Revenue by Funding Source



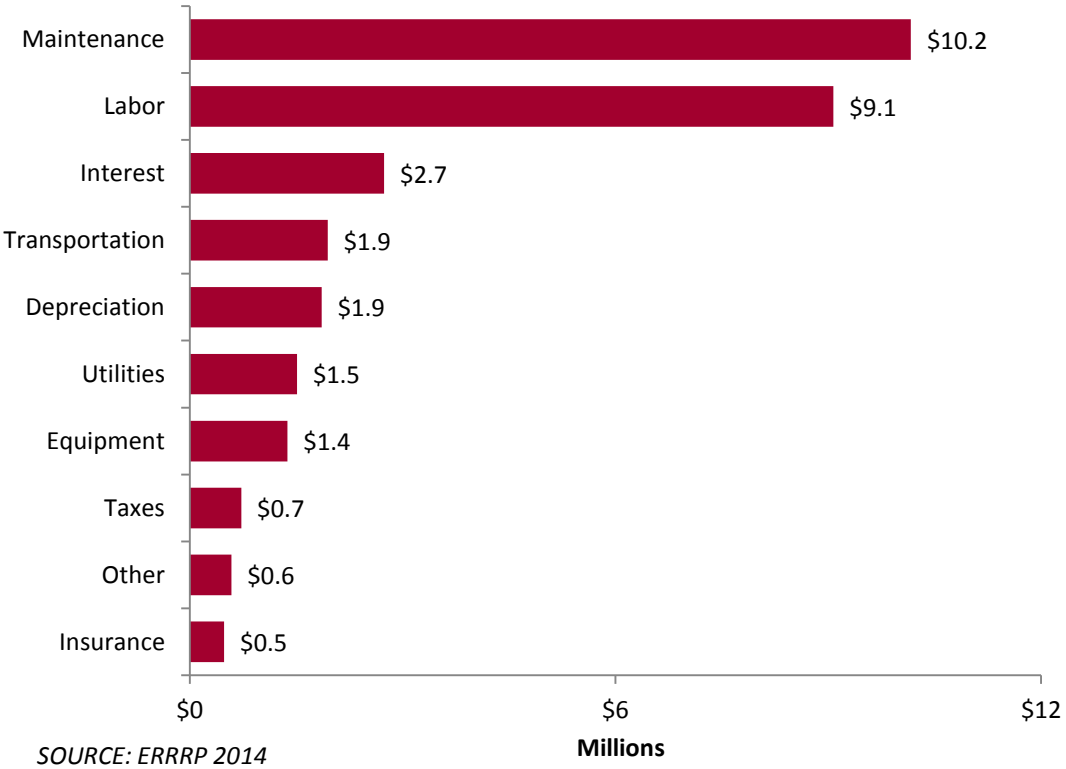
SOURCE: ERRRP 2014

Figure 4 shows the breakdown by percentages of the ERRRP's revenue funding sources. Shown in blue above, tipping fees represent the greatest share of the company's revenue with 75% of earnings coming from this source.

[6] Spending within Anoka, Hennepin, and Sherburne counties.

Figure 5 below shows the amount (in millions of dollars) the ERRRP spends throughout the year. Maintenance and Labor represent the company's largest expenditures, with a combined amount of nearly $20 million annually.

Figure 5. ERRRP Expenditures by Type, 2013



SOURCE: ERRRP 2014

Analysis by Parts

The Elk River Resource Recovery Project is unique in that its business functions comprise two industry sectors – Waste Management Services and Electric Power Generation. However, its annual expenditures are quite different from either of these sectors. The Resource Processing Plant (RPP) hires more employees than a typical waste disposal firm and spends much more on industrial machinery maintenance. The Energy Recovery Station (ERS) is most similar to a biomass electric generation facility, but biomass plants typically spend a very large portion of their budget on feedstock, such as wood pulp, where the ERS receives its feedstock at no cost. Because of the ERRRP's unique characteristics, the BBER modeled the ERRRP facility using a technique called Analysis by Parts. Results in Tables 2-4 (shown on pages 10 and 11) are reflective of the Analysis-by-Parts method.

