

Quantifying Project Flying Eagle's potential economic impacts in Wisconsin

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Executive summary

EY was retained by a Fortune 50 global manufacturer (the “Company”) who is currently conducting a site selection search for their proposed investment within the United States. Wisconsin has been identified as a potential location for this proposed investment, which will be referred to throughout this report as “Project Flying Eagle” or the “Project”.

As part of the engagement, EY has been commissioned to estimate the potential economic impacts in Wisconsin that would result from the construction and operations of a proposed generation 10.5 LCD fabrication facility, related Liquid Crystal Module (LCM) assembly and final TV assembly operations (Fab 818). This analysis estimated economic and tax effects related to: (1) temporary impacts related to Project development (capital expenditures) and (2) the ongoing annual impacts from Project operations. Table ES-1 summarizes the estimated economic and tax impacts.

One-time impacts from capital expenditures: The proposed construction of a new Fab 818 facility in Wisconsin will generate economic impacts over the anticipated four-year construction period. These impacts result from spending on construction services and Wisconsin-sourced materials and equipment. These impacts are described as “one-time” because they do not recur.

- The Project will require an estimated \$10.00 billion of capital investment to construct and equip the facility.
- Of this, an estimated \$5.70 billion will be for construction and equipment sourced from within Wisconsin (direct economic output). This direct spending, along with the related indirect and induced economic activity will support an average of **16,205 construction and related jobs in Wisconsin** over the 4-year construction period (direct, indirect, and induced effects).
- Project capital investment will support a one-time shock of **\$9.34 billion in sales for Wisconsin businesses (total economic output over four years)**.
- The anticipated \$5.57 billion of direct construction expenditures will account for 60% of the estimated total business sales shock. This spending will support an average of 10,145 direct jobs on-site during each year of construction.¹
- Over the period, direct employees at construction contractors and Wisconsin equipment manufacturers will earn an estimated **\$2.44 billion in direct labor income**.
- **Capital investments will generate nearly \$500 million in state and local tax revenues for Wisconsin governments.** Of this total, an estimated \$154 million will be state and local sales taxes on construction materials.²

Ongoing operating impacts: The Project’s operations will support jobs and incomes in Wisconsin on an ongoing basis. The estimated impacts reflect the anticipated annual operations of the Fab 818 facility, once fully-operational (stabilized operations).³

- The project will directly employ 13,000 workers in Wisconsin, once fully operational.
- **Project employees will earn an average of \$73,500 in total compensation, including estimated wages, overtime, and benefits.**⁴ Base wages will average \$53,875.

¹ Estimated construction costs provided by Project management were calibrated to reflect average cost differentials for construction labor and materials in Wisconsin.

² Assumes a 0.5% local sales tax rate. Does not include use taxes on equipment.

³ The operational impacts reflect the operations of the Fab 818 panel facility, L5, and LCM + Set.

⁴ This analysis is based on the headcount distribution, by occupation, provided by Project management and median wages (50th percentile) for each occupation from the Economic Research Institute (ERI).

- **The Fab 818 facility’s operations will support over 35,245 jobs throughout Wisconsin.** This includes jobs at Project Flying Eagle as well as jobs related to Project suppliers (indirect jobs) and businesses that sell to Project and supplier employees (induced jobs).
- **The estimated indirect employment impacts include 400 jobs at a glass manufacturer that would be co-located with the Project.**
- **Based on current information, the Project will result in a 2.7x multiplier on direct employment.** This multiplier can be interpreted as: for every 10 direct jobs, 17 additional jobs will be supported elsewhere in the state through indirect and induced economic activity – 27 jobs total.⁵
- The total (direct, indirect, and induced) impact on **state economic output will be an estimated \$11.11 billion, nearly half of which (47%) will be state GDP (\$5.22 billion).**
- Fab 818 facility operations **will support an estimated \$181 million in state and local tax revenues** annually through indirect and induced economic activity and taxes paid by Project employees on their incomes, purchases, and property.⁶

Table ES-1. Summary of Project Flying Eagle’s potential economic impacts in Wisconsin
Millions of 2017 dollars

