Just Transition Working Group

Recommendations and Materials

New York State Climate Action Council

April 5, 2021

NEW YORK STATE OF OPPORTUNITY. | Climate Action Council

Just Transition Working Group

JTWG Tasks and Deliverables		
Just Transition Principles	Not a statutory requirement	Draft research-based, New York-specific principles of a just transition for purposes of guiding WG/AP recommendations to the CAC
Workforce Development & Training	Statutory requirement	Make recommendations on how to build talent pipelines that focus on the trades, disadvantaged communities and underrepresented segments of the population, and transitioning power plant workers, and public sector employees, including with respect to the transferability of skills
Business Impacts	Statutory requirement	Subgroup formed to identify energy-intensive industries and related trades; advise on the potential impacts of carbon leakage risk; develop recommendations on issues and opportunities
Power Plant Inventory & Site Reuse	Statutory requirement	Subgroup formed to lead development of 1) power plant inventory and 2) Issues & Opportunities – identifying issues and opportunities presented by site reuse
Jobs Study	Statutory requirement	Analyze a broad set of employment impact questions related to achieving the statute's goals (*ongoing, anticipated complete at the end of 2021*)

Just Transition Principles

Just Transition Principles (1 of 2)

Category	Principle Language
Stakeholder-Engaged Transition Planning	Engage a diverse range of stakeholders via early, inclusive engagement in communities' transitions to local low-carbon economies, including New York's workforce and the State's disadvantaged communities.
Collaborative Planning for a Measured Transition Toward Long-Term Goals	Encourage collaborative state and community-based long-term planning, capacity building, and robust social dialogue in order to ensure a gradual and supported transition.
Preservation of Culture and Tradition	Ensure that transition plans, policies, and programs reflect and respect local wisdoms, cultures, and traditions, including recognition of indigenous sovereignty.
Realize Vibrant, Healthy Communities Through Repair of Structural Inequalities	Seek to lift up New Yorkers in the transition to a low-carbon economy by implementing transition policies and programs that promote cross-generational prosperity and gender and racial equity, in recognition of the disproportionate burden of environmental pollution and climate change on disadvantaged communities.
Equitable Access to High Quality, Family-Sustaining Jobs	Promote the creation of high-quality, family-sustaining jobs, including union jobs, and ensure that new jobs are created in transitioning and disadvantaged communities, connecting workers to employment opportunities through career services, skills training, and infrastructure investments.

Just Transition Principles (2 of 2)

Category	Principle Language
Redevelopment of Industrial Communities	Promote diversified, strengthened economies in the transition to a low-carbon economy, examine opportunities for community-centered ownership structures, and promote industry recovery, retention, and growth for regions and sectors in transition.
Development of Robust In-State Low-Carbon Energy and Manufacturing Supply Chain	Develop a robust in-state low-carbon supply chain, spanning full product lifecycles, to increase focus on exporting low- and no-carbon products and to ensure that jobs in these emerging sectors become more accessible to the local workforce and to disadvantaged communities.
Climate Adaptation Planning and Investment for a Resilient Future	Integrate climate adaptation into transition planning, including through promotion of community resilience and investment in sustainable infrastructure.
Protection and Restoration of Natural and Working Lands Systems & Resources	Promote the restoration, conservation, and resiliency of the State's agricultural and natural systems, improving local food security and supply and fostering healthy ecosystems, particularly in disadvantaged communities through sustainable land and natural resource use.
Mutually-Affirming Targets for State Industrialization & Decarbonization	Implement decarbonization policies that simultaneously bolster industry retention and sustainable economic development and growth, and ensure that economy-wide programs and policies address the social, environmental, and economic challenges of workers and communities in transition.

Initial Workforce Recommendations

Just Transition Working Group Workforce Recommendations

- CLCPA: The Working Group shall…
  - *…advise the council on issues and opportunities for workforce development and training related to energy efficiency measures, renewable energy and other clean energy technologies, with specific focus on training and workforce opportunities for disadvantaged communities, and segments of the population that may be underrepresented in the clean energy workforce such as veterans, women and formerly incarcerated persons;*
  - *…identify sector specific impacts of the state's current workforce and avenues to maximize the skills and expertise of New York state workers in the new energy economy;*
  - *…advise the council and conduct stakeholder outreach on any other workforce matters directed by the council;*
  - ***prepare and publish recommendations to the council on how to address: …. workforce development for trade-exposed entities, disadvantaged communities and underrepresented segments of the population***
- These workforce recommendations:
  - Are preliminary/initial based on input from the JTWG, CAC Advisory Panels and stakeholder input
  - Include "no regrets" strategies that will be useful across pathways scenarios/scoping plans
  - Build on activities already underway by NYSERDA/NYSDOL, others and address gaps
- Reminder:
  - JTWG also charged with conducting a holistic climate Jobs Study, which will inform more specific recommendations to come from the JTWG upon completion, including much more detailed granularity about workforce opportunities and needs by sector.
  - Outputs from that Jobs Study will be available over the course of 2021 to inform related analyses, with the full study deliverable expected to be complete by the end of 2021

Enabling Initiatives

Initiatives and components required for delivery	Implementation Lead	Time to Develop/Launch	Other key stakeholders

1) **Direct Displaced Worker Support:**
• Training fund, On-the-Job Training (OJT), job fairs
• More advanced support where facility closures are known ahead of time
• Implement training and other support services while individuals are still working; leverage decarbonization-related roles at employers where appropriate (e.g., where business lines align)
  • Retention: need to *retain* workers at plants where continued operation needed, as well as *retrain* workers
  • Leverage opportunities at dual-commodity utilities
• Identify distinct strategies and responses for key existing traditional energy sectors: Electric Power Generation, Transmission, Distribution, Storage Fuels, Motor Vehicles
  • Recommended: Survey of conventional power plant workforce to identify career status, future interests, timing needs, and other considerations
	NYS DOL	6-18 months	NYSERDA, DPS, NYPA, unions, Workforce Dev. Institute, developers, training organizations

Enabling initiatives

Initiatives and components required for delivery	Implementation lead	Time to Develop/Launch	Other key stakeholders
2. **Further Evaluate Labor Standards** (and reach implementation where possible) - Promoting good wages, benefits, local and targeted hiring, employer-led pre-apprenticeship and apprenticeship training through the following, where appropriate, feasible, and permitted by law: **Project Labor Agreements, and Community Benefits/Workforce Agreements**	NYS DOL	6-12 months	NYSERDA, labor unions, clean energy developers and contractors, Workforce Dev. Institute
3. **Targeted Financial Support for Businesses** to address DEI and build an inclusive clean energy economy (OJT, support for recruitment, training, hiring, job retention etc. for Disadvantaged Communities and MWBEs, design and installation firms, community-based organizations, start-ups)	NYSERDA	4-6 months	NYS DOL, MWBEs, Start-ups, ESD, Chambers of Commerce
4. Develop Climate Justice and Clean Energy **Training Curriculum and Programs** with focus on Disadvantaged Communities: Fund programs for K-12 Schools, Technical/P-TECH, Community Colleges and 4-year Colleges/Universities	NYSERDA	12-18 months	NYS DOL, SUNY, CUNY, NYPA, SED, representatives from K-12 schools, BOCES

Enabling initiatives

Initiatives and components required for delivery	Implementation lead	Time to Develop/Launch	Other key stakeholders
5. Comprehensive Career Pathway Programs ***Future Workers (primarily entry-level):*** Youth Build skills development programs, Job Corp programs, youth apprenticeships, pre-apprenticeships and internships (16-24 yr. olds) • Career awareness and supportive services for job placement • Climate Justice Job Corp Fellowships (entry-level and transitioning workers) and OJT ***Existing Workers (transitioning fossil fuel workers, manufacturers, clean energy workers, CBOs, MWBEs, SDVOBs, state/public workforce, etc.):*** • Technical Upskilling (curriculum and training equipment) • Career Advancement and management/leadership training	NYSERDA	3-15 months	NYS DOL, SUNY, CUNY, community-based orgs, labor unions, trade organizations, manufacturing associations including MACNY

Enabling Initiatives

Initiatives and components required for delivery	Implementation lead	Time to Develop/Launch	Other key stakeholders
6. Community Engagement, Stakeholder Input, Market Assessments			
Complete Jobs Study	NYSERDA	Ongoing	CAC, Advisory Panels and Working Groups
Continued stakeholder engagement to identify/assess industry demand, training/curriculum needs; facilitating communication/forum to share needs and best practices; supporting industry opportunity awareness and recruitment efforts	NYSERDA and NYS DOL	3-24 months	Unions, developers, manufacturers, building owners training orgs, trades associations, K-12
Fossil Fuel Workers: Understand and leverage transferrable skills with complementary training (in both energy and non-energy roles); surveys to understand worker plans for retirement and interest in retraining opportunities	NYS DOL, NYSERDA, DPS	3-18 months	Unions, trade associations, large project developers, clean energy design and install firms

Enabling strategy summary

Initiative #	Description	Action Type	Ease of Implementation	Cost to Develop & Implement
1	Direct Displaced Worker Support	Enabling	Medium/Difficult	$$
2	Labor Standards: PLAs and Community Agreements	Enabling	Medium/Difficult	--
3	Targeted Financial Support for Businesses	Enabling	Easy	$
4	CJ and CE Training Curriculum and Programs	Enabling	Medium	$
5	Career Pathway Programs (new & existing workers)	Enabling	Easy	$
6	Community Engagement, Stakeholder Input, Market Assessments	Enabling	Easy/Medium	$

Energy-Intensive Industries and Related Trades Identification

Objective

Climate Leadership and Community Protection Act, § 75-0103:

> "The Just Transition Working Group shall...Identify **energy-intensive industries** and **related trades**..."

Measures for Assessing Industries

A. Energy intensity: the ratio of an industry's *energy costs* relative to its *size*, or economic activity.

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

B. Emissions intensity: the ratio of an industry's *emissions produced* relative to its *size*, or economic activity.

$$\frac{\text{Emissions (tCO2e)} \times \$ \text{ Value of Carbon}}{\$ \text{ Value of Shipments, Sales or Revenues}} = \% \text{ Emission Intensity}$$

C. Trade exposure: the ratio of an industry's cross-border *trade activity* relative to its total market *size*.

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

Identifying Industries/Trades in NYS: Data Sources, Inputs

> **Key Data Sources – Energy-Intensive Industries:**

- Value of Shipments, Electricity and Fuel Expenditures and Consumption:
  - U.S. Annual Survey of Manufacturers (2018)
  - U.S. Economic Census: Mining (2017)
  - U.S. EIA Manufacturing Energy Consumption Survey (2018)
- Imports and Exports:
  - U.S. International Trade Commission (2018)
- 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

> **Key Data Sources – Related Trades:**

- 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 Department of Labor Occupational Employment Statistics (OES) Survey, 2016-2019

