

The Economic Impact of Building and Operating an 895 MW Coal-Based Power Plant in Finney County Kansas



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Final Report

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Executive Summary

Sunflower Electric Power Corporation currently operates a 360 megawatt coal-fired electrical generation station in Holcomb, KS near Garden City. As a result of an agreement with state officials, the facility will expand with the addition of one new 895 megawatt coal-fired power plant currently scheduled for opening in 2016.

Construction of the plant will take about four years and cost approximately \$2.24 billion. Peak construction employment will reach nearly 1,900 jobs. Upon completion the facility will create 88 permanent jobs with an annual payroll of approximately \$6.5 million.

The purpose of this report is to estimate the overall economic impacts of building and operating the new power station. A multi-regional economic model was built to estimate the impacts to Finney County, KS, southwestern Kansas, and the rest of Kansas.

Construction of the facility will generate nearly \$2 billion in total economic activity, and support an estimated 5,900 “job years” (one job for one year) throughout the state of Kansas paying \$250 million in labor income and generating over \$400 million in total income. The project also will generate more than \$29 million in state and local tax revenue.

Summary of Total Economic Impacts to the Kansas Economy of Construction Spending for the Sunflower Electric Power Plant, 2010\$

Impact Type	Output	Employment	Labor Income	Value Added
Direct Effect	\$1,625,657,387	3,284	\$144,943,312	\$227,055,056
Indirect Effect	\$232,346,331	1,585	\$75,567,213	\$122,196,719
Induced Effect	\$106,868,891	1,045	\$33,705,056	\$63,677,269
Total Effect	\$1,964,872,609	5,914	\$254,215,581	\$412,929,045

After taking into consideration the impact of reduced agricultural production due to the transfer of irrigation water rights, the plant will have a net economic benefit to Finney County, southwestern Kansas, and the state of Kansas. During each year of operation, the facility will generate nearly \$350 million in overall economic activity, more than 260 permanent jobs throughout the state that will pay \$17 million in labor income, and almost \$200 million in total income. Combined annual state and local tax revenue will grow by over \$41 million.

Summary Total Annual Economic Impacts to the Kansas Economy of Operation of the Sunflower Electric Power Plant, 2010\$

Impact Type	Output	Employment	Labor Income	Value Added
Direct Effect	\$323,165,040	76	\$10,011,071	\$183,146,084
Indirect Effect	\$15,942,531	114	\$4,933,753	\$7,591,927
Induced Effect	\$7,252,295	71	\$2,290,624	\$4,319,640
Total Effect	\$346,359,865	261	\$17,235,449	\$195,057,652

Introduction

Sunflower Electric Power Corporation currently owns and operates a 360 megawatt (MW) coal-based electrical generation unit at Holcomb Station near Garden City in southwestern Kansas. At present, this facility makes a sizable economic contribution to the southwestern Kansas economy and the state as a whole. When considering the number of workers directly employed at the facility and the labor income they earn, and calculating the direct and indirect economic contribution of this activity to the state of Kansas, the Holcomb Station is closely tied to over 300 jobs and nearly \$18.8 million in annual labor income.¹ So long as these jobs persist, the income impacts are renewed annually.

For a number of years, Sunflower Electric has wanted to expand the Holcomb facility. Several previous alternatives have been considered (Gamble, 2002, 2005). In May, 2009, the Kansas Legislature and Governor approved the construction of one 895 MW coal-fired power plant at the Holcomb Station.

This new facility will represent a major undertaking. Construction is expected to take 50 months, and cost approximately \$2.24 billion in direct investment. At peak construction, some 1,894 workers will be employed on the project. Following completion, the expanded facility will provide new jobs for 88 workers earning an average of approximately \$70,000 annually. The vast majority of these workers will come from the southwestern Kansas region.

Intuitively, most people understand the actual economic contribution of an activity extends beyond the direct employment and wages generated. Other regional industries supply inputs needed for production of the energy. Further, workers will spend their wages and salaries for household purchases that tend to spread the economic effects of an activity broadly throughout the economy. The purpose of this report is to update estimates of the economic contribution of the proposed production facility based on its current scale. Both the impact associated with construction of the facility as well as the ongoing contributions through the continuing operation of the facility are considered.

¹ Authors' calculations based on historical budgets. Labor income combines employee compensation and proprietary income and is reported in 2010\$.

Analysis Method

Social Accounting Matrix (SAM) analysis is a system of accounting for the economic transactions occurring in a state or regional economy over a period of one year. A SAM model creates a “computerized spreadsheet,” charting the flow of dollars between local business sectors, households, government, and other non-local consumers of locally-produced goods and services. SAM analysis enables estimates of how spending in one area of the economy “ripples” through the economy to other sectors.

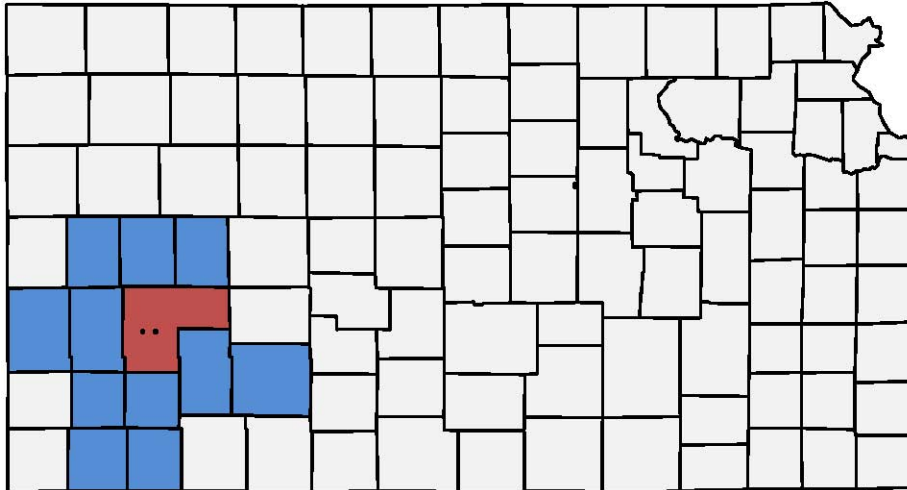
SAM analysis is an extension of Input-Output (I-O) analysis. I-O analysis focuses only on financial flows associated with production sectors in the economy. SAM analysis is a comprehensive accounting system that also accounts for taxes, investment, savings, and financial flows between institutions such as government and households. As such, it is a more comprehensive accounting system with the capacity to more accurately represent economic transactions and the impacts resulting from economic changes in the economy.

The SAM modeling system used for this analysis is the IMPLAN (IMpact analysis for PLANing) system originally developed by the U.S. Forest Service (MIG, 2010). The IMPLAN system consists of the software necessary to construct economic accounts, an impact analysis routine, and state- and county-level data files containing information related to economic activity.

Three models were built and used for this analysis. The first was a single-county model of Finney County, where the new Holcomb facility would be located. The second model encompassed other counties in southwestern Kansas excluding Finney County. These counties included Ford, Grant, Gray, Hamilton, Haskell, Kearny, Lane, Scott, Seward, Stevens, and Wichita Counties.² A third model included all other Kansas Counties. The three models were then linked together to create a multi-regional input-output (MRIO) model. The MRIO model can capture both the spillover and the feedback loops of economic changes. Thus, we can more accurately gauge how much of the impact associated with an activity occurring in Finney County will spill over into other southwestern Kansas counties and the rest of the state. A map showing the geography of the three models is in Figure 1.

² This area was selected based on the commuting flows between these adjacent counties and Finney County reported in the U.S. Census Bureau’s Journey to Work data files for 2000.

Figure 1. Finney County, Southwest Kansas, and the Rest of Kansas in the Multi-Region Input-Output Model



Estimates of Economic Impact

Economic impacts can be reported in several ways. The most general measure of impact is economic “output,” the overall value of production. For most sectors, output can be interpreted as the value of sales. While being the broadest measure of impact, it must be recognized that for many sectors, this represents an amount of “double-counting.” Ideally, we would measure only the increment of new value created at any stage of production. For example, in the trade sectors, only the retailer’s margin is counted and attributed to trade. The cost of the good sold and the cost to transport the good is allocated to the manufacturing and the trucking sectors. However, for other sectors, particularly agriculture, it’s not possible to separate these increments of value. Thus, an income measure is generally the preferred indicator of impact.

Another common measure of impact would be changes to local income. Labor income combines employee compensation (wages, salaries, and the value of certain fringe benefits) and proprietary income (payments to self-employed individuals such as private business owners, doctors, lawyers, etc.). Value added is the broadest measure of total income associated with productive activities. Value added is generally the preferable measure with which to evaluate the economic value of the project. Value added includes labor income plus other property type income (rents, royalties, dividends, corporate profits) and indirect business taxes (excise taxes, property taxes, fees and

licenses, and sales tax paid by business). Employment impacts also are reported. Employment is reported in number of jobs without regard to whether the job is full-time or part-time.

Direct and Indirect Economic Impacts

Economic impacts arise in several ways. In the case of estimating the economic impacts associated with a business facility, the direct (immediate) effects are the value of the sales, wages, or employment from the facility in the year of the study. In addition to the direct contribution made by the facility, indirect (ripple) effects also arise. There are two ways in which indirect impacts occur.

The first type of indirect impact might be termed an “enterprise effect.” These are the effects associated with an individual facility purchasing goods and services necessary for the facility’s operation from other local businesses. The firms supplying the goods or services to the facility must, in turn, increase their purchase of goods and services in order to meet the facility’s demand. In this way, the effect of demand for one firm’s product spreads to a wide variety of backward-linked businesses. In this report, they are referred to as indirect effects.

The second important way indirect impacts arise might be termed the “wage effect.” In this report, they are referred to as induced effects. Employers pay wages to labor who use their income to purchase household goods and services. As workers make these purchases, area trade and service businesses earn the income necessary to pay their workers and generate profits. This creates an additional round of spending. These rounds of spending and re-spending may continue for some time until the purchase of imported goods, paying non-local taxes, and non-local savings eventually cause the impact to “leak” out of the economy.

The time frame in which the indirect effects occur depends on the structure of the economy. In larger places with more goods and service businesses, the economy will capture a greater share of the impact from spending and the total impact may take several years to achieve. In smaller rural economies, the total impact will be much smaller. Of course, the reintroduction of new spending replenishes the process.

In SAM analysis, the entire process is compressed into a one-year time frame. The most recent year for which necessary information is available is 2008. The impact analysis estimates the direct and indirect effects as though the entire process occurred

in that year. Each year the spending continues, the direct and indirect effects are replenished.

An Overview of the Finney County Economy

A 143-sector model of the Finney County economy was built.³ Using a general aggregation of industries, we can get an initial view of overall economic activity in the county. Output, employment and several elements of value added are shown in Table 1. The full, detailed model is shown in Appendix 1.

In total, the Finney County economy generated nearly \$4 billion in total economic activity in 2008 as measured by output. Manufacturing was the largest economic sector by far, attesting to the importance of the livestock processing sector. Services and agriculture are two other important sectors. The largest sector in terms of employment and income was the services sector.

Table 1. The Finney County KS Economy, 2008\$

Industry	Employment	Output	Labor Income	Other Property Income	Indirect Business Tax	Total Value Added
Total	22,443	\$3,939,672,346	\$881,587,515	\$485,372,667	\$113,464,027	\$1,480,424,202
Agriculture	1,470	\$496,058,982	\$40,166,703	\$98,049,472	\$8,617,191	\$146,833,364
Mining	501	\$226,889,507	\$39,945,915	\$77,588,314	\$7,694,549	\$125,228,776
Construction	1,562	\$189,402,368	\$62,618,432	\$5,130,466	\$863,280	\$68,612,175
Manufacturing	3,671	\$1,610,898,032	\$178,162,435	\$36,757,515	\$3,922,774	\$218,842,719
TIPU	996	\$253,095,585	\$67,788,796	\$66,508,068	\$18,522,823	\$152,819,688
Trade	3,896	\$314,126,131	\$127,116,627	\$35,640,143	\$44,915,370	\$207,672,141
Service	6,795	\$650,886,086	\$209,383,479	\$141,411,457	\$28,928,040	\$379,722,977
Government	3,552	\$198,315,655	\$156,405,128	\$24,287,231	\$0	\$180,692,363

TIPU is Transportation, Information, and Public Utilities.

Economic Contribution versus Economic Impact

The estimates generated for this report should be considered the “economic impact” of the proposed facility rather than the “economic contribution.” Economic contribution analysis considers only the single scenario of some economic activity, whereas impact analysis would consider two scenarios: the economic activity of interest plus the next preferred alternative. This is because the resources dedicated to any activity would have some alternative use and would not simply be left idle. Only the net difference between the two scenarios would be considered “impact.” This report first considers agricultural

³ Similarly, a 171-sector model of the southwestern Kansas economy and a 393-sector model of the Rest of Kansas economy were built.

production that would be displaced by shifting irrigation water rights for an industrial use alternative.

The Value of Water

The planned expansion will require significant amounts of groundwater. It is estimated that the Holcomb expansion will require that 12,000 acre-feet of groundwater be diverted from irrigated agricultural production for its annual operation.⁴ This groundwater will be obtained by reducing irrigated acreage in the area immediately surrounding the facility. When agricultural water-use is reduced, crop production and revenue will, in all likelihood, be reduced in the near-term and producers and local communities will incur negative economic impacts. These direct economic impacts will ripple through the economy, creating additional indirect and induced impacts. The short-term magnitude of these impacts will depend on several factors: 1) the magnitude of the water-use reduction; 2) the current level of water-use efficiency in the production process; 3) the number of acres involved; 4) the crop mix for the area; 5) crop yields that depend on the shape of the crop-specific production functions which are impacted by localized growing season characteristics such as precipitation and temperature; and 6) prices and costs.

In order to place a value on water and estimate the direct impact to agricultural production, we first estimated the crops impacted (crop mix changes), the water-use per irrigated crop acreage, and then apply crop production budgets. This process is often used to analyze water-use impacts on agriculture. Pritchett et al. (2005) used this procedure to model the economic impacts of reduced irrigation water-use in the Republican River Basin of Colorado. Leatherman et al. (2006) evaluated the proposed CREP program in southwest Kansas with this method. Supalla, Buell, and McMullen (2006) used a similar technique in their evaluation of economic impacts associated with various policy scenarios aimed at reducing consumptive use of irrigation water in the Platte and Republican Basins of Nebraska.

The Water Information Management and Analysis System (WIMAS) is maintained by the Kansas Department of Agriculture, Division of Water Resources. WIMAS users can

⁴ This data was provided by Sunflower Electric Power Corporation. The required water rights necessary to achieve this quantity were acquired from willing sellers in fair market value transactions. The reinvestment of the land sale revenues received by the landowners could generate positive economic impacts. Due to uncertainties in how, when, and where the landowners would reinvest the revenue, the associated positive economic impact has not been estimated. As such, the estimated negative economic impacts to agriculture may be overstated.

obtain information on annual water-use as well as the crop acreage. Data was collected from 2000 through 2008 for the four-township area near the Holcomb facility.⁵ These data suggest, that on average, 60.5% of the affected acreage is typically planted to alfalfa, 25.9% to corn, 1.9% to sorghum, 5% to soybeans and 6.7% to wheat. The weighted average annual water-use per acre for this crop mix is 1.52 acre feet per acre. This implies that a total of 7,892 acres of irrigated crop land, of the same crop mix, will need to be retired in order to meet the water requirements for the Holcomb expansion.

The Department of Agricultural Economics at Kansas State University maintains two sources of crop production budget information. Data from the Farm Management Guides from 2002 through 2009 were compiled and averaged for all irrigated crops in the observed crop mix.⁶ Data available from the Kansas Farm Management Association, for the years 2004 through 2008, were used to verify and adjust the Farm Management guide data.⁷ These data suggest, on average and for the local crop mix, the weighted average farm revenue per acre is \$571.17 and the associated farm profit is \$149.48 per acre. Given the estimate that 7,892 irrigated acres will need to be retired suggests that the total direct impact on farm revenue will be approximately \$4,896,818 and the associated reduction in farm profit will be approximately \$1,179,713. These values represent the direct economic impact to agriculture used in the analysis of the ongoing operation of the Sunflower Electric power plant.

Construction Impacts

Construction impacts create a significant economic boost given the scale of spending. These are temporary impacts, however. Upon completion of the project, spending and re-spending will slowly wind down. It's only those activities that persist that replenish the economic stimulus. Still, these types of projects can inject a considerable economic boost during the period in which they occur.

The construction of the new power generating facility is expected to take 50 months. At peak, employment will reach 1,894 workers. The trades represented on the project include boilermakers, truck drivers, operators, instrument fitters, electricians, pipefitters, millwrights, iron workers, cement finishers, carpenters, laborers, and others. Certain of

⁵ The 2008 data is the most current data available.

⁶ These data are available at <http://www.agmanager.info/crops/> . The 2009 data is the most current data available.

⁷ These data are available at <http://www.agmanager.info/kfma/> . The 2004-2008 data is the most current data available.

these work crews will be specialized and will be brought in from out of the area and will likely reside temporarily in the Garden City area. As such, a considerable amount of construction labor spending will be captured by local trade and service providers, but a proportion will leave the region. Still, construction managers will hire as much of the needed labor locally to minimize costs.

The total direct construction cost is projected to be \$2,237,500,000.⁸ Of this amount, a certain proportion will be spent out of the region and out of the state for specialized design and engineering and payment of insurance and taxes. Based on project cost estimates, the value that will go to direct and indirect field costs will be \$1.626 billion. This was the amount used to estimate the impact to the region and the state. Given the temporal nature of the project, there is some uncertainty regarding the timing of the construction expenditures. To take this into account and apply the appropriate deflators, the direct effects were modeled as shown in Table 2. It should be noted that the total labor count is not the number of workers to be employed on the project. It only represents the intensity of on-site activity at a given point, and a means whereby we can apportion spending that will occur over a period of several years.