	Direct impact	Indirect & induced impacts	Total impact
Temporary impact of Fab 818 construction			
<i>Totals over a 4-year construction period</i>			
Average annual employment	10,234	5,972	16,205
Worker years	40,935	23,887	64,822
Labor income	\$2,441	\$1,169	\$3,609
GDP	\$3,008	\$2,010	\$5,019
Economic output	\$5,695	\$3,644	\$9,340
State & local taxes	\$376	\$121	\$498
Ongoing impact of Fab 818 operations			
<i>Estimated annual impact once fully-phased in</i>			
Employment	13,000	22,245	35,245
Labor income	\$956	\$1,112	\$2,068
GDP	\$3,361	\$1,859	\$5,219
Economic output	\$7,625	\$3,481	\$11,106
State & local taxes (incl. only direct employee taxes and all indirect/induced taxes)	\$65	\$115	\$181

*The direct tax impact from Fab 818 operations does not include estimates of business taxes that would be paid by the Project; **Note:** Figures may not appear to sum due to rounding. Worker years are equivalent to the number of jobs lasting an average of one year each; **Source:** EY analysis using the IMPLAN input-output multiplier model of Wisconsin and data provided by Project Flying Eagle management.

⁵ On average, Wisconsin semiconductor and other electronic component manufacturers currently operating in the state have employment multipliers between 1.8 and 4.3 based on the IMPLAN input-output model of Wisconsin.

⁶ Estimated tax impacts from operations do not include estimates of the businesses taxes that may be paid by the Project.

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Glossary of key terms

- ▶ **Backward linkage:** Links an industry to its suppliers or a household (an institution) and the producers of household goods and services.
- ▶ **Direct coefficients:** For each dollar outlay for a given industry, the amount used for purchase of goods and services from each industry sector modeled.
- ▶ **Economic output:** Economic output is the broadest measure of economic activity and includes value added and total intermediate input purchases (supplier purchases). For most industries, economic output is equivalent to total revenues (production value).
- ▶ **Employment:** Headcount (full- and part-time workers). Estimated employment includes self-employed persons.
- ▶ **Gross Domestic Product (GDP):** GDP, or value added, includes labor income, indirect business taxes, consumption of fixed capital (depreciation), and mixed income.
- ▶ **Indirect effects:** Indirect effects are related to purchases from in-state suppliers and the subsequent rounds of supplier purchases in the state economy.
- ▶ **Induced effects:** Induced effects are related to household consumption spending by direct and indirect employees.
- ▶ **Input-output accounts:** The accounting of all current money flows from and to (outlays and outputs) industries and institutions located within the region.
- ▶ **Labor income:** All wages, salaries, and benefits (including employer-paid payroll tax/social insurance) received by employees. Labor income includes earnings of proprietors (self-employed income).
- ▶ **Project Flying Eagle:** Refers to the potential LCD fabrication facility, including the Fab 818 panel facility, L5, and LCM + set components.
- ▶ **RPC (Regional purchase coefficients):** The share of goods and services purchased from in-state suppliers.
- ▶ **Taxes:** The estimated tax contribution includes all major state and local taxes (e.g. corporate and individual income, sales and excise, and local property taxes).

Quantifying Project Flying Eagle's potential economic impacts in Wisconsin

Overview

The Company is in the process of deciding the future location within the United States of two thin-film-transistor liquid crystal display ("TFT LCD") fabrication facilities which will reinvigorate American electronic manufacturing in the 3C industry (computer, communication, and consumer electronics) and attract additional investment from suppliers, competitors and other industry participants. Additionally, the Company is locating in the United States to be closer to their existing customer base and to further penetrate existing markets.

The two proposed facilities, one generation 6 facility and one generation 10.5 facility, would produce 8K substrate glass and would assist the US in being the first adopter of this front-edge 3C manufacturing. 8K substrate glass is used in the highest ultra-high definition resolution available (superior to the resolution of a human eye) and represents the cutting edge of digital imaging technology.

