Appendix C: Just Transition Working Group Recommendations to the Council on Measures to Minimize the Carbon Leakage Risk and Minimize Anti-Competitiveness Impacts of Potential Carbon Policies and Energy Sector Mandates

In its transition to a net zero greenhouse gas (GHG) emission economy, the State must also consider the issue of GHG emissions "leakage." Under the Climate Act, leakage is defined as, "A reduction in emissions of greenhouse gases in the state that is offset by an increase in emissions of greenhouse gases outside of the state." The concept of leakage is important given the fact that climate change is a global problem, whereas the State's policy authority is confined to activities within its borders.

New policies that increase the cost of energy, reduce the reliability of energy, or increase the cost of emitting GHGs could cause businesses to shift their production outside of New York, or avoid the State altogether, and instead invest in out-of-state locations with lower energy and/or GHG emission costs.

The problems caused by leakage are twofold. First, the state experiences a loss of jobs, investment, and tax revenues (economic leakage). Second, when businesses leave or avoid the state to operate in jurisdictions with less stringent clean energy or GHG emission policies, the likely end result would be an increase of emissions over the level that would have been allowed had the business remained in New York, thereby actually worsening global emissions.[1] In sum, mitigating leakage risk is of interest to the State for both climate and economic reasons, which is further demonstrated by the Climate Act requirements related to mitigating anti-competitive impacts and for the emission reduction regulations ultimately adopted by the New York State Department of Environmental Conservation (DEC) to incorporate measures to minimize emissions leakage.[2]

In general, industries most at risk of leakage include those that consume the most energy (and emit the most GHGs) and are most vulnerable to trade, often referred to as "energy-intensive and trade-exposed"

[1] The inverse of this scenario is also true – it would be possible for New York State to increase its own industrial emissions on an absolute basis, while actually lowering global emissions by creating an environment in which more emission-intensive production activities are shifted to New York and undertaken in a lower-emitting production environment. For example, New York State could displace the production of older, emissions-intensive steel overseas with the in-state production of less emissions-intensive, electric arc furnace-produced steel that is made with clean energy.

[2] See Environmental Conservation Law 75-0103(8)(d) and (f); 75-0109(3)(e).

(EITE) industries. The Scoping Plan does not define a formal list of industries that should be considered EITE as it relates to State policies, but, in New York, some EITE industries are likely to be in manufacturing-related industries that produce goods like cement, glass, primary metals, gases, and semiconductors.

As the State implements the Scoping Plan, it will need to carefully monitor the potential for unintended emission and economic leakage. The following represents a more detailed analysis related to the risk of leakage and potential measures to mitigate the risk of leakage.

Measures to Mitigate the Risk of Leakage in EITE Industries

Under the Climate Act, State agencies will be required to promulgate rules and regulations to ensure compliance with the statewide emissions reduction limits. To mitigate the risk of economic and emissions leakage, governments that implement large-scale industrial emission-reduction regimes tend to design such systems with special accommodations for EITE industries. For example, jurisdictions that otherwise assign a price per ton of carbon-dioxide equivalent (CO_2e) emitted (e.g., a cap-and-invest system) might provide emission allowances at no cost to EITE emitters (State of California) while other systems may compensate certain industries for some of the cost of their carbon liability (Australia).[3]

In cases where the primary risk of leakage is not an emissions price but the cost of energy, similarly, policies can also be designed to reduce the cost of energy for EITE industries, such as through discounted electricity rates.[4] Within New York, certain industries are similarly supported with low-cost hydropower or power proceed allocations from the New York Power Authority (NYPA), or with discount programs offered by utilities who are seeking to add more price-sensitive industrial energy consumers to their portfolios.

The Scoping Plan includes both of those potential sources of leakage. To the extent that the strategies in this Plan will lead to increased energy costs, the Plan identifies mitigation strategies that would proactively reduce the risk of leakage in EITE industries by relying on incentive-oriented approaches such

[3] While border adjustments (fees on imports and rebates to exports that are meant to create a level playing field when regulations vary across jurisdictions) are theoretically an option, they are generally considered to face significant legal and technical challenges under international trade laws. California 2010 Cap-and-Trade regulation, Appendix K at 33.

[4] Minnesota provides special discounted EITE electric rates but not in the context of an emissions reduction or control policy. The rates are available to certain industrial companies that are "uniquely exposed to global competitive pressures." *Minnesota Power makes competitive rate filing to help protect jobs in NE Minnesota*, Minnesota Power Press Release, June 30, 2016.

as financial and technical assistance programs and low-carbon procurement incentives, as described in more detail in the *Chapter 14. Industry*.

As discussed in the *Statewide and Cross-Sector Policies* section of the Scoping Plan, implementation of an economywide cap-and-invest program would reduce emissions and provide funding to support other programs. If industrial sources are included, mechanisms should be identified to mitigate the risk of leakage from such policy. First, New York could participate in a regional program that provides a common carbon price across the region. New York already participates in the Regional Greenhouse Gas Initiative (RGGI) and it could participate in another regional program as part of a multi-sector or economywide strategy. Second, the policy could be designed to provide free allowances to such facilities in any cap-and-invest program. The free allocation could be output-based and be based on benchmarking of more efficient, lower emission sources in the industry.

In the future, as DEC or other State agencies promulgate rules and regulations to achieve the statewide emissions reduction limits, the State should consider the strategies discussed in the *Chapter 7. Just Transition*, to mitigate the risk of leakage in EITE industries posed by any emission mandates that may threaten significant emissions leakage in industry.

Analysis to Identify Energy-Intensive Industries and Related Trades

This analysis is being provided per the Climate Act, which requires that the Just Transition Working Group (JTWG), among its other responsibilities, "identify energy-intensive industries and related trades…"[5] The report was prepared by staff to the JTWG in consultation with the EITE Industries Advisory Panel.

The analysis herein relies on a combination of publicly available Federal and State data sources to assess the energy intensity, emissions intensity, and trade intensity of all U.S. industries in the manufacturing and mining, quarrying, and oil and gas extraction sectors, as well as the New York State employment and occupational characteristics of the most intensive sectors.

[5] ECL § 75-0103.

A primary objective of this analysis was to determine which industries and occupations in New York may be most energy-intensive and trade-exposed, as a proxy for assessing which industries may be least and most at risk of emissions leakage in association with any future energy or GHG emission mandates.

This report presents information on the most energy-, emissions- and trade-intensive U.S. industries, as well as the presence of those industries in New York. It also includes recommendations in the event that the State elects to adopt an EITE definition in the future.

Background on Emissions Leakage

In the context of the Scoping Plan, new policies that increase the cost of energy, reduce the reliability of energy, or increase the cost of emitting GHGs could cause businesses that consume a lot of energy and/or emit a lot of GHG emissions to shift their production outside of New York, or avoid the State altogether, and instead invest in out-of-state locations with lower energy and/or GHG emission costs.

As an example, consider a scenario in which the State adopted new energy sector mandates that increased the total cost of energy by 20%. If a steel producer is currently spending 10% of its total costs on energy, it would now experience a 2% increase in its total costs. Because steel is generally sold as a global commodity with limited profit margins, the State's steel industry would be limited in its ability to raise its prices (without being displaced by competitors' cheaper substitutes) and, as a result, would experience a commensurate loss in profitability associated with its cost increases. With the in-state manufacturer unable or less able to profitably make steel in the state and sell it at globally competitive prices, the industry may shift more of its production to other jurisdictions with lower energy and/or GHG emission compliance costs where it could more profitably make steel.

Background on Energy Intensive and Trade Exposed (EITE) Industries

This section explains the meaning of EITE industries in greater detail.

1. Energy-Intensive Industries

Energy-intensive industries consume a high amount of energy (such as electricity and combustion fuels) as a share of their economic output. In general, energy intensity is measured by comparing an industry's energy expenditures as a percentage of its revenues. When the cost of energy increases, energy-intensive sectors will experience the greatest relative cost increases – for example, if the cost of electricity increases by 10%, an industry for which electricity is 10% of its costs of production will see its total costs increase

by 1%, whereas an industry for which electricity is 1% of the cost of production would see its total costs increase by only 0.1%.

2. Emissions-Intensive Industries

Emissions-intensive industries are those that emit a high amount of GHG emissions relative to the value of their economic output. Industries may produce GHG emissions either directly - such as from the on-site combustion of fossil fuels or from on-site chemical reactions that occur within industrial processes - or indirectly, such as by consuming electricity that was produced by the combustion of fossil fuels offsite. When climate policies are enacted that increase the price of GHG emissions, emissions-intensive industries generally will bear the greatest relative cost increases as a share of their total costs of operation, as with energy-intensive industries.[3]

3. Trade-Exposed Industries

Trade-exposed (or trade-intensive) industries are producers in highly competitive markets where customers are sensitive to prices. Trade exposure is often measured by the extent to which products are bought and sold across jurisdictional boundaries (e.g., agricultural commodities), as opposed to more captive industries (e.g., hospitals). Trade-exposed industries have limited ability to charge higher prices because their customers have access to numerous competitive substitutes and will tend to shift their purchases to the lowest-cost producers.

4. "EITE Industries"

EITE industries are those that are both "EI" (energy and/or emissions-intensive) and "TE" (trade-exposed), or those most impacted by increases to the costs of energy or emissions, as well as those least able to pass along any such increased costs to their consumers through higher prices. As a result, EITE industries are generally considered to be those most at risk of leakage.

The risk of leakage for non-EITE industries is much lower. Industries that are "trade-exposed" will still be minimally at risk of leakage from increased energy costs if they spend only a small percentage of their total revenues on energy. Similarly, industries that are energy- or emission-intensive but not trade-exposed will generally be less impacted by increased costs if they can pass the added costs along to consumers in the form of price increases, thereby minimizing the impact on profit.

Methods Used to Identify Energy-Intensive Industries in New York State

This section of the report is a summary of the methods used to identify energy-intensive, emissions-intensive, and trade-intensive industries and related trades in New York State. Methods used were based on a review of five jurisdictions' approaches and methodologies to calculating energy intensity and related measures (California, Canada, European Union, United States and Australia). A clear focus was placed on the Californian[6] and United States' American Clean Energy and Security Act (ACES)[7] methodologies as being the most applicable for New York State, and the methodology described herein was based primarily on the ACES method with New York State-specific adjustments. Calculations were performed by staff based in part on data compiled by The Cadmus Group LLC.

1. Classification of Industries

In assembling a taxonomy of industries to assess for EITE characteristics, staff relied on the 2017 list of industries included in the North American Industry Classification System (NAICS), which is published by the U.S. Census Bureau at http://census.gov/naics.

NAICS is a detailed industry classification system that includes numerical codes, written descriptions and lists of sample activities for over 1,000 different industries across North America. It was first developed between the United States, Canada, and Mexico to enable the three countries to directly compare industrial production statistics and has been used by the U.S. Census Bureau since 1997. Due to the significant availability of statistics for each NAICS industry, the system is frequently and widely used to classify and analyze industries by government authorities, policymakers, and researchers.

Staff selected NAICS for classifying industries for several reasons, including:

- Due to the widespread use of NAICS for compiling other statistics, NAICS is the only industrial classification system for which the necessary data is available to assess industry-by-industry activities such as energy consumption, emissions, and trade relative to their economic activity.
- Many businesses and industries are already familiar with their own NAICS code due to being required to list it on tax filings and related documents, which will make it easier for businesses to understand their industry's intensities based on their NAICS code.

[6] See: California Air Resources Board, Leakage Analysis: 2010 Regulation, Appendix K to the Initial Statement of Reasons.

[7] For additional details, see *The Effects of H.R. 2454 on International Competitiveness and Emission Leakage in Energy-Intensive Trade-Exposed Industries: An Interagency Report Responding to a Request from Senators Bayh, Specter, Stabenow, McCaskill, and Brown*, December 2, 2009.

- NAICS was also used for EITE analysis by the U.S., California, and Canada, allowing New York State to compare its results more easily against those of other jurisdictions.
- Relying on NAICS as a classification system will allow the State to measure industries in other ways, such as their number of jobs and firms, where they are located.

Specifically, staff examined the intensities of all industries with NAICS codes falling within the Manufacturing (31- to 33-) or Mining, Quarrying, and Oil and Gas Extraction (23-) sectors.

2. Identification of Measures for Assessment

Based on a review of other jurisdictions' precedent EITE industry definitions and available data, staff developed working definitions of each metric.