Table 2. Presumed Share of Total Construction Spending by Year, 2012-2015

Year	Average Labor		Construction Spending
	Count	Percent	
2012	242	7.37%	\$119,795,703
2013	726	22.11%	\$359,387,108
2014	1,497	45.58%	\$741,050,277
2015	819	24.94%	\$405,424,300
Total	3,284	100.00%	\$1,625,657,387

Table 3 summarizes the total economic impact of construction spending to the Kansas economy. This table tallies the direct, indirect and induced effects occurring throughout Kansas. The initial \$1.62 billion of construction spending is estimated to have a total impact of \$1.96 billion throughout the state. This level of activity is sufficient to support over 5,900 “job-years” of all types, and generate over one-quarter billion in labor income and nearly one-billion in all types of income.

⁸ Estimate provided by Sunflower Electric Power Corporation.

Table 3. Summary of Total Economic Impacts to the Kansas Economy of Construction Spending for the Sunflower Electric Power Plant, 2010\$

Impact Type	Output	Employment	Labor Income	Value Added
Direct Effect	\$1,625,657,387	3,284	\$144,943,312	\$227,055,056
Indirect Effect	\$232,346,331	1,585	\$75,567,213	\$122,196,719
Induced Effect	\$106,868,891	1,045	\$33,705,056	\$63,677,269
Total Effect	\$1,964,872,609	5,914	\$254,215,581	\$412,929,045

Given the temporary nature of construction impacts, we make the distinction between jobs and job-years. A job-year is simply one job for one year. In this case, it might be assumed that 5,914 workers were each employed for one year. More likely, some fewer number of workers would be employed for some multiple years. The specific number of jobs actually created is uncertain. We make this distinction so as not to overstate employment impacts. Alternatively, we view the income estimates as more firm. Some number of workers will, in fact, earn the income with a construction project of this type and scale.

The economic impacts associated with construction of the Holcomb power plant will be widely distributed throughout the economy. As shown in Table 4, every economic sector in the economy will receive some of the stimulus associated with construction spending. In addition to construction companies, a variety of support services will be required. But, much of the stimulus arises from the induced effects of household spending of the labor income generated from the project. The full detail of construction impact combining Finney County, western Kansas, and the rest of Kansas are reported in Table A2 in Appendix 1.

Table 4. Distribution of Total Economic Impacts by Economic Sector Associated with Construction of the Sunflower Electric Power Plant, 2010\$

Description	Total Output	Total Employment	Total Labor Income	Total Value Added
Total	\$1,752,280,694	5,914	\$254,215,582	\$412,929,045
Agriculture	\$560,517	2	\$38,202	\$203,699
Mining	\$745,430	2	\$180,300	\$410,943
Construction	\$1,415,432,292	3,309	\$146,020,951	\$228,310,694
Manufacturing	\$31,820,507	98	\$5,708,835	\$8,627,193
TIPU	\$26,705,075	119	\$7,523,240	\$15,732,430
Trade	\$70,769,222	633	\$27,131,317	\$45,788,570
Service	\$200,714,484	1,721	\$65,503,386	\$111,448,939
Government	\$5,533,167	30	\$2,109,351	\$2,406,578

TIPU is Transportation, Information and Public Utilities.

To see how these effects are distributed geographically, we consider Table 5. The \$1.625 billion in direct spending is, by definition, the direct economic effect. Certainly, a large portion of this will be spent outside of the region and the state for steel, specialized equipment, etc. In Table 5, we focus on the indirect and induced effects as those which are more likely to accrue to the region. Considering only those, Finney County will see a minimum increase in local sales of about \$236 million. An additional \$59 million will boost the surrounding regional economy, and \$43 million will accrue to the rest of Kansas.

Table 5. Changes in Output in Finney County, Western Kansas, and the Rest of Kansas Associated with Construction Spending for the Sunflower Electric Power Plant, 2010\$

Impact Type	Finney County	Western KS	Rest of KS	Total Impact
Direct Effect	\$1,625,657,387	\$0	\$0	\$1,625,657,387
Indirect Effect	\$145,241,604	\$50,838,712	\$36,266,015	\$232,346,331
Induced Effect	\$91,374,823	\$8,121,302	\$7,372,766	\$106,868,891
Total Effect	\$1,862,273,814	\$58,960,014	\$43,638,781	\$1,964,872,609

The distribution of output impacts by region and economic sector are shown in Table 6. Of course, construction will expand significantly in Finney County, but trade and services also will receive a major boost in sales. Other services also will greatly benefit in the larger southwestern Kansas economy. Elsewhere in the state, manufacturing will be the sector most impacted.

Table 6. Distribution of Output Impacts by Region and Economic Sector Associated with Construction of the Sunflower Electric Power Plant, 2010\$

Description	Finney County	SW Kansas	Rest of KS	Total Output
Total	\$1,649,681,900	\$58,960,013	\$43,638,781	\$1,752,280,694
Agriculture	\$270,977	\$198,045	\$91,494	\$560,517
Mining	\$25,774	\$73,793	\$645,863	\$745,430
Construction	\$1,415,072,676	\$185,242	\$174,374	\$1,415,432,292
Manufacturing	\$4,033,099	\$2,247,895	\$25,539,513	\$31,820,507
TIPU	\$19,842,238	\$4,331,039	\$2,531,798	\$26,705,075
Trade	\$63,336,994	\$4,033,649	\$3,398,578	\$70,769,222
Service	\$143,656,579	\$46,406,167	\$10,651,739	\$200,714,484
Government	\$3,443,563	\$1,484,183	\$605,421	\$5,533,167

TIPU is Transportation, Information and Public Utilities.

The direct employment impacts shown in Table 7 are estimated based on the annual average employment projected for project completion. While exceeding the peak monthly employment of 1,894, it seems reasonable given that we wouldn't expect the

same workers to be employed throughout the project. Rather, different contractors and teams will work on different components of the project.

The work occurring on the power plant will have a strong simulative effect on the local and regional economies. In Finney County, backward-linked industries are projected to increase employment by over 1,100 job-years. The spending of construction workers will increase local employment by an additional 900 job-years, bringing the total employment impact to Finney County of about 5,300 job-years. Adjacent county employment is projected to receive a boost, as well. About 360 job-years are projected to be supported in the region, and an additional 200 job-years will be supported throughout the rest of Kansas. Thus, the total job impact associated with construction of the Holcomb power plant will be nearly 6,000 job-years throughout the state.

Table 7. Changes in Employment in Finney County, Western Kansas, and the Rest of Kansas Associated with Construction Spending for the Sunflower Electric Power Plant

Impact Type	Finney County	Western KS	Rest of KS	Total Impact
Direct Effect	3,284	0	0	3,284
Indirect Effect	1,152	283	150	1,585
Induced Effect	906	77	63	1,045
Total Effect	5,342	359	213	5,914

The distribution of jobs by economic sector is shown in Table 8. The distribution of job impacts mirrors the patterns seen with output. In Finney County, construction will see a temporary boost of over 3,000 job-years. But, thanks to the multiplier effects, other sectors will see stimulus sufficient to support more than 2,000 additional job-years. Once again, trade and services will see the largest increase in demand and potential employment in other southwestern Kansas counties.

Table 8. Distribution of Employment Impacts by Region and Economic Sector Associated with Construction of the Sunflower Electric Power Plant

Description	Finney County	SW Kansas	Rest of KS	Total Employment
Total	5,342	359	213	5,914
Agriculture	1	1	1	2
Mining	0	0	2	2
Construction	3,305	2	2	3,309
Manufacturing	17	6	74	98
TIPU	78	25	15	119
Trade	567	38	28	633
Service	1,356	278	87	1,721
Government	17	9	4	30

TIPU is Transportation, Information and Public Utilities.

Of particular interest are changes to income. These impacts are a preferred focal point because they most directly reflect changes to individual economic welfare. These are the impacts that are most directly experienced by people in the community and throughout the state. Construction spending will directly increase wages, salaries and proprietary income by nearly \$150 million in Finney County over the life of the project. The associated indirect and induced economic effects will increase labor income by an additional \$110 million throughout the state.

Table 9. Changes in Labor Income in Finney County, Western Kansas, and the Rest of Kansas Associated with Construction Spending for the Sunflower Electric Power Plant, 2010\$

Impact Type	Finney County	Western KS	Rest of KS	Total Impact
Direct Effect	\$144,943,312	\$0	\$0	\$144,943,312
Indirect Effect	\$53,693,777	\$13,344,777	\$8,528,659	\$75,567,213
Induced Effect	\$29,131,662	\$2,273,194	\$2,300,200	\$33,705,056
Total Effect	\$227,768,751	\$15,617,971	\$10,828,859	\$254,215,581

The distribution of labor income by economic sector is shown in Table 10. Beyond the construction sector, services and trade sectors will get the largest share in Finney County thanks to the indirect and induced multiplier effects. Elsewhere in Kansas, an additional \$26 million in labor income will be generated. In total, over one-quarter billion dollars will flow to workers and business owners in Kansas.

Table 10. Distribution of Labor Income Impacts by Region and Economic Sector Associated with Construction of the Sunflower Electric Power Plant, 2010\$

Description	Finney County	SW Kansas	Rest of KS	Total Labor Income
Total	\$227,768,751	\$15,617,971	\$10,828,859	\$254,215,582
Agriculture	\$15,468	\$14,090	\$91,494	\$121,052
Mining	\$8,492	\$14,417	\$645,863	\$668,772
Construction	\$145,852,652	\$82,227	\$174,374	\$146,109,254
Manufacturing	\$746,467	\$381,672	\$25,539,513	\$26,667,651
TIPU	\$5,434,370	\$1,250,106	\$2,531,798	\$9,216,274
Trade	\$24,266,144	\$1,546,705	\$3,398,578	\$29,211,427
Service	\$50,155,152	\$11,809,436	\$10,651,739	\$72,616,327
Government	\$1,290,007	\$519,319	\$605,421	\$2,414,747

TIPU is Transportation, Information and Public Utilities.

Value added is the most comprehensive accounting of income generated from economic activity and the preferred metric by which to evaluate a given project. Finney County will see a significant boost in local income of all types of over \$350 million.

Nearly \$50 million accrues elsewhere in Kansas. Thus, it can be said that the construction project would increase wealth in the state by at least \$400 million.

Table 11. Changes in Value Added in Finney County, Western Kansas, and the Rest of Kansas Associated with Construction Spending for the Sunflower Electric Power Plant, 2010\$

Impact Type	Finney County	Western KS	Rest of KS	Total Impact
Direct Effect	\$227,055,056	\$0	\$0	\$227,055,056
Indirect Effect	\$85,217,073	\$23,570,536	\$13,409,110	\$122,196,719
Induced Effect	\$55,174,010	\$4,367,186	\$4,136,073	\$63,677,269
Total Effect	\$367,446,140	\$27,937,722	\$17,545,183	\$412,929,045

As shown in Table 12, the wealth is broadly shared across economic sectors. Beyond the construction businesses and workers, service and trade will benefit most.

Table 12. Distribution of Value Added Impacts by Region and Economic Sector Associated with Construction of the Sunflower Electric Power Plant, 2010\$

Description	Finney County	SW Kansas	Rest of KS	Total Value Added
Total	\$367,446,139	\$27,937,723	\$17,545,183	\$412,929,045
Agriculture	\$102,777	\$66,986	\$33,936	\$203,699
Mining	\$14,042	\$39,750	\$357,150	\$410,943
Construction	\$228,118,878	\$95,754	\$96,062	\$228,310,694
Manufacturing	\$973,205	\$576,290	\$7,077,698	\$8,627,193
TIPU	\$12,184,413	\$2,162,120	\$1,385,897	\$15,732,430
Trade	\$40,964,563	\$2,598,589	\$2,225,418	\$45,788,570
Service	\$83,568,848	\$21,827,546	\$6,052,546	\$111,448,939
Government	\$1,519,412	\$570,690	\$316,476	\$2,406,578

TIPU is Transportation, Information and Public Utilities.

Tax Impacts of Construction

As indicated earlier, Social Accounting Matrix Analysis is a comprehensive accounting system. As such, it contains information related to tax transfers from individuals and businesses. Such information is shown in Table 13 in relation to the construction project. Federal revenues are expected to increase by nearly \$50 million resulting from the project, with the most being generated by social insurance and corporate profits. State and local tax collections also will increase by nearly \$30 million, due primarily to sales and property tax. In total, the Sunflower construction project is projected to generate nearly \$77 million in government revenue.

Table 13. State, Local and Federal Tax Generation Associated with Construction of the Sunflower Electric Power Plant, 2010\$

	Description	Employee Compensation	Proprietor Income	Indirect Business		Total
				Tax	Households Corporations	
Federal Government Non-Defense	Social Ins Tax- Employee Contribution	\$10,246,372	\$5,971,735			\$16,218,107
	Social Ins Tax- Employer Contribution	\$10,362,189				\$10,362,189
	Indirect Bus Tax: Excise Taxes			\$1,571,604		\$1,571,604
	Indirect Bus Tax: Custom Duty			\$731,912		\$731,912
	Indirect Bus Tax: Fed Non-Taxes			\$1,208,156		\$1,208,156
	Corporate Profits Tax				\$6,410,501	\$6,410,501
	Personal Tax: Income Tax				\$11,230,144	\$11,230,144
	Total Federal Tax	\$20,608,562	\$5,971,735	\$3,511,670	\$11,230,144	\$47,732,612
State/Local Government Non-Education	Dividends				\$1,346,359	\$1,346,359
	Social Ins Tax- Employee Contribution	\$70,029	\$0			\$70,029
	Social Ins Tax- Employer Contribution	\$301,287				\$301,287
	Indirect Bus Tax: Sales Tax			\$9,850,869		\$9,850,869
	Indirect Bus Tax: Property Tax			\$8,426,890		\$8,426,890
	Indirect Bus Tax: Motor Vehicle License			\$183,218		\$183,218
	Indirect Bus Tax: Severance Tax			\$748,546		\$748,546
	Indirect Bus Tax: Other Taxes			\$397,158		\$397,158
	Indirect Bus Tax: S/L NonTaxes			\$1,209,526		\$1,209,526
	Corporate Profits Tax				\$1,127,830	\$1,127,830
	Personal Tax: Income Tax				\$4,014,608	\$4,014,608
	Personal Tax: NonTaxes (Fines - Fees)				\$977,845	\$977,845
	Personal Tax: Motor Vehicle License				\$210,668	\$210,668
	Personal Tax: Property Taxes				\$107,397	\$107,397
Personal Tax: Other Tax (Fish/Hunt)				\$125,509	\$125,509	
	Total State and Local Tax	\$371,315	\$0	\$20,816,207	\$5,436,026	\$29,097,737
	Total	\$20,979,877	\$5,971,735	\$24,327,877	\$16,666,170	\$76,830,349

Ongoing Impacts of the Sunflower Expansion

Currently, Sunflower employs 153 persons at Holcomb Station. Upon expansion, the workforce will expand by an additional 88 jobs. This will represent a permanent expansion, and the continuing spending on labor and local production inputs will result in a continuing increase in local jobs, income and economic activity.

To model this, we made a number of adjustments to our economic model. First, we adjusted the value added elements in the electric power generation, transmission and distribution sector in our model to reflect the Sunflower project's projected output, employment and payroll. We proportionately adjusted other value added elements, including proprietary income, other property type income, and indirect business taxes. Secondly, we adjusted the underlying production technology included for the sector as a default to restrict the inputs to coal rather than natural gas or oil as a fuel source.

To complete the analysis, we simultaneously model the expansion in electrical power generation and the reduction in agricultural output that will be displaced, and report the net difference. By simultaneously modeling changes to the second-best choice (agricultural production), we consider the analysis a true economic impact rather than the economic contribution of the project. We generate a similar series of impact tables as reported under construction with the important notation that these are considered permanent annual changes that are replenished each year that Sunflower Electric continues to operate at the projected scale modeled. While we project these changes to begin in 2016, all impacts are reported in 2010\$.

The summary of total annual economic impacts is presented in Table 14. This table tallies the direct, indirect and induced effects occurring throughout Kansas. The ongoing operation of the Sunflower facility is estimated to have a total annual impact of \$346 million throughout the state. This level of activity is sufficient to support over 261 jobs of all types, and generate over \$17 million in labor income and nearly \$200 million in all types of income.

Table 14. Summary Total Annual Economic Impacts to the Kansas Economy of Operation of the Sunflower Electric Power Plant, 2010\$

Impact Type	Output	Employment	Labor Income	Value Added
Direct Effect	\$323,165,040	76	\$10,011,071	\$183,146,084
Indirect Effect	\$15,942,531	114	\$4,933,753	\$7,591,927
Induced Effect	\$7,252,295	71	\$2,290,624	\$4,319,640
Total Effect	\$346,359,865	261	\$17,235,449	\$195,057,652

The economic impacts associated with operation of the Holcomb power plant will be widely distributed throughout the economy. As shown in Table 15, every economic sector in the economy will receive some of the stimulus associated with ongoing operation spending. Of course, Sunflower Electric is reported under the Transportation, Information, and Public Utilities (TIPU) category. In addition to utilities, services, construction (maintenance), and trade are the sectors receiving most of the stimulus. The full details of annual operations impact for the state of Kansas are reported in Table A3 in Appendix 1.

Table 15. Distribution of Total Annual Economic Impacts by Economic Sector Associated with Operation of the Sunflower Electric Power Plant, 2010\$

Description	Total Output	Total Employment	Total Labor Income	Total Value Added
Total	\$346,359,870	261	\$17,235,448	\$195,057,663
Agriculture	-\$4,195,379	-14	-\$244,742	-\$2,147,661
Mining	\$1,000,062	2	\$200,404	\$539,818
Construction	\$2,389,300	25	\$1,101,604	\$1,163,984
Manufacturing	\$669,714	1	\$86,250	\$124,307
TIPU	\$333,049,615	105	\$11,614,974	\$187,692,224
Trade	\$2,131,078	27	\$860,012	\$1,411,194
Service	\$10,907,492	112	\$3,438,341	\$6,081,709
Government	\$407,989	3	\$178,605	\$192,088

TIPU is Transportation, Information and Public Utilities

The scale and geographic distribution of the indirect and induced output impacts are reported in Table 16. An additional \$23 million of indirect and induced effects arise annually of which Finney County would capture approximately \$15 million and \$7 million would accrue to southwestern Kansas and the rest of the state.