EY was commissioned by the Company to estimate the ongoing direct, indirect, and induced economic benefits related to the construction of the new generation 10.5 Fabrication 818 (Fab 818) facility in Wisconsin. This analysis considers impacts related to:

- (1) **One-time (temporary) impacts of capital investment** – the construction of the proposed Fab 818 facility will temporarily support workers in Wisconsin, primarily in the construction sector.
- (2) **Ongoing (annual) impacts of Fab 818 facility operations** – Operations of the proposed Fab 818 facility will support ongoing jobs and incomes in Wisconsin.

This study estimates three types of economic effects related to Fab 818 facility construction and operations:

- **Direct effects** include the jobs, income, and operating expenditures of the Fab 818 facility, as well as the on-site construction contractors. See Figure 1 for further explanation.
- **Indirect (supplier) economic effects** are the result of the Fab 818 facility's purchases from local suppliers (e.g., technology, furniture, stationary, utilities, etc.) and the subsequent rounds of supplier purchases in the state economy.
- **Induced (employee spending) economic contributions** are related to employee household spending. Project and supplier employees will use a portion of their incomes to purchase goods and services from businesses in Wisconsin. These transactions support employment at businesses such as retailers, restaurants, and service companies.

The direct, indirect, and induced impacts are expressed in terms of five indicators:

- **Economic output:** Economic output is the broadest measure of economic activity and includes GDP and intermediate input purchases. For the proposed Fab 818 facility, economic output is equivalent to total revenues.
- **Gross Domestic Product (GDP):** GDP, or value added, is a component of economic output and includes labor income, payments to capital, and indirect taxes.
- **Labor income:** Labor income is a component of GDP and includes total employee compensation (value of wages and benefits) and proprietor income.
- **Employment:** Employment reflects the total number of full- and part-time jobs (headcount), and not full-time equivalent positions. The analysis assumes that the 13,000 Direct Project jobs will be full time positions.
- **State and local taxes:** Estimates include individual and corporate income taxes, sales and excise taxes, and local property taxes. Only income, property, and sales taxes paid by direct Project employees are included as direct taxes. Direct taxes do not include estimates of taxes paid by the Project.

Figure 1. Economic impact drivers

	Temporary impacts related to Project development	Ongoing impacts related to Project operations
Direct effect	Project development will temporarily support construction contractor and manufacturer jobs & incomes	Project employment, employee compensation, and production
Indirect effect	Purchases from in-state construction companies and equipment manufacturers will support jobs & incomes at these businesses' suppliers	Purchases from in-state businesses will support jobs and incomes at suppliers
Induced effect	Sales by businesses to employees support local service sector jobs & incomes	Sales by businesses to employees support local service sector jobs & incomes

Study limitations

The accompanying analyses were prepared for the use of Project Flying Eagle management. The analyses conducted in this report constitute neither an examination nor a compilation of prospective financial statements nor the application of agreed-upon procedures thereto in accordance with the attestation standards established by the American Institute of CPAs (AICPA). Accordingly, EY does not express an opinion on or offer any other assurances as to whether the analyses are presented in conformity with AICPA presentation guidelines or as to whether the underlying assumptions provide a reasonable basis for the analyses.

The reader should be aware of the following model limitations and assumptions when interpreting the results:

- Information on projected capital investments and facility operations (revenues, employment, and non-labor operating costs) were provided by Project management. EY has not independently validated this information.
- Indirect economic impacts were estimated based on relationships in the IMPLAN input-output model. The IMPLAN industry multipliers were chosen to most closely resemble the mix of activities related to the proposed Fab 818 facility but may be different in some cases. Wisconsin multipliers estimated by IMPLAN reflect the availability of supplier goods and services as well as differences in the operating profile for businesses currently operating in Wisconsin.
- In general, indirect and induced tax impacts are estimated based on statewide averages for all industries and households. These estimates do not incorporate industry-specific tax rates, exemptions, or bases.
- Direct state sales and use taxes on construction materials were estimated based on the applicable statutory tax rates (5% state; 0.5% local), assuming 50% of construction expenditures are on taxable materials.
- The analysis does not quantify downstream impacts related to potential future substrate sales. In reality, new businesses may choose to locate or expand within the state as a result of newly-locally-available technology.
- The economic impacts presented in this study (including employment and labor income) reflect the work location. These are jobs that will be based in Wisconsin and could be filled by residents or non-residents.