A. Energy Intensity

Energy intensity was defined as the ratio of an industry's energy consumption relative to its size, or economic activity. The numerator contains the proxy for the amount of energy used, and the denominator contains the proxy for amount of economic activity. The result of this ratio represents, in general, how much an industry spends on energy as a percentage of its total revenues. The formula for assessing energy intensity was established as follows:

$$\% \text{ Energy Intensity} = \frac{\$ \text{ Electricity Expenditures} + \$ \text{ Fuel Expenditures}}{\$ \text{ Value of Shipments, Sales, or Revenues}}$$

B. GHG Emissions Intensity

GHG emissions intensity was defined as the ratio of an industry's GHG emissions produced relative to its size, or economic activity. The numerator contains the proxy for the amount or cost of emissions, and the denominator contains the proxy for amount of economic activity. Emissions is the sum of GHG emissions from direct on-site fuel combustion, direct non-combustion industrial processes, and indirect emissions from the use of electricity. The formula for assessing GHG emissions intensity was established as follows:

$$\% \text{ GHG Emissions Intensity} = \frac{\text{Emissions } (tCO_2e) \times \$ \text{ Value of Carbon}}{\$ \text{ Value of Shipments, Sales, or Revenues}}$$

C. Trade Intensity / Trade Exposure

Trade intensity, or trade exposure, was defined as the ratio of an industry's cross-border trade activity relative to its total market size, or domestic production plus imports. The numerator contains the proxy for the measurement of trade, and the denominator contains the proxy for total market size. The working formula for assessing trade exposure was established as follows:

$$\% \text{ Trade Intensity} = \frac{\$ \text{ Imports} + \$ \text{ Exports}}{\$ \text{ Value of Shipments, Sales, or Revenues} + \$ \text{ Imports}}$$

3. Methods of Calculation for Intensities by Industry

To collect the necessary data and calculate each industry's intensities, staff followed the procedures outlined below.

A. Calculation of Energy Intensity

Staff used the Annual Survey of Manufacturers and the U.S. Economic Census reports, employing the most appropriate NAICS codes as unique identifiers, to calculate the energy intensity of Manufacturing and Mining, Quarrying, and Oil and Gas Extraction sectors in the United States. Using the sum of dollars spent on electricity and fuel divided by the total value of shipments, for each of these sectors, staff calculated the energy intensity of each industry as dollars spent over value of shipments.

B. Calculation of Emissions Intensity

Staff calculated emissions intensity based on the sum of each industry's direct combustion emissions, indirect electricity emissions, and direct non-combustion process emissions. Estimates for each emissions type was calculated as follows:

- Direct combustion emissions*:* Using primarily the fuel consumption data found in the 2018 U.S. Energy Information Administration (EIA) Manufacturers Energy Consumption Survey (MECS) report, staff calculated the emissions from direct combustion for each industry in Manufacturing and Mining at the six-digit NAICS code level. Where NAICS codes at the six-digit level were not available from the EIA MECS report, staff followed the alternative methods employed under the ACES approach as outlined by the U.S. Environmental Protection Agency (EPA).[8]

[8] U.S. Environmental Protection Agency Office of Air & Radiation. *Estimation of Eligible Sectors and Emissions under H.R. 2454*, February 23, 2010.

- Indirect electricity emissions: Using primarily the electricity consumption data found in the EIA MECS report, staff calculated the emissions from indirect electricity use for each Manufacturing and Mining, Quarrying, and Oil and Gas Extraction industry. Where NAICS codes at the six-digit level were not available in this report, staff followed the alternative methods employed under the ACES approach as outlined by the U.S. EPA.[9]

- Non-combustion process emissions: Staff reviewed the EPA GHG Inventory Team's methodology for calculating emissions from direct industrial processes. Based on this review, staff employed two methods for calculating direct emissions from industrial processes for each industry, using available data in the following order of priority:

    - Method 1: Takes the total value of shipments to estimate production weight and applies process emission factors to the estimated weight. The process emission factors are dependent upon production weight, which is estimated at the 6-digit NAICs level by dividing the total expenditures by a 2018 price per unit.
    - Method 2: Where Method 1 was insufficient, the total process emissions from the 2009 ACES report were divided by the then dollar value of shipments, and the same factor was applied to the 2018 dollar value of shipments.

Finally, staff calculated emissions intensity for each industry by summing together all three emission estimates and multiplying it by the New York State Value of Carbon ($125), then dividing the product by the industry's value of shipments.

C. Calculation of Trade Intensity

Staff compiled data on international trade for each industry at the six-digit NAICS level. Trade intensity was calculated as the sum of imports and exports divided by the sum of value of shipments and imports for each industry.

D. Addressing Data Gaps

Where information was not available at the six-digit NAICS level, staff sought to estimate the most accurate intensity possible by, first, seeing if such data was available under an alternative data source,[10] and/or, second, by identifying the highest digit NAICS code-level for which all data was available, and

[9] *Ibid.*

[10] For example, where data for a manufacturing industry was unavailable under the Annual Survey of Manufacturers, Staff generally reviewed the Economic Census to determine if data existed at the six-digit level.

then subtracting out any known lower-digit levels to produce the most accurate estimate possible for each six-digit NAICS industry.[11]

Methods Used to Identify Related Trades in New York State

Related trades were identified based on the simple compilation of data, with minor exceptions.

1. Method to Identify New York State Jobs, Establishments, and Worker Wages

The number of New York State jobs, establishments, and quarterly worker wages for each six-digit NAICS industry was estimated based on one of two methods, in order of priority, based on data availability:

- Method 1: Relies on the total number of jobs in New York State for each six-digit NAICS industry as per the Quarterly Census of Employment and Wages (QCEW), Q3, 2020, as per the New York State Department of Labor (DOL).
- Method 2: Where QCEW data was not able to be employed due to data confidentiality and suppression issues, for such industries, staff relied on data estimates from a third-party provider, EMSI, and used the most recent data available at each six-digit NAICS industry, Q2, 2020.

To calculate Annualized Average Worker Wages, an industry's total wages for the quarter were annualized by multiplying them by four and then divided by the number of total New York State jobs for that industry.

2. Method to Identify the Top New York State Occupations or Related Trades

Based on the aforementioned analyses, staff identified the top New York State occupations across the following categories of U.S. industries:

- All Manufacturing Industries
- All Mining and Natural Resource Industries
- Top 30 Energy-Intensive Industries

[11] By way of example, if two 6-digit codes lacked adequate data for an intensity calculation at the U.S. Industry level, Staff would then review whether data existed at the 5-digit code level. If data was still suppressed or unavailable, Staff would calculate intensity at the 4-digit code level. In some cases, certain 6-digit code data was available, while other 6-digit codes under the same 4-digit code were unavailable; in these cases, Staff would begin with the 4-digit code totals and then subtract out the known 6-digit code totals, to produce a more accurate imputed estimate of the intensity of any missing 6-digit code(s).

- Top 30 Emissions-Intensive Industries
- Top 30 Trade-Intensive Industries

The source for identifying the occupational data was the DOL Occupational Employment Statistics (OES) survey, 2016-2019.

Results of Energy, Emissions, and Trade Intensity Analysis

The exhibits attached to this appendix summarize the results of the staff's identification of energy-intensive industries and related trades, as well as the identification of emissions-intensive and trade-intensive industries. Below are some key highlights:

- **Manufacturing and Mining sector businesses span the state:** Businesses in these sectors are located nearly everywhere except for natural preserves such as the Adirondacks (Figure C-1).
- **Most potential EITE sector jobs are in the Manufacturing sector:** Overall, New York State has approximately 440,000 jobs in Manufacturing occupations, but only about 8,000 jobs in Mining and related sector occupations (Tables C-2 and C-3). Together, both sectors represent only about 9% of the State's roughly 8 million total private sector jobs in the state.
- **A small number of U.S. industries exhibit the greatest energy intensities:** Out of the 388 industries analyzed in the Manufacturing and Mining, Quarrying, and Oil and Gas Extraction sectors, only 41 industries had energy intensity over 5%, and only 10 of the 388 industries had energy intensity above 10%.
- **Most New York State jobs are not in the most leakage-prone industries:** While Manufacturing and Mining and Natural Resource occupations together represent nearly 450,000 jobs, only about 9,000 of these jobs are in occupations within the top 30 most energy-intensive and emission-intensive industries, suggesting that a small share of the overall sector is likely to be at the highest risk of leakage (Figure C-5). Additionally, 364,000 of the 404,000 sector jobs (90%) have energy-intensity of less than 2.5 percent, and 18 of the top 20 largest New York State Manufacturing and Mining sector industries have energy intensity of less than 2%.
- **The largest New York State industries that may be most prone to leakage appear to be in primary metals, chemicals, cement, glass, paper and semiconductor industries:** In examining Manufacturing and Mining, Quarrying, and Oil and Gas Extraction industries with at least 450 jobs and 2.5% energy intensity (an arbitrary threshold, see Figure C-13), the largest industry is Semiconductor and Related Device Manufacturing (7,200 jobs, 3.6% energy

intensity), followed by Paper (Except Newsprint) Mills (3,800 jobs, 6% energy intensity). However, the most energy-intensive industries with at least 450 jobs appear to be Alumina Refining and Primary Aluminum Production (500 jobs, 16.9% energy intensity), Industrial Gases Manufacturing (1,300 jobs, 15.4% energy intensity) and Cement Production (500 jobs, 14.8% energy intensity).

Considerations for a Definition of EITE Industries in New York State

As described earlier, governments that enact significant emission reduction policies have historically identified EITE industries and sought to take specific measures intended to reduce the risk of emissions and economic leakage. However, the Scoping Plan does not contain provisions for a carbon tax or industry-specific allowance price that might present a much greater risk of leakage to EITE industries and thus require more dramatic special accommodations. Nonetheless, in the future, if State energy sector or emission mandates threaten significant emissions leakage in industry, the State may wish to finalize an approach for which industries and business operating locations will be designated as EITE, as well as what benefits will be conferred for an industry's EITE status. This section outlines additional considerations for such a definition.

A. Considering the Benefits of an Industry Receiving an EITE Classification

At least as important as finalizing an approach to classify EITE industries will be determining what accommodation or benefit an EITE status would confer. Here, any benefits assigned to EITE industries should be carefully targeted to ameliorate the specific leakage risk that would otherwise be created. For example, if the primary leakage risk stems from increased electricity prices, the State should identify ways to lower electricity costs for EITE industries. Similarly, if a leakage risk stems from a limited emission allowance, then the State should consider differentiated allowances for EITE industries.

B. Considering Criteria to Use when Qualifying "EITE" Status

While energy and emissions intensity historically have been closely aligned, energy intensity becomes a less accurate indicator of GHG emission intensity as the electric system becomes cleaner and energy users employ new and innovative ways to use energy more efficiently. To this end, the State should consider using the measures of energy intensity and trade exposure to qualify as EITE when acting to mitigate the risk of leakage due to any energy cost increases, and emissions intensity and trade exposure to qualify as EITE when acting to mitigate the risk of leakage due to emission compliance cost increases. Alternatively, if the State imposes measures based on the carbon content or an industry's products or

some other regime, then the approach for identifying EITE industries may need to be adapted or modified as well, such as by measuring carbon intensity.

To this end, it is worth observing that different jurisdictions achieved markedly different results in identifying EITE industries under their systems, as shown below.[12]

Characteristic under EITE Definition	U.S. (ACES)	California	Canada
EITE Qualification Criteria*	a) >5% Energy or Emissions Intensity; and >15% Trade-Exposed; OR b) >20% Energy or Emissions Intensity	High Risk of Leakage = Emissions >1,000 tCO2e per $USD million of value added; and Trade Exposure >19%	Medium or High Risk of Leakage = a) ≥1% Emissions Intensity; and ≥10% Trade-Exposed; OR b) ≥3% Emissions Intensity; OR C) >80% Trade Exposed
EITE Industries	35	61	109

C. Assessing the Risk of Leakage Due to Intrastate Trade Exposure

New York – as with all U.S. states – must be concerned not only with international trade exposure, as contemplated by the U.S., European Union, Australian, and Canadian definitions, but also with interstate trade exposure to leakage. The barriers to moving across state lines are much lower than those involved with moving across international borders. California's cap-and-trade program accounts for domestic competition by setting the thresholds for classifying sectors as emissions intensive somewhat lower than what would be used in a national program. Similarly, New York State should consider whether any industries that appear less trade-intensive based on international commerce may still be "TE" as it relates to the risk of interstate leakage.

D. Selecting EITE Measures for which Data is Available

In finalizing the measures to be used when assessing whether an industry will qualify as EITE, as well as how frequently EITE status is re-assessed, data availability should be considered. As described previously, even when relying on a widely used industry classification system and national-level data sources, staff still was required to identify methodological remedies to address data gaps. To this end, any EITE definition should either rely on existing and available data or else provide for the collection of the

[12] American Clean Energy and Security Act of 2009, H.R. 2545 ("ACES"); State of California 2010 Cap-and-Trade regulation, Appendix K; Government of Canada Voluntary Participation Policy for Output-Based Pricing System (2018). In addition to the general criteria set forth herein, a number of approaches to identifying industries at risk of leakage also contain provisions for more detailed eligibility considerations to be applied on a case-by-case basis. *See, e.g.*, ACES (characterizing industries that exceed the standard thresholds as only "presumptively eligible").

new data required to support its implementation. For example, because the State of California already had a robust state-level industry GHG emission reporting system, it was able to calculate its in-state emissions intensity with a much higher degree of fidelity. The industry GHG emissions reporting system noted in *Chapter 14. Industry* would be an example of an improved GHG emissions reporting system.

E. Assessing Industries in Other Sectors for EITE Status

The working approach to identifying EITE industries used in this report was limited to an analysis of the Manufacturing and Mining, Quarrying, and Oil and Gas Extraction sectors. However, other sectors may also be vulnerable to business leakage. New York State may wish to expand its analysis to other sectors and industries to discern whether other industries may also be vulnerable to leakage due to a combination of energy and/or emissions intensity and trade exposure, such as certain greenhouse-based agriculture operations or data centers. Additionally, if the State imposes any industry-specific emission reduction or energy policies in other areas, such as trade-exposed aspects of the Transportation sector, then that sector may also merit additional analysis.