Table 16. Changes in Annual Output in Finney County, Western Kansas and the Rest of Kansas Associated with Ongoing Operation of the Sunflower Electric Power Plant, 2010\$

Impact Type	Finney County	Western KS	Rest of KS	Total Impact
Direct Effect	\$323,165,040	\$0	\$0	\$323,165,040
Indirect Effect	\$9,725,901	\$2,893,084	\$3,323,546	\$15,942,531
Induced Effect	\$6,140,979	\$474,379	\$636,937	\$7,252,295
Total Effect	\$339,031,919	\$3,367,463	\$3,960,483	\$346,359,865

The scale and sectoral distribution of annual output impacts are reported in Table 17. Again, services, trade, and construction sectors will see the biggest simulative boost.

Table 17. Distribution of Total Annual Output Impacts by Economic Sector Associated with Ongoing Operation of the Sunflower Electric Power Plant, 2010\$

Description	Finney County	SW Kansas	Rest of KS	Total Output
Total	\$339,031,924	\$3,367,463	\$3,960,483	\$346,359,870
Agriculture	-\$4,116,551	-\$40,708	-\$38,121	-\$4,195,379
Mining	\$12,117	\$173,468	\$814,477	\$1,000,062
Construction	\$2,245,060	\$74,994	\$69,246	\$2,389,300
Manufacturing	\$154,930	\$38,171	\$476,614	\$669,714
TIPU	\$329,902,493	\$1,617,965	\$1,529,157	\$333,049,615
Trade	\$1,868,492	\$107,633	\$154,952	\$2,131,078
Service	\$8,710,884	\$1,296,695	\$899,913	\$10,907,492
Government	\$254,500	\$99,244	\$54,245	\$407,989

We get a slightly different view of the ongoing impact of the expansion of the Sunflower Electric power plant expansion in Table 18. Here, we view the top 10 industries in Finney County to see a projected expansion in output.

Table 18. Top 10 Finney County Industry Sectors by Change in Output Associated with Annual Operations of the Sunflower Electric Power Plant, 2010\$

Description	Total Employment	Total Labor Income	Total Value Added	Total Output
Electric power generation, transmission, and distribution	88	\$10,252,549	\$185,434,576	\$327,548,384
Maintenance and repair construction of nonresidential structures	23	\$1,013,682	\$1,063,511	\$2,202,722
Food services and drinking places	35	\$577,415	\$867,344	\$1,772,163
Transport by rail	2	\$247,264	\$356,211	\$1,287,687
Imputed rental activity for owner-occupied dwellings	0	\$0	\$786,445	\$1,161,095
Monetary authorities and depository credit intermediation activities	6	\$269,780	\$707,930	\$986,591
Wholesale trade businesses	4	\$240,840	\$414,983	\$652,187
Legal services	6	\$271,985	\$348,586	\$573,382
Private hospitals	4	\$233,282	\$244,951	\$478,351
Offices of physicians, dentists, and other health practitioners	4	\$276,587	\$320,053	\$463,220

The work occurring on the power plant will have a strong simulative effect on the local and regional economies. After accounting for the changes in agriculture, the net increase in Finney County's annual employment is projected to be 76 new jobs. In Finney County, backward-linked industries are projected to increase employment by 90 jobs. The spending of utility workers will increase local employment by an additional 61 jobs, bringing the total employment impact to Finney County of about 226 jobs. Adjacent

county employment is projected to receive a boost, as well. About 18 jobs are projected to be supported in the region, and an additional 16 jobs will be supported throughout the rest of Kansas. Thus, the total job impact associated with construction of the Holcomb power plant will be nearly 261 throughout the state. These increases are considered permanent so long as the facility remains in operation.

Table 19. Changes in Employment in Finney County, Western Kansas and the Rest of Kansas Associated with the Operation of the Sunflower Electric Power Plant

Impact Type	Finney County	Western KS	Rest of KS	Total Impact
Direct Effect	76	0	0	76
Indirect Effect	90	14	11	114
Induced Effect	61	4	6	71
Total Effect	226	18	16	261

The distribution of jobs by economic sector is shown in Table 20. The distribution of job impacts mirrors the patterns seen with output. In Finney County, the TIPU sectors will see a boost of 96 jobs. But, thanks to the multiplier effects, other sectors will see stimulus sufficient to support more than 130 additional jobs. The service sector will actually see the largest overall jobs impact.

Table 20. Distribution of Employment Impacts by Region and Economic Sector Associated with Construction of the Sunflower Electric Power Plant

Description	Finney County	SW Kansas	Rest of KS	Total Employment
Total	226.4	18.3	16.0	261
Agriculture	-12.5	-0.8	-0.6	-14
Mining	0.0	0.4	1.9	2
Construction	23.3	0.8	0.6	25
Manufacturing	0.5	0.1	0.5	1
TIPU	96.6	4.6	3.8	105
Trade	23.5	1.4	1.7	27
Service	93.5	11.3	7.6	112
Government	1.5	0.7	0.4	3

TIPU is Transportation, Information and Public Utilities.

Table 21 show the top 10 Finney County industry sectors by change in employment associated with the expansion. Second most jobs will be created in eating and drinking establishments with 35 new jobs. Maintenance and repair jobs also increase by an estimated 23 positions.

Table 21. Top 10 Finney County Industry Sectors by Change in Employment Associated with Annual Operations of the Sunflower Electric Power Plant

Description	Total Employment	Total Labor Income	Total Value Added	Total Output
Electric power generation, transmission, and distribution	88	\$10,252,549	\$185,434,576	\$327,548,384
Food services and drinking places	35	\$577,415	\$867,344	\$1,772,163
Maintenance and repair construction of nonresidential structures	23	\$1,013,682	\$1,063,511	\$2,202,722
Monetary authorities and depository credit intermediation activities	6	\$269,780	\$707,930	\$986,591
Legal services	6	\$271,985	\$348,586	\$573,382
Accounting, tax preparation, bookkeeping, and payroll services	4	\$183,570	\$219,124	\$349,459
Wholesale trade businesses	4	\$240,840	\$414,983	\$652,187
Private hospitals	4	\$233,282	\$244,951	\$478,351
Offices of physicians, dentists, and other health practitioners	4	\$276,587	\$320,053	\$463,220
Nursing and residential care facilities	4	\$82,962	\$85,989	\$132,005

Of particular interest are changes to income. These impacts are a preferred focal point because they most directly reflect changes to individual economic welfare. These are the impacts that are most directly experienced by people in the community and throughout the state. Ongoing operations will directly increase wages, salaries and proprietary income by over \$10 million annually in Finney County. The associated indirect and induced economic effects will increase labor income by an additional \$7 million dollars annually throughout the state.

Table 22. Changes in Annual Labor Income in Finney County, Western Kansas and the Rest of Kansas Associated with Ongoing Operations of the Sunflower Electric Power Plant, 2010\$

Impact Type	Finney County	Western KS	Rest of KS	Total Impact
Direct Effect	\$10,011,071	\$0	\$0	\$10,011,071
Indirect Effect	\$3,452,163	\$715,808	\$765,782	\$4,933,753
Induced Effect	\$1,959,115	\$132,757	\$198,752	\$2,290,624
Total Effect	\$15,422,349	\$848,566	\$964,534	\$17,235,449

The distribution of labor income by economic sector is shown in Table 23. Beyond the TIPU sector, services, construction and trade sectors will get the largest share in Finney County thanks to the indirect and induced multiplier effects. Elsewhere in Kansas, an additional \$2 million in labor income will be generated annually. In total, an additional \$17 million will flow to workers and business owners in Kansas each year.

Table 23. Distribution of Annual Labor Income Impacts by Region and Economic Sector Associated with Ongoing Operation of the Sunflower Power Plant, 2010\$

Description	Total			
	Finney County	SW Kansas	Rest of KS	Labor Income
Total	\$15,422,349	\$848,566	\$964,534	17,235,448
Agriculture	-\$194,055	-\$31,667	-\$19,021	-244,742
Mining	\$2,376	\$33,855	\$164,173	200,404
Construction	\$1,032,194	\$34,278	\$35,132	1,101,604
Manufacturing	\$28,419	\$7,087	\$50,743	86,250
TIPU	\$10,899,751	\$373,325	\$341,898	11,614,974
Trade	\$755,016	\$43,009	\$61,986	860,012
Service	\$2,787,526	\$350,391	\$300,423	3,438,341
Government	\$111,121	\$38,287	\$29,197	178,605

TIPU is Transportation, Information and Public Utilities.

Considering the generation of new labor income in Table 24, the influence of the indirect and induced economic effects is evident. The increase in maintenance and repair of nonresidential structures income would be most closely associated with indirect effects, while increases in food services, health practitioners, and legal services are more closely associated with household spending.

Table 24. Top 10 Finney County Industry Sectors by Change in Labor Income Associated with Annual Operations of the Sunflower Electric Power Plant, 2010\$

Description	Total Employment	Total Labor	Total Value	Total
		Income	Added	Output
Electric power generation, transmission, and distribution	88	\$10,252,549	\$185,434,576	\$327,548,384
Maintenance and repair construction of nonresidential structures	23	\$1,013,682	\$1,063,511	\$2,202,722
Food services and drinking places	35	\$577,415	\$867,344	\$1,772,163
Offices of physicians, dentists, and other health practitioners	4	\$276,587	\$320,053	\$463,220
Legal services	6	\$271,985	\$348,586	\$573,382
Monetary authorities and depository credit intermediation activities	6	\$269,780	\$707,930	\$986,591
Transport by rail	2	\$247,264	\$356,211	\$1,287,687
Wholesale trade businesses	4	\$240,840	\$414,983	\$652,187
Private hospitals	4	\$233,282	\$244,951	\$478,351
Accounting, tax preparation, bookkeeping, and payroll services	4	\$183,570	\$219,124	\$349,459

Value added is the most comprehensive accounting of income generated from economic activity and the preferred metric by which to evaluate a given project. In this case, however, additional caution is warranted. In addition to labor income, value added includes other property type income, including corporate profits. In general, over half of value added is other property income in the electric power generation sector. Typically, corporate profits of this type are considered a leakage to the region. This is evident in

examining Table 25. While a large value of direct value added is generated in Finney County, the indirect and induced impacts are considerably smaller. This is because most of that value was exported. Still, some increment of value greater than the labor income total does remain in the county and in the state. But, information to determine the total is unavailable.

Table 25. Changes in Annual Value Added in Finney County, Western Kansas and the Rest of Kansas Associated with Ongoing Operation of the Sunflower Electric Power Plant, 2010\$

Impact Type	Finney County	Western KS	Rest of KS	Total Impact
Direct Effect	\$183,146,084	\$0	\$0	\$183,146,084
Indirect Effect	\$4,877,942	\$1,266,312	\$1,447,673	\$7,591,927
Induced Effect	\$3,707,724	\$251,927	\$359,989	\$4,319,640
Total Effect	\$191,731,750	\$1,518,239	\$1,807,663	\$195,057,652

Wealth generation as represented by value added is broadly shared across economic sectors, as shown in Table 26. Beyond the public utility sector, construction, service and trade will benefit most. While a negative value is associated with the agricultural production displacement, the net benefit value is significant.

Table 26. Distribution of Annual Value Added Impacts by Region and Economic Sector Associated with Ongoing Operation of the Sunflower Electric Power Plant, 2010\$

Description	Finney County	SW Kansas	Rest of KS	Total Value Added
Total	\$191,731,761	\$1,518,239	\$1,807,663	195,057,663
Agriculture	-\$2,095,930	-\$27,956	-\$23,775	-2,147,661
Mining	\$6,533	\$93,591	\$439,694	539,818
Construction	\$1,090,196	\$36,499	\$37,289	1,163,984
Manufacturing	\$33,980	\$10,245	\$80,082	124,307
TIPU	\$186,410,929	\$653,045	\$628,250	187,692,224
Trade	\$1,238,097	\$70,397	\$102,701	1,411,194
Service	\$4,926,478	\$641,737	\$513,493	6,081,709
Government	\$121,479	\$40,681	\$29,928	192,088

TIPU is Transportation, Information and Public Utilities.

Finally, we consider the top 10 Finney County industry sectors by change in annual value added. While the list is similar to other impact measures, it reinforces the notion of the wide distribution of positive economic benefit.

Table 27. Top 10 Finney County Industry Sectors by Change in Value Added Associated with Annual Operations of the Sunflower Electric Power Plant, 2010\$

Description	Total Employment	Total Labor Income	Total Value Added	Total Output
Electric power generation, transmission, and distribution	88	\$10,252,549	\$185,434,576	\$327,548,384
Maintenance and repair construction of nonresidential structures	23	\$1,013,682	\$1,063,511	\$2,202,722
Food services and drinking places	35	\$577,415	\$867,344	\$1,772,163
Imputed rental activity for owner-occupied dwellings	0	\$0	\$786,445	\$1,161,095
Monetary authorities and depository credit intermediation activities	6	\$269,780	\$707,930	\$986,591
Wholesale trade businesses	4	\$240,840	\$414,983	\$652,187
Transport by rail	2	\$247,264	\$356,211	\$1,287,687
Legal services	6	\$271,985	\$348,586	\$573,382
Offices of physicians, dentists, and other health practitioners	4	\$276,587	\$320,053	\$463,220
Private hospitals	4	\$233,282	\$244,951	\$478,351

Tax Impacts of Operation

As indicated earlier, Social Accounting Matrix Analysis is a comprehensive accounting system. As such, it contains information related to tax transfers from individuals and businesses. Such information is shown in Table 28 in relation to the construction project. Federal revenues are expected to increase by nearly \$20 million annually resulting from the project, with the most being generated by social insurance and corporate profits. State and local tax collections also will increase by nearly \$40 million annually, due primarily to sales and property tax. In total, the Sunflower construction project is projected to generate \$61.6 million annually in new government revenue.

Table 28. State, Local and Federal Tax Generation Associated with Ongoing Operation of the Sunflower Electric Power Plant, 2010\$

	Description	Employee Compensation	Proprietor Income	Indirect Business Tax		Households	Corporations	Total
Federal Government Non-Defense	Social Ins Tax- Employee Contribution	\$1,801,878	\$792,966					\$2,594,844
	Social Ins Tax- Employer Contribution	\$1,822,245						\$1,822,245
	Indirect Bus Tax: Excise Taxes			\$2,866,473				\$2,866,473
	Indirect Bus Tax: Custom Duty			\$1,334,945				\$1,334,945
	Indirect Bus Tax: Federal Non-Taxes			\$2,203,573				\$2,203,573
	Corporate Profits Tax						\$7,203,135	\$7,203,135
	Personal Tax: Income Tax					\$1,952,193		\$1,952,193
	Total Federal Tax	\$3,624,124	\$792,966	\$6,404,990	\$1,952,193	\$7,203,135	\$19,977,408	
State/Local Government Non-Education	Dividends						\$1,512,832	\$1,512,832
	Social Ins Tax- Employee Contribution	\$12,019	\$0					\$12,019
	Social Ins Tax- Employer Contribution	\$51,712						\$51,712
	Indirect Bus Tax: Sales Tax			\$17,949,264				\$17,949,264
	Indirect Bus Tax: Property Tax			\$15,354,632				\$15,354,632
	Indirect Bus Tax: Motor Vehicle License			\$333,841				\$333,841
	Indirect Bus Tax: Severance Tax			\$1,363,925				\$1,363,925
	Indirect Bus Tax: Other Taxes			\$723,662				\$723,662
	Indirect Bus Tax: S/L NonTaxes			\$2,203,877				\$2,203,877
	Corporate Profits Tax						\$1,267,282	\$1,267,282
	Personal Tax: Income Tax					\$682,875		\$682,875
	Personal Tax: NonTaxes (Fines - Fees)					\$164,491		\$164,491
	Personal Tax: Motor Vehicle License					\$35,445		\$35,445
	Personal Tax: Property Taxes					\$17,738		\$17,738
Personal Tax: Other Tax (Fish/Hunt)					\$21,497		\$21,497	
	Total State and Local Tax	\$63,731	\$0	\$37,929,202	\$922,045	\$2,780,114	\$41,695,092	
	Total	\$3,687,855	\$792,966	\$44,334,192	\$2,874,238	\$9,983,249	\$61,672,500	

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Summary

Sunflower Electric Power Corporation currently operates a 360 megawatt coal-fired electrical generation station in Holcomb, KS near Garden City. As a result of an agreement with state officials, the facility will expand with the addition of one new 895 megawatt coal-fired power plant currently scheduled for opening in 2016.

Construction of the plant will take about four years and cost approximately \$2.24 billion. Peak construction employment will reach nearly 1,900 jobs. Upon completion the facility will create 88 permanent jobs with an annual payroll of approximately \$6.5 million.

The purpose of this report was to estimate the overall economic impacts of building and operating the new power station. A multi-regional economic model was built to estimate the impacts to Finney County, KS, southwestern Kansas, and the rest of Kansas.

Construction of the facility will generate nearly \$2 billion in total economic activity, and support an estimated 5,900 job-years throughout the state of Kansas paying \$250 million in labor income and generating over \$400 million in total income. The project also will generate more than \$29 million in state and local tax revenue.

After taking into consideration the impact of reduced agricultural production due to the transfer of irrigation water rights, the plant will have a net economic benefit to Finney County, southwestern Kansas, and the state of Kansas. During each year of operation, the facility will generate nearly \$350 million in overall economic activity, more than 260 jobs throughout the state that will pay \$17 million in labor income, and almost \$200 million in total income. Combined annual state and local tax revenue will grow by over \$41 million annually.