Table 1. IMPLAN Commodity Sectors Used for the ERRRP Customized Industry

IMPLAN Commodity Number	*Description*
3020	Oil and natural gas
3049	Electricity transmission and distribution
3050	Natural gas, and distribution services
3051	Water, sewage treatment, and other utility services
3062	Maintained and repaired nonresidential structures
3344	Light trucks and utility vehicles
3345	Heavy duty trucks
3395	Wholesale trade distribution services
3402	Retail services - Gasoline stores
3411	Truck transportation services
3428	Wireless telecommunications (except satellite)
3433	Monetary authorities and depository credit intermediation services
3437	Insurance
3445	Commercial and industrial machinery and equipment rental and leasing services
3449	Architectural, engineering, and related services
3454	Management, scientific, and technical consulting services
3455	Environmental and other technical consulting services
3456	Scientific research and development services
3464	Employment services
3466	Travel arrangement and reservation services
3467	Investigation and security services
3468	Services to buildings and dwellings
3471	Waste management and remediation services
3499	Hotels and motel services, including casino hotels
3501	Full-service restaurant services
3502	Limited-service restaurant services
3507	Commercial and industrial machinery and equipment repairs and maintenance
3511	Dry-cleaning and laundry services
3523	Other products and services of state govt enterprises

SOURCE: IMPLAN

Analysis by Parts allows the user to create a customized industry based on an existing budgetary spending pattern[7]. Analysis by Parts is the process of splitting or parsing an impact analysis issue into smaller and more specific parts. This technique allows the user to specify the amount of commodity inputs, the proportion of local labor income, and the proportion of local purchases.

All expenditures provided by the ERRRP were re-categorized as IMPLAN commodities. Table 1 on page 8 includes a list of those commodities used to create the customized industry for the ERRRP.

Scenarios

The following section describes the three scenarios modeled in this analysis and the inputs and assumptions used to develop each one. In Scenario I, the inputs provided by the ERRRP are used to create a customized industry, which is modeled using the Analysis-by-Parts method. Scenarios II and III represent alternative waste disposal and energy production methods and provide a benchmark upon which to compare the magnitude of ERRRP's economic impacts. Scenarios II and III model equivalent levels of spending in the appropriate sectors, using industry change activities. Details are described below.

Scenario I – Economic Impact of the Elk River Resource Recovery Project

Scenario I uses the direct expenditures provided by the ERRRP as the original input for the model. The Analysis-by-Parts method was then used to analyze the economic impacts of all the ERRRP expenditures as well as labor income and fringe benefits on the region and the state. Depreciation and property taxes were not included in the analysis, as they are considered leakages.

Scenario II – Economic Impact of Equivalent Waste Disposal and Energy Production

Scenario II explores the economic impacts of a similar level of waste disposal at a typical waste disposal facility (i.e. landfill) and a similar level of electric generation, using industry change activities in existing IMPLAN sectors rather than Analysis-by-Parts. In 2013, more than 96% of the revenue generated by Electric power generation facilities in the three-county region came from facilities that burn fossil fuels[8]. For that reason, we assumed a similar level of industry sales in IMPLAN sector 42, Electric Power Generation–Fossil Fuels. For the waste disposal portion of the analysis, we assumed an equivalent amount of waste disposal (300,000 tons per year) with an average tipping fee of $50/ton, for an industry sales total of $15 million per year in IMPLAN Sector 471, Waste Management and Remediation Services. The Waste Management sector includes garbage collection services as well as landfills, and typically, garbage collection services have much higher average employment levels than landfills. For that reason, we adjusted the employment and employee compensation to align with similar-sized landfill operations in the region.

[7] IMPLAN, 2015
[8] IMPLAN, 2013

Scenario III – Economic Impact of Equivalent Waste Disposal, No Energy Production

Scenario III examines what the economic impact to the region and state would be if the waste was being processed at a traditional landfill, but the electricity was being generated outside the region and the state. Because Great River Energy produces a large percentage of its electricity at coal-fired power plants in North Dakota, and because Minnesota ranks 33rd in the nation in terms of energy production, it is likely that, if the ERRRP was not producing electricity at its plant, the production would happen outside the three-county region and/or the state. Like Scenario II, we assumed an equivalent amount of waste disposal (300,000 tons per year) with an average tipping fee of $50/ton, for an industry sales total of $15 million per year in the Waste Management sector, and we adjusted the employment and labor income estimates to align with similar-sized landfill operations in the region.