F. Assigning EITE Status to Specific Economic Activities within an Industry

In some cases, it is possible that the State may wish to go even further than the approximately 1,000 industries included in the NAICS system and make EITE determinations at an even more granular level of detail. As an example, as it relates to steel production, California's cap-and-trade system exempted only facilities using an electric arc furnace, but not facilities using older and more emissions-intensive production methods. In addition, it is possible that the State might identify economic activities carried out by businesses that are EITE in the context of broader industries for which the aggregate of activities are not, on average, EITE.

G. Assigning Differentiated Benefits Based Relative Intensity/Exposure

Rather than applying a binary designation of a sector as EITE or non-EITE, the State may wish to further classify sectors based on tiers. For example, assigning certain benefits to only those industries that are High Emissions Intensity and High Trade Exposure, even if a High Emissions Intensity and Moderate Trade Exposure industry would ordinarily be thought of as "EITE." If an EITE definition was promulgated for use by other state agencies, when designing programs for EITEs, each agency could exercise discretion in identifying the tiers appropriate for different benefits.

H. Aligning State Efforts with Federal Policy

Due to the failure of the ACES legislation to become law, staff did not identify any active Federal designations of EITE industries. However, in the event that the federal government implements stringent emissions or energy policies in the future, or policies designed to mitigate leakage risk among EITE industries, then such policy changes could require changes to any state EITE definitions or benefits in force.

I. Developing Procedures for Verification of EITE Status

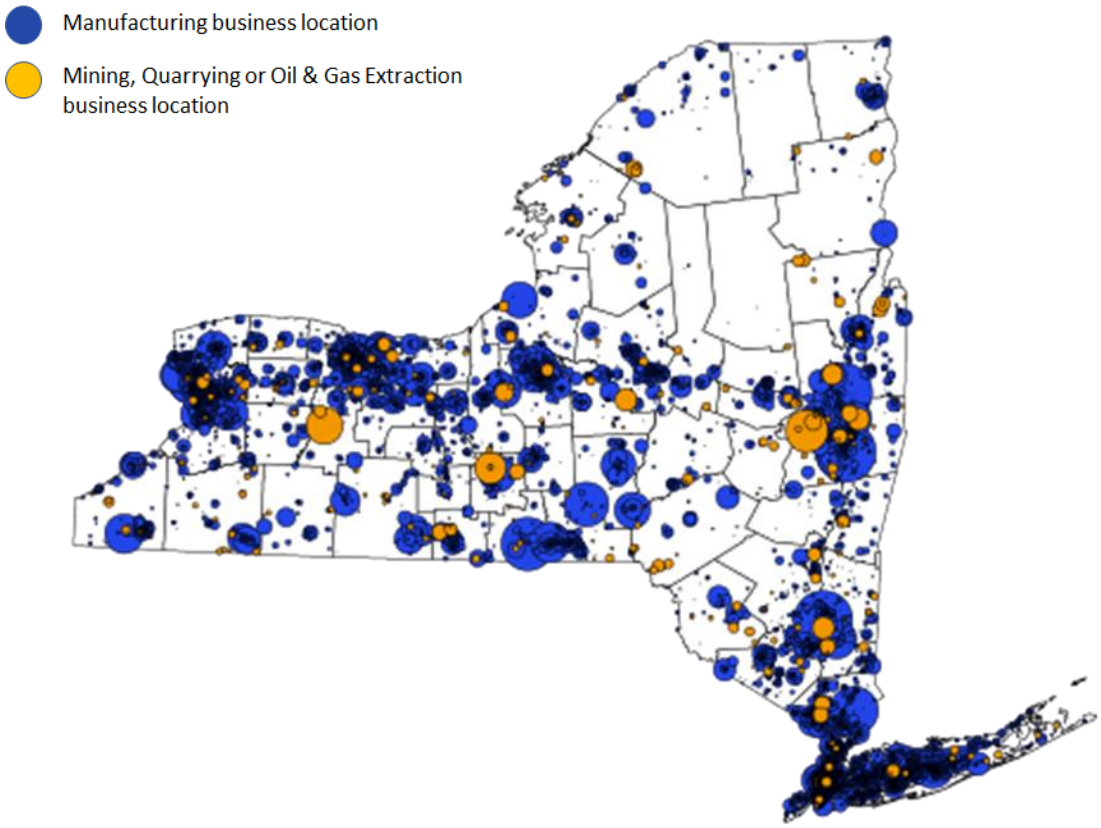
Government authorities have previously used NAICS codes to confer status or eligibility under certain programs or initiatives. For example, in 2020, as part of the Paycheck Protection Program, NAICS codes were used to determine the size thresholds for a business to be considered an eligible borrower. Similarly, as part of the State's COVID-19 New York Forward reopening strategy in 2020, NAICS industries were used to describe when different business locations could reopen. However, in cases where a business might conduct activities described under multiple NAICS industries and where the stakes of one's NAICS industry designation are high, there is an inherent incentive for a business to represent its operations as falling into the most favorable NAICS industry. To this end, any State entity using the NAICS EITE designations will – as it would need to for any eligibility system the State might employ – develop a system for verifying that a business or its operation location truly due fall into the identified EITE industry and thus merit the associated benefits.

J. Assigning EITE Status based on Appeal Procedures

It is impossible to capture the unique nature of every business in one industry category, and many businesses may operate economic activities that fall into multiple NAICS industry definitions. Here, the State may wish to develop appeal procedures such that a business whose industry is not listed as EITE may still yet qualify as EITE at one or more operating locations that are determined to present a leakage risk due to certain policies.

Appendix C Exhibits

Figure C-1. Manufacturing and Mining Industries in New York State



Source: New York State Department of Labor

Table C-1. Top New York State Occupations with Manufacturing Sector

SOC Code	Occupational Title	Employment	% Of Sector Employment
-	*Total all occupations*	*440,547*	*100.00%*
51-2090	Miscellaneous Assemblers and Fabricators	29,125	6.61%
51-1011	First-Line Supervisors of Production and Operating Workers	17,531	3.98%
51-9111	Packaging and Filling Machine Operators and Tenders	14,744	3.35%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	13,825	3.14%
51-2028	Electrical, electronic, and electromechanical assemblers, except coil winders, tapers, and finishers	11,969	2.72%
51-4041	Machinists	11,875	2.70%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	9,992	2.27%
11-1021	General and Operations Managers	9,782	2.22%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	9,038	2.05%
17-2112	Industrial Engineers	8,685	1.97%
15-1256	Software Developers and Software Quality Assurance Analysts and Testers	7,546	1.71%
51-4121	Welders, Cutters, Solderers, and Brazers	7,337	1.67%
51-6031	Sewing Machine Operators	7,116	1.62%
51-5112	Printing Press Operators	6,904	1.57%
43-5071	Shipping, Receiving, and Inventory Clerks	6,746	1.53%
43-9061	Office Clerks, General	6,462	1.47%
51-3092	Food Batchmakers	6,265	1.42%
43-4051	Customer Service Representatives	6,258	1.42%
49-9041	Industrial Machinery Mechanics	5,996	1.36%
53-7064	Packers and Packagers, Hand	5,670	1.29%
49-9071	Maintenance and Repair Workers, General	5,236	1.19%
43-5061	Production, Planning, and Expediting Clerks	5,137	1.17%
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	4,910	1.11%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	4,881	1.11%
17-2141	Mechanical Engineers	4,770	1.08%
53-7051	Industrial Truck and Tractor Operators	4,765	1.08%
51-3011	Bakers	4,753	1.08%
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	4,487	1.02%

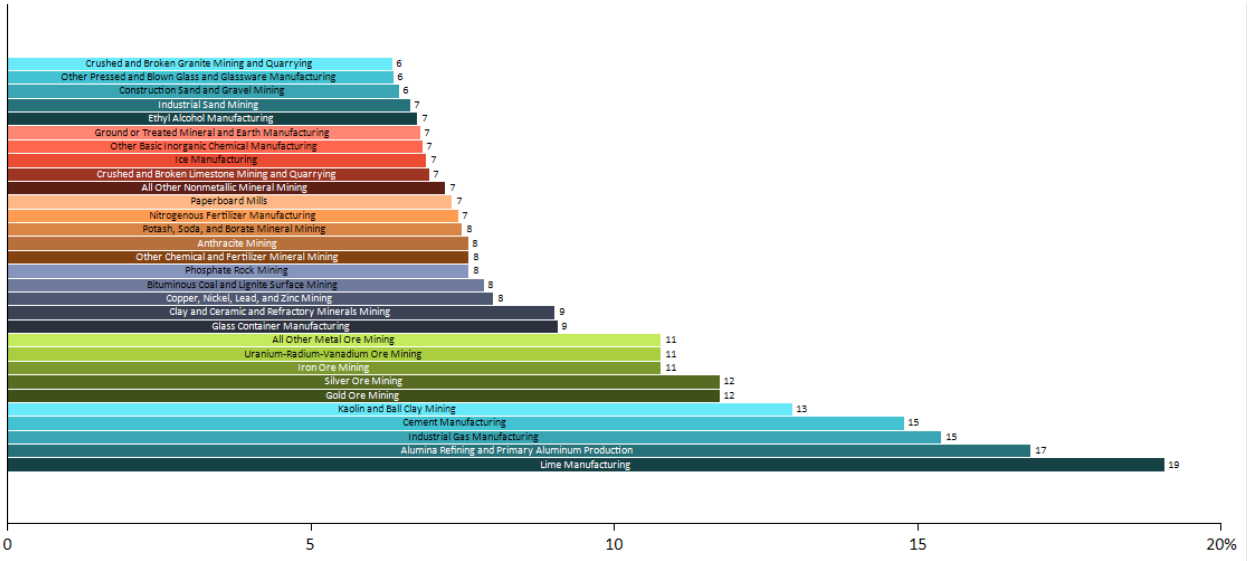
Source: New York State Department of Labor, Occupational Employment Statistics (OES) survey, 2016-2019.

Table C-2. Top New York State Occupations within Mining and Natural Resources Sector

SOC Code	Occupational Title	Employment	% Of Sector Employment
-	*Total all occupations*	*8,222*	*100.00%*
53-3032	Heavy and Tractor-Trailer Truck Drivers	714	8.68%
39-2021	Animal Caretakers	712	8.66%
47-2073	Operating Engineers and Other Construction Equipment Operators	520	6.33%
47-5022	Excavating and Loading Machine and Dragline Operators, Surface Mining	391	4.75%
47-2061	Construction Laborers	390	4.74%
45-4022	Logging Equipment Operators	355	4.32%
53-7064	Packers and Packagers, Hand	327	3.97%
45-2093	Farmworkers, Farm, Ranch, and Aquacultural Animals	233	2.84%
11-1021	General and Operations Managers	233	2.84%
51-9111	Packaging and Filling Machine Operators and Tenders	227	2.76%
43-9061	Office Clerks, General	213	2.60%
49-3042	Mobile Heavy Equipment Mechanics, Except Engines	177	2.16%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	167	2.03%
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	154	1.87%
45-2092	Farmworkers and Laborers, Crop, Nursery, and Greenhouse	141	1.71%
39-2011	Animal Trainers	135	1.64%
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	132	1.60%
47-5097	Earth Drillers, Except Oil and Gas; and Explosives Workers, Ordnance Handling Experts, and Blasters	122	1.49%
51-9021	Crushing, Grinding, and Polishing Machine Setters, Operators, and Tenders	120	1.46%
49-9041	Industrial Machinery Mechanics	114	1.38%
49-9071	Maintenance and Repair Workers, General	96	1.16%
25-3021	Self-Enrichment Teachers	95	1.15%
47-5051	Rock Splitters, Quarry	89	1.08%
51-9032	Cutting and Slicing Machine Setters, Operators, and Tenders	89	1.08%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	87	1.06%
45-2021	Animal Breeders	83	1.00%

Source: New York State Department of Labor, Occupational Employment Statistics (OES) survey, 2016-2019.
Note: Includes occupations associated with Natural Resources that were not included in EITE analysis.