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Appendix 1

Selected Detailed Results Tables

Table A1. The 143-Sector Model of the Finney County Economy, 2008\$

Description	Total Output	Total Employment	Total Labor Income	Total Value Added
Total	\$1,649,681,900	5,342	\$227,768,751	\$367,446,139
Oilseed farming	\$4,630	0	\$189	\$2,368
Grain farming	\$151,353	0	\$6,919	\$76,954
Cattle ranching and farming	\$71,398	0	\$4,933	\$12,264
Dairy cattle and milk production	\$4,269	0	\$209	\$1,600
Animal production, except cattle and poultry and eggs	\$5,185	0	\$753	\$2,665
Commercial hunting and trapping	\$33,419	0	\$1,710	\$6,368
Support activities for agriculture and forestry	\$721	0	\$754	\$560
Extraction of oil and natural gas	\$9,294	0	\$1,792	\$5,020
Mining and quarrying sand, gravel, clay, and ceramic and refractory minerals	\$16,373	0	\$6,676	\$8,978
Support activities for oil and gas operations	\$108	0	\$24	\$44
Electric power generation, transmission, and distribution	\$9,872,769	17	\$2,012,795	\$7,293,028
Natural gas distribution	\$1,532,200	2	\$158,480	\$369,130
Water, sewage and other treatment and delivery systems	\$130,527	1	\$54,990	\$94,111
Construction of new nonresidential manufacturing structures	\$1,413,065,472	3,284	\$144,943,312	\$227,055,056
Construction of other new residential structures	\$19,783	0	\$4,672	\$4,949
Maintenance and repair construction of nonresidential structures	\$1,368,737	14	\$629,886	\$660,849
Maintenance and repair construction of residential structures	\$618,684	7	\$274,782	\$398,024
Other animal food manufacturing	\$69,586	0	\$6,595	\$11,604
Animal (except poultry) slaughtering, rendering, and processing	\$345,222	1	\$33,501	\$37,485
Bread and bakery product manufacturing	\$33,022	0	\$9,931	\$11,513
Tortilla manufacturing	\$43,519	0	\$9,855	\$13,047
All other food manufacturing	\$39,968	0	\$7,339	\$9,459
Soft drink and ice manufacturing	\$848,024	1	\$113,406	\$124,002
All other textile product mills	\$4,540	0	\$1,031	\$1,230
Engineered wood member and truss manufacturing	\$575,729	5	\$144,237	\$146,505
Printing	\$87,753	1	\$21,977	\$30,250
Other basic organic chemical manufacturing	\$1,936	0	\$140	\$237
Fertilizer manufacturing	\$5,781	0	\$518	\$783
Plastics pipe and pipe fitting manufacturing	\$33,972	0	\$3,208	\$6,242
Tire manufacturing	\$34,687	0	\$8,787	\$13,492
Other rubber product manufacturing	\$14,191	0	\$3,265	\$5,103
Ready-mix concrete manufacturing	\$350,008	1	\$49,266	\$72,465
Other concrete product manufacturing	\$350,051	2	\$93,927	\$125,789
Miscellaneous nonmetallic mineral product manufacturing	\$53,725	0	\$7,368	\$13,076
Ornamental and architectural metal products manufacturing	\$184,040	1	\$40,424	\$55,330
Metal tank (heavy gauge) manufacturing	\$831,345	3	\$150,382	\$247,317
Machine shops	\$179	0	\$53	\$69
Farm machinery and equipment manufacturing	\$10,714	0	\$862	\$1,607
Metal cutting and forming machine tool manufacturing	\$13	0	\$3	\$3
Other general purpose machinery manufacturing	\$37,294	0	\$5,772	\$7,672
Sign manufacturing	\$77,801	1	\$34,618	\$38,925
Wholesale trade businesses	\$46,759,432	305	\$17,267,364	\$29,752,764
Retail Stores - Motor vehicle and parts	\$2,257,060	30	\$1,297,728	\$1,633,716

Retail Stores - Furniture and home furnishings	\$808,033	10	\$313,867	\$504,530
Retail Stores - Electronics and appliances	\$446,919	7	\$244,779	\$299,476
Retail Stores - Building material and garden supply	\$1,702,601	18	\$696,508	\$1,130,859
Retail Stores - Food and beverage	\$2,764,013	34	\$1,191,655	\$1,791,170
Retail Stores - Health and personal care	\$1,002,473	13	\$476,604	\$745,654
Retail Stores - Gasoline stations	\$1,216,377	13	\$365,963	\$830,828
Retail Stores - Clothing and clothing accessories	\$1,355,489	21	\$429,100	\$874,476
Retail Stores - Sporting goods, hobby, book and music	\$573,836	14	\$216,756	\$353,244
Retail Stores - General merchandise	\$2,471,225	45	\$1,077,065	\$1,600,534
Retail Stores - Miscellaneous	\$874,427	21	\$453,360	\$656,055
Retail Nonstores - Direct and electronic sales	\$1,105,108	35	\$235,394	\$791,257
Transport by air	\$980,694	5	\$157,348	\$183,593
Transport by rail	\$64,538	0	\$15,988	\$37,312
Transport by water	\$29,997	0	\$2,400	\$6,489
Transport by truck	\$5,106,115	37	\$1,961,884	\$2,618,466
Transit and ground passenger transportation	\$3,610	0	\$1,597	\$2,268
Transport by pipeline	\$257,347	0	\$49,416	\$71,189
Scenic and sightseeing transportation and support activities for transportation	\$641,312	4	\$428,041	\$584,148
Couriers and messengers	\$976,369	9	\$447,047	\$727,711
Warehousing and storage	\$246,760	3	\$144,385	\$196,970
Newspaper publishers	\$1,104,023	11	\$303,800	\$356,384
Motion picture and video industries	\$175,453	2	\$11,481	\$17,873
Radio and television broadcasting	\$414,203	3	\$256,232	\$199,963
Telecommunications	\$9,657,341	22	\$1,416,518	\$3,825,548
Data processing, hosting, ISP, web search portals and related services	\$40,166	0	\$2,720	\$4,078
Other information services	\$413,057	1	\$26,628	\$70,091
Monetary authorities and depository credit intermediation activities	\$7,613,715	44	\$2,081,943	\$5,463,232
Nondepository credit intermediation and related activities	\$1,752,846	9	\$736,092	\$1,147,652
Securities, commodity contracts, investments, and related activities	\$898,363	4	\$414,693	\$422,333
Insurance carriers	\$1,754,980	7	\$398,212	\$728,396
Insurance agencies, brokerages, and related activities	\$732,226	6	\$314,939	\$401,235
Funds, trusts, and other financial vehicles	\$111,650	0	\$4,155	\$2,781
Real estate establishments	\$5,797,530	34	\$875,237	\$4,524,366
Imputed rental activity for owner-occupied dwellings	\$17,337,294	0	\$0	\$11,743,070
Automotive equipment rental and leasing	\$254,329	1	\$53,563	\$114,778
General and consumer goods rental except video tapes and discs	\$245,068	1	\$159,149	\$177,909
Video tape and disc rental	\$30,892	1	\$9,067	\$14,057
Commercial and industrial machinery and equipment rental and leasing	\$1,932,354	6	\$368,849	\$686,192
Legal services	\$9,955,863	97	\$4,722,582	\$6,052,627
Accounting, tax preparation, bookkeeping, and payroll services	\$12,902,472	165	\$6,777,642	\$8,090,342
Architectural, engineering, and related services	\$10,774,429	89	\$6,099,005	\$6,184,126
Custom computer programming services	\$181,256	2	\$102,248	\$107,023
Management, scientific, and technical consulting services	\$1,242,160	10	\$615,840	\$703,043
Environmental and other technical consulting services	\$134,725	1	\$67,332	\$81,838
Scientific research and development services	\$65,528	1	\$31,966	\$28,443
Advertising and related services	\$519,375	6	\$184,161	\$223,221
Veterinary services	\$281,073	4	\$100,586	\$110,074
Management of companies and enterprises	\$640,394	4	\$233,965	\$325,905

Employment services	\$71,955	3	\$48,404	\$52,270
Travel arrangement and reservation services	\$40,454	1	\$10,910	\$21,657
Office administrative services	\$135,087	2	\$65,255	\$86,350
Business support services	\$364,538	8	\$144,708	\$195,918
Investigation and security services	\$8,900	0	\$5,030	\$5,856
Services to buildings and dwellings	\$5,986,885	100	\$2,661,531	\$3,276,579
Other support services	\$52,939	1	\$15,805	\$34,890
Waste management and remediation services	\$600,432	4	\$119,881	\$191,505
Other private educational services	\$167,021	3	\$55,415	\$69,321
Offices of physicians, dentists, and other health practitioners	\$6,875,579	60	\$4,105,376	\$4,750,552
Home health care services	\$467,092	12	\$260,521	\$329,557
Medical and diagnostic labs and outpatient and other ambulatory care services	\$910,070	5	\$321,369	\$560,668
Private hospitals	\$7,093,604	62	\$3,459,408	\$3,632,445
Nursing and residential care facilities	\$1,960,096	58	\$1,231,868	\$1,276,810
Child day care services	\$605,963	19	\$214,027	\$357,524
Individual and family services	\$971,676	33	\$414,445	\$462,050
Community food, housing, and other relief services, including rehabilitation services	\$335,581	12	\$198,014	\$156,683
Promoters of performing arts and sports and agents for public figures	\$136,013	4	\$25,009	\$34,943
Museums, historical sites, zoos, and parks	\$44,673	1	\$23,228	\$27,049
Fitness and recreational sports centers	\$172,620	7	\$37,757	\$40,709
Bowling centers	\$30,205	1	\$8,133	\$11,243
Amusement parks, arcades, and gambling industries	\$519,931	6	\$112,052	\$137,966
Other amusement and recreation industries	\$204,874	2	\$37,992	\$67,234
Hotels and motels, including casino hotels	\$106,146	2	\$34,250	\$62,519
Other accommodations	\$65	0	\$6	\$9
Food services and drinking places	\$8,915,822	175	\$2,904,998	\$4,363,641
Automotive repair and maintenance, except car washes	\$4,268,222	51	\$1,659,607	\$2,452,411
Car washes	\$448,541	7	\$149,662	\$256,830
Electronic and precision equipment repair and maintenance	\$1,172,037	8	\$405,709	\$758,335
Commercial and industrial machinery and equipment repair and maintenance	\$8,827,517	57	\$2,723,497	\$5,811,640
Personal and household goods repair and maintenance	\$7,143	0	\$1,897	\$3,846
Personal care services	\$344,780	8	\$134,571	\$216,937
Death care services	\$172,135	2	\$92,177	\$102,883
Dry-cleaning and laundry services	\$326,620	7	\$169,073	\$255,626
Other personal services	\$154,678	1	\$29,884	\$86,117
Religious organizations	\$995,669	4	\$205,068	\$521,824
Grantmaking, giving, and social advocacy organizations	\$361,178	9	\$180,594	\$74,900
Civic, social, professional, and similar organizations	\$2,568,221	56	\$1,287,379	\$749,048
Private household operations	\$268,856	33	\$232,037	\$265,924
US Postal Service	\$653,433	7	\$545,279	\$502,980
Other Federal Government enterprises	\$15,479	0	\$12,928	\$13,575
State and local government passenger transit	\$4,166	0	\$5,301	\$283
State and local government electric utilities	\$435,522	1	\$111,469	\$198,804
Other state and local government enterprises	\$2,334,964	9	\$615,030	\$803,770

Table A2. Detailed Impact of Construction Spending to the Kansas Economy, 2010\$

Description	Total Output	Total Employment	Total Labor Income	Total Value Added
Total	\$1,752,280,694	5,914	\$254,215,582	\$412,929,045
Oilseed farming	\$8,432	0	\$337	\$4,311
Grain farming	\$217,297	1	\$9,767	\$110,483
Vegetable and melon farming	\$10,941	0	\$2,003	\$6,590
Fruit farming	\$247	0	\$52	\$131
Tree nut farming	\$12	0	\$2	\$8
Greenhouse, nursery, and floriculture production	\$1,372	0	\$436	\$1,055
Cotton farming	\$540	0	\$90	\$253
All other crop farming	\$26,242	0	\$2,288	\$9,218
Cattle ranching and farming	\$192,134	0	\$10,983	\$33,003
Dairy cattle and milk production	\$25,135	0	\$1,045	\$9,417
Poultry and egg production	\$298	0	\$23	\$54
Animal production, except cattle and poultry and eggs	\$33,046	0	\$3,207	\$16,982
Commercial logging	\$1,401	0	\$318	\$513
Commercial hunting and trapping	\$37,919	1	\$1,983	\$7,414
Support activities for agriculture and forestry	\$5,501	0	\$5,669	\$4,269
Extraction of oil and natural gas	\$570,291	1	\$112,640	\$308,062
Mining coal	\$1,393	0	\$402	\$759
Mining and quarrying stone	\$66,234	0	\$24,252	\$43,902
Mining and quarrying sand, gravel, clay, and ceramic and refractory minerals	\$101,651	0	\$41,695	\$55,718
Mining and quarrying other nonmetallic minerals	\$1,226	0	\$356	\$706
Support activities for oil and gas operations	\$4,472	0	\$937	\$1,754
Support activities for other mining	\$163	0	\$17	\$41
Electric power generation, transmission, and distribution	\$10,885,840	19	\$2,219,046	\$8,041,384
Natural gas distribution	\$2,724,968	3	\$283,905	\$661,531
Water, sewage and other treatment and delivery systems	\$137,505	1	\$57,928	\$99,142
Construction of new nonresidential manufacturing structures	\$1,413,065,472	3,284	\$144,943,312	\$227,055,056
Construction of other new residential structures	\$30,724	0	\$7,238	\$7,669
Maintenance and repair construction of nonresidential structures	\$1,633,659	17	\$758,996	\$796,065
Maintenance and repair construction of residential structures	\$702,437	8	\$311,404	\$451,905
Dog and cat food manufacturing	\$9,806	0	\$594	\$1,697
Other animal food manufacturing	\$99,662	0	\$8,619	\$15,164
Flour milling and malt manufacturing	\$10,297	0	\$528	\$944
Wet corn milling	\$12,439	0	\$444	\$776
Soybean and other oilseed processing	\$3,839	0	\$60	\$102
Fats and oils refining and blending	\$3,411	0	\$82	\$201
Breakfast cereal manufacturing	\$904	0	\$66	\$215
Confectionery manufacturing from purchased chocolate	\$2,630	0	\$334	\$590
Nonchocolate confectionery manufacturing	\$2,316	0	\$345	\$473
Frozen food manufacturing	\$18,979	0	\$2,117	\$2,732
Fruit and vegetable canning, pickling, and drying	\$9,456	0	\$795	\$1,393
Fluid milk and butter manufacturing	\$34,646	0	\$2,232	\$3,564
Dry, condensed, and evaporated dairy product manufacturing	\$1,215	0	\$31	\$57
Animal (except poultry) slaughtering, rendering, and processing	\$504,409	1	\$48,677	\$54,466

Poultry processing	\$1,955	0	\$400	\$427
Seafood product preparation and packaging	\$126	0	\$6	\$7
Bread and bakery product manufacturing	\$44,863	0	\$13,086	\$15,170
Cookie, cracker, and pasta manufacturing	\$5,353	0	\$804	\$1,375
Tortilla manufacturing	\$44,755	0	\$10,088	\$13,356
Snack food manufacturing	\$10,990	0	\$718	\$1,883
Coffee and tea manufacturing	\$418	0	\$31	\$55
Flavoring syrup and concentrate manufacturing	\$33,655	0	\$1,866	\$13,515
Seasoning and dressing manufacturing	\$7,792	0	\$1,312	\$1,557
All other food manufacturing	\$47,245	0	\$8,722	\$11,242
Soft drink and ice manufacturing	\$883,313	1	\$118,505	\$129,559
Breweries	\$2,990	0	\$108	\$452
Wineries	\$1,791	0	\$86	\$131
Fiber, yarn, and thread mills	\$56	0	\$7	\$8
Broadwoven fabric mills	\$244	0	\$39	\$49
Narrow fabric mills and schiffli machine embroidery	\$52	0	\$11	\$11
Nonwoven fabric mills	\$384	0	\$47	\$69
Knit fabric mills	\$262	0	\$40	\$41
Textile and fabric finishing mills	\$961	0	\$159	\$191
Carpet and rug mills	\$198	0	\$46	\$78
Curtain and linen mills	\$274	0	\$70	\$96
Textile bag and canvas mills	\$3,320	0	\$805	\$1,001
All other textile product mills	\$9,700	0	\$2,297	\$2,739
Apparel knitting mills	\$599	0	\$160	\$209
Cut and sew apparel contractors	\$2,698	0	\$788	\$1,257
Mens and boys cut and sew apparel manufacturing	\$168	0	\$40	\$54
Womens and girls cut and sew apparel manufacturing	\$4,576	0	\$705	\$1,136
Other cut and sew apparel manufacturing	\$435	0	\$124	\$150
Apparel accessories and other apparel manufacturing	\$29	0	\$8	\$8
Footwear manufacturing	\$47	0	\$11	\$13
Other leather and allied product manufacturing	\$108	0	\$22	\$32
Sawmills and wood preservation	\$3,698	0	\$445	\$554
Engineered wood member and truss manufacturing	\$636,678	6	\$164,623	\$167,193
Wood windows and doors and millwork manufacturing	\$16,418	0	\$4,139	\$4,808
Wood container and pallet manufacturing	\$54,414	0	\$13,061	\$18,065
Manufactured home (mobile home) manufacturing	\$283	0	\$81	\$74
Prefabricated wood building manufacturing	\$32,187	0	\$8,642	\$10,247
All other miscellaneous wood product manufacturing	\$10,610	0	\$2,536	\$3,792
Paper mills	\$3,894	0	\$384	\$666
Paperboard Mills	\$4,962	0	\$490	\$783
Paperboard container manufacturing	\$155,446	0	\$31,927	\$33,780
Coated and laminated paper, packaging paper and plastics film manufacturing	\$4,190	0	\$491	\$666
All other paper bag and coated and treated paper manufacturing	\$2,484	0	\$496	\$545
Stationery product manufacturing	\$15,069	0	\$2,831	\$3,185
All other converted paper product manufacturing	\$4,689	0	\$991	\$1,158
Printing	\$244,704	2	\$70,916	\$97,612
Support activities for printing	\$6,325	0	\$3,287	\$3,790
Petroleum refineries	\$3,691,034	0	\$296,607	\$484,405
Asphalt paving mixture and block manufacturing	\$10,110	0	\$3,023	\$4,577