III. Findings: Elk River Resource Recovery Project's Economic Impact on the Three-County Region

Scenario I – Elk River Resource Recovery Project

Table 2 summarizes the total economic effects from the Elk River Resource Recovery Project on the three-county region and the State of Minnesota. These results use the direct expenditures provided by the Elk River Resource Recovery Project as the original input for the model.

Table 2. Impact Summary of ERRRP on the Three-County Region and State of Minnesota

Total Effects	*Employment*	*Labor Income*	*Value Added*	*Output*
Three-County Region	253	$20,238,239	$26,947,155	$56,227,069
State of Minnesota	362	$25,100,665	$34,267,054	$70,231,591

SOURCE: IMPLAN

The left-most column of Table 2, labeled Employment, estimates the number of jobs that the ERRRP created directly and indirectly. Employment estimates are in terms of jobs, not in terms of full-time equivalent employees. Therefore, these jobs may be temporary, part-time, or short-term jobs. According to the results of this analysis, it is estimated that the ERRRP contributed to the creation of 253 jobs in the three-county region and 362 jobs in the State of Minnesota.

The second column, Labor Income, is an estimate of all employee compensation, including wages, benefits, and proprietor income. In 2013, it is estimated that the ERRRP contributed to over $20 million in employee wages and benefits in the three-county region, and more than $25 million in Minnesota.

Column three, labeled Value Added, shows the economic impacts of the expenditures that the ERRRP put specifically towards wages, rents, interest, and profits related to its 2013 operations. Value Added represents the contribution to GDP made by an individual producer, industry, or sector. In 2013, the ERRRP was estimated to have a total value added impact of nearly $27 million in the three-county region and $34 million statewide.

The last column, Output, is the value of all local production required to sustain activities. In 2013, the ERRRP spent approximately $30 million (see Direct Effect Table 3) leading to a total output impact of $56 million regionally and $70 million statewide.

These results highlight the fact that the state-level impacts are much larger than the regional impacts. The primary reason for this occurrence can be explained by the concept of leakage. A small area like a county (or group of counties) can have a high level of leakage. One of the ERRRP's major expenditures is for a contracted maintenance and construction company located in Duluth, MN. When modeling the economic impact of the ERRRP on the three-county region (Table 3), these purchases are considered leakages and are not included in the results. However, when modeling the impacts of the ERRRP on the State of Minnesota (Table 4), they are considered local purchases, and therefore, they are included in the analysis.

Further details of all Scenario I impacts are shown in Tables 3 and 4. In these tables, direct expenditures provided by the Elk River Resource Recovery Project are listed in the column labeled, Direct Effect. Indirect Effect shows the measurement of increased spending between commercial, government, and service industries. Induced Effect measures the amount of increased spending by residential households. Total Effect is the sum of Direct, Indirect, and Induced Effects.

Table 3. Impact Detail of ERRRP on the Three-County Region

Impact Type	*Employment*	*Labor Income*	*Value Added*	*Output*
Direct Effect	79	$9,071,652	$11,657,394	$30,462,040
Indirect Effect	97	$7,122,577	$8,869,230	$15,342,687
Induced Effect	77	$4,044,010	$6,420,531	$10,422,342
Total Effect	253	$20,238,239	$26,947,155	$56,227,069