> **Other Inputs:**

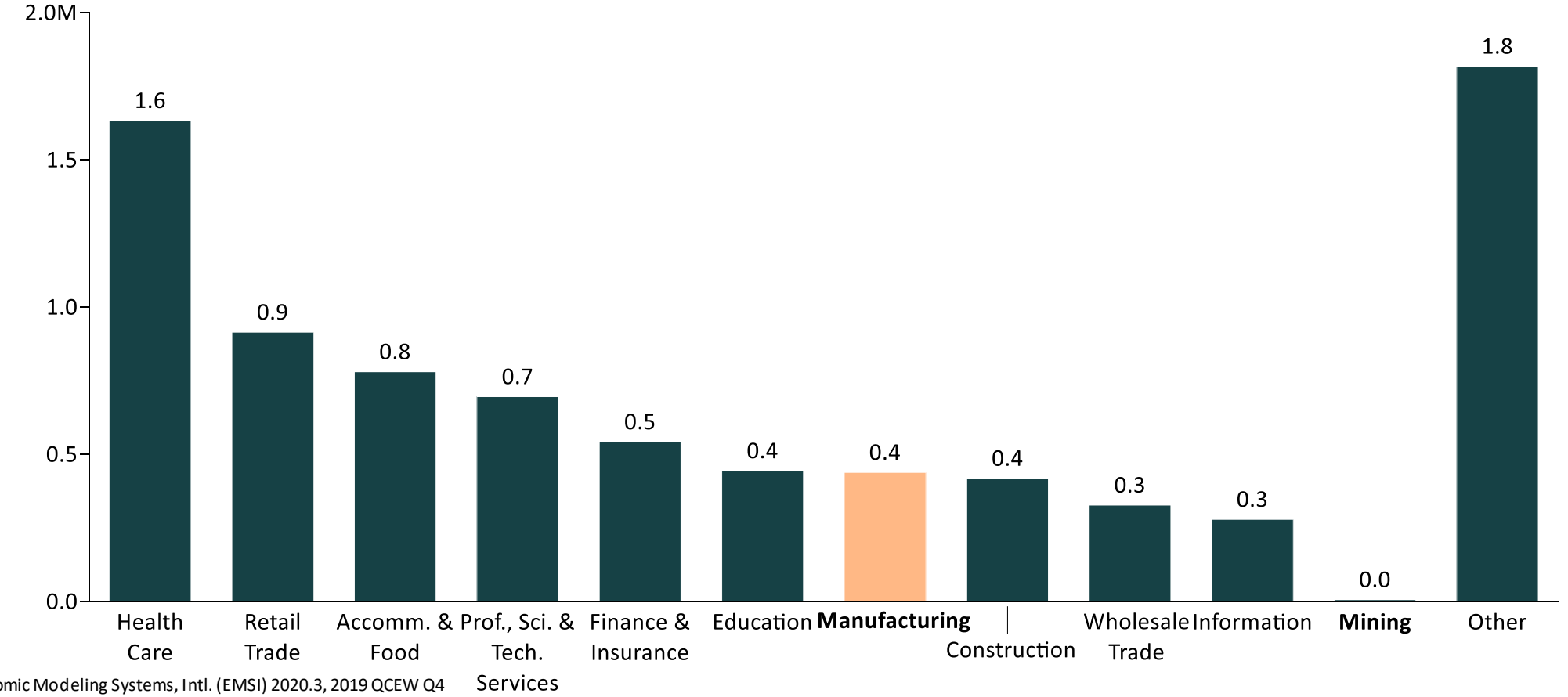
- Value of Carbon:
  - NYS DEC Value of Carbon Guidance: $125 (2020)
- GHG Emission Factors
  - A combination of U.S.-level and NYS-specific factors were applied to estimate electricity, fuel combustion emissions and non-combustion process emissions across industries.

Identifying Industries/Trades in NYS: Key Limitations

- Industry data was available at U.S.-level only
- Industry data was available for Manufacturing, Mining only
- Certain data was unavailable at 6-digit NAICS industry and was estimated based on 4-digit or 5-digit NAICS sector-level.
- Trade data was available at the international trade-level only
- Electricity and fuel combustion GHG emissions were based on estimates of 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 NYS value of carbon was used to quantify GHG emissions intensity due to the lack of an applicable emission price.
- Data was compiled across different sources and reporting years.

Energy-intensive industries are concentrated in the Manufacturing and Mining sectors

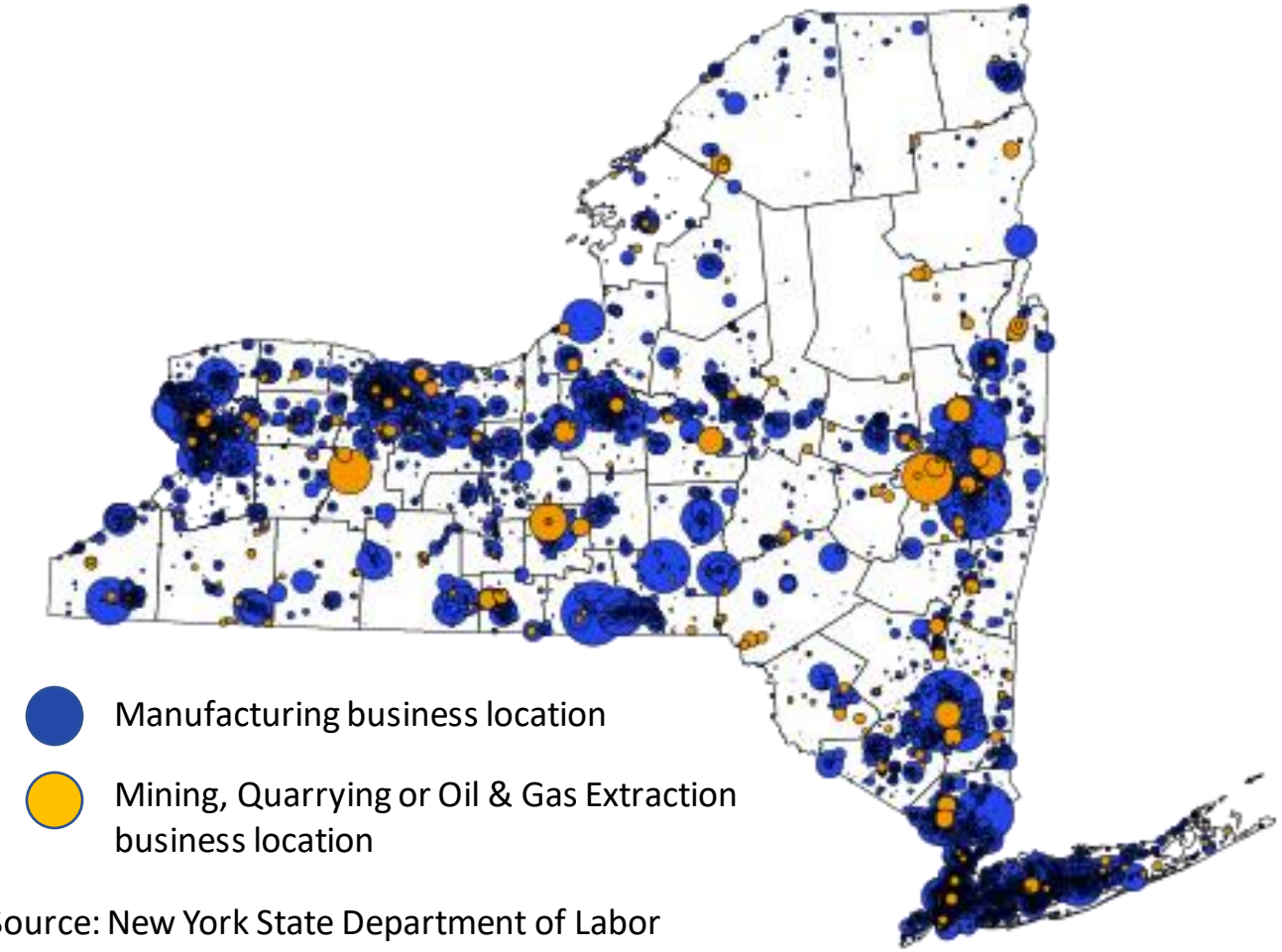
Private Sector Employment in New York State
(Millions of Jobs, 2019)



Source: Economic Modeling Systems, Intl. (EMSI) 2020.3, 2019 QCEW Q4

Note: Other includes Agriculture, Forestry, Utilities, Transportation, Warehousing, Real Estate, Management of Companies, Admin and Support, Arts, Entertainment and Other Services.

Manufacturing and Mining Locations Span New York State



Source: New York State Department of Labor

<u>Manufacturing and Mining Industries in New York State:</u>

- ~17,000 Business Locations
- ~404,000 Jobs
  - ~399,000 Manufacturing
  - ~5,000 Mining, Quarrying or Oil & Gas Extraction
- Top Manufacturing industries (by jobs)
  - Pharmaceutical Preparation Manufacturing
  - Commercial Printing (except Screen and Books)
  - All Other Plastics Product Manufacturing
  - Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing
  - Machine Shops

Top New York State Occupations within Manufacturing Industries

SOC Code	Occupational Title	Employment	% Of Industry 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%

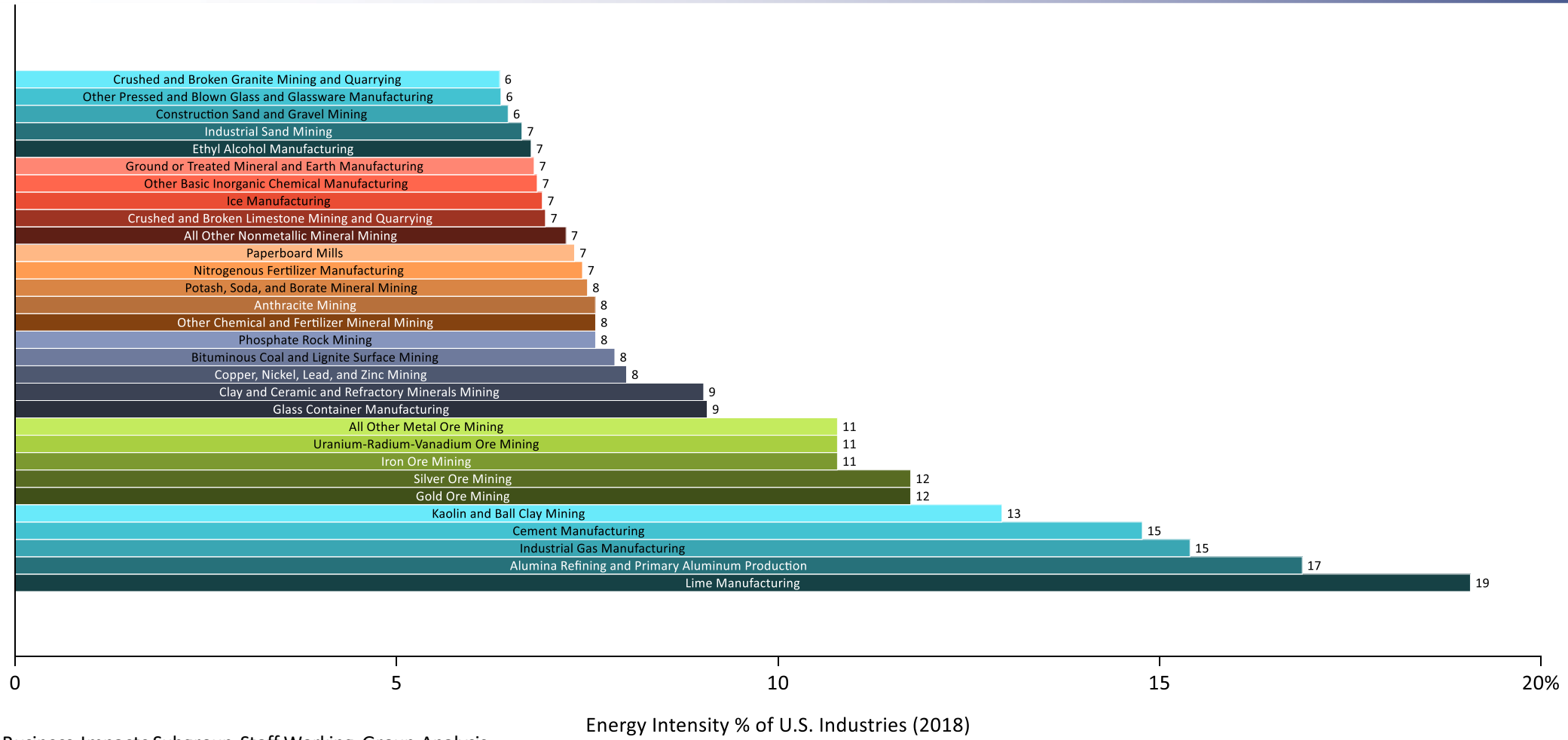
Source: New York State Department of Labor, Occupational Employment Statistics (OES) survey, 2016-2019.