Asphalt shingle and coating materials manufacturing	\$135,240	0	\$50,135	\$76,274
Petroleum lubricating oil and grease manufacturing	\$128,972	0	\$37,673	\$64,498
Industrial gas manufacturing	\$6,473	0	\$740	\$1,706
Synthetic dye and pigment manufacturing	\$18,181	0	\$2,414	\$3,188
Alkalies and chlorine manufacturing	\$5,708	0	\$730	\$1,092
Carbon black manufacturing	\$1,010	0	\$117	\$199
All other basic inorganic chemical manufacturing	\$8,127	0	\$1,366	\$2,070
Other basic organic chemical manufacturing	\$33,849	0	\$1,516	\$2,538
Plastics material and resin manufacturing	\$15,044	0	\$1,764	\$2,869
Artificial and synthetic fibers and filaments manufacturing	\$1,216	0	\$192	\$245
Fertilizer manufacturing	\$85,275	0	\$7,328	\$10,985
Pesticide and other agricultural chemical manufacturing	\$1,945	0	\$136	\$587
Medicinal and botanical manufacturing	\$754	0	\$161	\$237
Pharmaceutical preparation manufacturing	\$37,252	0	\$4,212	\$11,770
In-vitro diagnostic substance manufacturing	\$7,666	0	\$1,726	\$1,777
Biological product (except diagnostic) manufacturing	\$2,232	0	\$229	\$484
Paint and coating manufacturing	\$42,556	0	\$6,718	\$9,164
Adhesive manufacturing	\$1,120	0	\$203	\$239
Soap and cleaning compound manufacturing	\$26,873	0	\$2,701	\$8,785
Toilet preparation manufacturing	\$1,233	0	\$102	\$318
Printing ink manufacturing	\$6,065	0	\$1,277	\$1,392
All other chemical product and preparation manufacturing	\$33,937	0	\$5,282	\$6,942
Plastics packaging materials and unlaminated film and sheet manufacturing	\$24,254	0	\$2,838	\$5,400
Unlaminated plastics profile shape manufacturing	\$3,469	0	\$585	\$954
Plastics pipe and pipe fitting manufacturing	\$262,159	1	\$28,140	\$54,678
Laminated plastics plate, sheet (except packaging), and shape manufacturing	\$12,325	0	\$1,953	\$3,261
Polystyrene foam product manufacturing	\$118,098	0	\$19,740	\$40,422
Urethane and other foam product (except polystyrene) manufacturing	\$42,282	0	\$6,713	\$11,424
Plastics bottle manufacturing	\$8,570	0	\$1,269	\$2,644
Other plastics product manufacturing	\$111,019	0	\$23,690	\$34,937
Tire manufacturing	\$130,879	0	\$31,853	\$48,874
Rubber and plastics hoses and belting manufacturing	\$38,128	0	\$7,558	\$11,835
Other rubber product manufacturing	\$18,481	0	\$4,243	\$6,628
Pottery, ceramics, and plumbing fixture manufacturing	\$1,703	0	\$356	\$478
Brick, tile, and other structural clay product manufacturing	\$47,877	0	\$14,641	\$22,664
Clay and nonclay refractory manufacturing	\$3,217,226	10	\$643,758	\$862,701
Flat glass manufacturing	\$41,179	0	\$8,568	\$16,376
Other pressed and blown glass and glassware manufacturing	\$789	0	\$242	\$333
Glass product manufacturing made of purchased glass	\$2,502	0	\$569	\$778
Cement manufacturing	\$278,233	0	\$30,035	\$91,333
Ready-mix concrete manufacturing	\$4,497,374	14	\$765,578	\$1,125,588
Concrete pipe, brick, and block manufacturing	\$233,531	1	\$46,118	\$78,042
Other concrete product manufacturing	\$1,284,645	7	\$361,537	\$484,141
Lime and gypsum product manufacturing	\$149,707	0	\$21,464	\$45,257
Abrasive product manufacturing	\$969	0	\$178	\$370
Cut stone and stone product manufacturing	\$3,135	0	\$1,208	\$1,322
Mineral wool manufacturing	\$23,483	0	\$5,280	\$9,426
Miscellaneous nonmetallic mineral product manufacturing	\$59,676	0	\$8,305	\$14,739
Iron and steel mills and ferroalloy manufacturing	\$49,946	0	\$3,121	\$5,507

Steel product manufacturing from purchased steel	\$49,584	0	\$5,876	\$8,189
Secondary smelting and alloying of aluminum	\$1,088	0	\$58	\$76
Aluminum product manufacturing from purchased aluminum	\$15,672	0	\$1,380	\$1,941
Primary smelting and refining of nonferrous metal (except copper and aluminum)	\$1,609	0	\$124	\$210
Copper rolling, drawing, extruding and alloying	\$25,555	0	\$1,589	\$2,564
Ferrous metal foundries	\$51,858	0	\$12,854	\$15,623
Nonferrous metal foundries	\$4,078	0	\$863	\$908
All other forging, stamping, and sintering	\$4,652	0	\$655	\$882
Custom roll forming	\$10,133	0	\$1,089	\$1,911
Crown and closure manufacturing and metal stamping	\$4,431	0	\$921	\$1,169
Cutlery, utensil, pot, and pan manufacturing	\$2,945	0	\$598	\$1,364
Handtool manufacturing	\$5,617	0	\$1,326	\$2,099
Plate work and fabricated structural product manufacturing	\$705,632	2	\$122,837	\$200,350
Ornamental and architectural metal products manufacturing	\$2,012,167	10	\$450,604	\$616,630
Power boiler and heat exchanger manufacturing	\$99,674	0	\$16,789	\$26,670
Metal tank (heavy gauge) manufacturing	\$1,023,410	4	\$188,033	\$309,216
Metal can, box, and other metal container (light gauge) manufacturing	\$11,419	0	\$926	\$1,859
Ammunition manufacturing	\$8,417	0	\$1,585	\$3,719
Arms, ordnance, and accessories manufacturing	\$96	0	\$20	\$44
Hardware manufacturing	\$1,182	0	\$176	\$317
Spring and wire product manufacturing	\$16,443	0	\$3,680	\$5,917
Machine shops	\$30,182	0	\$9,198	\$12,043
Turned product and screw, nut, and bolt manufacturing	\$14,511	0	\$3,553	\$5,615
Coating, engraving, heat treating and allied activities	\$40,639	0	\$9,063	\$13,929
Valve and fittings other than plumbing manufacturing	\$141,918	0	\$24,394	\$49,330
Plumbing fixture fitting and trim manufacturing	\$59,298	0	\$6,810	\$17,484
Ball and roller bearing manufacturing	\$2,070	0	\$305	\$623
Fabricated pipe and pipe fitting manufacturing	\$450,248	2	\$78,817	\$143,158
Other fabricated metal manufacturing	\$1,141,258	5	\$251,890	\$411,991
Farm machinery and equipment manufacturing	\$1,366,219	3	\$136,011	\$257,103
Lawn and garden equipment manufacturing	\$2,337	0	\$214	\$339
Construction machinery manufacturing	\$17,718	0	\$1,685	\$3,038
Mining and oil and gas field machinery manufacturing	\$163	0	\$18	\$26
Other industrial machinery manufacturing	\$1,743	0	\$442	\$535
Plastics and rubber industry machinery manufacturing	\$1,917	0	\$611	\$686
Semiconductor machinery manufacturing	\$220	0	\$24	\$33
Vending, commercial, industrial, and office machinery manufacturing	\$24	0	\$5	\$6
Optical instrument and lens manufacturing	\$4	0	\$1	\$1
Photographic and photocopying equipment manufacturing	\$89	0	\$13	\$25
Other commercial and service industry machinery manufacturing	\$106,563	0	\$23,921	\$32,214
Air purification and ventilation equipment manufacturing	\$80,173	0	\$17,278	\$22,240
Heating equipment (except warm air furnaces) manufacturing	\$84,145	0	\$14,539	\$20,812
Air conditioning, refrigeration, and warm air heating equipment manufacturing	\$241,932	1	\$36,695	\$57,433
Industrial mold manufacturing	\$1,723	0	\$686	\$755
Metal cutting and forming machine tool manufacturing	\$735	0	\$202	\$244
Special tool, die, jig, and fixture manufacturing	\$47	0	\$17	\$19
Cutting tool and machine tool accessory manufacturing	\$7,955	0	\$2,770	\$3,343
Rolling mill and other metalworking machinery manufacturing	\$1,400	0	\$356	\$447

Turbine and turbine generator set units manufacturing	\$1,166	0	\$110	\$260
Speed changer, industrial high-speed drive, and gear manufacturing	\$3,664	0	\$553	\$796
Mechanical power transmission equipment manufacturing	\$21,099	0	\$4,856	\$6,666
Other engine equipment manufacturing	\$2,704	0	\$169	\$284
Pump and pumping equipment manufacturing	\$91,040	0	\$13,509	\$20,357
Air and gas compressor manufacturing	\$1,809	0	\$208	\$293
Material handling equipment manufacturing	\$673,875	2	\$110,387	\$145,357
Power-driven handtool manufacturing	\$13,092	0	\$2,031	\$3,475
Other general purpose machinery manufacturing	\$973,110	3	\$166,207	\$221,125
Packaging machinery manufacturing	\$139	0	\$38	\$43
Industrial process furnace and oven manufacturing	\$5,819	0	\$1,450	\$1,889
Fluid power process machinery manufacturing	\$16,309	0	\$2,796	\$3,919
Electronic computer manufacturing	\$978	0	\$97	\$120
Computer storage device manufacturing	\$59	0	\$4	\$5
Computer terminals and other computer peripheral equipment manufacturing	\$422	0	\$54	\$56
Telephone apparatus manufacturing	\$3,034	0	\$319	\$354
Broadcast and wireless communications equipment manufacturing	\$2,819	0	\$364	\$381
Other communications equipment manufacturing	\$2,619	0	\$554	\$613
Audio and video equipment manufacturing	\$882	0	\$85	\$95
Bare printed circuit board manufacturing	\$251	0	\$54	\$55
Semiconductor and related device manufacturing	\$5,599	0	\$987	\$1,128
Electronic capacitor, resistor, coil, transformer, and other inductor manufacturing	\$430	0	\$95	\$102
Electronic connector manufacturing	\$4,262	0	\$886	\$932
Printed circuit assembly (electronic assembly) manufacturing	\$173	0	\$24	\$25
Other electronic component manufacturing	\$2,064	0	\$386	\$403
Electromedical and electrotherapeutic apparatus manufacturing	\$14	0	\$3	\$3
Search, detection, and navigation instruments manufacturing	\$112	0	\$19	\$20
Automatic environmental control manufacturing	\$1,206	0	\$236	\$249
Industrial process variable instruments manufacturing	\$6,945	0	\$1,443	\$1,495
Electricity and signal testing instruments manufacturing	\$1,721	0	\$356	\$371
Analytical laboratory instrument manufacturing	\$56	0	\$11	\$11
Irradiation apparatus manufacturing	\$46	0	\$5	\$6
Watch, clock, and other measuring and controlling device manufacturing	\$1,895	0	\$290	\$307
Software, audio, and video media for reproduction	\$2,265	0	\$595	\$618
Magnetic and optical recording media manufacturing	\$874	0	\$226	\$232
Lighting fixture manufacturing	\$3,429,585	10	\$797,245	\$1,402,314
Small electrical appliance manufacturing	\$5,292	0	\$988	\$2,147
Household cooking appliance manufacturing	\$1,438	0	\$252	\$446
Other major household appliance manufacturing	\$11,998	0	\$1,303	\$4,117
Power, distribution, and specialty transformer manufacturing	\$13,743	0	\$1,764	\$3,724
Motor and generator manufacturing	\$10,456	0	\$1,745	\$3,730
Switchgear and switchboard apparatus manufacturing	\$42,272	0	\$6,998	\$15,345
Relay and industrial control manufacturing	\$9,474	0	\$1,714	\$3,186
Storage battery manufacturing	\$22,725	0	\$3,803	\$5,705
Wiring device manufacturing	\$175,962	1	\$35,395	\$68,040
All other miscellaneous electrical equipment and component manufacturing	\$13,688	0	\$3,393	\$4,883
Automobile manufacturing	\$10,021	0	\$1,010	\$1,432

Light truck and utility vehicle manufacturing	\$6,511	0	\$612	\$835
Heavy duty truck manufacturing	\$733	0	\$80	\$86
Motor vehicle body manufacturing	\$4,807	0	\$815	\$1,012
Truck trailer manufacturing	\$7,914	0	\$1,687	\$1,746
Travel trailer and camper manufacturing	\$2,589	0	\$622	\$452
Motor vehicle parts manufacturing	\$67,826	0	\$10,974	\$12,122
Aircraft manufacturing	\$11,461	0	\$1,256	\$1,956
Aircraft engine and engine parts manufacturing	\$536	0	\$68	\$99
Other aircraft parts and auxiliary equipment manufacturing	\$908	0	\$155	\$203
Railroad rolling stock manufacturing	\$486	0	\$50	\$79
Boat building	\$121	0	\$36	\$39
Motorcycle, bicycle, and parts manufacturing	\$552	0	\$58	\$84
All other transportation equipment manufacturing	\$2,213	0	\$227	\$378
Wood kitchen cabinet and countertop manufacturing	\$30,263	0	\$9,033	\$8,864
Upholstered household furniture manufacturing	\$267	0	\$64	\$88
Nonupholstered wood household furniture manufacturing	\$81	0	\$25	\$40
Metal and other household furniture manufacturing	\$87	0	\$16	\$28
Institutional furniture manufacturing	\$962	0	\$204	\$379
Office Furniture	\$8	0	\$3	\$4
Custom architectural woodwork and millwork manufacturing	\$54,686	0	\$11,832	\$22,525
Showcase, partition, shelving, and locker manufacturing	\$34,581	0	\$8,674	\$12,534
Mattress manufacturing	\$742	0	\$132	\$285
Blind and shade manufacturing	\$148	0	\$43	\$54
Surgical and medical instrument, laboratory and medical instrument manufacturing	\$524	0	\$136	\$177
Surgical appliance and supplies manufacturing	\$6,864	0	\$1,671	\$2,671
Dental equipment and supplies manufacturing	\$105	0	\$28	\$41
Ophthalmic goods manufacturing	\$213	0	\$58	\$82
Dental laboratories manufacturing	\$2,962	0	\$2,012	\$2,150
Jewelry and silverware manufacturing	\$9	0	\$1	\$2
Sporting and athletic goods manufacturing	\$6,946	0	\$2,036	\$2,765
Doll, toy, and game manufacturing	\$1,704	0	\$277	\$438
Office supplies (except paper) manufacturing	\$815	0	\$232	\$323
Sign manufacturing	\$121,914	1	\$53,726	\$60,002
Gasket, packing, and sealing device manufacturing	\$3,299	0	\$1,101	\$1,183
Musical instrument manufacturing	\$2,163	0	\$844	\$907
All other miscellaneous manufacturing	\$12,032	0	\$3,363	\$4,357
Broom, brush, and mop manufacturing	\$9,448	0	\$2,898	\$4,346
Wholesale trade businesses	\$52,408,426	339	\$19,375,272	\$33,374,769
Retail Stores - Motor vehicle and parts	\$2,520,392	34	\$1,445,738	\$1,822,137
Retail Stores - Furniture and home furnishings	\$888,971	11	\$345,641	\$555,544
Retail Stores - Electronics and appliances	\$509,159	8	\$279,863	\$342,400
Retail Stores - Building material and garden supply	\$1,875,882	20	\$765,688	\$1,242,826
Retail Stores - Food and beverage	\$3,087,228	39	\$1,328,180	\$1,997,307
Retail Stores - Health and personal care	\$1,120,622	15	\$532,919	\$833,535
Retail Stores - Gasoline stations	\$1,350,226	15	\$406,171	\$922,251
Retail Stores - Clothing and clothing accessories	\$1,473,430	23	\$466,559	\$950,565
Retail Stores - Sporting goods, hobby, book and music	\$628,921	15	\$237,598	\$387,421
Retail Stores - General merchandise	\$2,728,429	49	\$1,189,700	\$1,767,787
Retail Stores - Miscellaneous	\$960,422	24	\$498,287	\$720,575
Retail Nonstores - Direct and electronic sales	\$1,217,114	40	\$259,701	\$871,453

Transport by air	\$1,086,311	5	\$176,927	\$207,359
Transport by rail	\$462,811	1	\$114,919	\$268,147
Transport by water	\$31,431	0	\$2,446	\$6,613
Transport by truck	\$7,931,411	58	\$3,024,473	\$4,035,175
Transit and ground passenger transportation	\$45,124	1	\$16,577	\$24,137
Transport by pipeline	\$672,842	1	\$125,684	\$181,339
Scenic and sightseeing transportation and support activities for transportation	\$913,814	6	\$613,841	\$832,330
Couriers and messengers	\$1,359,788	16	\$622,225	\$1,013,481
Warehousing and storage	\$453,231	6	\$265,268	\$361,791
Newspaper publishers	\$1,647,522	15	\$477,000	\$559,472
Periodical publishers	\$37,190	0	\$9,009	\$11,330
Book publishers	\$11,086	0	\$2,081	\$3,871
Directory, mailing list, and other publishers	\$38,603	0	\$6,610	\$16,725
Software publishers	\$7,553	0	\$1,742	\$3,316
Motion picture and video industries	\$367,242	4	\$26,265	\$40,726
Sound recording industries	\$364	0	\$18	\$48
Radio and television broadcasting	\$582,050	4	\$364,397	\$283,285
Cable and other subscription programming	\$123,607	0	\$23,840	\$31,716
Internet publishing and broadcasting	\$64,659	0	\$4,009	\$12,703
Telecommunications	\$21,954,278	47	\$3,332,478	\$8,999,918
Data processing, hosting, ISP, web search portals and related services	\$261,101	1	\$61,983	\$92,712
Other information services	\$487,150	2	\$33,657	\$88,795
Monetary authorities and depository credit intermediation activities	\$9,307,247	54	\$2,545,227	\$6,678,429
Nondepository credit intermediation and related activities	\$2,090,158	11	\$868,438	\$1,353,963
Securities, commodity contracts, investments, and related activities	\$1,361,606	8	\$562,598	\$572,991
Insurance carriers	\$2,884,652	12	\$631,760	\$1,154,078
Insurance agencies, brokerages, and related activities	\$1,183,086	11	\$481,560	\$613,135
Funds, trusts, and other financial vehicles	\$240,296	1	\$11,608	\$7,741
Real estate establishments	\$7,217,647	49	\$1,123,022	\$5,632,619
Imputed rental activity for owner-occupied dwellings	\$19,413,751	0	\$0	\$13,149,517
Automotive equipment rental and leasing	\$784,646	4	\$171,103	\$373,116
General and consumer goods rental except video tapes and discs	\$362,672	2	\$229,521	\$256,045
Video tape and disc rental	\$42,695	1	\$12,825	\$20,011
Commercial and industrial machinery and equipment rental and leasing	\$19,526,843	56	\$4,193,066	\$8,019,519
Lessors of nonfinancial intangible assets	\$81,237	0	\$4,140	\$48,075
Legal services	\$10,445,751	102	\$4,954,119	\$6,350,785
Accounting, tax preparation, bookkeeping, and payroll services	\$13,451,966	172	\$7,058,284	\$8,426,731
Architectural, engineering, and related services	\$11,615,035	95	\$6,587,770	\$6,679,820
Specialized design services	\$22,323	0	\$8,592	\$12,396
Custom computer programming services	\$210,433	2	\$119,882	\$125,474
Computer systems design services	\$38,585	1	\$39,212	\$31,837
Other computer related services, including facilities management	\$25,928	0	\$18,073	\$22,506
Management, scientific, and technical consulting services	\$1,715,348	13	\$864,585	\$988,394
Environmental and other technical consulting services	\$368,435	2	\$181,324	\$220,851
Scientific research and development services	\$89,797	1	\$46,109	\$40,974
Advertising and related services	\$756,972	8	\$271,895	\$329,857
Photographic services	\$51,858	1	\$21,634	\$33,790