One-time economic impacts related to construction

The significant investment to construct the proposed Fab 818 facility will temporarily support jobs and incomes in Wisconsin. These contributions are referred to as “one-time” effects because they do not recur.

Overview of Project development:

- The Project will require an estimated \$10.00 billion of capital investment to construct and equip the facility. Of this, an estimated \$5.70 billion will be for construction and equipment sourced from within Wisconsin (direct economic output). Purchases from Wisconsin vendors will support additional economic activity in the state.
- The anticipated \$5.57 billion of direct construction expenditures will support an average of 10,145 direct jobs at construction contractors during each year of construction.⁷ Every \$10 million of construction investment will support 73 temporary construction-sector jobs and 42 additional related temporary jobs through indirect and induced economic activity.
- Over the period, direct employees at construction contractors and Wisconsin equipment manufacturers will earn an estimated \$2.44 billion in direct labor income – averaging \$59,600 in total compensation per direct job per year.
- The Project or construction contractor will pay an estimated \$154 million of state and local sales taxes on construction materials.⁸

Key highlights of the one-time economic impacts:

- Direct Project expenditures, along with the related indirect and induced economic activity will support an average of 16,205 construction and related jobs per year in Wisconsin over the 4-year construction period (direct, indirect, and induced effects).
- Project capital investment will support a one-time shock of \$9.34 billion in sales for Wisconsin businesses (total economic output over four years). Direct construction expenditures account for 60% of the estimated total business sales shock.
- Of the total state economic output impact, \$5.02 billion will be Wisconsin GDP, averaging \$1.25 billion per year. The GDP impact includes \$902 million of labor income per year earned by direct, indirect, and induced employees working in Wisconsin.
- Capital investments will generate \$498 million in state and local tax revenues.
- Including indirect and induced effects in Wisconsin and throughout the state, construction of the proposed Fab 818 facility will support an average of 16,205 jobs per year – totaling 64,822 “worker years.” Worker years are the total number of jobs lasting an average of one year each. These jobs include construction contractors and engineers, as well as employees at construction material suppliers.

⁷ Estimated construction costs provided by Project management were calibrated to reflect average cost differentials for construction labor and materials in Wisconsin.

⁸ Assumes a 0.5% local sales tax rate.

Table 1. One-time statewide impacts of Project Flying Eagle planned capital investments
Millions of 2017 dollars

	Direct	Indirect	Induced	Total
	<i>Construction contractors & equipment suppliers</i>	<i>Payments made to suppliers</i>	<i>Businesses selling to direct & indirect employees</i>	<i>Total one-time impact</i>
Average annual employment	10,234	1,737	4,235	16,205
Worker years	40,935	6,947	16,940	64,822
Labor income	\$2,441	\$433	\$735	\$3,609
GDP	\$3,008	\$677	\$1,333	\$5,019
Economic output	\$5,695	\$1,309	\$2,335	\$9,340

Note: Figures may not appear to sum due to rounding. Worker years are equivalent to the number of jobs lasting an average of one year each.

Source: EY analysis using the IMPLAN input-output multiplier model and data provided by Project management.

Table 2. Estimated state and local tax impacts of planned capital investments, by tax type
Millions of 2017 dollars

	Direct	Indirect	Induced	Total
State taxes				
Sales & excise taxes*	\$181	\$12	\$21	\$214
Individual income	\$67	\$12	\$20	\$99
Corporate income	\$9	\$2	\$3	\$13
Other state taxes	\$13	\$2	\$4	\$19
Total state taxes	\$269	\$28	\$47	\$344
Statewide local taxes				
Property taxes	\$90	\$16	\$27	\$132
Other local taxes	\$18	\$1	\$2	\$21
Total local taxes	\$107	\$17	\$29	\$153
Total state & local taxes	\$376	\$45	\$76	\$498

*Includes estimated sales taxes on construction materials. The analysis does not estimate any potential sales and use taxes on equipment.

Note: Figures may not appear to sum due to rounding.