Top New York State Occupations within Mining & Natural Resources

SOC Code	Occupational Title	Employment	Percent Of Industry 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.

Preliminary Estimates:
Energy Intensity by U.S. Industry – Top 30 (2018)



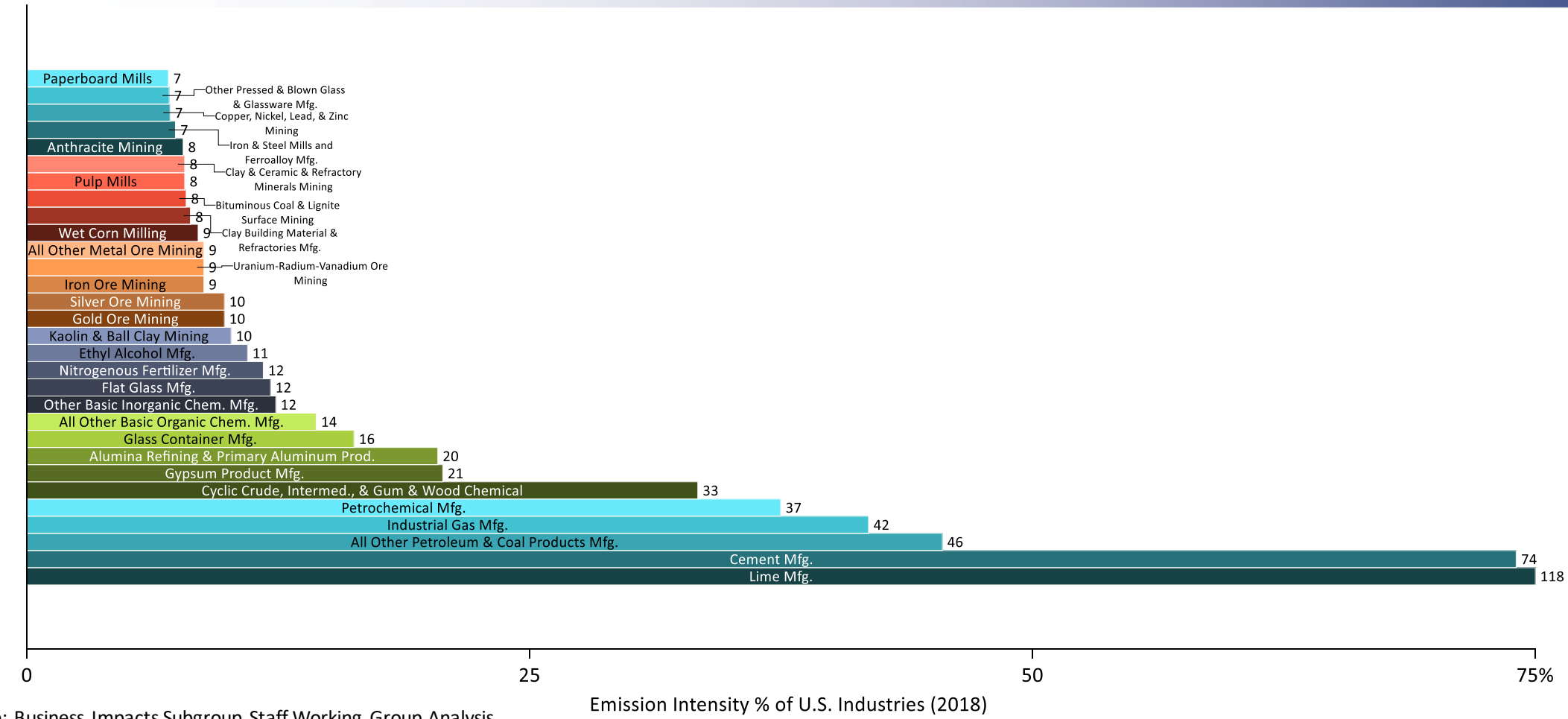
Source: Business Impacts Subgroup Staff Working Group Analysis.
Note: Energy intensity is defined as the sum of fuel and electricity expenditures by each industry divided by its value of shipments.

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.
Note: *Indicates data is not releasable under DOL confidentiality protocols.

Preliminary Estimates:
Emission Intensity by U.S. Industry – Top 30 (2018)



Source: Business Impacts Subgroup Staff Working Group Analysis.

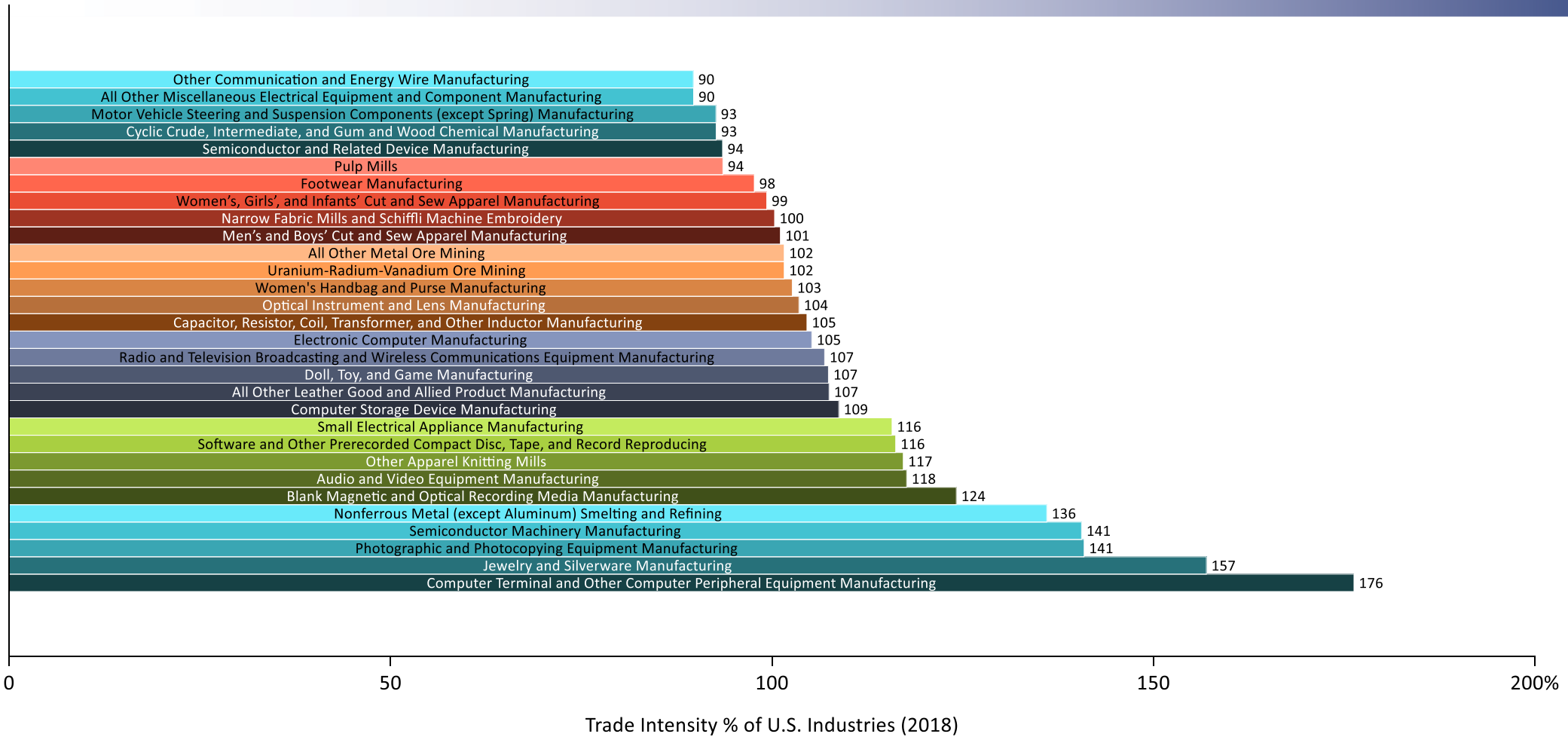
Notes 1. Emission intensity is defined for each industry as: i) the product of: a) the sum of direct fuel, direct non-combustion process and indirect electricity emissions; and b) the NYS value of carbon $125; ii) divided by its value of shipments. 2. X-axis has been capped at 75% to enhance visibility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

Top New York State Occupations within Top 30 U.S. Industries by *Emission 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	*	*

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

Preliminary Estimates:
Trade Intensity by U.S. Industry – Top 30



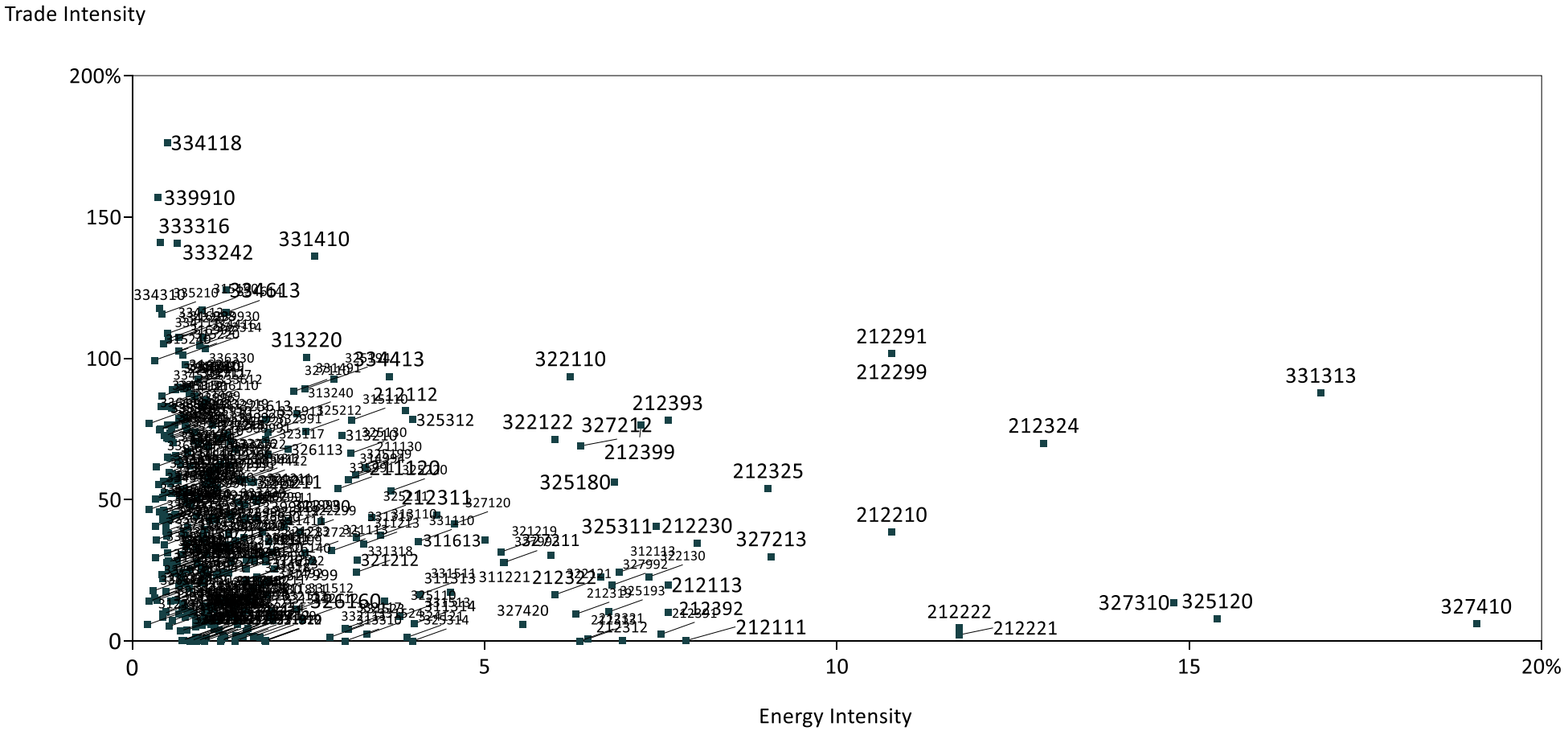
Source: Business Impacts Subgroup Staff Working Group Analysis
Note: Trade intensity is defined as each industry's sum of imports and exports divided by the sum of its value of shipments and imports.