Figure C-2. Energy Intensity by U.S. Industry – Top 30 (2018)



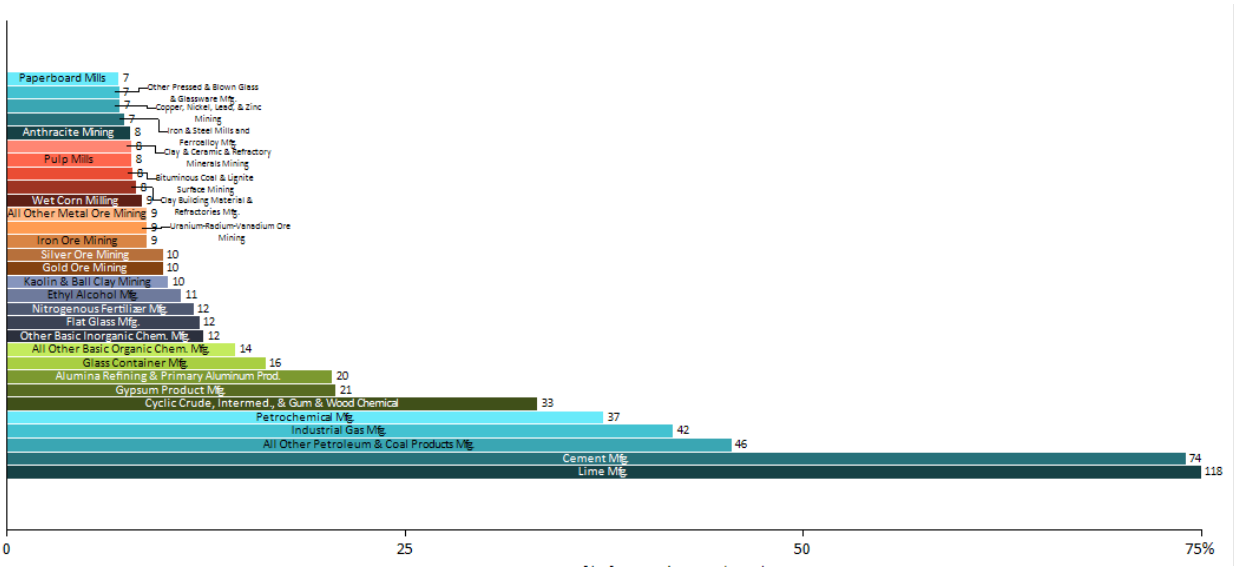
Source: Business Impacts Subgroup Staff Working Group Analysis.
Note: Energy intensity is defined as the sum of fuel and electricity expenditures by each industry divided by its value of shipments.

Table C-3. Top New York State Occupations within Top 30 U.S. Industries by Energy Intensity

Occupational Title	Employment	% of Industry Employment
Total all occupations	9,391	100.00%
Heavy and Tractor-Trailer Truck Drivers	586	6.24%
Chemical Equipment Operators and Tenders	444	4.73%
Industrial Machinery Mechanics	415	4.42%
Operating Engineers and Other Construction Equipment Operators	407	4.34%
Excavating and Loading Machine and Dragline Operators, Surface Mining	342	3.64%
Construction Laborers	323	3.44%
Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	304	3.24%
Packaging and Filling Machine Operators and Tenders	267	2.84%
Inspectors, Testers, Sorters, Samplers, and Weighers	266	2.83%
First-Line Supervisors of Production and Operating Workers	262	2.79%
Miscellaneous Assemblers and Fabricators	239	2.54%
Laborers and Freight, Stock, and Material Movers, Hand	225	2.40%
Maintenance and Repair Workers, General	224	2.39%
Industrial Engineers	186	1.98%
Packers and Packagers, Hand	176	1.88%
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	170	1.81%
Mobile Heavy Equipment Mechanics, Except Engines	161	1.72%
General and Operations Managers	148	1.58%
First-Line Supervisors of Construction Trades and Extraction Workers	116	1.24%
Paper Goods Machine Setters, Operators, and Tenders	116	1.24%
Industrial Truck and Tractor Operators	113	1.20%
Crushing, Grinding, and Polishing Machine Setters, Operators, and Tenders	113	1.20%
Electricians	107	1.14%
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	104	1.11%
Light Truck Drivers	103	1.10%
Mixing and Blending Machine Setters, Operators, and Tenders	99	1.05%
Bookkeeping, Accounting, and Auditing Clerks	97	1.04%
Office Clerks, General	97	1.03%
Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic	*	*

Source: New York State Department of Labor, Occupational Employment Statistics (OES) survey, 2016-2019.
**Indicates data is not releasable under DOL confidentiality protocols.*

Figure C-3. GHG Emissions Intensity by U.S. Industry – Top 30 (2018)

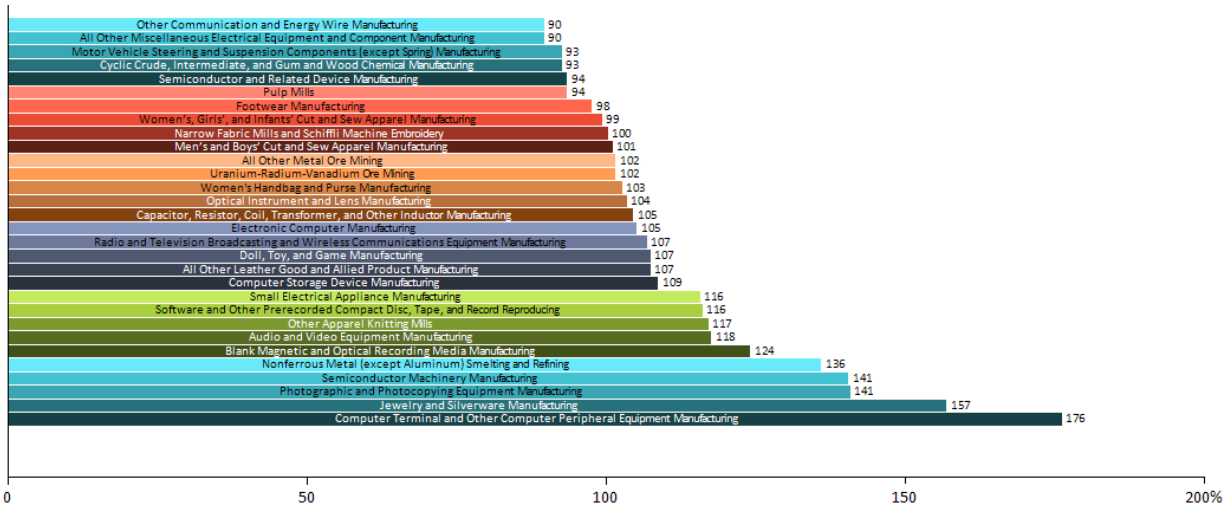


Source: Business Impacts Subgroup Staff Working Group Analysis.
Notes: 1. Emission intensity is defined for each industry as: i) the product of: a) the sum of direct fuel, direct non-combustion process and indirect electricity emissions; and b) the New York State value of carbon $125; ii) divided by its value of shipments. 2. X-axis has been capped at 75% to enhance visibility of industries relative to extreme value of Lime Manufacturing.

Table C-4. Top New York State Occupations within Top 30 U.S. Industries by GHG Emissions Intensity

SOC Code	Occupational Title	Employment	% Of Industry Employment
-	Total all occupations	8,756	100.00%
51-9011	Chemical Equipment Operators and Tenders	685	7.82%
49-9041	Industrial Machinery Mechanics	554	6.32%
51-2090	Miscellaneous Assemblers and Fabricators	431	4.92%
51-1011	First-Line Supervisors of Production and Operating Workers	420	4.79%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	298	3.41%
17-2112	Industrial Engineers	278	3.18%
49-9071	Maintenance and Repair Workers, General	273	3.12%
47-2111	Electricians	264	3.01%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	256	2.93%
51-9051	Furnace, Kiln, Oven, Drier, and Kettle Operators and Tenders	212	2.43%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	208	2.37%
53-7064	Packers and Packagers, Hand	196	2.24%
51-9111	Packaging and Filling Machine Operators and Tenders	196	2.23%
51-9041	Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	182	2.08%
43-5071	Shipping, Receiving, and Inventory Clerks	146	1.67%
53-7051	Industrial Truck and Tractor Operators	141	1.61%
11-1021	General and Operations Managers	139	1.59%
11-3051	Industrial Production Managers	127	1.45%
51-4041	Machinists	122	1.39%
51-8091	Chemical Plant and System Operators	120	1.37%
51-9196	Paper Goods Machine Setters, Operators, and Tenders	116	1.33%
51-9195	Molders, Shapers, and Casters, Except Metal and Plastic	104	1.19%
43-5061	Production, Planning, and Expediting Clerks	101	1.16%
51-9124	Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	94	1.07%
51-4021	Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic	*	*
51-4051	Metal-Refining Furnace Operators and Tenders	*	*

Figure C-4. Trade Intensity by U.S. Industry – Top 30 (2018)



Source: Business Impacts Subgroup Staff Working Group Analysis
Note: Trade intensity is defined as each industry's sum of imports and exports divided by the sum of its value of shipments and imports.

Table C-5. Top New York State Occupations within Top 30 U.S. Industries by Trade Intensity

SOC Code	Occupational Title	Employment	% Of Industry Employment
-	Total all occupations	45,817	100.00%
15-1256	Software Developers and Software Quality Assurance Analysts and Testers	3,747	8.18%
51-2028	Electrical, electronic, and electromechanical assemblers, except coil winders, tapers, and finishers	2,543	5.55%
51-6031	Sewing Machine Operators	2,138	4.67%
17-2112	Industrial Engineers	1,759	3.84%
51-9071	Jewelers and Precious Stone and Metal Workers	1,724	3.76%
17-2071	Electrical Engineers	1,498	3.27%
11-1021	General and Operations Managers	1,149	2.51%
51-1011	First-Line Supervisors of Production and Operating Workers	1,089	2.38%
17-2141	Mechanical Engineers	1,066	2.33%
17-3023	Electrical and Electronic Engineering Technologists and Technicians	1,009	2.20%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	983	2.14%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	907	1.98%
43-4051	Customer Service Representatives	860	1.88%
51-2090	Miscellaneous Assemblers and Fabricators	857	1.87%
15-1211	Computer Systems Analysts	775	1.69%
13-1020	Buyers and Purchasing Agents	714	1.56%
17-3026	Industrial Engineering Technologists and Technicians	704	1.54%
43-5071	Shipping, Receiving, and Inventory Clerks	619	1.35%
43-9061	Office Clerks, General	586	1.28%
15-1232	Computer User Support Specialists	584	1.28%
11-9041	Architectural and Engineering Managers	560	1.22%
13-1161	Market Research Analysts and Marketing Specialists	554	1.21%
13-2011	Accountants and Auditors	530	1.16%
11-3021	Computer and Information Systems Managers	529	1.15%
51-9083	Ophthalmic Laboratory Technicians	519	1.13%
43-5061	Production, Planning, and Expediting Clerks	501	1.09%
17-2072	Electronics Engineers, Except Computer	488	1.07%
27-1022	Fashion Designers	482	1.05%
17-2199	Engineers, All Other	470	1.03%
13-1198	Project Management Specialists and Business Operations Specialists, All Other	467	1.02%
51-9141	Semiconductor Processing Technicians	*	*
13-1111	Management Analysts	*	*
51-2031	Engine and Other Machine Assemblers	*	*

Source: New York State Department of Labor, Occupational Employment Statistics (OES) survey, 2016-2019.
**Indicates data is not releasable under DOL confidentiality protocols.*

Figure C-5. Energy vs. Trade Intensity - U.S. Manufacturing and Mining Industries (2018)

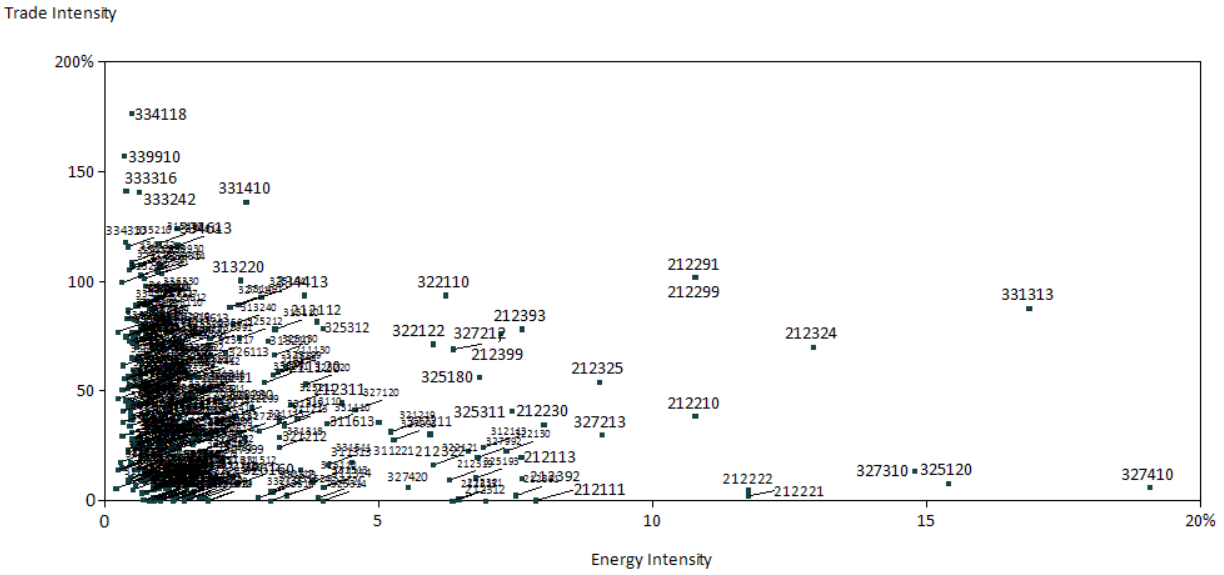


Figure C-6. Energy vs. Trade Intensity - Energy vs. Trade Intensity by New York State Employment: Manufacturing and Mining