Veterinary services	\$318,767	5	\$116,244	\$127,234
All other miscellaneous professional, scientific, and technical services	\$341,550	1	\$34,345	\$166,208
Management of companies and enterprises	\$1,199,442	7	\$481,154	\$659,653
Employment services	\$506,464	15	\$357,951	\$386,456
Travel arrangement and reservation services	\$113,732	1	\$32,334	\$64,101
Office administrative services	\$3,651,686	45	\$1,781,223	\$2,374,543
Facilities support services	\$7,177	0	\$4,035	\$4,396
Business support services	\$813,423	14	\$349,434	\$471,754
Investigation and security services	\$36,499	1	\$21,618	\$25,160
Services to buildings and dwellings	\$6,606,743	112	\$2,913,553	\$3,583,165
Other support services	\$187,884	3	\$60,979	\$123,827
Waste management and remediation services	\$1,152,888	7	\$266,538	\$425,467
Private elementary and secondary schools	\$15,870	1	\$9,688	\$9,968
Private junior colleges, colleges, universities, and professional schools	\$55,710	1	\$21,961	\$23,498
Other private educational services	\$239,037	4	\$85,575	\$107,033
Offices of physicians, dentists, and other health practitioners	\$7,541,660	66	\$4,503,317	\$5,210,962
Home health care services	\$534,977	13	\$298,709	\$377,860
Medical and diagnostic labs and outpatient and other ambulatory care services	\$1,202,494	6	\$423,497	\$740,017
Private hospitals	\$7,595,769	66	\$3,703,303	\$3,888,542
Nursing and residential care facilities	\$2,162,083	63	\$1,368,625	\$1,418,724
Child day care services	\$650,777	21	\$229,349	\$383,031
Individual and family services	\$1,066,074	36	\$454,862	\$507,099
Community food, housing, and other relief services, including rehabilitation services	\$367,571	13	\$219,615	\$173,721
Performing arts companies	\$84,164	7	\$20,755	\$23,810
Spectator sports companies	\$16,407	1	\$4,160	\$4,861
Promoters of performing arts and sports and agents for public figures	\$207,054	7	\$34,604	\$48,224
Independent artists, writers, and performers	\$6,233	0	\$2,325	\$3,132
Museums, historical sites, zoos, and parks	\$52,066	1	\$26,784	\$31,181
Fitness and recreational sports centers	\$242,651	9	\$58,236	\$62,917
Bowling centers	\$32,358	1	\$8,634	\$11,936
Amusement parks, arcades, and gambling industries	\$579,778	6	\$124,147	\$152,876
Other amusement and recreation industries	\$264,644	3	\$48,720	\$86,163
Hotels and motels, including casino hotels	\$131,217	2	\$42,457	\$77,375
Other accommodations	\$244	0	\$57	\$86
Food services and drinking places	\$10,270,307	203	\$3,334,190	\$5,007,767
Automotive repair and maintenance, except car washes	\$5,342,865	66	\$2,068,138	\$3,050,951
Car washes	\$470,549	8	\$156,740	\$268,915
Electronic and precision equipment repair and maintenance	\$1,341,131	9	\$465,031	\$867,740
Commercial and industrial machinery and equipment repair and maintenance	\$9,702,926	62	\$2,994,559	\$6,387,968
Personal and household goods repair and maintenance	\$124,637	1	\$32,596	\$67,479
Personal care services	\$395,612	9	\$154,697	\$249,018
Death care services	\$192,051	3	\$99,458	\$111,150
Dry-cleaning and laundry services	\$369,791	8	\$191,707	\$289,413
Other personal services	\$213,507	2	\$42,102	\$117,260
Religious organizations	\$1,065,318	5	\$213,384	\$542,928
Grantmaking, giving, and social advocacy organizations	\$386,137	10	\$196,368	\$81,446
Civic, social, professional, and similar organizations	\$3,687,066	81	\$1,840,622	\$1,071,755
Private household operations	\$296,126	37	\$255,572	\$292,897

US Postal Service	\$1,306,389	15	\$1,063,986	\$981,450
Other Federal Government enterprises	\$39,470	0	\$34,431	\$36,155
State and local government passenger transit	\$9,193	0	\$8,057	\$429
State and local government electric utilities	\$709,504	1	\$163,456	\$291,522
Other state and local government enterprises	\$3,468,611	13	\$839,421	\$1,097,022

Table A3. Detailed Impact of Ongoing Operation of the Sunflower Power Plant to the Kansas Economy, 2010\$

Description	Total Output	Total Employment	Total Labor Income	Total Value Added
Total	\$346,359,870	261	\$17,235,448	\$195,057,663
Oilseed farming	-\$1,789	0	-\$68	-\$915
Grain farming	-\$4,143,612	-13	-\$189,331	-\$2,106,779
Vegetable and melon farming	\$1,047	0	\$192	\$631
Fruit farming	\$19	0	\$4	\$10
Tree nut farming	-\$1	0	\$0	-\$1
Greenhouse, nursery, and floriculture production	\$90	0	\$28	\$69
Cotton farming	-\$18	0	-\$2	-\$9
All other crop farming	-\$268	0	-\$23	-\$94
Cattle ranching and farming	-\$2,477	0	-\$91	-\$426
Dairy cattle and milk production	\$1,869	0	\$77	\$700
Poultry and egg production	\$32	0	\$2	\$6
Animal production, except cattle and poultry and eggs	\$1,246	0	\$127	\$640
Commercial logging	\$87	0	\$20	\$32
Commercial hunting and trapping	\$2,546	0	\$133	\$499
Support activities for agriculture and forestry	-\$54,148	-1	-\$55,810	-\$42,025
Extraction of oil and natural gas	\$964,902	2	\$190,455	\$521,225
Mining coal	\$26,675	0	\$7,697	\$14,542
Mining and quarrying stone	\$2,528	0	\$926	\$1,676
Mining and quarrying sand, gravel, clay, and ceramic and refractory minerals	\$483	0	\$198	\$265
Mining and quarrying other nonmetallic minerals	-\$142	0	-\$41	-\$82
Support activities for oil and gas operations	\$5,598	0	\$1,168	\$2,188
Support activities for other mining	\$18	0	\$2	\$5
Electric power generation, transmission, and distribution	\$327,597,554	89	\$10,262,556	\$185,470,898
Natural gas distribution	\$57,555	0	\$6,055	\$14,111
Water, sewage and other treatment and delivery systems	\$10,214	0	\$4,303	\$7,364
Construction of other new residential structures	\$2,149	0	\$507	\$537
Maintenance and repair construction of nonresidential structures	\$2,340,454	24	\$1,080,410	\$1,133,405
Maintenance and repair construction of residential structures	\$46,697	1	\$20,687	\$30,042
Dog and cat food manufacturing	\$831	0	\$50	\$144
Other animal food manufacturing	\$8,557	0	\$752	\$1,323
Flour milling and malt manufacturing	\$1,047	0	\$54	\$96
Wet corn milling	\$1,178	0	\$42	\$74
Soybean and other oilseed processing	\$449	0	\$7	\$12
Fats and oils refining and blending	\$360	0	\$9	\$21
Breakfast cereal manufacturing	\$89	0	\$6	\$21
Confectionery manufacturing from purchased chocolate	\$297	0	\$38	\$67
Nonchocolate confectionery manufacturing	\$315	0	\$47	\$64
Frozen food manufacturing	\$2,220	0	\$248	\$320
Fruit and vegetable canning, pickling, and drying	\$1,076	0	\$90	\$159
Fluid milk and butter manufacturing	\$3,653	0	\$235	\$375
Dry, condensed, and evaporated dairy product manufacturing	\$113	0	\$3	\$5

Animal (except poultry) slaughtering, rendering, and processing	\$48,119	0	\$4,638	\$5,189
Poultry processing	\$213	0	\$44	\$47
Seafood product preparation and packaging	\$14	0	\$1	\$1
Bread and bakery product manufacturing	\$4,254	0	\$1,229	\$1,425
Cookie, cracker, and pasta manufacturing	\$611	0	\$92	\$157
Tortilla manufacturing	\$3,083	0	\$694	\$919
Snack food manufacturing	\$1,380	0	\$90	\$236
Coffee and tea manufacturing	\$49	0	\$4	\$6
Flavoring syrup and concentrate manufacturing	\$3,301	0	\$183	\$1,326
Seasoning and dressing manufacturing	\$1,031	0	\$174	\$206
All other food manufacturing	\$4,200	0	\$777	\$1,001
Soft drink and ice manufacturing	\$69,127	0	\$9,289	\$10,155
Breweries	\$267	0	\$10	\$40
Wineries	\$161	0	\$8	\$12
Fiber, yarn, and thread mills	-\$28	0	-\$4	-\$4
Broadwoven fabric mills	\$13	0	\$2	\$3
Narrow fabric mills and schiffli machine embroidery	\$1	0	\$0	\$0
Nonwoven fabric mills	\$11	0	\$1	\$2
Knit fabric mills	\$11	0	\$2	\$2
Textile and fabric finishing mills	\$44	0	\$7	\$9
Carpet and rug mills	\$12	0	\$3	\$5
Curtain and linen mills	\$24	0	\$6	\$8
Textile bag and canvas mills	\$207	0	\$50	\$62
All other textile product mills	\$608	0	\$145	\$172
Apparel knitting mills	\$52	0	\$14	\$18
Cut and sew apparel contractors	\$167	0	\$49	\$78
Mens and boys cut and sew apparel manufacturing	\$13	0	\$3	\$4
Womens and girls cut and sew apparel manufacturing	\$404	0	\$62	\$100
Other cut and sew apparel manufacturing	\$37	0	\$11	\$13
Apparel accessories and other apparel manufacturing	\$2	0	\$1	\$1
Footwear manufacturing	\$4	0	\$1	\$1
Other leather and allied product manufacturing	\$8	0	\$2	\$2
Sawmills and wood preservation	\$434	0	\$52	\$65
Engineered wood member and truss manufacturing	\$2,176	0	\$566	\$575
Wood windows and doors and millwork manufacturing	\$824	0	\$208	\$241
Wood container and pallet manufacturing	\$1,548	0	\$370	\$511
Manufactured home (mobile home) manufacturing	\$84	0	\$24	\$22
Prefabricated wood building manufacturing	\$397	0	\$107	\$126
All other miscellaneous wood product manufacturing	\$509	0	\$122	\$182
Paper mills	\$204	0	\$20	\$35
Paperboard Mills	\$412	0	\$41	\$65
Paperboard container manufacturing	\$2,428	0	\$499	\$528
Coated and laminated paper, packaging paper and plastics film manufacturing	\$332	0	\$39	\$53
All other paper bag and coated and treated paper manufacturing	\$64	0	\$13	\$14
Stationery product manufacturing	\$148	0	\$28	\$31
All other converted paper product manufacturing	\$32	0	\$7	\$8
Printing	\$30,037	0	\$8,265	\$11,376
Support activities for printing	\$594	0	\$309	\$356
Petroleum refineries	\$338,002	0	\$26,887	\$43,894

Asphalt paving mixture and block manufacturing	\$327	0	\$98	\$148
Asphalt shingle and coating materials manufacturing	\$1,397	0	\$518	\$788
Petroleum lubricating oil and grease manufacturing	\$1,759	0	\$514	\$880
Industrial gas manufacturing	\$971	0	\$112	\$258
Synthetic dye and pigment manufacturing	\$25	0	\$3	\$4
Alkalies and chlorine manufacturing	\$225	0	\$29	\$43
Carbon black manufacturing	\$22	0	\$3	\$4
All other basic inorganic chemical manufacturing	-\$205	0	-\$34	-\$52
Other basic organic chemical manufacturing	\$1,016	0	\$47	\$79
Plastics material and resin manufacturing	\$283	0	\$33	\$54
Artificial and synthetic fibers and filaments manufacturing	\$17	0	\$3	\$3
Fertilizer manufacturing	-\$6,789	0	-\$583	-\$874
Pesticide and other agricultural chemical manufacturing	-\$7,045	0	-\$492	-\$2,125
Medicinal and botanical manufacturing	\$54	0	\$11	\$17
Pharmaceutical preparation manufacturing	\$2,773	0	\$314	\$876
In-vitro diagnostic substance manufacturing	\$515	0	\$116	\$120
Biological product (except diagnostic) manufacturing	\$157	0	\$16	\$34
Paint and coating manufacturing	\$729	0	\$115	\$157
Adhesive manufacturing	\$58	0	\$10	\$12
Soap and cleaning compound manufacturing	\$436	0	\$44	\$142
Toilet preparation manufacturing	\$105	0	\$9	\$27
Printing ink manufacturing	\$263	0	\$55	\$60
All other chemical product and preparation manufacturing	\$563	0	\$88	\$115
Plastics packaging materials and unlaminated film and sheet manufacturing	\$519	0	\$61	\$115
Unlaminated plastics profile shape manufacturing	\$22	0	\$4	\$6
Plastics pipe and pipe fitting manufacturing	\$3,062	0	\$328	\$637
Laminated plastics plate, sheet (except packaging), and shape manufacturing	\$214	0	\$34	\$57
Polystyrene foam product manufacturing	\$959	0	\$160	\$328
Urethane and other foam product (except polystyrene) manufacturing	\$967	0	\$154	\$261
Plastics bottle manufacturing	\$573	0	\$85	\$177
Other plastics product manufacturing	\$3,048	0	\$650	\$959
Tire manufacturing	\$1,613	0	\$395	\$607
Rubber and plastics hoses and belting manufacturing	\$1,832	0	\$363	\$569
Other rubber product manufacturing	\$847	0	\$195	\$304
Pottery, ceramics, and plumbing fixture manufacturing	\$6	0	\$1	\$2
Brick, tile, and other structural clay product manufacturing	\$307	0	\$94	\$145
Clay and nonclay refractory manufacturing	\$101	0	\$20	\$27
Flat glass manufacturing	\$17	0	\$4	\$7
Other pressed and blown glass and glassware manufacturing	\$34	0	\$11	\$15
Glass product manufacturing made of purchased glass	\$76	0	\$17	\$24
Cement manufacturing	\$1,356	0	\$146	\$445
Ready-mix concrete manufacturing	\$6,738	0	\$1,146	\$1,684
Concrete pipe, brick, and block manufacturing	\$2,422	0	\$478	\$809
Other concrete product manufacturing	\$16,822	0	\$4,736	\$6,342
Lime and gypsum product manufacturing	\$1,446	0	\$207	\$437
Abrasive product manufacturing	\$11	0	\$2	\$4
Cut stone and stone product manufacturing	\$291	0	\$112	\$123
Mineral wool manufacturing	\$686	0	\$154	\$275
Miscellaneous nonmetallic mineral product manufacturing	\$142	0	\$20	\$35