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	*	*

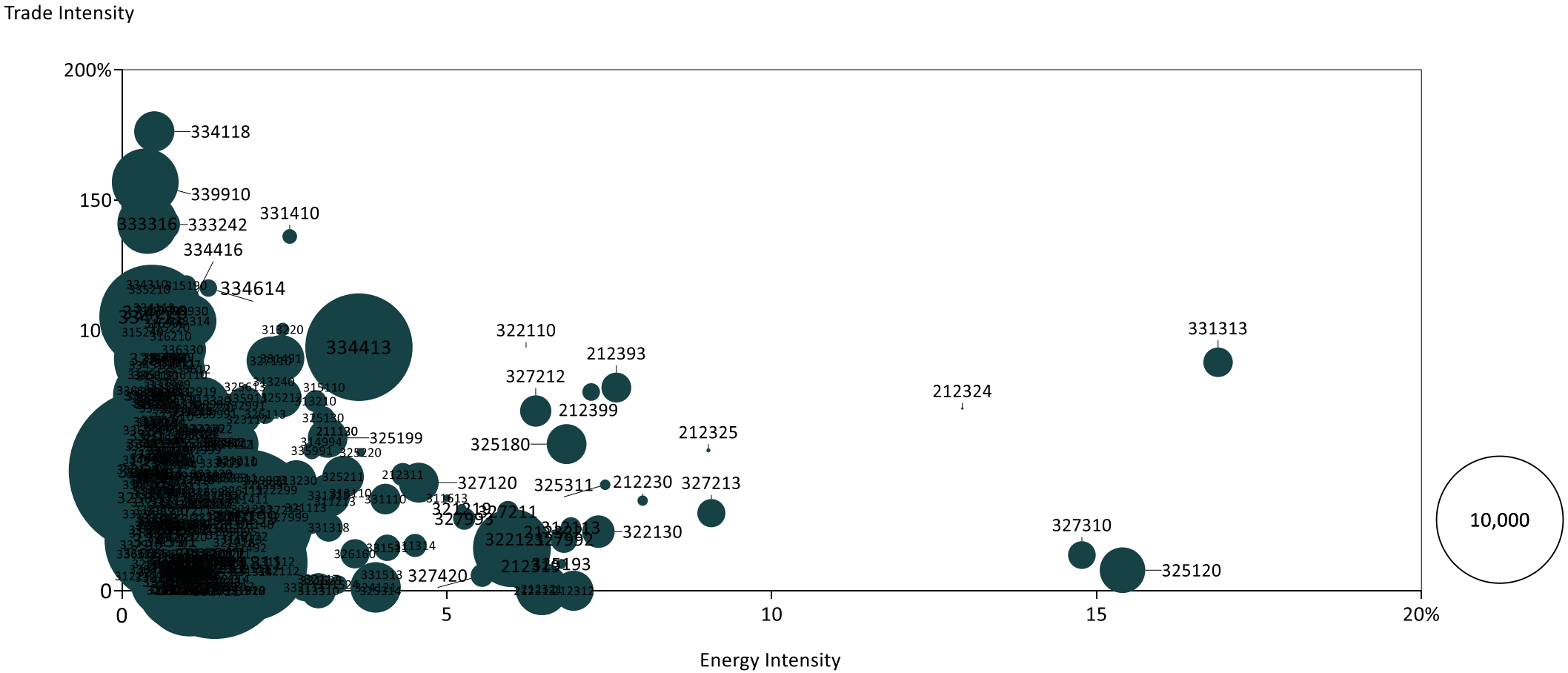
Source: New York State Department of Labor, Occupational Employment Statistics (OES) survey, 2016-2019.
Note: *Indicates data is not releasable under DOL confidentiality protocols.

Preliminary Estimates: Energy vs. Trade Intensity U.S. Manufacturing and Mining Industries (2018)



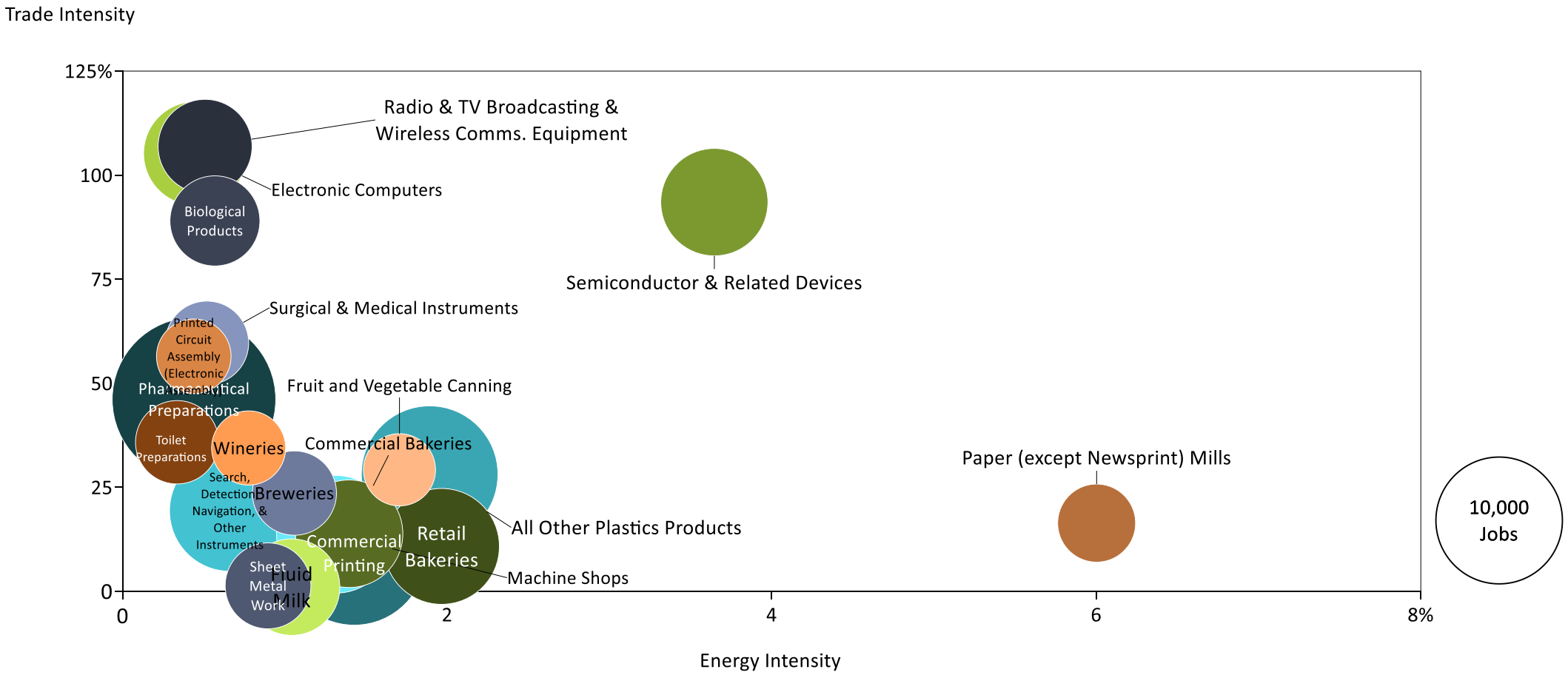
Source: Business Impacts Subgroup Staff Working Group Analysis
Note: Industries are denoted by six-digit NAICS code.

Preliminary Estimates: Energy vs. Trade Intensity by NYS Employment: Manufacturing and Mining



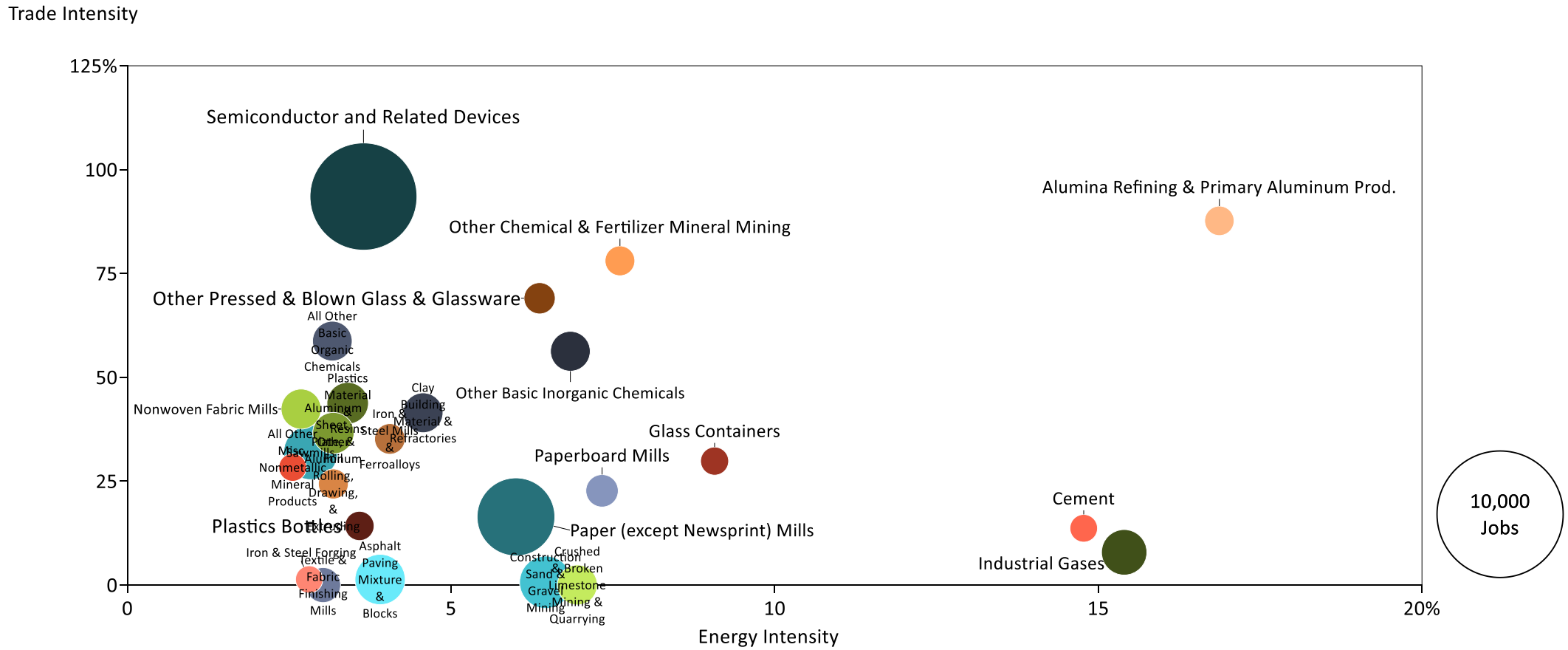
Source: Business Impacts Subgroup Staff Working Group Analysis
Note: Industries are denoted by six-digit NAICS code.