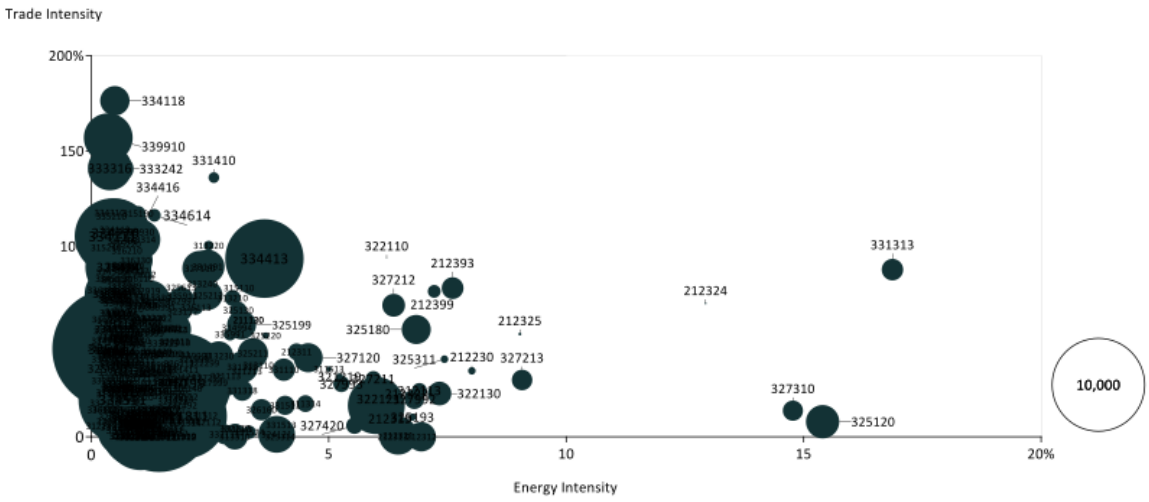


Figure C-7. Energy vs. Trade Intensity - Top 20 Manufacturing Industries by New York State Jobs

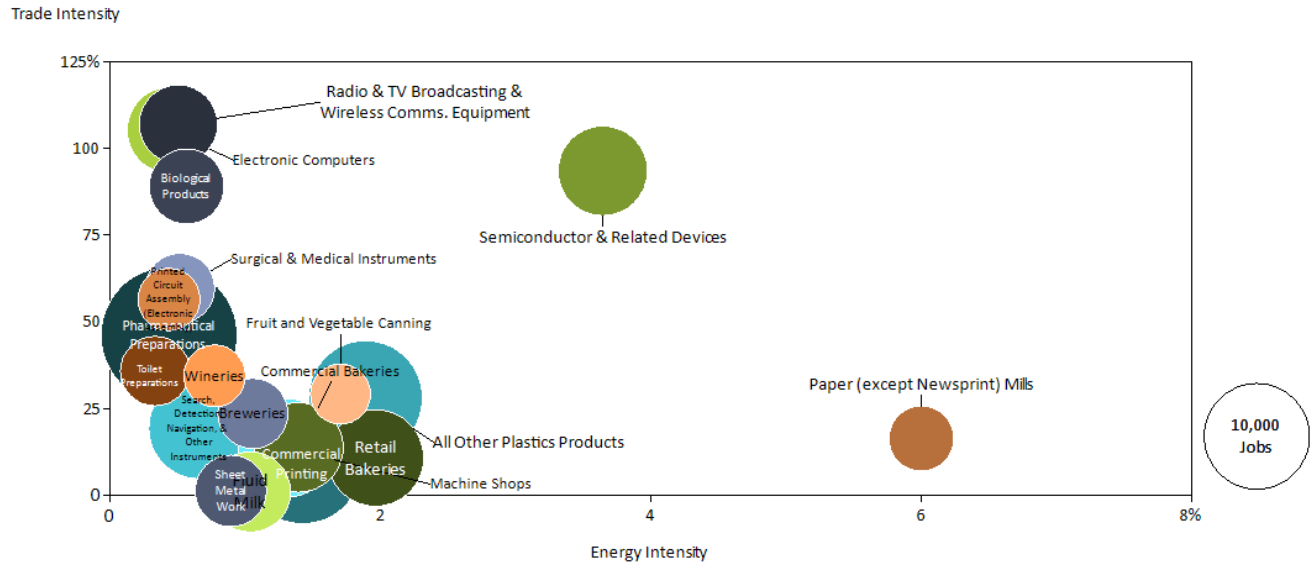


Figure C-8. Energy vs. Trade Intensity - New York State Industries >2.5% Energy Intensity, >450 Jobs

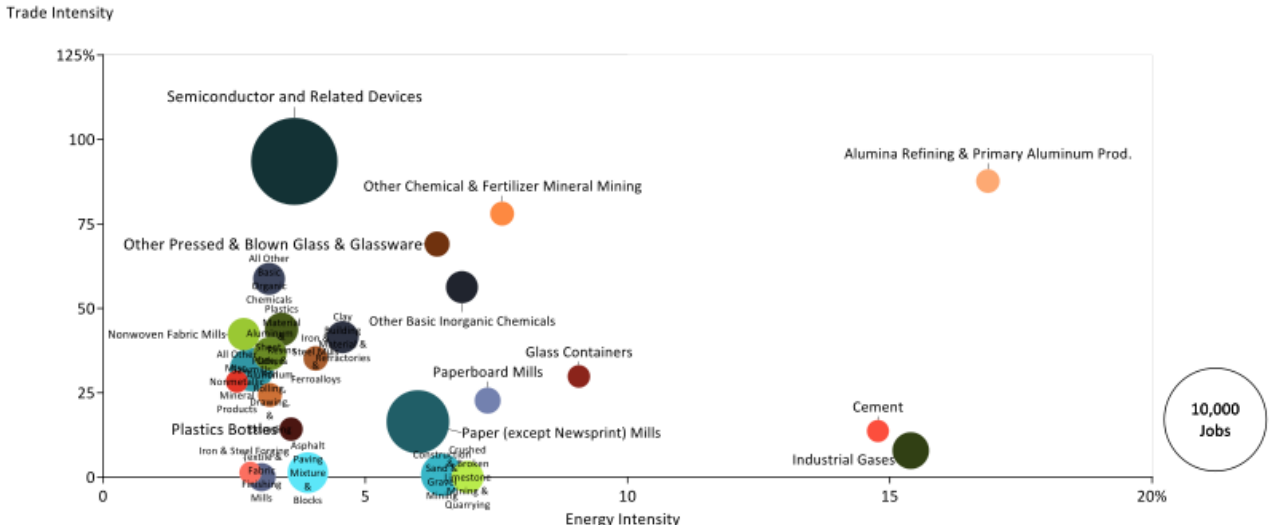


Table C-6. Complete EITE Analysis Results by U.S. Industry (Sorted by Total New York State Jobs)