Iron and steel mills and ferroalloy manufacturing	\$518	0	\$32	\$57
Steel product manufacturing from purchased steel	\$475	0	\$56	\$79
Secondary smelting and alloying of aluminum	\$117	0	\$6	\$8
Aluminum product manufacturing from purchased aluminum	\$108	0	\$10	\$13
Primary smelting and refining of nonferrous metal (except copper and aluminum)	\$22	0	\$2	\$3
Copper rolling, drawing, extruding and alloying	\$385	0	\$24	\$39
Ferrous metal foundries	\$1,554	0	\$385	\$468
Nonferrous metal foundries	\$14	0	\$3	\$3
All other forging, stamping, and sintering	\$243	0	\$34	\$46
Custom roll forming	\$79	0	\$8	\$15
Crown and closure manufacturing and metal stamping	\$29	0	\$6	\$8
Cutlery, utensil, pot, and pan manufacturing	\$119	0	\$24	\$55
Handtool manufacturing	\$240	0	\$57	\$90
Plate work and fabricated structural product manufacturing	\$6,605	0	\$1,157	\$1,887
Ornamental and architectural metal products manufacturing	\$3,648	0	\$817	\$1,118
Power boiler and heat exchanger manufacturing	\$675	0	\$114	\$181
Metal tank (heavy gauge) manufacturing	\$1,750	0	\$322	\$530
Metal can, box, and other metal container (light gauge) manufacturing	\$294	0	\$24	\$47
Ammunition manufacturing	\$11	0	\$2	\$5
Arms, ordnance, and accessories manufacturing	\$5	0	\$1	\$2
Hardware manufacturing	\$26	0	\$4	\$7
Spring and wire product manufacturing	\$145	0	\$33	\$52
Machine shops	\$1,536	0	\$467	\$612
Turned product and screw, nut, and bolt manufacturing	\$277	0	\$68	\$107
Coating, engraving, heat treating and allied activities	\$2,122	0	\$473	\$727
Valve and fittings other than plumbing manufacturing	\$509	0	\$87	\$177
Plumbing fixture fitting and trim manufacturing	\$249	0	\$29	\$74
Ball and roller bearing manufacturing	\$129	0	\$19	\$39
Fabricated pipe and pipe fitting manufacturing	\$352	0	\$62	\$112
Other fabricated metal manufacturing	\$638	0	\$141	\$230
Farm machinery and equipment manufacturing	-\$3,206	0	-\$317	-\$600
Lawn and garden equipment manufacturing	\$37	0	\$3	\$5
Construction machinery manufacturing	\$158	0	\$15	\$28
Mining and oil and gas field machinery manufacturing	\$24	0	\$3	\$4
Other industrial machinery manufacturing	\$81	0	\$20	\$25
Plastics and rubber industry machinery manufacturing	\$3	0	\$1	\$1
Semiconductor machinery manufacturing	\$18	0	\$2	\$3
Vending, commercial, industrial, and office machinery manufacturing	\$1	0	\$0	\$0
Photographic and photocopying equipment manufacturing	\$4	0	\$1	\$1
Other commercial and service industry machinery manufacturing	\$55	0	\$12	\$16
Air purification and ventilation equipment manufacturing	\$49	0	\$11	\$14
Heating equipment (except warm air furnaces) manufacturing	\$142	0	\$25	\$35
Air conditioning, refrigeration, and warm air heating equipment manufacturing	\$7,790	0	\$1,182	\$1,849
Industrial mold manufacturing	\$8	0	\$3	\$4
Metal cutting and forming machine tool manufacturing	\$11	0	\$3	\$4
Special tool, die, jig, and fixture manufacturing	\$1	0	\$1	\$1
Cutting tool and machine tool accessory manufacturing	\$91	0	\$32	\$38
Rolling mill and other metalworking machinery	\$2	0	\$1	\$1

manufacturing				
Turbine and turbine generator set units manufacturing	\$25,831	0	\$2,440	\$5,765
Speed changer, industrial high-speed drive, and gear manufacturing	\$70	0	\$10	\$15
Mechanical power transmission equipment manufacturing	\$93	0	\$21	\$29
Other engine equipment manufacturing	\$71	0	\$4	\$7
Pump and pumping equipment manufacturing	\$385	0	\$57	\$86
Air and gas compressor manufacturing	\$443	0	\$51	\$72
Material handling equipment manufacturing	\$160	0	\$26	\$35
Power-driven handtool manufacturing	\$10	0	\$2	\$3
Other general purpose machinery manufacturing	\$140	0	\$24	\$32
Industrial process furnace and oven manufacturing	\$15	0	\$4	\$5
Fluid power process machinery manufacturing	\$101	0	\$17	\$24
Electronic computer manufacturing	\$61	0	\$6	\$7
Computer storage device manufacturing	\$1	0	\$0	\$0
Computer terminals and other computer peripheral equipment manufacturing	\$24	0	\$3	\$3
Telephone apparatus manufacturing	\$137	0	\$14	\$16
Broadcast and wireless communications equipment manufacturing	\$170	0	\$22	\$23
Other communications equipment manufacturing	\$72	0	\$15	\$17
Audio and video equipment manufacturing	\$18	0	\$2	\$2
Bare printed circuit board manufacturing	\$4	0	\$1	\$1
Semiconductor and related device manufacturing	\$105	0	\$19	\$21
Electronic capacitor, resistor, coil, transformer, and other inductor manufacturing	\$10	0	\$2	\$2
Electronic connector manufacturing	\$41	0	\$9	\$9
Printed circuit assembly (electronic assembly) manufacturing	\$3	0	\$0	\$0
Other electronic component manufacturing	\$47	0	\$9	\$9
Electromedical and electrotherapeutic apparatus manufacturing	\$1	0	\$0	\$0
Search, detection, and navigation instruments manufacturing	\$8	0	\$1	\$1
Automatic environmental control manufacturing	\$18	0	\$4	\$4
Industrial process variable instruments manufacturing	\$91	0	\$19	\$20
Electricity and signal testing instruments manufacturing	\$9	0	\$2	\$2
Analytical laboratory instrument manufacturing	\$1	0	\$0	\$0
Irradiation apparatus manufacturing	\$3	0	\$0	\$0
Watch, clock, and other measuring and controlling device manufacturing	\$20	0	\$3	\$3
Software, audio, and video media for reproduction	\$138	0	\$36	\$38
Magnetic and optical recording media manufacturing	\$67	0	\$17	\$18
Lighting fixture manufacturing	\$406	0	\$94	\$166
Small electrical appliance manufacturing	\$65	0	\$12	\$26
Household cooking appliance manufacturing	\$43	0	\$8	\$13
Other major household appliance manufacturing	\$166	0	\$18	\$57
Power, distribution, and specialty transformer manufacturing	\$36	0	\$5	\$10
Motor and generator manufacturing	\$192	0	\$32	\$69
Switchgear and switchboard apparatus manufacturing	\$404	0	\$67	\$147
Relay and industrial control manufacturing	\$176	0	\$32	\$59
Storage battery manufacturing	-\$84	0	-\$14	-\$21
Wiring device manufacturing	\$274	0	\$55	\$106
All other miscellaneous electrical equipment and component manufacturing	\$33	0	\$8	\$12

Automobile manufacturing	\$845	0	\$85	\$121
Light truck and utility vehicle manufacturing	\$585	0	\$55	\$75
Heavy duty truck manufacturing	\$31	0	\$3	\$4
Motor vehicle body manufacturing	\$68	0	\$11	\$14
Truck trailer manufacturing	\$5	0	\$1	\$1
Travel trailer and camper manufacturing	\$37	0	\$9	\$6
Motor vehicle parts manufacturing	\$1,965	0	\$318	\$351
Aircraft manufacturing	\$548	0	\$60	\$93
Aircraft engine and engine parts manufacturing	\$8,761	0	\$1,117	\$1,612
Other aircraft parts and auxiliary equipment manufacturing	\$101	0	\$17	\$23
Railroad rolling stock manufacturing	\$472	0	\$48	\$76
Boat building	\$7	0	\$2	\$2
Motorcycle, bicycle, and parts manufacturing	\$34	0	\$4	\$5
All other transportation equipment manufacturing	\$9	0	\$1	\$2
Wood kitchen cabinet and countertop manufacturing	\$1,894	0	\$566	\$555
Upholstered household furniture manufacturing	\$17	0	\$4	\$6
Nonupholstered wood household furniture manufacturing	\$6	0	\$2	\$3
Metal and other household furniture manufacturing	\$5	0	\$1	\$2
Institutional furniture manufacturing	\$45	0	\$10	\$18
Office Furniture	\$1	0	\$0	\$0
Custom architectural woodwork and millwork manufacturing	\$8	0	\$2	\$3
Showcase, partition, shelving, and locker manufacturing	\$58	0	\$15	\$21
Mattress manufacturing	\$56	0	\$10	\$22
Blind and shade manufacturing	\$10	0	\$3	\$4
Surgical and medical instrument, laboratory and medical instrument manufacturing	\$34	0	\$9	\$12
Surgical appliance and supplies manufacturing	\$167	0	\$41	\$65
Dental equipment and supplies manufacturing	\$7	0	\$2	\$3
Ophthalmic goods manufacturing	\$17	0	\$5	\$6
Dental laboratories manufacturing	\$208	0	\$141	\$151
Jewelry and silverware manufacturing	\$1	0	\$0	\$0
Sporting and athletic goods manufacturing	\$130	0	\$38	\$52
Doll, toy, and game manufacturing	\$125	0	\$20	\$32
Office supplies (except paper) manufacturing	\$40	0	\$11	\$16
Sign manufacturing	\$16,702	0	\$7,424	\$8,344
Gasket, packing, and sealing device manufacturing	\$60	0	\$20	\$21
Musical instrument manufacturing	\$42	0	\$16	\$18
All other miscellaneous manufacturing	\$627	0	\$175	\$227
Broom, brush, and mop manufacturing	\$185	0	\$57	\$85
Wholesale trade businesses	\$780,476	5	\$288,812	\$497,428
Retail Stores - Motor vehicle and parts	\$191,183	3	\$109,719	\$138,256
Retail Stores - Furniture and home furnishings	\$64,966	1	\$25,264	\$40,609
Retail Stores - Electronics and appliances	\$38,782	1	\$21,329	\$26,097
Retail Stores - Building material and garden supply	\$137,343	1	\$56,067	\$91,008
Retail Stores - Food and beverage	\$224,178	3	\$96,417	\$145,014
Retail Stores - Health and personal care	\$81,215	1	\$38,620	\$60,409
Retail Stores - Gasoline stations	\$98,206	1	\$29,538	\$67,078
Retail Stores - Clothing and clothing accessories	\$106,591	2	\$33,747	\$68,766
Retail Stores - Sporting goods, hobby, book and music	\$46,228	1	\$17,468	\$28,487
Retail Stores - General merchandise	\$198,553	4	\$86,581	\$128,655
Retail Stores - Miscellaneous	\$70,743	2	\$36,700	\$53,076

Retail Nonstores - Direct and electronic sales	\$92,615	3	\$19,751	\$66,312
Transport by air	\$77,373	0	\$12,579	\$14,735
Transport by rail	\$3,010,758	5	\$563,431	\$812,826
Transport by water	\$10,693	0	\$831	\$2,248
Transport by truck	\$615,770	5	\$234,831	\$313,306
Transit and ground passenger transportation	\$5,462	0	\$2,083	\$3,018
Transport by pipeline	\$1,359,082	3	\$337,239	\$786,911
Scenic and sightseeing transportation and support activities for transportation	\$233,024	2	\$156,135	\$212,249
Couriers and messengers	\$57,080	1	\$26,121	\$42,543
Warehousing and storage	\$15,051	0	\$8,809	\$12,015
Newspaper publishers	\$289,018	3	\$82,052	\$96,244
Periodical publishers	\$2,699	0	\$654	\$822
Book publishers	\$1,005	0	\$189	\$351
Directory, mailing list, and other publishers	\$2,630	0	\$450	\$1,140
Software publishers	\$689	0	\$159	\$302
Motion picture and video industries	\$20,031	0	\$1,438	\$2,232
Sound recording industries	\$31	0	\$2	\$4
Radio and television broadcasting	\$98,517	1	\$61,019	\$47,545
Cable and other subscription programming	\$8,136	0	\$1,569	\$2,088
Internet publishing and broadcasting	\$4,912	0	\$305	\$965
Telecommunications	\$774,635	2	\$117,825	\$318,206
Data processing, hosting, ISP, web search portals and related services	\$7,448	0	\$1,632	\$2,441
Other information services	\$169,445	1	\$11,141	\$29,344
Monetary authorities and depository credit intermediation activities	\$1,138,548	7	\$311,350	\$816,967
Nondepository credit intermediation and related activities	\$120,509	1	\$50,117	\$78,139
Securities, commodity contracts, investments, and related activities	\$110,564	1	\$44,748	\$45,575
Insurance carriers	\$199,749	1	\$44,118	\$80,632
Insurance agencies, brokerages, and related activities	\$79,290	1	\$32,526	\$41,418
Funds, trusts, and other financial vehicles	\$16,228	0	\$838	\$560
Real estate establishments	\$328,559	2	\$51,249	\$256,406
Imputed rental activity for owner-occupied dwellings	\$1,305,657	0	\$0	\$884,361
Automotive equipment rental and leasing	\$12,102	0	\$2,623	\$5,673
General and consumer goods rental except video tapes and discs	\$12,671	0	\$8,073	\$9,008
Video tape and disc rental	\$2,880	0	\$864	\$1,347
Commercial and industrial machinery and equipment rental and leasing	\$110,259	0	\$23,688	\$45,223
Lessors of nonfinancial intangible assets	\$23,567	0	\$1,194	\$13,947
Legal services	\$608,549	6	\$288,674	\$370,085
Accounting, tax preparation, bookkeeping, and payroll services	\$377,867	5	\$198,243	\$236,712
Architectural, engineering, and related services	\$83,782	1	\$48,294	\$48,974
Specialized design services	\$1,091	0	\$420	\$606
Custom computer programming services	\$12,404	0	\$7,386	\$7,729
Computer systems design services	\$4,634	0	\$4,730	\$3,845
Other computer related services, including facilities management	\$2,478	0	\$1,728	\$2,151
Management, scientific, and technical consulting services	\$46,411	0	\$23,329	\$26,690
Environmental and other technical consulting services	\$71,405	0	\$35,026	\$42,693
Scientific research and development services	\$51,418	0	\$25,209	\$22,428
Advertising and related services	\$128,569	1	\$45,637	\$55,338

Photographic services	\$2,862	0	\$1,185	\$1,852
Veterinary services	\$21,524	0	\$7,842	\$8,584
All other miscellaneous professional, scientific, and technical services	\$34,686	0	\$3,459	\$16,749
Management of companies and enterprises	\$36,711	0	\$15,542	\$21,146
Employment services	\$36,175	1	\$25,805	\$27,855
Travel arrangement and reservation services	\$6,835	0	\$1,987	\$3,939
Office administrative services	\$68,862	1	\$33,915	\$45,178
Facilities support services	\$769	0	\$432	\$471
Business support services	\$69,519	1	\$29,680	\$40,079
Investigation and security services	\$3,488	0	\$2,087	\$2,428
Services to buildings and dwellings	\$239,353	4	\$105,323	\$129,484
Other support services	\$25,968	0	\$8,361	\$17,114
Waste management and remediation services	\$37,936	0	\$8,894	\$14,201
Private elementary and secondary schools	\$1,225	0	\$768	\$790
Private junior colleges, colleges, universities, and professional schools	\$4,436	0	\$1,776	\$1,900
Other private educational services	\$16,064	0	\$5,784	\$7,235
Offices of physicians, dentists, and other health practitioners	\$511,980	4	\$305,798	\$353,874
Home health care services	\$36,220	1	\$20,221	\$25,582
Medical and diagnostic labs and outpatient and other ambulatory care services	\$82,222	0	\$28,943	\$50,582
Private hospitals	\$516,988	5	\$251,982	\$264,586
Nursing and residential care facilities	\$146,323	4	\$92,652	\$96,041
Child day care services	\$44,049	1	\$15,547	\$25,968
Individual and family services	\$71,961	2	\$30,813	\$34,353
Community food, housing, and other relief services, including rehabilitation services	\$24,809	1	\$14,811	\$11,716
Performing arts companies	\$11,809	1	\$2,993	\$3,435
Spectator sports companies	\$968	0	\$249	\$291
Promoters of performing arts and sports and agents for public figures	\$9,872	0	\$1,697	\$2,366
Independent artists, writers, and performers	\$356	0	\$134	\$180
Museums, historical sites, zoos, and parks	\$3,506	0	\$1,811	\$2,108
Fitness and recreational sports centers	\$20,806	1	\$4,953	\$5,351
Bowling centers	\$2,162	0	\$578	\$799
Amusement parks, arcades, and gambling industries	\$39,164	0	\$8,397	\$10,340
Other amusement and recreation industries	\$19,632	0	\$3,614	\$6,391
Hotels and motels, including casino hotels	\$6,357	0	\$2,060	\$3,753
Other accommodations	\$15	0	\$4	\$6
Food services and drinking places	\$1,924,405	38	\$625,564	\$939,605
Automotive repair and maintenance, except car washes	\$112,383	1	\$43,602	\$64,347
Car washes	\$13,558	0	\$4,511	\$7,739
Electronic and precision equipment repair and maintenance	\$26,376	0	\$9,161	\$17,066
Commercial and industrial machinery and equipment repair and maintenance	\$84,712	1	\$26,166	\$55,771
Personal and household goods repair and maintenance	\$3,134	0	\$822	\$1,698
Personal care services	\$27,229	1	\$10,650	\$17,145
Death care services	\$13,069	0	\$6,783	\$7,579
Dry-cleaning and laundry services	\$24,441	1	\$12,666	\$19,129
Other personal services	\$13,113	0	\$2,570	\$7,217
Religious organizations	\$71,069	0	\$14,294	\$36,371
Grantmaking, giving, and social advocacy organizations	\$26,612	1	\$13,615	\$5,647
Civic, social, professional, and similar organizations	\$163,591	4	\$82,256	\$47,893

Private household operations	\$19,802	2	\$17,090	\$19,586
US Postal Service	\$134,251	2	\$109,668	\$101,161
Other Federal Government enterprises	\$3,679	0	\$3,190	\$3,350
State and local government passenger transit	\$993	0	\$883	\$47
State and local government electric utilities	\$25,959	0	\$5,794	\$10,333
Other state and local government enterprises	\$243,108	1	\$59,069	\$77,197

Appendix 2

Basics of Input-Output Modeling

Basics of Input-Output Modeling¹

A simple non-technical discussion of the formulation of input-output (IO) modeling is presented in this section. Similar descriptive treatments are readily available, including Shaffer, Deller and Marcouiller (2004), while more advanced discussions of input-output include Miernyk (1965), and Miller and Blair (1985). As a descriptive tool, IO analysis represents a method for expressing the economy as a series of accounting transactions within and between the producing and consuming sectors. As an analytical tool, IO analysis expresses the economy as an interaction between the supply and demand for commodities. Given these interpretations, the IO model may be used to assess the impacts of alternative scenarios on the region's economy.

Transactions Table

A central concept of IO modeling is the interrelationship between the producing sectors of the region (e.g., manufacturing firms), the consuming sectors (e.g., households) and the rest of the world (i.e., regional imports and exports).² The simplest way to express this interaction is a regional transactions table (Table A1). The transactions table shows the flows of all goods and services produced (or purchased) by sectors in the region. The key to understanding this table is realizing that one firm's purchases are another firm's sales and that producing more of one output requires the production or purchase of more of the inputs needed to produce that product.

The transactions table may be read from two perspectives. Reading down a column gives the purchases by the sector named at the top of the column from each of the sectors named at the left. Reading across a row gives the sales of the sector named at the left of the row to those named at the top. In the illustrative transaction table for a fictitious regional economy (Table A1), reading down the first column shows that the agricultural firms buy \$10 worth of their inputs from other agricultural firms. The sector also buys \$4 worth of inputs from manufacturing firms and \$6 worth from the service industry. Note that agricultural firms also made purchases from non-processing sectors of the economy, such as the household sector (\$16) and imports from other regions (\$14).³ Purchases from the household sector represent value added, or income to people in the form of wages and investment returns. In this example, agricultural firms purchased a total of \$50 worth of inputs.