Preliminary Estimates: Energy vs. Trade Intensity Top 20 Manufacturing Industries by NYS Jobs



Source: Business Impacts Subgroup Staff Working Group Analysis
Note: Includes top 20 largest Manufacturing industries regardless of energy or trade intensity; no Mining industries were in the top 20.

Preliminary Estimates: Energy vs. Trade Intensity NYS Industries >2.5% Energy Intensity, >450 Jobs



Source: Business Impacts Subgroup Staff Working Group Analysis.
Note: Energy intensity and jobs thresholds used only for data visualization and do not represent formal criteria.

Challenges and Opportunities

Just Transition Workstream: Business Challenges and Opportunities

Scope workstream: Business Impacts	
Context:	The Business Impacts subgroup identified the following for consideration by the Just Transition Working Group. These suggestions should be viewed as preliminary, broadly crafted for the whole of industry based on a general understanding of what a transition to a clean energy economy could mean, and warrant further exploration on a sector and subsector basis before prescribing any course of action. In accordance with the statute and to complement the EITE panel, these are not mitigation or enabling strategies (i.e., result in direct or indirect sectoral greenhouse gas emissions reductions). Potential national-level policy should be monitored for its implications to state industries and proposed courses of action provided here.
Statutory objectives:	Recommendations on how to address: • Issues and opportunities related to the energy intensive and trade exposed entities • Measures to minimize the carbon leakage risk and minimize anti-competitiveness impacts of any potential carbon policies and energy sector mandates
Deliverable:	An initial identification and cataloging of challenges, including leakage, and opportunities with a menu of potential options for minimization (challenges) and realization (opportunities).

Business Challenges and Opportunities List

Catalog List	
Challenges 1. Business and emissions leakage 2. Electricity/fuel costs, system reliability	**Potential Strategies** 1a. Incentives for early action, benchmarks 1b. Cap and invest*, output-based rebates* 2. Low cost, clean power programs, energy efficiency, on-site renewable electricity and energy storage,
Opportunities 1. Build and foster strategic partnerships 2. Promote low carbon products	**Potential Strategies** 1. Consortia, economic development groups, partnerships with K-12, technical schools, and colleges, business outreach and awareness 2. Recognition, procurement policies, regional/national cooperation to expand markets for low carbon products

**Potential strategies should an emissions scheme applicable to industry be contemplated*

Business Challenges and Strategies

Challenge:	**Business and Emissions Leakage** (1 of 5)
Nature of the challenge:	• When there is an increase in greenhouse gas emissions (GHGs) in one jurisdiction as a result of an emissions reduction in another jurisdiction. • Leakage can occur when economic activity that emits GHGs relocates from a jurisdiction that has adopted climate change mitigation policies to another jurisdiction that has not.
Additional considerations:	• Studies suggest the occurrence of leakage may be less than perceived: most project less than 10% leakage, many project less than 5% leakage (Aldy, 2017).* • The World Trade Organization (WTO) General Agreement on Tariffs and Trade (GATT) limits the nature of economic attraction activity and should be considered in any economic development and retention strategies including clean energy.** • Potential national-level policy should be monitored for its implications to any state-proposed course of action.

** Greg Dotson, Presentation to the Just Transition Working Group, Nov. 2020*

***World Trade Organization, United States – Certain Measures Relating to the Renewable Energy Sector, Report of the Panel, WT/DS510/R, June 27, 2019.*

Business Challenges and Strategies

Challenge:	**Business and Emissions Leakage** (2 of 5)

Potential Strategy	Examples, including case studies
Incentives for Early Action Description: Support early adopters of decarbonization technologies/solutions. Provide a means of inducing or supporting early emission reductions by industrial actors, including reason to act as early technology/solutions adopters. Considerations: • Benchmarking between state-based industries, nationally, globally • Baseline year for emissions reductions • Alignment with other requirements or programs (e.g., Science-based Targets Initiative) • Ensure that early actors are not later penalized for taking early actions (i.e., industrial opportunities only go to those who have not taken early action to reduce emissions) • Treatment of facilities in disadvantaged communities	Extended compliance: Facilities would commit to reducing GHG years ahead of the 2030 or 2050 deadlines and receive an extension for compliance with any DEC drafted regulations for specific sectors. Example: EPA's Hazardous Air Pollutant (HAP) Early Reduction: Program allows a qualifying facility to defer compliance with Maximum Available Control Technology (MACT) standards for 6 years if it reduces HAP emissions by 90 percent (95 percent for hazardous particulate emissions) before the applicable MACT is proposed. Emission Reductions Alberta Shovel-Ready Challenge: Provides funding for industrial emissions reduction pilots, demonstrations, and first-of-its-kind deployment projects that can begin within 60 days. RD&D pilot funding: De-risk initial investment in early-stage technologies and encourage early adoption. Low-cost financing: De-risk initial investment in early-stage technologies and encourage early adoption.

Business Challenges and Strategies

Challenge: **Business and Emissions Leakage** (3 of 5)

Potential Strategy	Examples, including case studies
Set Industry Specific Benchmarks Description: A tool used to compare emissions intensity of production. The benchmark can be used to determine compliance with a strategy or program; it can also be used to determine qualification for incentives. It can be measured on a percentage basis or an output basis. Considerations: • Alignment with reductions in any proposed emissions scheme • Different levels of emissions reductions already achieved by different industries • Benchmarks for fuel, process emissions (e.g., British Columbia) • Benchmarking between state-based industries, nationally, globally (e.g., only two cement manufacturers in NYS) • Connect to crediting early actors • Evolution as industry improves	CA: Uses sector product metrics. In order to account for energy flow carbon costs, adjustment factors were used. Finally, a targeted stringency level was created by the evaluation of production-weighted average emissions intensity for the duration of a historical base period. This evaluation was followed by a target that the benchmark allocate 90% of this stringency level per unit product. EU: For ETS third phase (2013-2020), benchmarks were based on an amount which reflected the average emissions performance of the top 10% of installations which produced that product. The same method was used for the fourth phase, although benchmark values will be updated in order to accurately reflect technological progress (2021-2025 and again for 2026-2030). British Columbia: (Fuel emissions only) The region's carbon tax applies to fuels combusted in industry. A program called CleanBC for Industry allocates funding equivalent to tax paid by industry to incentivize less-polluting operations.

Business Challenges and Strategies

Challenge:	**Business and Emissions Leakage** (4 of 5)

Potential Strategy	Examples, including case studies
Cap and Invest Description: Allowances to pollute are required for industrial emissions Considerations: • Allowances could be structured to allow an on-ramp to full compliance. • Likely easier to implement than a carbon border adjustment. • Cap, bankability, tradability of allowances • Benchmarking between state-based industries, nationally, globally • Treatment of facilities in disadvantaged communities.	California: Distribution through a combination of quarterly auctions and direct distribution (majority sold at auction). Percentage of total emissions covered by distributed emission allowances depends on the industry and facility efficiency in relation to industry intensity benchmarks. Canada: Jurisdictions enact either a price-based system or a cap-and-trade system. For example, in the Nova Scotia cap-and-trade system, industrial facilities receive allowances based on production intensity benchmarks. EU: Sectors and sub-sectors determined to be at risk of significant carbon leakage are allocated a greater share of distributed allowances in comparison to other industries. This policy is projected to continue through 2030.

Business Challenges and Strategy

Challenge: **Business and Emissions Leakage** (5 of 5)

Potential Strategy	Examples, including case studies
Output-based Rebates (OBRs) Description: Receive a payment per unit of production for manufactured goods that fall below an emissions intensity benchmark. This solution potentially reduces the monetary burden of a carbon pricing regulatory scheme. Considerations: • Benchmarking between state-based industries, nationally, globally • Frequently proposed in lieu of a carbon border adjustment mechanism • Eligibility, structure, and level of compensation, including right-sizing the administrative burden relative to benefits • Treatment of facilities in disadvantaged communities	American Clean Energy and Security (ACES) Act: Proposed to grant OBRs to industries with annual carbon dioxide emissions of 731 million metric tons in 2006.* Canadian Output Based Pricing Regulations: Rebate mechanism in Canada's Carbon Tax system for covered facilities generating greater than 50 kilotons CO2e**. Benchmarks are set as a percentage of the production-weighted national average of emission intensity with careful attention to heterogeneity of processes within sectors.

**Kaufman et al., Output-Based Rebates: An Alternative to Border Carbon Adjustments for Preserving US Competitiveness, Dec. 2020.*
***Covered facilities with emissions ranging from 10kt to 50kt CO2e may opt-in.*

Business Challenges and Strategy

Challenge:	**Electricity/Fuel Costs, System Reliability** (1 of 2)
Nature of the challenge:	Electricity and fuel are two important industrial inputs that must be managed to avoid increased operational costs. Severe and sustained price increases may lead to underinvestment and, if sustained for a prolonged period of time, may result in business leakage and job losses. Industry also relies on a stable electricity (generation and transmission) system to power their operations and manufacture goods and provide services.
Additional considerations:	• Electricity and fuel prices are subject to many factors not solely controlled by the State. • Electric system reliability is critical to all economic sectors, including industry. • Power Generation Advisory Panel recommendations for how electricity, fuel costs, and system reliability.

Potential Strategy	Examples, including case studies
Low-Cost, Clean Power Programs Description: Provide access to low cost, clean energy resources to help to reduce emissions associated with industrial electricity demand. Focus in areas/companies with high electricity demand and in-state jobs. Considerations: • NYPA hydropower is a limited resource, already deployed to many EITEs • Building and fostering markets for competitive renewable resources	• NYPA Economic Development Hydropower Programs ○ NYPA Green Jobs Incentive Plan • Washington State: Benefits from low-cost electricity provided by the Grand Coulee Dam

Business Challenges and Strategies

Challenge:	**Electricity/Fuel Costs, System Reliability** (2 of 2)

Potential Strategy	Examples, including case studies
Support On-Site Energy Efficiency, Renewable Electricity Generation, Energy Storage Description: Some industrial users may be able to reduce electricity costs and emissions while securing back-up power by increasing energy efficiency and installing on-site, renewable energy and/or storage. Considerations: • Interconnection • Local capacity/reliability • Use cases/economics	NYSERDA Programs: Flexible Technical Assistance (FlexTech) Program, Commercial and Industrial (C&I) Carbon Challenge, Commercial New Construction, Strategic Energy Management, NY-Sun, Energy Storage, Heat Pumps NYPA Energy Services: Energy Efficiency, Solar PV, Wind, Energy Storage, Micro-Grids, New York Energy Manager, Electric Vehicle Charging Infrastructure and Streetlighting upgrades delivered on a turnkey, advisory and/or service basis. New York Examples: • Pepsi's bottling center in Newburgh has 400kW solar system on the roof • GE Healthcare in Troy has a 950kW solar system • GE Power in Schenectady has a 2.2MW solar system

Business Opportunities and Strategies

Opportunity	**Strategic Partnerships**
Nature of the opportunity:	Businesses, including manufacturers, can produce the goods and services of a clean energy economy. To help businesses understand the opportunity spaces and adopt best practices, outreach to and collaboration among relevant actors (e.g., clean energy developers, manufacturers, state agencies) should be fostered.

Potential Strategy	Examples, including case studies
Partnerships • Consortia • Economic development working groups • Partnerships with K-12, technical schools, colleges • Business outreach and awareness (PEP/MI, Business Council, NYS Economic Development Council, MACNY) Considerations: • Challenges for connecting with companies, including decisionmakers, whose headquarters is outside NY	Partnerships: • Consortia: NY-Battery Energy and Storage Technology (NY-BEST), Offshore Wind R&D Consortium • Economic Development Working Group: NYS working group to facilitate clean economic development and provide consulting. One stop shop for businesses looking to expand, retain or meet CLCPA goals. • NYSTAR-Funded Centers: Stony Brook University, RPI, Syracuse • EPA ENERGY STAR Industrial Partnership: A network of industrial energy managers who share best practices and practical advice across industries in a non-competitive and no-sell environment.