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Pharmaceutical Preparation Manufacturing	325412	183	16,708	$74,924	0.4%	0.3%	46.1%
Commercial Printing (except Screen and Books)	323111	1,161	12,907	$56,017	1.4%	0.7%	9.2%
All Other Plastics Product Manufacturing	326199	228	11,655	$57,719	1.9%	0.8%	28.1%
Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	334511	55	9,107	$102,375	0.7%	0.3%	19.4%
Machine Shops	332710	677	8,623	$55,709	1.3%	0.6%	13.7%
Retail Bakeries	311811	950	8,347	$31,816	2.0%	1.2%	10.8%
Commercial Bakeries	311812	279	7,198	$46,891	1.4%	0.8%	13.9%
Semiconductor and Related Device Manufacturing	334413	77	7,175	$110,012	3.6%	1.7%	93.5%
Electronic Computer Manufacturing	334111	30	6,689	$161,928	0.4%	0.2%	105.2%
Fluid Milk Manufacturing	311511	55	5,774	$71,310	1.0%	0.6%	1.0%
Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing	334220	64	5,519	$85,192	0.5%	0.2%	106.9%
Biological Product (except Diagnostic) Manufacturing	325414	12	5,052	$101,381	0.6%	0.3%	89.0%
Sheet Metal Work Manufacturing	332322	230	4,587	$61,053	0.9%	0.4%	1.3%
Breweries	312120	273	4,419	$50,775	1.1%	0.6%	23.6%
Surgical and Medical Instrument Manufacturing	339112	83	4,335	$68,635	0.5%	0.2%	59.7%
Toilet Preparation Manufacturing	325620	96	4,321	$74,886	0.3%	0.2%	35.8%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Paper (except Newsprint) Mills	322121	36	3,789	$70,370	6.0%	6.8%	16.4%
Printed Circuit Assembly (Electronic Assembly) Manufacturing	334418	45	3,473	$67,904	0.4%	0.2%	56.5%
Wineries	312130	245	3,422	$33,732	0.8%	0.4%	34.5%
Fruit and Vegetable Canning	311421	72	3,243	$58,705	1.7%	1.1%	29.2%
Precision Turned Product Manufacturing	332721	90	3,216	$52,045	1.5%	0.6%	0.0%
Cheese Manufacturing	311513	42	3,184	$54,501	0.9%	0.5%	5.6%
Sign Manufacturing	339950	373	3,181	$57,848	0.7%	0.4%	3.5%
Corrugated and Solid Fiber Box Manufacturing	322211	57	3,032	$64,656	1.1%	0.6%	5.7%
Other Aircraft Parts and Auxiliary Equipment Manufacturing	336413	51	2,984	$70,994	0.4%	0.2%	45.1%
Relay and Industrial Control Manufacturing	335314	47	2,973	$84,816	0.4%	0.2%	75.0%
Women's, Girls', and Infants' Cut and Sew Apparel Manufacturing	315240	277	2,824	$71,166	0.3%	0.2%	99.3%
Ready-Mix Concrete Manufacturing	327320	165	2,792	$71,945	1.2%	0.9%	0.0%
Jewelry and Silverware Manufacturing	339910	447	2,783	$72,497	0.4%	0.2%	156.9%
Cut and Sew Apparel Contractors	315210	409	2,741	$43,418	0.8%	0.5%	0.0%
All Other Miscellaneous General Purpose Machinery Manufacturing	333999	61	2,672	$98,534	0.7%	0.3%	79.2%
Other Measuring and Controlling Device Manufacturing	334519	60	2,623	$82,255	0.5%	0.2%	72.6%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Surgical Appliance and Supplies Manufacturing	339113	155	2,617	$60,824	0.4%	0.2%	55.5%
Ornamental and Architectural Metal Work Manufacturing	332323	254	2,556	$66,988	0.7%	0.4%	11.3%
Dental Laboratories	339116	356	2,475	$55,879	0.6%	0.3%	24.0%
Other Motor Vehicle Parts Manufacturing	336390	39	2,460	$62,324	0.7%	0.3%	51.3%
Railroad Rolling Stock Manufacturing	336510	26	2,459	$73,312	0.7%	0.4%	30.5%
Fabricated Structural Metal Manufacturing	332312	112	2,456	$67,661	0.7%	0.4%	13.1%
All Other Miscellaneous Manufacturing	339999	184	2,373	$59,644	0.5%	0.3%	56.5%
Wood Kitchen Cabinet and Countertop Manufacturing	337110	372	2,330	$50,678	1.1%	0.6%	11.2%
Metal Window and Door Manufacturing	332321	80	2,301	$63,771	0.8%	0.4%	10.4%
Photographic and Photocopying Equipment Manufacturing	333316	39	2,263	$98,262	0.4%	0.2%	140.9%
Other Industrial Machinery Manufacturing	333249	71	2,204	$78,313	0.7%	0.3%	51.3%
Frozen Specialty Food Manufacturing	311412	40	2,173	$54,712	1.3%	0.6%	1.9%
Fluid Power Valve and Hose Fitting Manufacturing	332912	17	2,160	$69,815	0.8%	0.3%	33.5%
All Other Miscellaneous Electrical Equipment and Component Manufacturing	335999	55	2,141	$181,320	0.6%	0.3%	89.7%
Instruments and Related Products Manufacturing for Measuring,	334513	73	2,093	$66,563	0.4%	0.2%	86.6%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Displaying, and Controlling Industrial Process Variables							
Meat Processed from Carcasses	311612	73	2,046	$53,841	1.0%	0.5%	0.2%
Electronic Connector Manufacturing	334417	18	2,036	$87,237	0.7%	0.3%	62.5%
Copper Rolling, Drawing, Extruding, and Alloying	331420	22	1,968	$64,743	1.0%	0.5%	24.8%
Ophthalmic Goods Manufacturing	339115	37	1,959	$65,823	0.8%	0.3%	74.8%
Paper Bag and Coated and Treated Paper Manufacturing	322220	53	1,903	$59,326	1.3%	0.7%	33.5%
Power Boiler and Heat Exchanger Manufacturing	332410	27	1,870	$69,088	0.7%	0.4%	38.6%
Glass Product Manufacturing Made of Purchased Glass	327215	71	1,865	$58,963	2.4%	1.4%	31.0%
All Other Miscellaneous Fabricated Metal Product Manufacturing	332999	83	1,853	$61,276	1.2%	0.6%	71.6%
Photographic Film, Paper, Plate, and Chemical Manufacturing	325992	19	1,844	$79,117	1.4%	2.2%	44.0%
Capacitor, Resistor, Coil, Transformer, and Other Inductor Manufacturing	334416	37	1,837	$55,141	1.0%	0.4%	104.6%
Sawmills	321113	105	1,831	$49,599	2.8%	1.5%	31.9%
Commercial Screen Printing	323113	261	1,823	$36,743	1.0%	0.5%	39.4%
Other Communications Equipment Manufacturing	334290	44	1,823	$97,669	0.3%	0.2%	40.7%
Optical Instrument and Lens Manufacturing	333314	48	1,815	$68,306	1.0%	0.5%	103.5%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Perishable Prepared Food Manufacturing	311991	70	1,808	$43,873	0.9%	0.5%	1.2%
Other Electronic Component Manufacturing	334419	65	1,804	$63,957	0.7%	0.3%	53.7%
Nonupholstered Wood Household Furniture Manufacturing	337122	199	1,797	$49,796	1.2%	0.6%	60.4%
Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals	334515	62	1,792	$83,607	0.4%	0.2%	83.0%
Air and Gas Compressor Manufacturing	333912	9	1,778	$81,029	0.5%	0.2%	73.6%
Electroplating, Plating, Polishing, Anodizing, and Coloring	332813	83	1,768	$57,299	3.6%	1.9%	N/A
Current-Carrying Wiring Device Manufacturing	335931	20	1,744	$82,514	0.6%	0.3%	88.9%
Motor Vehicle Electrical and Electronic Equipment Manufacturing	336320	33	1,729	$53,160	0.6%	0.3%	64.2%
Turbine and Turbine Generator Set Units Manufacturing	333611	24	1,716	$113,403	0.7%	0.4%	76.0%
Construction Sand and Gravel Mining	212321	140	1,710	$70,132	6.5%	5.4%	0.7%
Motor Vehicle Transmission and Power Train Parts Manufacturing	336350	22	1,683	N/A	0.8%	0.4%	25.3%
All Other Miscellaneous Food Manufacturing	311999	42	1,643	$63,493	1.2%	0.7%	54.2%
Industrial Truck, Tractor, Trailer, and Stacker Machinery Manufacturing	333924	12	1,641	N/A	0.5%	0.2%	52.6%
Confectionery Manufacturing	311352	77	1,607	$42,854	0.9%	0.5%	27.6%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
from Purchased Chocolate							
Asphalt Paving Mixture and Block Manufacturing	324121	90	1,582	$86,785	3.9%	4.2%	1.3%
Folding Paperboard Box Manufacturing	322212	20	1,576	$61,916	1.1%	0.5%	7.8%
Irradiation Apparatus Manufacturing	334517	15	1,572	$100,820	0.6%	0.3%	70.1%
Motor Vehicle Metal Stamping	336370	6	1,568	N/A	1.0%	0.4%	5.6%
Soft Drink Manufacturing	312111	32	1,558	$69,592	1.1%	0.6%	10.2%
Metal Crown, Closure, and Other Metal Stamping (except Automotive)	332119	52	1,546	$59,419	1.4%	0.6%	9.9%
Custom Architectural Woodwork and Millwork Manufacturing	337212	138	1,534	$59,924	0.9%	0.5%	0.3%
Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers	332812	103	1,489	$55,909	2.2%	1.2%	N/A
Other Engine Equipment Manufacturing	333618	3	1,466	N/A	0.5%	0.3%	64.7%
Electromedical and Electrotherapeutic Apparatus Manufacturing	334510	51	1,465	$83,624	0.3%	0.2%	50.3%
Cut Stone and Stone Product Manufacturing	327991	158	1,455	$51,776	1.1%	0.6%	43.7%
Pottery, Ceramics, and Plumbing Fixture Manufacturing	327110	36	1,445	$60,586	2.3%	1.3%	88.3%
Wood Container and Pallet Manufacturing	321920	93	1,414	$43,024	1.4%	0.8%	8.5%
Tire Manufacturing (except Retreading)	326211	1	1,407	N/A	1.7%	0.9%	56.3%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Machine Tool Manufacturing	333517	60	1,405	$59,959	0.6%	0.3%	75.6%
Cookie and Cracker Manufacturing	311821	50	1,390	$42,737	1.0%	0.5%	6.5%
Plastics Bag and Pouch Manufacturing	326111	27	1,386	$60,759	1.7%	0.7%	28.4%
Special Die and Tool, Die Set, Jig, and Fixture Manufacturing	333514	98	1,375	$53,694	1.3%	0.6%	13.6%
Gasket, Packing, and Sealing Device Manufacturing	339991	25	1,374	$60,486	1.5%	0.7%	67.9%
Nonferrous Metal (except Copper and Aluminum) Rolling, Drawing, and Extruding	331491	17	1,347	$62,715	2.4%	1.3%	89.2%
Other Concrete Product Manufacturing	327390	72	1,311	$57,310	1.0%	0.6%	9.3%
Motor Vehicle Steering and Suspension Components (except Spring) Manufacturing	336330	6	1,307	N/A	0.9%	0.4%	92.6%
Industrial Gas Manufacturing	325120	16	1,293	$113,689	15.4%	41.8%	7.9%
Ice Cream and Frozen Dessert Manufacturing	311520	45	1,276	$52,234	1.2%	0.5%	3.9%
Other Snack Food Manufacturing	311919	20	1,253	$47,283	0.8%	0.5%	3.8%
Musical Instrument Manufacturing	339992	41	1,248	$58,510	1.2%	0.6%	61.2%
Polystyrene Foam Product Manufacturing	326140	16	1,245	$57,720	2.0%	1.1%	25.4%
Textile Bag and Canvas Mills	314910	96	1,179	$44,756	0.9%	0.4%	44.2%
Motor Vehicle Gasoline Engine and Engine Parts Manufacturing	336310	27	1,161	$62,849	0.8%	0.3%	49.4%
Analytical Laboratory	334516	37	1,150	$66,321	0.6%	0.4%	58.3%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Instrument Manufacturing							
Fluid Power Pump and Motor Manufacturing	333996	8	1,106	$86,086	0.7%	0.3%	78.6%
Plastics Material and Resin Manufacturing	325211	22	1,079	$104,750	3.4%	3.8%	43.8%
Men's and Boys' Cut and Sew Apparel Manufacturing	315220	75	1,072	$55,935	0.7%	0.4%	101.1%
Aluminum Sheet, Plate, and Foil Manufacturing	331315	5	1,070	N/A	3.2%	1.4%	36.6%
Showcase, Partition, Shelving, and Locker Manufacturing	337215	79	1,038	$58,897	1.1%	0.6%	55.4%
Commercial, Industrial, and Institutional Electric Lighting Fixture Manufacturing	335122	37	1,031	$61,558	0.5%	0.3%	37.1%
Other Millwork (including Flooring)	321918	104	1,018	$54,312	1.7%	0.9%	18.5%
Measuring, Dispensing, and Other Pumping Equipment Manufacturing	333914	29	1,010	$81,657	0.6%	0.3%	52.2%
Other Commercial and Service Industry Machinery Manufacturing	333318	59	1,009	$60,852	0.5%	0.2%	27.9%
Computer Terminal and Other Computer Peripheral Equipment Manufacturing	334118	31	1,009	$111,482	0.5%	0.2%	176.3%
Nonwoven Fabric Mills	313230	14	1,001	$49,197	2.7%	1.2%	42.4%
Crushed and Broken Limestone Mining and Quarrying	212312	43	998	$73,800	7.0%	6.0%	0.0%
Sanitary Paper Product Manufacturing	322291	7	994	$65,177	1.4%	0.7%	28.3%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Other Basic Inorganic Chemical Manufacturing	325180	25	989	$88,270	6.8%	12.4%	56.3%
Clay Building Material and Refractories Manufacturing	327120	28	989	$68,715	4.6%	8.1%	41.5%
All Other Basic Organic Chemical Manufacturing	325199	26	984	$85,319	3.2%	14.4%	58.7%
Motor Vehicle Body Manufacturing	336211	23	950	$47,574	0.6%	0.3%	71.4%
Metal Can Manufacturing	332431	9	945	$82,487	1.6%	0.7%	3.4%
Wood Office Furniture Manufacturing	337211	35	928	$51,827	1.1%	0.5%	30.8%
Polish and Other Sanitation Good Manufacturing	325612	25	927	$52,214	1.0%	0.5%	23.4%
Poultry Processing	311615	34	910	$40,314	1.0%	0.5%	7.4%
Plate Work Manufacturing	332313	51	895	$70,099	1.3%	0.6%	0.3%
Packaging Machinery Manufacturing	333993	32	890	$71,065	0.4%	0.2%	42.9%
Aircraft Engine and Engine Parts Manufacturing	336412	20	890	$71,816	0.5%	0.3%	44.1%
Metal Kitchen Cookware, Utensil, Cutlery, and Flatware (except Precious) Manufacturing	332215	16	884	$54,007	1.1%	0.7%	69.0%
Synthetic Rubber Manufacturing	325212	2	877	N/A	2.5%	4.4%	74.2%
Ball and Roller Bearing Manufacturing	332991	11	877	$65,165	1.9%	0.9%	71.2%
Sporting and Athletic Goods Manufacturing	339920	49	875	$57,631	1.1%	0.6%	58.4%
Dog and Cat Food Manufacturing	311111	15	845	$74,880	0.9%	0.5%	9.7%
All Other Miscellaneous	314999	98	842	$52,837	1.0%	0.5%	55.2%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Textile Product Mills							
Elevator and Moving Stairway Manufacturing	333921	24	830	$69,160	0.6%	0.3%	27.3%
Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing	333415	32	809	$62,344	0.5%	0.2%	38.9%
Unlaminated Plastics Profile Shape Manufacturing	326121	16	795	$69,889	1.4%	0.6%	13.4%
Heating Equipment (except Warm Air Furnaces) Manufacturing	333414	18	773	$66,643	1.0%	0.5%	36.1%
Textile and Fabric Finishing Mills	313310	88	765	$72,454	3.0%	1.7%	0.0%
Other Animal Food Manufacturing	311119	44	760	$62,638	1.2%	0.6%	7.0%
Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum)	331492	12	757	$65,677	1.9%	1.1%	16.5%
Office Supplies (except Paper) Manufacturing	339940	32	757	$56,092	0.7%	0.4%	53.8%
Metal Tank (Heavy Gauge) Manufacturing	332420	23	755	$79,550	1.0%	0.5%	26.0%
Ship Building and Repairing	336611	16	752	$99,052	0.7%	0.3%	8.5%
Frozen Cakes, Pies, and Other Pastries Manufacturing	311813	16	745	$42,234	1.3%	0.7%	13.9%
Audio and Video Equipment Manufacturing	334310	47	741	$90,804	0.4%	0.2%	117.6%
Plastics Packaging Film and Sheet (including Laminated) Manufacturing	326112	16	733	$55,478	1.9%	0.8%	38.5%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Spice and Extract Manufacturing	311942	24	726	$72,442	0.5%	0.3%	14.1%
Distilleries	312140	72	725	$45,383	0.5%	0.3%	45.3%
Flour Milling	311211	10	724	$87,128	1.7%	0.7%	14.1%
Small Arms, Ordnance, and Ordnance Accessories Manufacturing	332994	13	714	$74,659	1.2%	0.6%	42.7%
Nonchocolate Confectionery Manufacturing	311340	28	704	$37,675	1.4%	0.7%	23.9%
Industrial Valve Manufacturing	332911	18	701	$80,837	0.8%	0.4%	87.5%
Industrial Mold Manufacturing	333511	49	701	$53,128	1.8%	0.8%	43.3%
Flavoring Syrup and Concentrate Manufacturing	311930	15	698	$60,882	0.4%	0.2%	22.1%
All Other Rubber Product Manufacturing	326299	24	684	$52,142	1.6%	0.8%	43.5%
Apparel Accessories and Other Apparel Manufacturing	315990	63	678	$40,427	0.7%	0.4%	89.3%
Curtain and Linen Mills	314120	84	676	$47,167	0.6%	0.3%	82.4%
Semiconductor Machinery Manufacturing	333242	14	676	$132,775	0.6%	0.2%	140.6%
Other Paperboard Container Manufacturing	322219	12	675	$61,004	1.4%	0.6%	9.8%
Dry, Condensed, and Evaporated Dairy Product Manufacturing	311514	9	671	$61,728	1.0%	0.6%	25.6%
Wood Window and Door Manufacturing	321911	40	668	$55,371	1.1%	0.6%	6.6%
Industrial and Commercial Fan and Blower and Air Purification Equipment Manufacturing	333413	27	664	$53,509	0.8%	0.4%	52.5%
Paperboard Mills	322130	5	658	$86,912	7.3%	7.0%	22.7%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Residential Electric Lighting Fixture Manufacturing	335121	49	658	$61,416	0.6%	0.4%	63.6%
Rolling Mill and Other Metalworking Machinery Manufacturing	333519	15	653	$67,207	0.7%	0.4%	24.4%
Abrasive Product Manufacturing	327910	27	646	$61,901	1.8%	0.9%	49.4%
In-Vitro Diagnostic Substance Manufacturing	325413	10	643	$63,167	0.5%	0.2%	72.0%
Other Guided Missile and Space Vehicle Parts and Auxiliary Equipment Manufacturing	336419	2	637	N/A	0.4%	0.2%	50.9%
Stationery Product Manufacturing	322230	26	635	$56,598	1.0%	0.4%	7.4%
Hardware Manufacturing	332510	31	629	$61,550	0.8%	0.4%	66.9%
Mattress Manufacturing	337910	18	623	$55,909	0.3%	0.1%	17.7%
Truss Manufacturing	321214	19	622	$50,084	0.7%	0.4%	0.3%
Dry Pasta, Dough, and Flour Mixes Manufacturing from Purchased Flour	311824	44	618	$42,773	1.1%	0.5%	12.3%
All Other Miscellaneous Chemical Product and Preparation Manufacturing	325998	44	618	$72,684	1.4%	0.8%	37.8%
Other Pressed and Blown Glass and Glassware Manufacturing	327212	22	610	$63,074	6.4%	7.1%	69.0%
All Other Miscellaneous Wood Product Manufacturing	321999	64	608	$46,343	2.2%	1.1%	40.7%
Rolled Steel Shape Manufacturing	331221	11	608	$86,285	1.5%	0.8%	5.8%
Blind and Shade Manufacturing	337920	35	601	$62,676	0.5%	0.2%	43.3%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Paint and Coating Manufacturing	325510	29	597	$76,027	0.6%	0.3%	14.3%