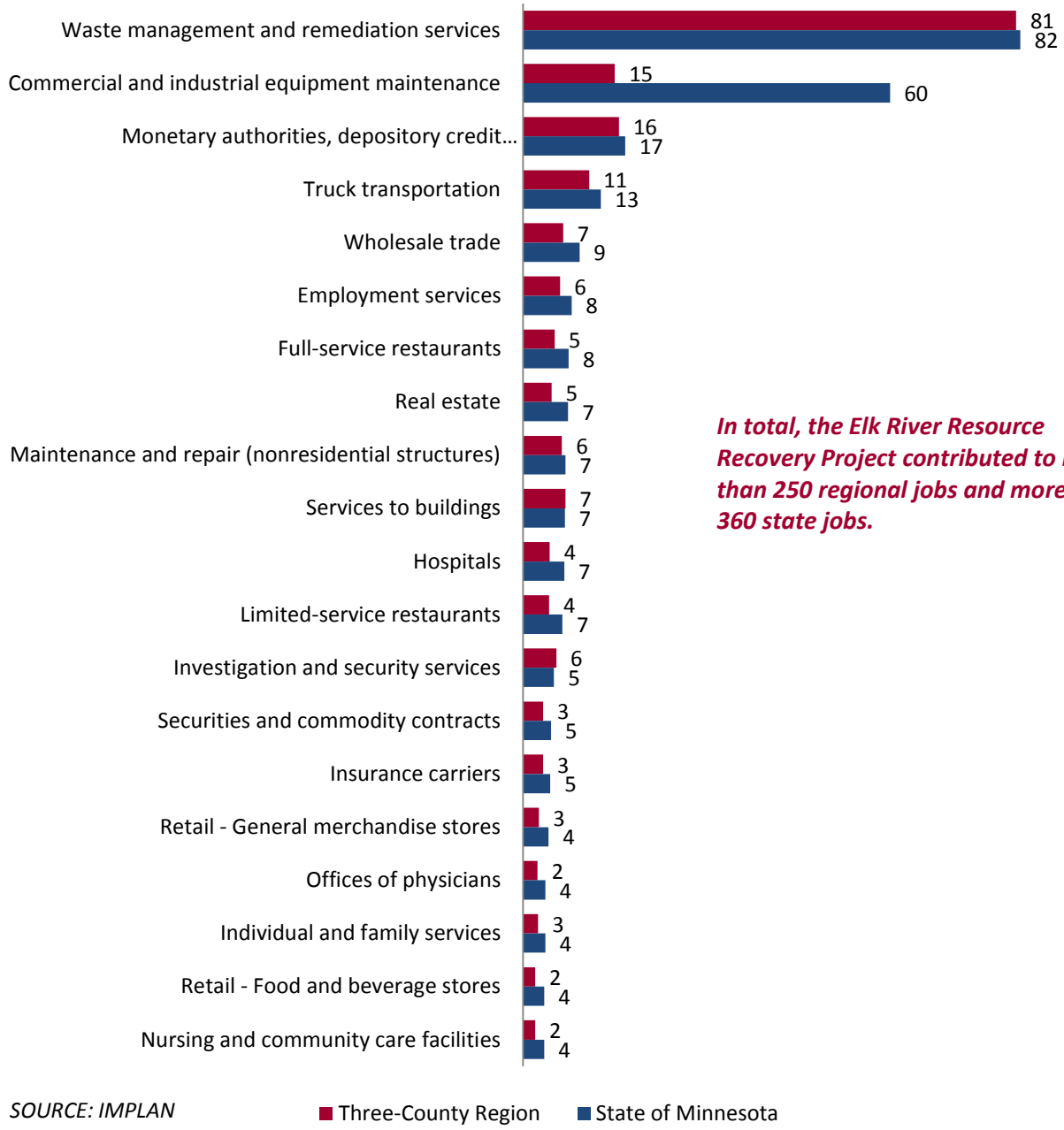
SOURCE: IMPLAN

Table 4. Impact Detail of ERRRP on the State of Minnesota

Impact Type	*Employment*	*Labor Income*	*Value Added*	*Output*
Direct Effect	79	$9,071,652	$11,657,394	$30,462,040
Indirect Effect	155	$10,199,567	$12,846,157	$22,527,085
Induced Effect	127	$5,829,446	$9,763,503	$17,242,466
Total Effect	362	$25,100,665	$34,267,054	$70,231,591

SOURCE: IMPLAN

Figure 6. Estimated Employment Impacts (Top 20 Impacted Sectors)



SOURCE: IMPLAN

In total, the Elk River Resource Recovery Project contributed to more than 250 regional jobs and more than 360 state jobs.