Business Opportunities and Strategies

Opportunity	**Promote Low Carbon Practices and Products**
Nature of the opportunity:	Provide a means of distinguishing goods and services produced with lower greenhouse gas emissions to encourage development, demand, and consumption of such goods and services.

Potential Strategies	Examples, including case studies
Recognition Program Description: Develop a state-focused program to identify and promote best practices and industrial leadership in emissions reduction and low carbon products. Considerations: • Benchmarking **Public Procurement Policies** Description: Develop preferential procurement standards for low-carbon building and other materials as appropriate. **Cooperation to Expand Markets for Low Carbon Products** Description: Coordinate with other states and at a national level to develop mutual mechanisms to support growing markets for low carbon products.	(Recognition) DOE Better Plants: Works with 223 leading manufacturers and water utilities to achieve energy efficiency improvements, providing national recognition, technical support, in-plant trainings, and energy-saving resources to partners. The partners generally set targets to decrease their energy intensity by 25% over a period of ten years. (Recognition) EPA ENERGY STAR: Provides recognition that validates good work, raises awareness of the value of energy management, and drives further energy savings. Manufacturing plants must achieve an ENERGY STAR score of 75 or higher using an industry-specific ENERGY STAR Energy Performance Indicator (EPI). (Procurement, Expanding Markets) Buy Clean California Act: Requires the California Department of General Services to establish maximum acceptable Global Warming Potential (GWP) for various products. (Expanding Markets) Database: State/national database for common standards, Environmental Product Declarations (EPDs) (expanding markets)

Power Plants

Overview of Power Plant Work-Products

Two power-plant deliverables for Just Transition Working Group

> Language from CLCPA:
  - "[the Just Transition Working Group shall] … identify sites of electric generating facilities that may be closed as a result of a transition to a clean energy sector and the issues and opportunities presented by reuse of those sites"

> Two main deliverables:
  - **Power Plant Inventory**
  - **Identification of Issues and Opportunities Presented by Site Reuse**

Issues & Opportunities Presented by Site Reuse

Issues Presented by Power Plant Site Reuse

CLCPA directs JTWG to "identify issues and opportunities presented by site reuse":

> **Issues presented by site reuse:**
- Displaced workforce, and local economic impacts
- Reduced local property tax revenues (County, Municipality, School District)
- Parcel ownership, transfer, and associated factors
- Local planning capacity and community engagement
- Impacts caused by a dormant site being left unattended/unmanaged
- Environmental remediation
- Reliability impacts (current reliability role/contribution)
- Stranded assets and infrastructure impacts

> *Following slides present these issues in more detail*

Reuse Issue: Displaced workforce, local economic impacts

- Workers at fossil fuel facilities **face considerable uncertainty and apprehension** related to the future of their workplace and livelihood. Supporting and providing resources to displaced workers is a **critical element of New York's just transition**, with a need for regular and informative **communications**
- **Existing power plant workforce** is a true jewel of New York State and asset for the future of the energy system, being **highly skilled and trainable**
- It may prove difficult for site reuse/redevelopment to provide **same-site job opportunities** for workers previously employed in power plant operations, aside from certain opportunities in remediation, security
- Identified need for **more advanced outreach and support** to employees well prior to a plant's closure where known, in addition to "rapid response" resources deployed in the months immediately preceding closure
- Recommend focus be on where the **workforce impacts/concerns will be most acute** – e.g., for the mid-career worker with a young family and mortgage, too far from retirement age
  - Activities such as a **state-led survey of workers'** current status, skillsets, plans for retirement, interests in clean energy and other new fields, and other information may be valuable to **inform workforce resources and planning**
  - Recognition that traditional power gen. workforce is not a single unit, and there **will be variability in desires and needs**
- Strong desire to find job placement and training **opportunities for these workers within New York State** as first preference – targeting skills-alignment in both energy and non-energy roles
  - Identified need for **both retraining *and retention***, however, to ensure plants are sufficiently staffed through the remainder of their operational lives.
- Recognize substantial indirect economic impacts in/around plant communities – beyond direct employment

Reuse Issue: Reduced local property tax revenues

- In many instances, major power generation facilities are **significant contributors to the local property tax base** via County, Municipality, School District and other tax payments – sometimes the largest single source of tax revenue (especially in more rural communities)
- The State has recently expanded forward-looking funding for the **Electric Generation Facility Cessation Mitigation Fund**: Press Release - PSC Provides $112.5 Million for Communities Impacted by Aging Power Plant Closures
  - Time availability of awards: awards are available over a seven year period with a potential maximum award of 80% of lost revenues in the first year that decreases by 10% of lost revenues each year, to ultimately end in the seventh year in a potential maximum award of up to 20% of lost revenues.
  - *See re: Huntley: "School, town and county taxes paid by NRG for the Huntley site had shriveled as of last year to just $515,000 combined. A state mitigation fund is providing money to offset the loss of the tax revenue from the plant, but this pool of funding ends in 2023 [for Huntley] – a deadline that looms over the sale process."*
- **Proactive efforts** will need to be taken at the local and state level to do the **long-term budgeting** that accounts for potential future tax revenue losses
  - Recognition that certain opportunities for reuse will have only partial ability to offset previous (power plant) property tax contributions by themselves

Reuse Issue:
Parcel ownership, transfer, and associated factors

- The prospects for reuse of a power plant site is, intuitively, linked to the **status of the site's ownership**, and the active willingness (or more passive cooperation) of the site owner(s) to pursue or allow for redevelopment.
- **Existing property owner(s)** may be directly interested in redeveloping the site, especially as relates to future energy uses at the site. If not, however, options may need to be pursued to transfer parcel ownership and/or subdivide the site to allow for timely **redevelopment by other interested parties**.
  - This is especially true if the existing owner is not interested/motivated to initiate redevelopment swiftly (see Issue: Impacts caused by dormant site)
- In the process of transfer, subdivision, and reuse more generally, the **local zoning status** of the parcel will be a material factor confining reuse opportunities and related requirements
  - In some cases, power plants may predate the adoption of local zoning maps and ordinances, meaning that **parcels may be subject to legacy zoning designations** resulting from the power plant itself, rather than more up-to-date local plans related to the site
  - Zoning/site considerations may create other issues to contend with in reuse; see: parking requirements for Yonkers plant
- **Willing cooperation of adjacent landowners** is also a material factor for the speed and options for reuse, especially for reuse activities requiring greater physical footprint (e.g., solar installations pursuing land lease agreements from neighboring properties)

Reuse Issue:
Local planning capacity and community engagement

- Tackling a major site reuse/development project such as a power plant is a **considerable undertaking for localities**, a **time and resource-intensive planning exercise** posing both technical hurdles and sometimes delicate political challenges
  - But: advance planning can help communities respond to and prepare for power plant closures
- Especially in the midst and wake of COVID-19, **local planning resources and in-house expertise may be constrained** and/or misaligned with the needs related to navigating power plant site reuse
  - State resources will be key to bridge any planning gaps, including via direct grants and resources such as a statewide redevelopment toolkit (see: NYSERDA Technical Assistance).
- A critical element of local planning capacity is to **ensure that local community voices are heard and can contribute** to planning efforts, both as a matter of principle for a Just Transition, and more concretely to ensure that any plans for reuse are designed and shaped with local community benefits in mind – seizing opportunities for site reuse to **repair historical impacts borne locally**
  - Successful community engagement may require balancing of preferences between locality priorities and neighboring residents – to strike an appropriate balance between, e.g., future property taxes and use-cases most beneficial to community residents (to the extent those diverge).

Reuse Issue:
Impacts caused by dormant site

- A driving factor for many localities' pursuit of site reuse may be the desire to **avoid or minimize the amount of time a site lies dormant** – neither operating, providing property tax payments, or being developed for future uses.
- The impacts caused by a dormant site being left unattended/unmanaged can include **fiscal, aesthetic/eyesore, public health and safety, environmental, and abutting parcel concerns**, among others.
  - Proactive communication to community members as to the likely duration of any site dormancy/ vacancy should be considered.
- This issue is not unique to power plants (see, e.g., Bethlehem Steel), but the **risk may be acute for power plant sites**, given often large physical footprints, their visual prominence on waterfronts and other areas of public interest, the presence of high-voltage equipment, and potential environmental remediation concerns

Reuse Issue: Environmental Remediation

- A prerequisite for successful and safe site reuse will in many instances be environmental **assessment and remediation of any harmful site impacts** left behind after plant closure
- These efforts may entail activities such as asbestos abatement, waste removal, other environmental remediation and restoration, including during and after the demolition of any **power plant structures and associated infrastructure** (e.g., fuel delivery and storage)
- The extent of remediation **measures required will vary widely** by site and by plant type
  - For Somerset plant: "a roughly six-month process involving remediation of the coal yard, cleaning out water collection basins, draining, cleaning and disconnecting tanks and having them removed from the state's chemical bulk storage registry, and capping the plant's on-site landfill."
- **Funding to support remediation** activities may require a mix of public and private programs and sources, including federal and state brownfield-related opportunities
  - **Brownfield Opportunity Area (BOA)** program administered by NYS Department of State highlighted as a promising pathway supporting assessment, remediation, and productive reuse.
- Certain environmental remediation needs (e.g., Asbestos) may link back to necessary support due to any plant workers who may have been exposed during their time at the plant

Reuse Issue: Reliability impacts

- Another key factor to be understood for the purposes of both retirement and reuse is **reliability**, encompassing any **current reliability role/contribution** from an existing plant, any **impacts that may arise** due to retirement, and any **future contribution of energy infrastructure** at the site
  - Consider flexibility attributes of resource/fuel diversity, especially during periods of prolonged need (long heat/cold spells)
- Detailed, prescriptive **processes exist at the NYISO** governing the safe retirement of facilities serving the bulk power system, with studies to determine whether a generator deactivation reliability need would result from the deactivation of a facility in question.
  - Large generators must provide **365 days notice** prior to retirement or mothball outage
  - NYISO review of generator deactivation is part of the **Short Term Assessment of Reliability (STAR),** which is performed on a quarterly basis in coordination with Responsible Transmission Owners
  - Example: NYISO issued a report in December 2017 on system reliability impacts of Indian Point Energy Center (IPEC) closure dates in 2020 and 2021, concluding that the plant could close on schedule without negatively impacting reliability.
  - Conversely, plans and schedules for retirement and deactivation could be disrupted in instances where studies do reveal a reliability need that cannot otherwise be resolved in time for planned closure
- In some cases, especially for older plants serving New York City, the **transmission and distribution grid** has been built up based specifically on the locations of existing plants – which has created a need to solve for things like load pockets and transmission security constraints with solutions at or providing power to existing plant location areas

Reuse Issue: Stranded assets and infrastructure impacts

- Site reuse efforts will also have to contend with impacts related to **site assets that may be stranded** in the process of closure and redevelopment
- Regarding a plant itself, the risk of stranded assets **from a ratepayer perspective** is largely mitigated in the New York context, given the restructured nature of our power market
- Beyond the plant's status with respect to financing and investor obligations, **infrastructure serving the plant**, such as fuel transportation and storage, may be rendered obsolete/stranded should their use no longer be needed – these **may include assets owned by public utilities** (electric, gas, water, etc.) and which may have other impacts at the time of plant closure.
- Plant closure may also prompt potential needs for **asset separation**, specifically to separate and disentangle switchyard and substation equipment that will remain owned and operated by the transmission owner after the plant's closure.
  - These separation upgrades will bring benefits but can come with meaningful costs; see: National Grid investments energize ex-Huntley plant's redevelopment potential
- Also a consideration for existing and future infrastructure: **climate vulnerability** of sites and solutions for reuse, requiring the climate-proofing of future site uses, expecting increasingly common and damaging extreme events