Source: EY analysis using the IMPLAN input-output multiplier model and data provided by Project management.

Ongoing economic impacts related to Fab 818 facility operations

Contributions related to operations provide a snapshot of the continual economic impacts of the proposed Fab 818 facility. The estimated impacts reflect the anticipated annual operations of the Fab 818 facility, once fully-operational (stabilized operations), based on information provided by Project management and certain assumptions by EY.

Overview of Project operations:

- The Project's direct impacts can be described in terms of economic value generated through its annual production (direct economic output) and economic value distributed through its payments to Wisconsin suppliers, employees, and governments.
- **Economic value generated:** The Project will produce \$7.63 billion of gross economic output per year, once fully operational, assuming a capacity of six million assembled televisions per year.
- **Economic value distributed:**
 - **Employment:** The project will directly employ 13,000 workers in Wisconsin, once fully operational.
 - **Wages:** Project employees will earn an average of \$73,500 in total compensation, including estimated wages, overtime, and benefits.⁹ This includes base wages of \$53,875. The direct labor income impact will be \$956 million per year.
 - **Supplier purchases:** The project is expected to purchase \$4.26 billion of non-labor operating inputs annually. Of this, an estimated one-third will be sourced from within Wisconsin, based on trade relationships in the IMPLAN model including locally-sourced raw materials and other inputs.
 - **Taxes:** The analysis estimates that Project employees will pay \$65 million per year in state and local taxes on their incomes, purchases, and property.

Key highlights of the economic impacts:

- **Employment multiplier:** Based on current information, the Project will result in a 2.7x multiplier on direct employment. This multiplier can be interpreted as: for every 10 direct jobs, 17 additional jobs will be supported elsewhere in the state through indirect and induced economic activity – 27 jobs total.
 - On average, Wisconsin semiconductor and other electronic component manufacturers currently operating in the state have employment multipliers between 1.8 and 4.3.
 - This finding is in line with the overall average employment multiplier for the Wisconsin manufacturing sector.¹⁰

⁹ This analysis is based on the headcount distribution, by occupation, provided by Project management and median wages for each occupation from the Economic Research Institute (ERI).

¹⁰ Average of the employment multipliers for all IMPLAN manufacturing sectors in Wisconsin weighted by employment is 2.7.

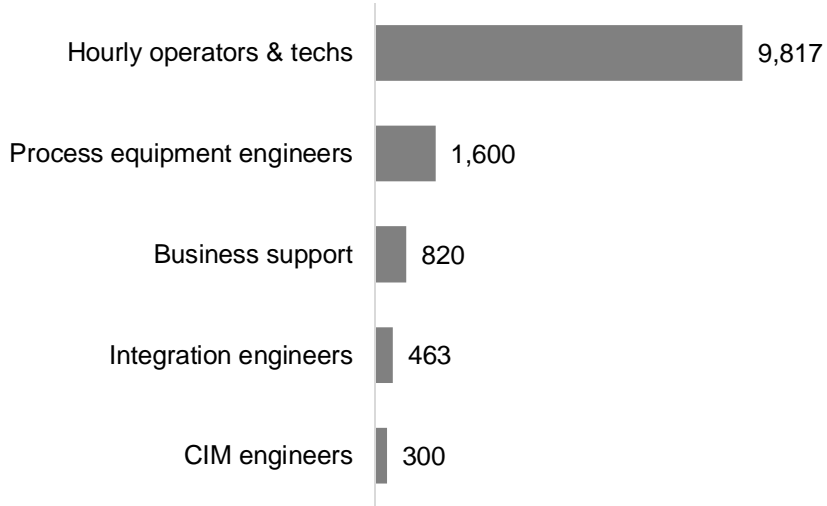
- **Total job impact:** The Fab 818 facility's operations will support more than 35,000 jobs throughout Wisconsin. This includes jobs at Project Flying Eagle as well as jobs related to Project suppliers (indirect jobs) and businesses that sell to Project and supplier employees (induced jobs).
- **Job impact, by sector:** The Fab 818 facility will not only support direct manufacturing jobs, but also in other sectors as a result of the indirect and induced effects (Figure 4).
 - One-third of the total job impact is supported through the indirect effect, totaling 11,453 indirect jobs statewide at businesses that will sell goods and services to the Project. The estimated indirect employment impacts include 400 jobs at a glass manufacturer that would be co-located with the Project.
- **Economic output and GDP:** The total (direct, indirect, and induced) impact on state economic output will be an estimated \$11.11 billion, nearly half of which (47%) will be state GDP (\$5.22 billion).
- **Taxes:** Fab 818 facility operations will support an estimated \$115 million in state and local tax revenues annually through indirect and induced economic activity.