Figure 6 shows the estimated employment impacts in the top twenty most impacted sectors. All 79 employees (See Direct Effect Table 3) at the ERRRP were classified in the Waste Management and Remediation Services sector, and clearly that is the sector with the largest employment as a result of the ERRRP. Other impacted sectors include Commercial and Industrial Equipment Maintenance, Monetary

Authorities, Truck Transportation, Wholesale Trade, Employment Services, and Full-service Restaurants.

It is interesting to note the large discrepancy between the regional and state employment impacts in the Commercial and Industrial Equipment Maintenance sector (shown second from the top in Figure 6). Sixty jobs are estimated to have been created in that sector at the state level, due in part to the large contract with the maintenance and construction company in Duluth, MN. When modeled at the state level, you can see how the ERRRP spending contributes to the creation of a large number of jobs in this sector, whereas those are considered leakages at the regional level and are not shown.

Scenario II – Equivalent Waste Disposal and Energy Production

Scenario II explores the economic impacts of a similar level of waste disposal (300,000 tons per year) at a typical waste disposal facility (i.e. landfill) and a similar level of electric generation. The impacts of this scenario were modeled at the regional and state levels. Data for these models were supplied by IMPLAN. Employment and labor income adjustments were made to the Waste Management sector to align with similar-sized landfill operations in the region[9].

Table 5 below provides a summary of the total economic effects from Scenario II. Again, we see that the state-level impacts are larger than the regional impacts, although the difference is not nearly as significant in this scenario. The reason is because this scenario uses IMPLAN data and assumptions rather than the ERRRP direct expenditures. Therefore, no adjustment was made for the large maintenance contract outside the three-county region.

Table 5. Impact Summary of Equivalent Waste Disposal and Energy Production on Region and State

Total Effects	*Employment*	*Labor Income*	*Value Added*	*Output*
Three-County Region	89	$5,829,415	$13,128,970	$29,164,592
State of Minnesota	101	$5,862,643	$13,706,423	$31,124,232

SOURCE: IMPLAN

The total economic effects from the ERRRP (Scenario I) are much larger than the total effects from Scenario II. In some cases, the effect of the ERRRP is three to four times that of traditional waste disposal and energy production methods. There are a number of reasons for this difference. The first is that the ERRRP has a waste disposal process that is more labor intensive and requires more skilled workers than the typical landfill. Similarly, its energy production requires more employees than the typical electric production facility. The ERRRP has higher average tipping fees than most other regional landfills, which means that it earns more revenue for the same amount of disposed waste. Finally, as a non-profit organization, the ERRRP doesn't keep as much in proprietor income (i.e. profits) as a

[9] Reference USA, 2014

privately-owned firm. All of these factors help to explain the large gap between the economic impacts of the ERRRP and alternative methods of waste disposal and electric generation.

Further details of all Scenario II impacts are shown in Tables 6 and 7.

Table 6. Impacts of Equivalent Waste Disposal and Energy Production on the Three-County Region

Impact Type	*Employment*	*Labor Income*	*Value Added*	*Output*
Direct Effect	29	$2,174,845	$7,688,925	$20,149,518
Indirect Effect	38	$2,507,564	$3,619,094	$6,059,079
Induced Effect	22	$1,147,006	$1,820,951	$2,955,995
Total Effect	89	$5,829,415	$13,128,970	$29,164,592

SOURCE: IMPLAN

Table 7. Impacts of Equivalent Waste Disposal and Energy Production on the State of Minnesota

Impact Type	*Employment*	*Labor Income*	*Value Added*	*Output*
Direct Effect	29	$2,062,429	$7,677,165	$20,149,518
Indirect Effect	43	$2,458,827	$3,782,385	$7,006,806
Induced Effect	29	$1,341,387	$2,246,873	$3,967,908
Total Effect	101	$5,862,643	$13,706,423	$31,124,232

SOURCE: IMPLAN

Scenario III – Equivalent Waste Disposal, No Energy Production

Scenario III examines what the economic impact to the region and state would be if the waste was being processed at a traditional landfill, but the electricity being generated at the facility was generated outside the state. Because Great River Energy produces a large percentage of its electricity at coal-fired power plants in North Dakota, and Minnesota ranks 33rd in the nation in terms of energy production, it is likely that, if the ERRRP was not producing electricity at its plant, the production would happen outside the three-county region and/or the state.