Opportunities Presented by Power Plant Site Reuse

JTWG to identify issues and opportunities presented by site reuse

> **Opportunities presented by site reuse:**
  - Repurposing with onsite clean energy resources
  - Interconnection points and infrastructure for offsite renewables
  - Commercial redevelopment – residential, commercial, mixed-use, etc.
  - Port/marine infrastructure
  - Industrial reuse, Information Technology/data centers, manufacturing
  - Green-space, park infrastructure – including for climate resilience
  - Diversify/extend property tax revenues

> *Following slides present these opportunities in greater detail*

Reuse Opportunity: Repurposing with onsite clean energy resources

- Repurposing power plant sites with **onsite clean energy resources** is a natural top candidate for reuse: solar, wind, energy storage, EV charging, zero-carbon fuel production, etc.
  - While development may pose more challenges than typical/greenfield sites, expect opportunities for **both private renewable development** and development via **public programs** such as Build Ready (NYSERDA)
- Onsite clean energy facilities will benefit from use of **significant grid infrastructure and interconnection capacity** as power plant CRIS rights expire/are transferred
- While facilities may not be able to replace power plant capacity 1-for-1 in all cases, onsite clean energy resources present opportunity to materially **reduce the pollution burden on local communities** – a contributor to asthma, other respiratory illness, heart disease, and other health outcomes
  - Geographically targeted **demand-side resources** (energy efficiency, demand response, active demand management/load flexibility, grid-interactive buildings) are also an important tool
- Because the transmission and distribution networks have in many cases been built up based specifically on the locations of existing plants, **onsite resources** (and injections of power) at the location of plants will be **especially beneficial to the grid**
- For **day-to-day peak reliability applications**, energy **storage technologies present strong potential** as a means of replacing peaking units with short runtimes with 4-hour and 8-hour lithium-ion storage technologies (with limitations for more extended and seasonal peak needs in the future, incl. extreme weather conditions)
  - Storage may be most conducive to **sites with limited geographical footprint**, especially at plants in urban locations

Reuse Opportunity: Interconnection/transmission for offsite renewables

> Sites also present significant opportunities to serve as **transmission interconnection points for offsite renewable resources**, such as offshore wind and upstate renewables
  - As with onsite resources, this model for reuse would make use of **grid interconnection capacity** and infrastructure availability, as well as space for **new grid infrastructure** like HVDC converter stations
  - Interconnection of offsite resources can be implemented as an **independent solution, or as a purposeful complement** to onsite clean energy infrastructure (e.g., to pair with energy storage)

> **Prominent opportunities exist** for this model to emerge, most notably via NYSERDA's Offshore Wind RFPs and Tier 4 RFP, and at/via facilities owned/leased by NYPA and LIPA
  - Proposed offshore wind connections: Empire Wind 1 at Gowanus; Sunrise Wind at Holbrook; Empire Wind 2 at Barrett; Beacon Wind at Astoria
  - Multiple prospective Tier 4 projects announced – some connecting at Zone J power plant sites

> This reuse opportunity may also be **compatible with a variety of other potential uses** depending on physical footprint of the interconnection/grid equipment necessary, additional available space onsite

Reuse Opportunity: Commercial redevelopment

> Opportunities for a **range of commercial redevelopment uses** – residential, commercial, office-space, mixed-use, etc. – may also present themselves as options at power plant sites
  - Such development may support construction jobs, but not all may support long-term onsite job creation

> Despite potential demolition and remediation needs, commercial developers may find value in site characteristics (**location, waterfront access**, etc.) as well as to repurpose **visually striking elements of the plant structure**
  - Variation in real estate property value across regions of the state also likely to direct this interest

> Depending on site characteristics, can bring **commerce and vibrance** to areas that may not have significant housing population and commercial activity nearby
  - In environmental justice areas and disadvantaged communities, however, **caution needs to be exercised** to ensure redevelopment centers around benefitting local communities and does not unfold in a way that **promotes or induces displacement of local residents**

Reuse Opportunity: Port/Marine Uses & Infrastructure

- Many plants situated on the waterfront may be valuable as opportunities to pursue **port/marine transport infrastructure uses**, especially for plants whose water-access is also connected to rail, highway, and **other transportation modes**
- Power plant sites on the waterfront may have unique **access to deep-water ports** in particular, which would allow for uses that **protect/preserve the working waterfront**, with activities such as offshore wind staging, assembly, and manufacturing
- Rebuilding the capacity for maritime dependent uses – both commercial and recreational – may be well-received as a way to **continue the history/tradition** of waterfront work and access
  - See: South Brooklyn Marine Terminal, as selected to serve as an offshore wind port facility, and the broader Sunset Park Brownfield Opportunity Area, as supported by NYSDOS's BOA program
- Waterfront access may have the additional attribute of **supporting intermodal marine transit**, whether for routine use (e.g., ferry services) or as an asset to address climate vulnerability (e.g., storm infrastructure for response and evacuation)

Reuse Opportunity:
Industrial reuse, IT/data centers, manufacturing

- Like many energy infrastructure applications, heavier **energy-consumptive reuse opportunities** may also benefit from significant grid capacity available at power plant sites.
- These more industrial applications may include **information technology/data centers, general manufacturing, green manufacturing,** greenhouses & agriculture, and others
  - Certain use-cases may also benefit from water-access for cooling processes (e.g., data centers)
- Many information technology and manufacturing reuse opportunities promise potential for **job creation, local investment, and property tax contributions**
- **Green manufacturing** (e.g., electric vehicle supply chain/componentry) has natural synergies with CLCPA goals for decarbonization and economic development
- Recognition of certain such use-cases being explored while existing power plants remain operational, rather than repurposing them
  - Close attention needed to **ensure industrial applications are energy efficient and powered by clean energy** so as to further CLCPA achievement and economic development goals

Reuse Opportunities:
Green-space, parks, climate resilience infrastructure

- Power plant sites may also provide creative opportunities for **publicly accessible green-space, and parks infrastructure** – especially for waterfront locations
- This includes **adaptive forms of reuse** providing **climate resilience/ecological services**, e.g. leveraging designs and measures to reduce/absorb **flood surges** and alleviate **heat island effect**, among other **nature-based adaptation solutions**
- Ability (lack thereof) to benefit financially from reuse exclusively reserved to these opportunities may not make them the first preference of existing property owners, but could **add value as a partial reuse** alongside other forms of compatible development and reuse
  - And **public entities could play a more central role** where opportunities exist to conserve land and create publicly beneficial green-space – acknowledging that doing so may not by itself support long-term job creation
- Reuse could also be directed to actively **complement and combine with adjacent/nearby park infrastructure** that may exist along waterfronts

Reuse Opportunity: Diversify and extend property tax revenues

- Any/all of the aforementioned opportunities should provide localities with the added benefit of **finding uses to diversify and extend property tax revenues** from sites after the end of a plant's useful life
- A host community's planning for the long-term/life after the plant should be reflected in the use or uses pursued, with a preference in some cases for **multi-stream property tax revenues**
- **Local, regional, and state economic development efforts** should leverage the site, employee skillsets, and community attributes to guide economic development strategy, once again in a manner seeking multiple, diversified tax revenue-positive enterprises
- Municipalities and property owners will likely pursue a variety of tactics to **market and promote interest in redeveloping a power plant site** for new uses
  - **Digital and social media** may provide new opportunities to attract positive attention to the opportunities for site reuse, new opportunities for members of the community to weigh in with input

Power Plants Inventory

Power Plant Inventory: Objectives and Approach

CLCPA: "identify facilities that may be closed as a result of a transition to a clean energy sector"

> **Objectives of the power plant inventory effort**

- Fulfill requirements of the statute, inform Climate Action Council and Advisory Panel deliberations and actions
- Compile key information about the existing generation fleet, useful to a range of interested stakeholders
- Help inform understanding of issues and opportunities, including those related to workforce, local economic/tax impacts, etc.
- Assist in ongoing and future planning efforts at local and state level, and prepare for any future federal resources

Power Plant Inventory: Objectives and Approach

CLCPA: "identify facilities that may be closed as a result of a transition to a clean energy sector"

> **Important notes and reminders**

- Inventory is informational only, rather than predictive or decisional: it does not opine in any way on the State or Working Group's view of which plants *will* close, the cause(s) of any future closures, or the specific timing/order of any future closures
- Just Transition Working Group is not a decision-making body, and this inventory is not binding in any way
- Inventory focuses on objective plant metrics and data-points most salient in future transitions: plant age, capacity factor, fuel type, environmental/emission compliance, etc. Many data points will change over time, and this inventory is just a snapshot.
- Planning decisions will be result of multiple considerations: commercial, operational, regulatory, market factors, among others
- Plant deactivations follow very prescriptive process through New York Independent System Operator (NYISO), see appendix. Inclusion of a plant on this list does not suggest such deactivation planning or other NYISO processes are imminent or should be initiated.
- In referencing inventory, please be respectful of and sensitive to the community and human stories contained in and behind the numbers on the page: the jobs, reliability, emissions, and health impacts alike
- All in the context of major CLCPA requirements: 70% renewable by 2030, 100% zero-emission by 2040 (see appendix for major policy drivers)

Power Plant Inventory: Research Sources

Sources and methods used in assembling and analyzing the data contained in the inventory

- **Power Generation Data**: drawn primarily from the NYISO's 2020 Gold Book (Plant, Owner/Operator, City/Town, NYISO Zone, Plant Vintage, Primary Fuel, Nameplate Capacity)
  - Plants presented on a site/facility-level in this Inventory, including with aggregated nameplate capacity and capacity factors where multiple units exist at a single facility; age/vintage shown only for the oldest unit at each facility
  - Full unit-by-unit breakdown of generator performance and attributes available in the Gold Book and data appendices.
- **GIS Coordinates**: compiled from a variety of publicly available sources online, with manual spot checks and adjustments
- **Jobs**: reflects site-specific employment totals as of early 2021, as contributed by members of the Power Plants Subgroup
  - Additional aggregate employment figures for the full inventory compiled via 2020 NYSDOL QCEW data
- **Local Property Taxes**: compiled by agency research, drawing from publicly available local property tax databases online
- **Environmental Justice**: developed using DEC's Potential EJ Area Maps, NYSERDA's interim Disadvantaged Communities webpage, and supplemental agency research
- **Grid Infrastructure**: data assembled via independent agency analysis and research of NYISO and other related resources
- **Potential Clean Energy Associated w/ Site, Active Repowering Proposals**: Information assembled from a variety of sources and public reports, including projects proposed in NYISO's interconnection queue
- **Site Information**: information assembled via independent agency analysis and research of local property/zoning resources and other publicly available resources

Power Plant Inventory: Summary of Facilities Identified

CLCPA: "identify facilities that may be closed as a result of a transition to a clean energy sector"

> **Private facilities (IPPs, IOUs)**
- 32 facilities, roughly 16,000 MW of capacity
  - Inclusive of 3 GW of previous/known retirements, plus multiple facilities that will be out of service pursuant to DEC regs
- Represent roughly $140M local property tax contributions per year (excl. indirect local economic impacts)
- Employment: at least approximately 1,685 jobs
  - Approx. 1,429 confirmed site-specific jobs; 256 additional aggregated jobs from NYSDOL QCEW data

> **Public facilities (owned by/serving NYPA, LIPA, municipal utilities)**
- 29 facilities, roughly 6,500 MW of capacity
  - Inclusive of multiple facilities with units going out of service pursuant to DEC NOx regulations
- Represent roughly $180M local property tax contributions per year (excl. indirect local economic impacts)
- Employment: at least approximately 421 jobs
  - Approx. 91 confirmed site-specific jobs; 330 additional aggregated jobs from NYSDOL QCEW data