Table 3. Ongoing statewide impacts of Project Flying Eagle annual operations
Millions of 2017 dollars

	Direct	Indirect	Induced	Total
	<i>Project operations</i>	<i>Fab 818 facility suppliers</i>	<i>Businesses selling to employees</i>	<i>Total annual impact</i>
Employment	13,000	11,453	10,792	35,245
Labor income	\$956	\$643	\$469	\$2,068
GDP	\$3,361	\$1,005	\$854	\$5,219
Economic output	\$7,625	\$1,984	\$1,497	\$11,106

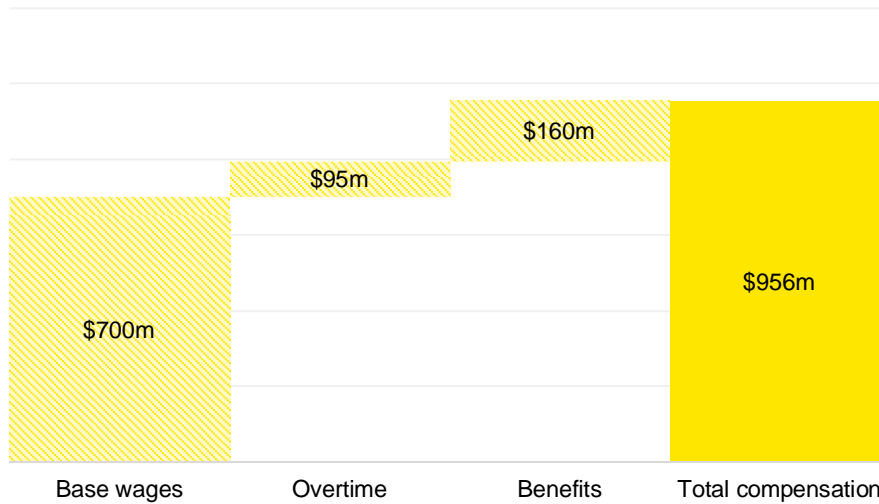
Note: Figures may not appear to sum due to rounding.
 Source: EY analysis using the IMPLAN input-output multiplier model.

Figure 2. Projected Project Flying Eagle employment, by function
Total direct employment = 13,000



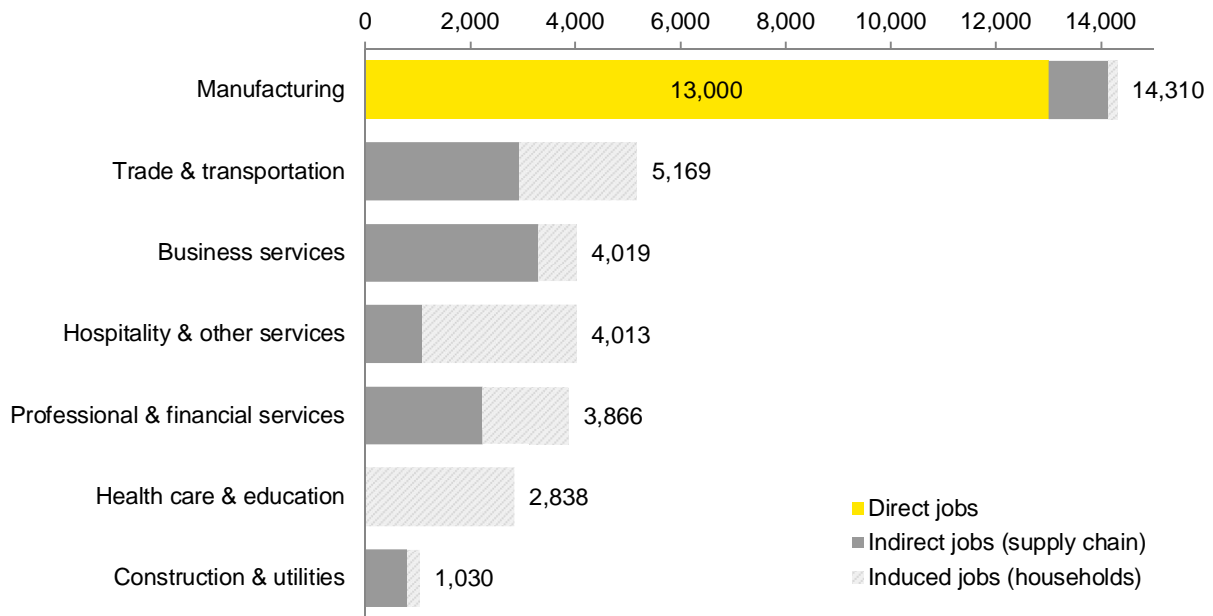
Source: Data provided by Project management.