Bolt, Nut, Screw, Rivet, and Washer Manufacturing	332722	27	592	$60,770	1.4%	0.6%	62.2%
Fluid Power Cylinder and Actuator Manufacturing	333995	8	587	$67,729	0.7%	0.3%	37.4%
Iron and Steel Mills and Ferroalloy Manufacturing	331110	23	584	$61,070	4.1%	7.4%	35.2%
Cutting Tool and Machine Tool Accessory Manufacturing	333515	31	574	$71,674	1.5%	0.6%	49.0%
Speed Changer, Industrial High-Speed Drive, and Gear Manufacturing	333612	16	571	$59,482	1.0%	0.5%	85.1%
Other Cut and Sew Apparel Manufacturing	315280	61	564	$52,391	0.5%	0.2%	71.6%
Other Aluminum Rolling, Drawing, and Extruding	331318	5	561	N/A	3.2%	0.6%	24.3%
Other Chemical and Fertilizer Mineral Mining	212393	5	555	$65,835	7.6%	5.7%	78.0%
Switchgear and Switchboard Apparatus Manufacturing	335313	29	552	$78,696	0.4%	0.2%	74.7%
Plastics Pipe and Pipe Fitting Manufacturing	326122	8	543	$125,389	1.9%	0.8%	20.9%
Lawn and Garden Tractor and Home Lawn and Garden Equipment Manufacturing	333112	10	543	N/A	0.5%	0.2%	31.1%
Alumina Refining and Primary Aluminum Production	331313	8	542	$82,567	16.9%	20.4%	87.7%
Plastics Bottle Manufacturing	326160	14	533	$48,580	3.6%	1.4%	14.2%
Prefabricated Metal Building and	332311	15	527	$68,079	0.5%	0.3%	5.1%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Component Manufacturing							
Coffee and Tea Manufacturing	311920	44	524	$57,060	0.5%	0.3%	25.3%
Saw Blade and Handtool Manufacturing	332216	28	520	$54,195	1.3%	0.6%	62.4%
Motor and Generator Manufacturing	335312	18	503	$66,687	0.5%	0.2%	82.8%
Other Metal Container Manufacturing	332439	17	495	$53,534	1.4%	0.8%	44.9%
Glass Container Manufacturing	327213	7	493	$80,197	9.1%	16.3%	29.8%
Motor Vehicle Brake System Manufacturing	336340	3	489	N/A	0.9%	0.4%	50.4%
Fiber Optic Cable Manufacturing	335921	10	481	$46,421	0.6%	0.3%	56.8%
Concrete Block and Brick Manufacturing	327331	30	480	$69,237	1.5%	0.9%	1.9%
All Other Miscellaneous Nonmetallic Mineral Product Manufacturing	327999	20	479	$82,729	2.6%	1.5%	28.3%
Cement Manufacturing	327310	24	477	$77,325	14.8%	74.0%	13.7%
Urethane and Other Foam Product (except Polystyrene) Manufacturing	326150	18	476	$60,042	1.0%	0.5%	25.4%
Frozen Fruit, Juice, and Vegetable Manufacturing	311411	10	474	$57,251	1.9%	1.1%	35.1%
Dental Equipment and Supplies Manufacturing	339114	32	470	$69,072	0.4%	0.2%	45.7%
Iron and Steel Forging	332111	16	467	$60,840	2.8%	1.5%	1.3%
Heavy Duty Truck Manufacturing	336120	4	465	N/A	0.2%	0.1%	46.5%
Farm Machinery and Equipment Manufacturing	333111	13	452	$56,910	0.6%	0.3%	44.7%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Support Activities for Printing	323120	68	448	$52,361	1.2%	0.5%	4.3%
Ground or Treated Mineral and Earth Manufacturing	327992	4	448	$56,291	6.8%	3.8%	19.7%
Other Communication and Energy Wire Manufacturing	335929	9	445	$56,386	0.8%	0.3%	89.7%
Industrial Process Furnace and Oven Manufacturing	333994	12	442	$82,342	0.8%	0.4%	48.3%
Telephone Apparatus Manufacturing	334210	14	436	$68,810	0.6%	0.3%	44.6%
Metal Household Furniture Manufacturing	337124	33	434	$53,675	0.9%	0.5%	69.9%
Iron Foundries	331511	10	432	$59,770	4.1%	3.8%	16.5%
Roasted Nuts and Peanut Butter Manufacturing	311911	18	431	$45,122	0.8%	0.4%	9.7%
Other Fabricated Wire Product Manufacturing	332618	25	427	$48,401	1.1%	0.6%	42.6%
Power, Distribution, and Specialty Transformer Manufacturing	335311	13	424	$60,336	1.0%	0.5%	37.8%
Oil and Gas Field Machinery and Equipment Manufacturing	333132	3	414	N/A	0.7%	0.3%	22.1%
Prefabricated Wood Building Manufacturing	321992	26	412	$46,356	0.9%	0.5%	4.9%
Primary Battery Manufacturing	335912	4	409	$71,173	1.6%	0.7%	57.0%
Bottled Water Manufacturing	312112	19	402	$55,974	2.4%	1.1%	7.6%
Fabric Coating Mills	313320	12	401	$68,336	1.4%	0.8%	73.0%
All Other Converted Paper Product Manufacturing	322299	21	399	$42,793	2.4%	1.2%	38.7%
Leather and Hide Tanning and Finishing	316110	26	395	$42,661	1.0%	0.5%	83.0%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Pesticide and Other Agricultural Chemical Manufacturing	325320	10	389	$65,451	0.9%	0.5%	33.0%
Books Printing	323117	21	386	$56,214	1.9%	0.8%	65.8%
Office Furniture (except Wood) Manufacturing	337214	11	382	$76,159	0.7%	0.3%	9.6%
All Other Leather Good and Allied Product Manufacturing	316998	26	378	$48,752	0.7%	0.3%	107.5%
Mayonnaise, Dressing, and Other Prepared Sauce Manufacturing	311941	32	369	$74,211	0.8%	0.4%	18.7%
Specialty Canning	311422	5	364	N/A	0.9%	0.6%	6.6%
Overhead Traveling Crane, Hoist, and Monorail System Manufacturing	333923	11	359	$63,196	0.4%	0.2%	23.4%
Broom, Brush, and Mop Manufacturing	339994	17	359	$51,465	0.8%	0.3%	48.7%
Medicinal and Botanical Manufacturing	325411	25	356	$70,107	0.6%	0.3%	59.0%
Aircraft Manufacturing	336411	11	353	N/A	0.4%	0.1%	8.3%
Spring Manufacturing	332613	12	342	$61,793	1.4%	0.7%	34.0%
Soap and Other Detergent Manufacturing	325611	34	339	$80,656	0.5%	0.2%	10.4%
Metal Heat Treating	332811	15	337	$90,504	5.4%	6.1%	N/A
Dimension Stone Mining and Quarrying	212311	31	333	$49,466	4.3%	4.1%	44.6%
Mechanical Power Transmission Equipment Manufacturing	333613	11	333	$60,959	1.1%	0.5%	60.0%
Other Crushed and Broken Stone Mining and Quarrying	212319	14	330	$88,216	6.3%	5.2%	9.5%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Synthetic Dye and Pigment Manufacturing	325130	8	329	$77,392	3.1%	1.8%	66.4%
Gypsum Product Manufacturing	327420	17	326	$77,586	5.5%	20.7%	5.9%
Institutional Furniture Manufacturing	337127	25	318	$49,402	0.9%	0.4%	86.8%
Tobacco Manufacturing	312230	25	315	$54,494	0.2%	0.1%	5.7%
Mineral Wool Manufacturing	327993	6	309	$69,564	5.3%	6.5%	27.7%
Conveyor and Conveying Equipment Manufacturing	333922	19	302	$73,652	0.6%	0.3%	28.0%
Broadwoven Fabric Mills	313210	24	300	$53,215	3.0%	1.3%	72.8%
Construction Machinery Manufacturing	333120	16	300	$54,897	0.6%	0.3%	65.6%
Upholstered Household Furniture Manufacturing	337121	29	294	$56,167	0.5%	0.2%	34.0%
Animal (except Poultry) Slaughtering	311611	28	288	$32,176	0.6%	0.3%	25.4%
Flat Glass Manufacturing	327211	8	284	$65,242	5.9%	12.1%	30.4%
Cane Sugar Manufacturing	311314	1	282	N/A	4.5%	3.4%	17.4%
Adhesive Manufacturing	325520	18	274	$64,249	1.0%	0.5%	20.7%
Power-Driven Handtool Manufacturing	333991	5	272	$60,526	0.6%	0.3%	76.4%
Seafood Product Preparation and Packaging	311710	16	267	$70,958	1.6%	1.1%	21.5%
Ice Manufacturing	312113	15	261	$45,880	6.9%	3.4%	24.3%
Iron and Steel Pipe and Tube Manufacturing from Purchased Steel	331210	9	258	$50,811	1.9%	0.9%	0.2%
Other Apparel Knitting Mills	315190	33	255	$59,866	1.0%	0.5%	117.2%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Printing Machinery and Equipment Manufacturing	333244	19	253	$56,119	1.1%	0.5%	68.7%
Secondary Smelting and Alloying of Aluminum	331314	6	250	$59,155	2.0%	3.2%	7.4%
Electric Lamp Bulb and Part Manufacturing	335110	3	247	N/A	1.1%	0.7%	56.7%
Steel Investment Foundries	331512	4	244	$55,614	2.3%	1.1%	11.2%
Fertilizer (Mixing Only) Manufacturing	325314	16	243	$59,912	4.0%	2.5%	0.0%
Food Product Machinery Manufacturing	333241	20	243	$66,851	0.5%	0.3%	38.1%
Petroleum Lubricating Oil and Grease Manufacturing	324191	13	236	$57,022	0.7%	1.3%	0.2%
Unlaminated Plastics Film and Sheet (except Packaging) Manufacturing	326113	9	235	$60,384	2.2%	1.0%	67.8%
Support Activities for Oil and Gas Operations	213112	40	234	$75,559	3.3%	2.8%	N/A
Fabricated Pipe and Pipe Fitting Manufacturing	332996	20	234	$118,875	0.9%	0.5%	0.0%
Artificial and Synthetic Fibers and Filaments Manufacturing	325220	2	233	N/A	3.7%	6.3%	53.1%
Chocolate and Confectionery Manufacturing from Cacao Beans	311351	19	224	$34,758	1.0%	0.5%	0.0%
Noncurrent-Carrying Wiring Device Manufacturing	335932	7	220	$59,648	1.0%	0.5%	12.4%
Cut Stock, Resawing Lumber, and Planing	321912	8	215	$47,049	1.9%	1.0%	0.0%
Doll, Toy, and Game Manufacturing	339930	36	214	$54,237	1.0%	0.5%	107.4%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Small Electrical Appliance Manufacturing	335210	8	210	$51,450	0.4%	0.2%	115.7%
Aluminum Foundries (except Die-Casting)	331524	14	206	$45,496	3.3%	4.0%	2.4%
Manufactured Home (Mobile Home) Manufacturing	321991	3	194	N/A	0.6%	0.4%	7.2%
Automatic Environmental Control Manufacturing for Residential, Commercial, and Appliance Use	334512	11	194	$58,034	0.5%	0.3%	42.5%
All Other Nonmetallic Mineral Mining	212399	7	193	$62,196	7.2%	5.9%	76.3%
Software and Other Prerecorded Compact Disc, Tape, and Record Reproducing	334614	55	189	$128,366	1.3%	0.6%	116.2%
Bare Printed Circuit Board Manufacturing	334412	19	188	$63,513	1.7%	0.8%	56.2%
Fats and Oils Refining and Blending	311225	4	187	N/A	0.7%	0.4%	11.9%
Laminated Plastics Plate, Sheet (except Packaging), and Shape Manufacturing	326130	10	185	$57,605	1.6%	0.8%	25.4%
Sawmill, Woodworking, and Paper Machinery Manufacturing	333243	21	185	$50,809	0.8%	0.4%	62.0%
Carbon and Graphite Product Manufacturing	335991	6	185	$56,850	2.9%	1.5%	53.8%
Rope, Cordage, Twine, Tire Cord, and Tire Fabric Mills	314994	4	179	$47,812	3.1%	1.3%	57.2%
Printing Ink Manufacturing	325910	16	168	$67,509	0.9%	0.4%	73.9%
Welding and Soldering	333992	6	159	$72,429	0.8%	0.4%	40.4%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Equipment Manufacturing							
Plumbing Fixture Fitting and Trim Manufacturing	332913	4	156	$73,467	0.3%	0.2%	29.5%
Hardwood Veneer and Plywood Manufacturing	321211	2	154	N/A	1.8%	0.8%	50.1%
Other Metal Valve and Pipe Fitting Manufacturing	332919	7	150	$71,208	1.1%	0.5%	76.5%
Totalizing Fluid Meter and Counting Device Manufacturing	334514	9	147	$66,717	0.5%	0.2%	41.1%
Boat Building	336612	18	146	$51,638	0.7%	0.3%	20.3%
Concrete Pipe Manufacturing	327332	4	141	$90,962	1.3%	0.7%	1.3%
Footwear Manufacturing	316210	16	139	$40,115	0.7%	0.3%	97.7%
Nonferrous Metal (except Aluminum) Smelting and Refining	331410	11	134	$70,349	2.6%	4.0%	136.0%
Rubber and Plastics Hoses and Belting Manufacturing	326220	6	130	$68,659	1.4%	0.7%	70.3%
Drilling Oil and Gas Wells	213111	22	125	$54,244	1.7%	1.6%	N/A
Computer Storage Device Manufacturing	334112	10	118	$81,042	0.5%	0.2%	108.7%
Narrow Fabric Mills and Schiffli Machine Embroidery	313220	11	111	$57,173	2.5%	1.5%	100.3%
Nonferrous Metal Die-Casting Foundries	331523	10	109	$68,085	3.1%	3.2%	4.0%
Other Lighting Equipment Manufacturing	335129	14	108	$65,265	0.5%	0.2%	76.4%
Custom Compounding of Purchased Resins	325991	6	104	$44,440	1.6%	0.7%	28.6%
Motorcycle, Bicycle, and Parts Manufacturing	336991	15	101	$48,508	0.3%	0.2%	61.6%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Dried and Dehydrated Food Manufacturing	311423	9	100	$50,658	1.8%	1.2%	19.8%
Nonferrous Forging	332112	2	99	N/A	2.0%	1.0%	8.5%
Natural Gas Extraction	211130	13	97	$97,586	3.3%	2.8%	61.3%
Other Nonferrous Metal Foundries (except Die-Casting)	331529	7	92	$55,722	1.9%	0.9%	0.1%
Rubber Product Manufacturing for Mechanical Use	326291	5	86	$55,474	1.6%	0.7%	1.5%
Powder Metallurgy Part Manufacturing	332117	4	86	$74,342	3.0%	1.5%	4.5%
Scale and Balance Manufacturing	333997	4	86	$58,576	0.5%	0.2%	65.0%
Tire Retreading	326212	7	77	$50,695	1.7%	0.9%	1.7%
All Other Petroleum and Coal Products Manufacturing	324199	2	75	N/A	1.8%	45.5%	1.4%
Nitrogenous Fertilizer Manufacturing	325311	4	69	$86,785	7.4%	11.8%	40.7%
Ethyl Alcohol Manufacturing	325193	1	66	N/A	6.8%	11.0%	10.3%
Travel Trailer and Camper Manufacturing	336214	6	64	$36,860	0.3%	0.2%	14.5%
Women's Handbag and Purse Manufacturing	316992	16	63	$42,789	0.7%	0.3%	102.7%
Fastener, Button, Needle, and Pin Manufacturing	339993	9	63	$51,539	2.2%	1.1%	42.5%
Custom Roll Forming	332114	4	59	N/A	1.6%	0.8%	4.5%
Tortilla Manufacturing	311830	7	58	$37,262	1.6%	0.9%	10.8%
Reconstituted Wood Product Manufacturing	321219	4	58	$60,377	5.2%	4.1%	31.5%
Knit Fabric Mills	313240	9	57	$42,733	2.3%	1.3%	80.3%
Plastics Plumbing Fixture Manufacturing	326191	3	55	N/A	1.0%	0.5%	7.2%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Household Furniture (except Wood and Metal) Manufacturing	337125	9	53	$45,754	0.9%	0.4%	70.8%
Copper, Nickel, Lead, and Zinc Mining	212230	2	50	N/A	8.0%	7.1%	34.6%
Storage Battery Manufacturing	335911	5	42	$83,673	1.9%	1.2%	73.9%
Carpet and Rug Mills	314110	5	40	$111,737	1.4%	0.7%	33.1%
All Other Transportation Equipment Manufacturing	336999	8	40	$48,481	0.5%	0.2%	25.2%
Wood Preservation	321114	6	39	$57,306	0.9%	0.6%	7.2%
Crude Petroleum Extraction	211120	11	37	$50,164	3.3%	2.8%	61.3%
Asphalt Shingle and Coating Materials Manufacturing	324122	3	36	N/A	1.2%	1.8%	6.2%
Rendering and Meat Byproduct Processing	311613	5	34	$57,958	5.0%	3.6%	35.6%
Mining Machinery and Equipment Manufacturing	333131	2	33	N/A	1.5%	0.7%	57.1%
Motor Vehicle Seating and Interior Trim Manufacturing	336360	4	31	N/A	0.5%	0.2%	26.2%
Support Activities for Nonmetallic Minerals (except Fuels) Mining	213115	3	31	$79,479	3.3%	2.8%	N/A
Engineered Wood Member (except Truss) Manufacturing	321213	1	30	N/A	2.0%	1.0%	31.4%
Steel Wire Drawing	331222	3	28	$44,814	1.9%	0.9%	30.4%
Steel Foundries (except Investment)	331513	4	25	$47,763	4.0%	2.0%	6.2%
Breakfast Cereal Manufacturing	311230	6	23	$42,753	1.4%	0.8%	11.6%
Petroleum Refineries	324110	4	23	N/A	1.3%	1.4%	24.2%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Fiber, Yarn, and Thread Mills	313110	5	22	$20,444	3.5%	1.4%	37.5%
Creamery Butter Manufacturing	311512	3	21	$28,029	1.0%	0.6%	6.8%
Surface Active Agent Manufacturing	325613	5	21	$52,317	1.9%	1.4%	78.3%
Burial Casket Manufacturing	339995	1	17	N/A	1.8%	0.8%	22.7%
Explosives Manufacturing	325920	4	15	$78,937	1.6%	0.9%	36.5%
Ammunition (except Small Arms) Manufacturing	332993	1	15	N/A	1.5%	0.8%	35.5%
Industrial Sand Mining	212322	3	13	$68,645	6.6%	5.6%	22.6%
Support Activities for Metal Mining	213114	4	12	N/A	3.3%	2.8%	N/A
Hosiery and Sock Mills	315110	4	12	$47,745	3.1%	1.4%	78.1%
Major Household Appliance Manufacturing	335220	2	12	N/A	0.5%	0.3%	55.7%
Light Truck and Utility Vehicle Manufacturing	336112	2	11	N/A	0.2%	0.1%	14.1%
Soybean and Other Oilseed Processing	311224	4	9	$47,128	1.2%	0.8%	33.1%
Crushed and Broken Granite Mining and Quarrying	212313	1	5	N/A	6.4%	5.4%	0.0%
Kaolin and Ball Clay Mining	212324	1	5	N/A	12.9%	10.2%	70.0%
Clay and Ceramic and Refractory Minerals Mining	212325	1	5	N/A	9.0%	7.8%	53.9%
Malt Manufacturing	311213	2	5	N/A	3.3%	2.1%	34.3%
Pulp Mills	322110	2	5	N/A	6.2%	7.8%	93.6%
Automobile Manufacturing	336111	3	5	N/A	0.2%	0.1%	76.9%
Bituminous Coal and Lignite Surface Mining	212111	0	0	$0	7.9%	7.9%	0.2%
Bituminous Coal Underground Mining	212112	0	0	$0	3.9%	2.2%	81.5%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Anthracite Mining	212113	0	0	$0	7.6%	7.8%	19.9%
Iron Ore Mining	212210	0	0	$0	10.8%	8.8%	38.5%
Gold Ore Mining	212221	0	0	$0	11.7%	9.8%	2.2%
Silver Ore Mining	212222	0	0	$0	11.7%	9.8%	4.6%
Uranium-Radium-Vanadium Ore Mining	212291	0	0	$0	10.8%	8.8%	101.6%
All Other Metal Ore Mining	212299	0	0	$0	10.8%	8.8%	101.6%
Potash, Soda, and Borate Mineral Mining	212391	0	0	$0	7.5%	6.8%	2.4%
Phosphate Rock Mining	212392	0	0	$0	7.6%	5.7%	10.0%
Support Activities for Coal Mining	213113	0	0	N/A	3.3%	2.8%	N/A
Rice Milling	311212	0	0	$0	1.6%	0.8%	48.2%
Wet Corn Milling	311221	0	0	$0	5.3%	8.5%	27.7%
Beet Sugar Manufacturing	311313	0	0	$0	4.5%	3.4%	17.4%
Softwood Veneer and Plywood Manufacturing	321212	0	0	$0	3.2%	1.7%	28.7%
Newsprint Mills	322122	0	0	$0	6.0%	0.6%	71.3%
Petrochemical Manufacturing	325110	0	0	$0	3.8%	37.5%	8.7%
Cyclic Crude, Intermediate, and Gum and Wood Chemical Manufacturing	325194	0	0	$0	2.9%	33.4%	92.7%
Phosphatic Fertilizer Manufacturing	325312	0	0	$0	4.0%	1.5%	78.3%
Lime Manufacturing	327410	0	0	$0	19.1%	118.2%	6.0%
Small Arms Ammunition Manufacturing	332992	0	0	$0	1.2%	0.6%	23.5%
Blank Magnetic and Optical Recording Media Manufacturing	334613	0	0	$0	1.3%	0.6%	124.2%
Truck Trailer Manufacturing	336212	0	0	$0	0.5%	0.2%	28.5%
Motor Home Manufacturing	336213	0	0	$0	0.3%	0.2%	15.1%