The impacts of this scenario were modeled at the regional and state levels. Data for these models were supplied by IMPLAN. Employment and labor income adjustments were made to the Waste Management sector to align with similar-sized landfill operations in the region[10].

A summary of the economic impacts of Scenario III are shown in Table 8 below. These impacts are the smallest of the three scenarios. If the waste disposed at the ERRRP was going to a traditional waste disposal facility and the energy was being produced outside the state, the economic effects on the region and the state would be much smaller. In fact, the total value of all local production in this scenario (output) is smaller than the value of ERRRP's direct expenditures from Scenario 1 (see Tables 3

[10] Reference USA, 2014

and 4 on page 12).

Table 8. Impact Summary of Equivalent Waste Disposal on Region and State, No Energy Production

Total Effects	*Employment*	*Labor Income*	*Value Added*	*Output*
Three-County Region	80	$4,867,490	$9,666,185	$23,717,102
State of Minnesota	92	$5,255,791	$10,520,685	$25,640,021

SOURCE: IMPLAN

Further details of all Scenario III impacts are shown in Tables 9 and 10.

Table 9. Impacts of Equivalent Waste Disposal on the Three-County Region

Impact Type	*Employment*	*Labor Income*	*Value Added*	*Output*
Direct Effect	25	$1,518,237	$4,724,893	$15,506,582
Indirect Effect	37	$2,391,367	$3,420,589	$5,741,920
Induced Effect	18	$957,887	$1,520,702	$2,468,599
Total Effect	80	$4,867,490	$9,666,185	$23,717,102

SOURCE: IMPLAN

Table 10. Impacts of Equivalent Waste Disposal on the State of Minnesota

Impact Type	*Employment*	*Labor Income*	*Value Added*	*Output*
Direct Effect	25	$1,708,354	$4,950,653	$15,506,582
Indirect Effect	41	$2,342,764	$3,552,493	$6,570,392
Induced Effect	26	$1,204,673	$2,017,539	$3,563,047
Total Effect	92	$5,255,791	$10,520,685	$25,640,021

SOURCE: IMPLAN

IV. Conclusions

The BBER analyzed three scenarios and reported economic impacts on both the three-county region and the State of Minnesota for each scenario.

Table 11 below shows the overall total effects of the three scenarios on the three-county region. Scenario I, reflective of the ERRRP results alone, shows the economic benefits of employment and labor income are approximately triple the other scenarios' results. Value added and output impacts are approximately double the other scenarios' results. Scenarios II and III were included to show the difference in magnitude of economic impacts from the ERRRP facility as compared to more traditional waste disposal and energy production methods.

Differences in business practices, higher tipping fees, and the ERRRP's nonprofit status all contribute to the difference in economic impacts between Scenario I and the other two scenarios.

Table 11. Three-County Region (Anoka, Sherburne, and Hennepin) Total Effects

Impact Type	Employment	Labor Income	Value Added	Output
Scenario I	253	$20,238,239	$26,947,155	$56,227,069
Scenario II	89	$5,829,415	$13,128,970	$29,164,592
Scenario III	80	$4,867,490	$9,666,185	$23,717,102

SOURCE: IMPLAN

Table 12 below shows the overall total effects of the three scenarios on the State of Minnesota. For Scenario I, which is reflective of the ERRRP results alone, the state results significantly increase over those of the three-county region. These increases are due to the added expenditure of a contracted maintenance and construction company located in Duluth, MN., and are calculated in state data but not in the local, three-county region data.

Scenarios II and III show slight increases over those of the three-county region, which is typical of a larger study area.

Table 12. State of Minnesota Total Effects

Impact Type	Employment	Labor Income	Value Added	Output
Scenario I	362	$25,100,665	$34,267,054	$70,231,591
Scenario II	101	$5,862,643	$13,706,423	$31,124,232
Scenario III	92	$5,255,791	$10,520,685	$25,640,021

SOURCE: IMPLAN

Note: Readers are encouraged to remember the UMD Labovitz School's BBER was asked to supply an economic impact analysis only. Any subsequent policy recommendations should be based on the "big picture" of total impact.

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