Figure 3. Projected Project Flying Eagle employee compensation, by component
Real 2017 Dollars



Note: Figures may not appear to sum due to rounding.
 Source: Data provided by Project management; EY analysis.

Figure 4. Distribution of direct, indirect, and induced employment, by sector
Total employment impact = 35,245



Source: EY analysis using the IMPLAN input-output multiplier model.

Table 4. Estimated state and local tax impacts of Project operations, by tax type
Millions of 2017 dollars

	Direct: Project	Direct: Employees	Indirect	Induced	Total
State taxes					
Individual income	TBD	\$26	\$18	\$13	\$57
Corporate income	TBD	\$0	\$2	\$2	\$4
Sales & excise taxes	TBD	\$16	\$18	\$13	\$47
Other state taxes	TBD	\$2	\$3	\$2	\$8
Total state taxes	TBD	\$44	\$41	\$30	\$116
Statewide local taxes					
Property taxes	TBD	\$20	\$24	\$17	\$60
Other local taxes	TBD	\$2	\$2	\$1	\$4
Total local taxes	TBD	\$21	\$25	\$18	\$65
Total state & local taxes	TBD	\$65	\$67	\$49	\$181

Note: Figures may not appear to sum due to rounding.

Source: EY analysis using the IMPLAN input-output multiplier model.

Appendix – Study methodology

The estimated economic and tax contributions presented in this study are based on information regarding the proposed Fab 818 facility's potential investments and operations, provided the client's management or estimated by EY. The state economic and tax impacts related to this activity were estimated using the regional Economic Impact Analysis for Planning (IMPLAN) input-output economic models for Wisconsin, which describe relationships between businesses, households, and governments within the state. This model follows flows of purchases as purchases of local goods by companies and employees support sales, jobs, and tax revenues. IMPLAN is used by the public sector as well as private-sector businesses and other researchers and is based on widely accepted methodology for estimating these types of economic linkages.

The magnitude of each economic effect is described in terms of an economic multiplier. The multipliers in the IMPLAN model are based on the Leontief matrix, which estimates the total economic requirements for every unit of direct output in a given industry using detailed inter-industry relationships documented in the input-output model. The input-output framework connects commodity supply from one industry to commodity demand by another. The multipliers estimated using this approach captures all of the upstream economic activity (or backward linkages) related to an industry's production by attaching technical coefficients to expenditures. These output coefficients (dollars of demand) are then translated into dollars of GDP and labor income and number of employees based on industry averages.

In general, estimated tax impacts are estimated based on the historical relationship between state tax collections (by tax type) to economic activity (measured as personal income). This ratio estimates the effective tax rates for each tax type as a share of total personal income. This approach assumes that direct Project employees and taxes from the indirect and induced activity will generate taxes at the statewide effective rate on economic activity.

Figure A-1 outlines the relationships between the key inputs (including source information), the stages of analysis, and the final outputs and results that are described in this report.

Figure A-1. Diagram of analysis inputs, intermediate results, and outputs