U.S. Industry		NYS Payrolled Locations	NYS Jobs	Ave. Worker Wages (Annualized)	Energy Intensity		Trade Intensity
Guided Missile and Space Vehicle Manufacturing	336414	0	0	$0	0.4%	0.2%	9.6%
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing	336415	0	0	$0	0.5%	0.3%	17.5%
Military Armored Vehicle, Tank, and Tank Component Manufacturing	336992	0	0	$0	0.5%	0.3%	27.8%

Sources and Assumptions to Identify Industry Intensities and Related Trades

A. Data Sources

- Value of Shipments, Electricity and Fuel Expenditures:
  - U.S. Annual Survey of Manufacturers (2018)
  - U.S. Economic Census: Mining (2017)
- Imports and Exports:
  - U.S. International Trade Commission (2018)
- Electricity and Fuel Consumption:
  - U.S. EIA Manufacturing Energy Consumption Survey (2018)
  - U.S. Annual Survey of Manufacturers (2018)
  - U.S. Economic Census (2017)
- Process Emissions:
  - **Emissions factors:**
    - IPCC Emissions Factors Database
    - U.S. EPA Office of Air & Radiation, *Estimation of Eligible Sectors and Emissions under H.R. 2454* (2010)
  - **Global Warming Potential source:**
    - Intergovernmental Panel on Climate Change (IPCC), Fifth Assessment (AR5) 20-year figures
  - **Pricing**
    - International Monetary Fund Commodity Pricing
    - United States Geological Survey
- Employment, Establishments and Worker Wages
  - New York State Department of Labor, Quarterly Census of Employment and Wages (QCEW), Q3 2020
  - EMSI Data Run 2021.1, QCEW Data 2020 Q2 (most recent)
- Occupations
  - New York State DOL Occupational Employment Statistics (OES) survey, 2016-2019.

B. Other Inputs:

- Value of Carbon:
    - New York State DEC Value of Carbon Guidance: $125 (2020)
- GHG Emission Factors
    - A combination of U.S.-level and New York State-specific factors were applied to estimate electricity, fuel combustion emissions and non-combustion process emissions across industries.

C. Key Limitations:

- Industry data was available at the U.S.-level only
- Industry data was available for Manufacturing, Mining sectors only
- Certain data was unavailable at 6-digit NAICS industry and has been estimated based on 4-digit or 5-digit NAICS-level.
- Trade data was available at the international trade-level only
- Electricity and fuel combustion GHG emissions were based on estimates of the amounts of electricity and fuel consumed.
- Process GHG emissions were estimated only for a subset of industries likely to have significant process emissions based on estimated production volumes.
- The New York State Value of Carbon was used to quantify GHG emissions intensity due to the lack of an applicable emission price.