Reading across the first row shows that agriculture sold \$10 worth of its output to agriculture, \$6 worth to manufacturing, \$2 worth to the service sector. The remaining \$32 worth of agricultural output was sold to households or exported out of the region. In this case \$20 worth of agricultural output was sold to households within the region and the remaining \$12 was sold to firms or households outside the region. In the terminology

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² A "region" is defined here as a functioning economic area. This could be as large as multiple states such as the Great Plains states or as small as a specific county.

³ Note that government has not been entered into the table. If government were to be introduced, payments would be in the form of taxes.

of IO modeling, \$18 = (\$10+\$6+\$2) worth of agricultural output was sold for intermediate consumption, and the remaining \$32 = (\$20+\$12) worth was sold to final demand. Note that the transactions table is balanced: total agricultural output (the sum of the row) is exactly equal to agricultural purchases (the sum of the column). In an economic sense, total outlays (column sum, \$50) equal total income (row sum, \$50), or demand exactly equals supply. This is true for each sector.

Table A1. Illustrative Input-Output Transactions Matrix

Processing Sectors (Sellers)	Purchasing Sectors (Demand)			Final Demand		Total Output
	Agr.	Mfg.	Serv.	HH	Exports	
Agriculture	\$10	\$6	\$2	\$20	\$12	\$50
Manufacturing	\$4	\$4	\$3	\$24	\$14	\$49
Services	\$6	\$2	\$1	\$34	\$10	\$53
Households	\$16	\$25	\$38	\$1	\$52	\$132
Imports	\$14	\$12	\$9	\$53	\$0	\$88
Total Inputs	\$50	\$49	\$53	\$132	\$88	\$372

The transactions table is important because it provides a comprehensive picture of the region's economy. Not only does it show the total output of each sector, but it also shows the interdependencies between sectors. It also indicates the sectors from which the region's residents earn income as well as the degree of openness of the region through imports and exports. In this example households' total income, or value added for the region is \$132 (note total household income equals total household expenditure), and total regional imports is \$88 (note regional imports equals regional exports). More open economies will have a larger percentage of total expenditures devoted to imports. As discussed below, the "openness" of the economy has a direct and important impact on the size of economic multipliers. Specifically, more open economies have a greater share of purchases, both intermediate and final consumption purchases, taking the form of imports. As new dollars are introduced (injected from exports) into the economy they leave the economy more rapidly through leakages (imports).

Direct Requirements Table

Important production relationships in the regional economy can be further examined if the patterns of expenditures made by a sector are stated in terms of proportions. Specifically, the proportions of all inputs needed to produce one dollar of output in a given sector can be used to identify linear production relationships. This is accomplished by dividing the dollar value of inputs purchased from each sector by total expenditures. Or, each transaction in a column is divided by the column sum. The resulting table is called the direct requirements table (Table A2).

The direct requirements table, as opposed to the transactions table, can only be read down each column. Each cell represents the dollar amount of inputs required from the industry named at the left to produce one dollar's worth of output from the sector named at the top. Each column essentially represents a 'production recipe' for a dollar's worth of output. Given this latter interpretation, the upper part of the table (above households) is often referred to as the matrix of technical coefficients. In this example, for every dollar of sales by the agricultural sector, 20 cents worth of additional output from itself, 8 cents

of output from manufacturing, 12 cents of output from services, and 32 cents from households will be required.

Table A2. Illustrative Direct Requirements Matrix

Processing Sectors (Sellers)	Purchasing Sectors (Demand)		
	Agr.	Mfg.	Serv.
Agriculture	\$0.20	\$0.12	\$0.04
Manufacturing	\$0.08	\$0.08	\$0.06
Services	\$0.12	\$0.04	\$0.02
Households	\$0.32	\$0.51	\$0.72
Imports	\$0.28	\$0.24	\$0.17
Total Inputs	\$1.00	\$1.00	\$1.00

In the example region, an additional dollar of output by the agricultural sector requires firms in agriculture to purchase a total of 40 cents from other firms located in the region. If a product or service required in the production process is not available from within the region, the product must be imported. In the agricultural sector, 28 cents worth of inputs are imported for each dollar of output. It is important to note that in IO analysis, this production formula, or technology (the column of direct requirement coefficients), is assumed to be constant and the same for all establishments within a sector regardless of input prices or production levels.

Assuming the direct requirements table also represents spending patterns necessary for additional production, the effects of a change in final demand of the output on the other of sectors can be predicted. For example, assume that export demand for the region's agricultural products increases by \$100,000. From Table A2, it can be seen that any new final demand for agriculture will require purchases from the other sectors in the economy. The amounts shown in the first column are multiplied by the change in final demand to give the following figures: \$20,000 from agriculture, \$8,000 from manufacturing, and \$12,000 from services. These are called the direct effects and, in this example, they amount to a total impact on the economy of \$140,000 (the initial change [\$100,000] plus the total direct effects [\$40,000]). For many studies of economic impact the direct and initial effects are treated as the same although there are subtle differences.

The strength of input-output modeling is that it does not stop at this point, but also measures the indirect effects of an increase in agricultural exports. In this example, the agricultural sector increased purchases of manufactured goods by \$8,000. To supply agriculture's new need for manufacturing products, the manufacturing sector must increase production. To accomplish this, manufacturing firms must purchase additional inputs from the other regional sectors.

Continuing our \$100,000 increase in export demand for a region's agricultural products, for every dollar increase in output, manufacturing must purchase an additional 12 cents of agricultural goods ($\$8,000 \times .12 = \960), 8 cents from itself ($\$8,000 \times .08 = \640), and 4 cents from the service sector ($\$8,000 \times .04 = \320). Thus, the impact on the economy from an increase in agricultural exports will be more than the \$140,000 identified previously. The total impact will be \$140,000 plus the indirect effect on manufacturing totaling \$1,920 ($\$960 + \$640 + \320), or \$141,920. A similar process examining the service sector increases the total impact yet again by \$1,440 ($[\$12,000 \times .04] + [\$12,000 \times .06] + [\$12,000 \times .02] = \$1,440$).

The cycle does not stop, however, after only two rounds of impacts. To supply the manufacturing sectors with the newly required inputs, agriculture must increase output again, leading to an increase in manufacturing and service sector outputs. This process continues until the additional increases drop to an insignificant amount. The total impact on the regional economy, then, is the sum of a series of direct and indirect impacts. Fortunately, the sum of these direct and indirect effects can be more efficiently calculated by mathematical methods. The methodology was developed by the Noble winning economist Wassily Leontief and is easily accomplished in computerized models.

Total Requirements Table

Typically, the result of the direct and indirect effects is presented as a total requirements table, or the Leontief inverse table (Table A3). Each cell in Table A3 indicates the dollar value of output from the sector named at the left that will be required in total (i.e., direct plus indirect) for a one dollar increase in final demand for the output from the sector named at the top of the column. For example, the element in the first row of the first column indicates the total dollar increase in output of agricultural production that results from a \$1 increase in final demand for agricultural products is \$1.28. Here the agricultural multiplier is 1.28: for every dollar of direct agricultural sales there will be an additional 28 cents of economic activity as measured by industry sales.

An additional, useful interpretation of the transactions table, as well as the direct requirements and total requirements tables, is the measure of economic linkages within the economy. For example, the element in the second row of the first column indicates the total increase in manufacturing output due to a dollar increase in the demand for agricultural products is 12 cents. This allows the analyst to not only estimate the total economic impact but also provide insights into which sectors will be impacted and to what level.

Highly linked regional economies tend to be more self-sufficient in production and rely less on outside sources for inputs. More open economies, however, are often faced with the requirement of importing production inputs into the region. The degree of openness can be obtained from the direct requirements table (Table A2) by reading across the imports row.⁴ The higher these proportions are the more open the economy. By definition, as imports increase the values of the direct requirement coefficients will decline. It follows then that the values making up the total requirements table, or the multipliers, will be smaller. In other words, more open economies have smaller multipliers due to larger imports. The degree of linkage can be obtained by analyzing the values of the off-diagonal elements (those elements in the table with a value of less than one) in the total requirements table. Generally, larger values indicate a tightly linked economy, whereas smaller values indicate a looser or more open economy.

Table A3. Illustrative Total Requirements Matrix

⁴ As described above, the openness of the economy can also be discussed in terms of leakages; greater leakages translate into a more open economy.

Processing Sectors (Sellers)	Purchasing Sectors (Demand)		
	Agr.	Mfg.	Serv.
Agriculture	\$1.28	\$0.17	\$0.06
Manufacturing	\$0.12	\$1.11	\$0.07
Services	\$0.16	\$0.17	\$1.03
Total Inputs	\$1.56	\$1.35	\$1.16

Input-Output Multipliers

Through the discussion of the total requirements table, the notion of external changes in final demand rippling throughout the economy was introduced.⁵ The total requirements table can be used to compute the total impact a change in final demand for one sector will have on the entire economy. Specifically, the sum of each column shows the total increase in regional output resulting from a \$1 increase in final demand for the column heading sector. Retaining the agricultural example, an increase of \$1 in the demand for agricultural output will yield a total increase in regional output equal to \$1.56 (Table A3). This figure represents the initial dollar increase plus 56 cents in direct and indirect effects. The column totals are often referred to as output multipliers.

The use of these multipliers for policy analysis can prove insightful. These multipliers can be used in preliminary policy analysis to estimate the economic impact of alternative policies or changes in the local economy. In addition, the multipliers can be used to identify the degree of structural interdependence between each sector and the rest of the economy. For example, in the illustrative region, a change in the agriculture sector would influence the local economy to the greatest extent, while changes in the service sector would produce the smallest change.

The output multiplier described here is perhaps the simplest input-output multiplier available. The construction of the transactions table and its associated direct and total requirements tables creates a set of multipliers ranging from output to employment multipliers.

The complete set includes:

<u>Type</u>	<u>Definition</u>
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1. Output Multiplier. The output multiplier for industry *i* measures the sum of direct and indirect requirements from all sectors needed to deliver one additional dollar unit of output of *i* to final demand.
2. Income Multiplier. The income multiplier measures the total change in income throughout the economy from a dollar unit change in final demand for any given sector.

⁵ Economic impact analysis is an attempt to model the impacts that an economic change has on regions. Input-output analysis specifies this economic change, most commonly, as a change in final demand for some product. Economists sometimes might refer to this as the "exogenous shock" applied to the system. Simply stated, this is the manner in which we attempt to introduce an economic change.

3. Employment Multiplier. The employment multiplier measures the total change in employment due to a one unit change in the employed labor force of a particular sector.

The income multiplier represents a change in total income (employee compensation plus proprietary income plus other property income plus indirect business taxes) for every dollar change in income for any given sector. The employment multiplier represents the total change in employment resulting from the change in employment in any given sector. Thus, we have three ways that we can describe the change in final demand.

Consider for example a cattle feeder operation that has \$1 million in sales (industry output), pays labor \$100,000 inclusive of wages, salaries and retained profits, and employs three workers including the farm proprietor. Suppose that demand for cattle produced at this operation increased 10 percent, or \$100,000 dollars. We could use the traditional output multiplier to determine what the total impact on output would be. Alternatively, to produce this additional output the farmer may find that they need to hire a part-time worker. We could use the employment multiplier to examine the impact of this new hire on total employment in the economy. In addition, the income paid to labor will increase by some amount and we can use the income multiplier to see what the total impact of this additional income will have on the larger economy.

But how are these income and employment multipliers derived if the IO model only looks at the flow of industry expenditures (output)? In the strictest sense, the IO does not understand changes in employment or income, only changes in final demand (sales or output). To do this we use the fact that the IO model is a “fixed proportion” representation of the underlying production technologies. This is perhaps most clear by reexamining the direct requirements table (Table A2). For every dollar of output (sales) inputs are purchased in a fixed proportion according to the production technology described by the direct requirements table. For every dollar of output there is a fixed proportion of employment required as well as income paid. In our simple cattle feeder example, for every dollar of output there are $.000003 = (3 \div 1,000,000)$ jobs and $$.10 = (100,000 \div 1,000,000)$ in income. We can use these fixed proportions to convert changes in output (sales) into changes in employment and income.

Graphically, we can illustrate the round-by-round relationships modeled using input-output analysis. This is found in Figure A1. The direct effect of change is shown in the far left-hand side of the figure (the first bar (a)). For simplification, the direct effect of a \$1.00 change in the level of exports, the indirect effects will spillover into other sectors and create an additional 66 cents of activity. In this example, the simple output multiplier is 1.66. A variety of multipliers can be calculated using input-output analysis.

While multipliers may be used to assess the impact of changes on the economy, it is important to note that such a practice leads to limited impact information. A more complete analysis is not based on a single multiplier, but rather, on the complete total requirements table.

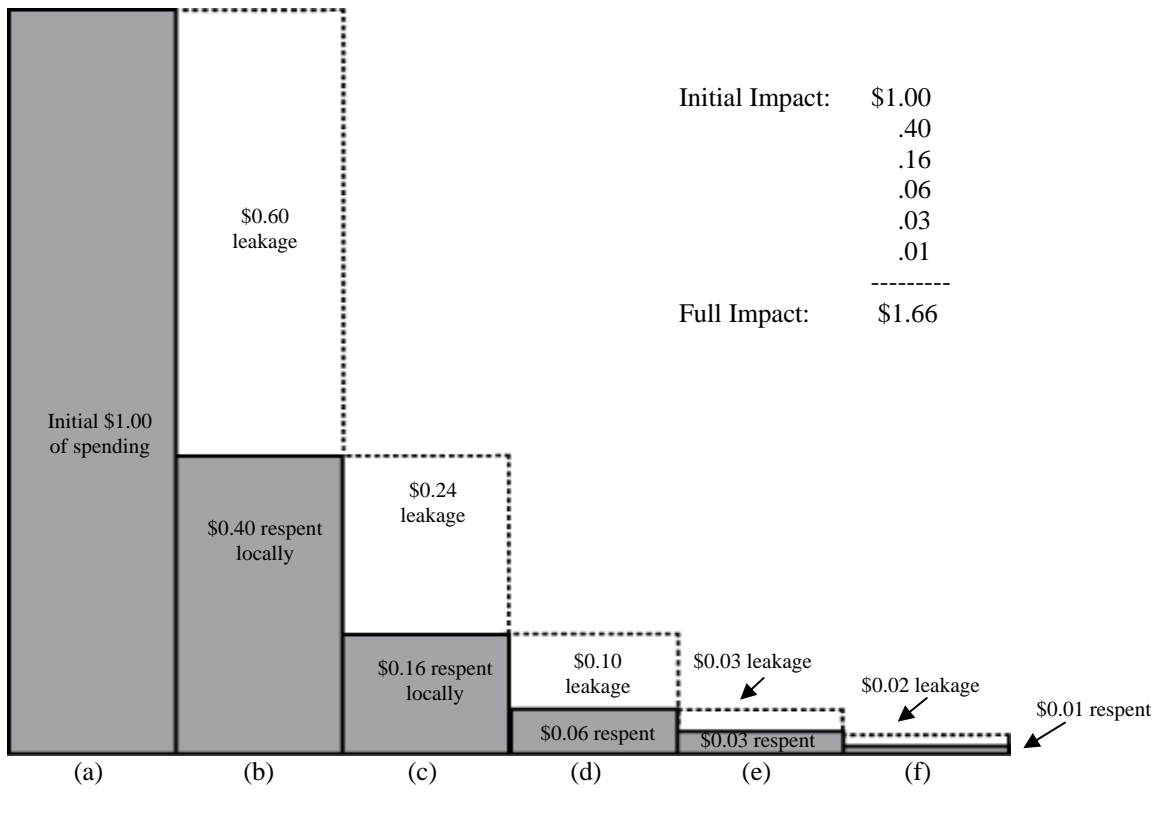


Figure A1. Multipliers and the round-by-round impacts estimated using input-output analysis

Initial, Indirect and Induced Effects

The input-output model and resulting multipliers described up to this point presents only part of the story. In this construction of the total requirements table (Table A3) and resulting multipliers the production technology does not include labor. In the terminology of IO modeling, this is an “open” model. In this case, the multiplier captures only the initial effect (initial change in final demand or the initial shock) and the impact of industry to industry sales. This latter effect is called the indirect effect and results in a Type I multiplier. A more complete picture would include labor in the total requirements table. In the terminology of IO modeling, the model should be “closed” with respect to labor. If this is done, we have a different type of multiplier, specifically a Type II multiplier, which is composed of the initial and indirect effects and also what is called the induced effects.

The Type II multiplier is a more comprehensive measure of economic impact because it captures industry to industry transactions (indirect) and also the impact of labor spending income in the economy (induced effect). In the terminology of IO analysis an “open” model where the induced effect is not captured, any labor or proprietor income that may be gained (positive shock) or lost (negative shock) is assumed to be lost to the economy. In our simple cattle feeder example, any additional income (wages, salaries and profits) derived from the change in output (sales) is pocketed by labor and is not respent in the economy. This clearly is not the case: any additional income resulting from

more labor being hired (or fired) will be spent in the economy generating an additional round of impacts. This second round is referred to as the induced impact.

Insights can be gained by comparing and contrasting the indirect and induced effects. For example, industries that are more labor intensive will tend to have larger induced impacts relative to indirect. In addition, industries that tend to pay higher wages and salaries will also tend to have larger induced effects. By decomposing the Type II multiplier into its induced and indirect effects one can gain a better understanding of the industry under examination and its relationship to the larger economy.

Extensions to Social Accounting Matrix Analysis

While IO analysis focuses exclusively on the producing sectors of the economy, social accounting matrix (SAM) analysis tracks all monetary flows in the region. Thus, a SAM represents a much more comprehensive accounting system than IO. In capturing non-market financial flows (government transfers, pension, saving, etc.) as well as the market transactions, the SAM provides a more complete indication of the changes associated with an economic event or policy. The SAM retains the essential structure and assumptions of the IO system, but expands the accounting to comprehensively track all financial transactions in the region.