> **Context for overall statewide generation fleet and power sector**:
- ~150 emitting facilities, total of 38+ GW of total capacity (26+ GW of which are fossil-based resources)
- Roughly 24,000* employed in full traditional electric power generation sector, as of 2019 (pre-COVID)
  - *Not employed directly at power plants, but rather across full supply chain (O&M, manufacturing, etc.), including partial time

Power Plant Inventory: Employment

Summary of power plant employment via JTWG subgroup and NYSDOL data sources

> **Subgroup Input**: site-specific employment figures contributed via subgroup members and agencies total approximately **1,520** workers across 22 plants (out of 61 facilities on inventory)

> **NYSDOL QCEW* Data**: provides ability to look at de-identified/aggregated employment numbers for the plants in question on our inventory

- Confidentiality rules prevent data to be shared at a firm- or employee-specific level
- QCEW data identifies approximately **586** additional employees at other facilities on our inventory
- Data remains unavailable or unverifiable for the remaining small number of facilities

> Combined, these data inputs suggest that the facilities on our inventory correspond to at least approximately **2,100 jobs**, with additional jobs expected for plants where data is not available

**QCEW, Quarterly Census of Employment and Wages, 2020 Data*

Power Plant Inventory
Non-Gov't Plants – IPPs, IOUs, etc. (1 of 5)

Simple Power Plant Name	Owner/ Operator	City/town	NYISO Zone	GIS Coordinates	Plant Vintage (Oldest Unit)	Primary Fuel	Nameplate Rating (MW)	2018 Capacity Factor (Aggregate)	2019 Capacity Factor (Aggregate)	Jobs	Local Property Taxes ($ per year)	Located in Potential EJ Area?	Grid Infrastructure	Potential Clean Energy Associated w/ Site	Active Repowering Proposal	Site Information
East River (note: cogen, electricity and steam)	ConEd	Manhattan	J	40.72719, -73.9725	1951-11-01	NG	726.2	46.5%	44.3%	290	$23,800,000	Y	CRIS (S/W): 653.9 MW / 731.4 MW Voltage at substation: East River 69kV Local TO substation: East River			Acreage: 3.2 Parcel zoning: M3-2 Assets (Buildings, Rail, Roads, Water): East River, FDR Drive, ConEd (building)
Danskammer	Danskammer Energy, LLC	Newburgh	G	41.57304527022974, -73.96472865969712	1951-12-01	NG	532	0.7%	0.2%		$1,500,000	N	CRIS (S/W): 511.1 MW / 511.1 MW Voltage at substation: 115kV Local TO substation: Danskammer		Q#791 Danskammer Energy Center is a repowering project that would include retiring Danskammer units# 1, 2, 3, and 4. Currently in Article 10 proceeding.	Acreage: 180 Assets (Buildings, Rail, Roads, Water): Hudson River, Roseton Generating Facility
Greenidge 4	Emera	Torrey	C	42.6789, -76.9483	1953-12-01	NG	112.5	20.5%	5.7%		$60,000	N	CRIS (S/W): 106.3 MW / 106.3 MW Voltage at substation: 115 kV Local TO substation: Greenidge			Acreage: 300 Parcel zoning: I-Industrial Assets (Buildings, Rail, Roads, Water): Seneca Lake, NY-14 (hwy)
Astoria (Steam - ConEd)	Eastern Generation Co. (ArcLight Capital)	Queens	J	40.78767, -73.91256	1954-03-01	NG	959	12.8%	7.9%	90 (union only)	$575,000	Y	CRIS (S/W): 938.9 MW / 943.7 MW Voltage at substation: Local TO substation:	Storage		Acreage: 300 Parcel zoning: M3-1 Assets (Buildings, Rail, Roads, Water): East River
Cayuga	Cayuga Operating Company, LLC	Lansing	C	42.603333, -76.63555	1955-09-01	BIT	322.5	3.5%	5.9%	2	$2,200,000	N	CRIS (S/W): 154.1 MW / 154.1 MW Voltage at substation: 115 kV Local TO substation: Cayuga	Large-scale solar		Acreage: 400 Parcel zoning: IR Assets (Buildings, Rail, Roads, Water): Road access, water
Arthur Kill	NRG	Staten Island	J	40.59171, -74.20011	1959-08-01	NG	931.7	12.1%	11.1%		$8,600,000	Y - near	CRIS (S/W): 903.3 MW / 908.4 MW Voltage at substation: 138/345 Local TO substation: Freshkill 138 kV	Storage		Parcel zoning: M3-1 Assets (Buildings, Rail, Roads, Water): Water, Pratt Industries Paper Mills (nearby)

Power Plant Inventory
Non-Gov't Plants – IPPs, IOUs, etc. (2 of 5)

Simple Power Plant Name	Owner/ Operator	City/town	NYISO Zone	GIS Coordinates	Plant Vintage (Oldest Unit)	Primary Fuel	Nameplate Rating (MW)	2018 Capacity Factor (Aggregate)	2019 Capacity Factor (Aggregate)	Jobs	Local Property Taxes ($ per year)	Located in Potential EJ Area?	Grid Infrastructure	Potential Clean Energy Associated w/ Site	Active Repowering Proposal	Site Information
Ravenswood	Helix Ravenswood, LLC (LS Power)	Queens	J	40.75883, -73.94485	1963-02-01	NG	2,445.90	15.5%	12.2%	160	$32,000,000	Y	CRIS (S/W): 2024.9 MW / 2084.4 MW Voltage at substation: 345 kV Local TO substation: Rainey	Storage, Transmission		Acreage: 27 Parcel zoning: M3-1 Assets (Buildings, Rail, Roads, Water): East River
74 St. (note: steam)	ConEd	Manhattan	J	40.76803, -73.95091	1968-10-01	KER	37	0.1%	0.1%	138	$1,500,000	Yes, near	CRIS (S/W): 39.1 MW / 49.2 MW Voltage at substation: 138kV Local TO substation: East 75th Street			Parcel zoning: M3-2 Assets (Buildings, Rail, Roads, Water): East River, FDR Drive
59 St. GT 1 (note: steam)	ConEd	Manhattan	J	40.77133, -73.99108	1969-06-01	KER	17.1	0.1%	0.1%	110	$9,800,000	Yes, near	CRIS (S/W): 15.4 MW / 20.1 MW Voltage at substation: 138kV Local TO substation: West 65th Street			Parcel zoning: M3-2, CL Assets (Buildings, Rail, Roads, Water): Hwy 9A, Hudson River
Coxsackie GT	Central Hudson Gas & Elec. Corp.	Coxsackie	G	42.3435, -73.8353	1969-12-01	KER	21.6	0.3%	0.4%		$34,800	Y	CRIS (S/W): 19.9 MW / 26.0 MW Voltage at substation: 69 kV Local TO substation: Coxsackie			Parcel zoning: Medium Density Residential–1 Assets (Buildings, Rail, Roads, Water): RTE 9W (road), Coxsackie Correctional Facility
South Cairo	Central Hudson Gas & Elec. Corp.	Cairo	G	42.29128, -73.98645	1970-06-01	KER	21.6	0.2%	0.1%		$62,500	N	CRIS (S/W): 19.8 MW / 25.9 MW Voltage at substation: 69kV Local TO substation: South Cairo			Parcel zoning: COM: commercial Assets (Buildings, Rail, Roads, Water): RNYS Route 32, 23
Astoria - NRG	NRG	Queens	J	40.78770822289384, -73.91289082617163	1970-06-01	KER	558	0.8%	0.3%	30	$4,500,000	Y	CRIS (S/W): 504.4 MW / 620.8 MW Voltage at substation: 138 kV Local TO substation: Astoria	Storage	Q#393 Berrians East Replacement is a repowering project that would include retiring NRG/Astoria GTs 2, 3, and 4 and replacing with more efficient turbines. Project was granted its CPCN certificate by the PSC in 2011; application pending for DEC air permits [SEQR review with DEC as lead agency, not Article 10]	Acreage: 15 Parcel zoning: M3-1 Assets (Buildings, Rail, Roads, Water): East River

Power Plant Inventory
Non-Gov't Plants – IPPs, IOUs, etc. (3 of 5)

Simple Power Plant Name	Owner/ Operator	City/town	NYISO Zone	GIS Coordinates	Plant Vintage (Oldest Unit)	Primary Fuel	Nameplate Rating (MW)	2018 Capacity Factor (Aggregate)	2019 Capacity Factor (Aggregate)	Jobs	Local Property Taxes ($ per year)	Located in Potential EJ Area?	Grid Infrastructure	Potential Clean Energy Associated w/ Site	Active Repowering Proposal	Site Information
Hudson Ave (note: steam)	ConEd	Brooklyn	J	40.7052, -73.9807	1970-07-01	KER	48.9	0.1%	0.2%	20	$3,000,000	Yes	CRIS (S/W): 15.1 MW / 19.7 MW Voltage at substation: 69 kV Local TO substation: Farragut 138 kV			Parcel zoning: M3-1 Assets (Buildings, Rail, Roads, Water): East River
Hillburn GT	Seneca Power Partners / Alliance Energy Group	Hillburn	G	41.12713740 4844596, -74.16438035 962115 -74.16	1971-04-01	NG	46.5	0.1%	0.1%		$314,600	Y	CRIS (S/W): 37.9 MW / 51.8 MW Voltage at substation: 69 kV Local TO substation: Hillburn			Assets (Buildings, Rail, Roads, Water): Ramapo River, NJ-17, Rail (near)
Shoemaker GT	Seneca Power Partners / Alliance Energy Group	Middletown	G	41.4278, -74.4186	1971-05-01	NG	41.9	0.1%	0.3%		$193,000	Y	CRIS (S/W): 33 MW / 45 MW Voltage at substation: 115/138 kV Local TO substation: Shoemaker 69 kV			Parcel zoning: I-2: Heavy Industry Assets (Buildings, Rail, Roads, Water): I-84, Rail (near)
Gowanus	Eastern Generation Co. (ArcLight Capital)	Brooklyn	J	40.66433, -74.00674	1971-06-01	FO2	640	0.3%	0.1%	50 (union only)	$3,500,000	Y	CRIS (S/W): 578.4 MW / 755.3 MW Voltage at substation: 138kV Local TO substation: Gowanus	Gowanus substation is landing point for Empire Wind 1 (OSW).	Q#778 Gowanus Gas Turbine Facility Repowering is a repowering project that would include retiring Eastern Generation Gowanus Barges# 1, 2, 3, and 4. Currently in Article 10 proceeding.	Acreage: 38 Parcel zoning: M3 -1 Assets (Buildings, Rail, Roads, Water): Gowanus Canal, Gowanus Expressway
Narrows	Eastern Generation Co. (ArcLight Capital)	Brooklyn	J	40.65104, -74.02543	1972-05-01	FO2	352	2.3%	1.2%	30	$2,600,000	Y	CRIS (S/W): 309.1 MW / 403.6 MW Voltage at substation: 138 kV Local TO substation: Narrow	Storage		Parcel zoning: M3-1 Assets (Buildings, Rail, Roads, Water): Bay Ridge Channel, Belt Parkway
Bowline	GenOn Energy Management, LLC	West Haverstraw	G	41.2044, -73.9689	1972-09-01	NG	1,242	4.3%	2.6%		$2,600,000	Y, near	CRIS (S/W): 1145.1 MW / 1145.1 MW Voltage at substation: 345 kV Local TO substation: Bowline			Acreage: 150 Parcel zoning: Assets (Buildings, Rail, Roads, Water): Minisceongo Creek, Hudson River

Power Plant Inventory
Non-Gov't Plants – IPPs, IOUs, etc. (4 of 5)

Simple Power Plant Name	Owner/ Operator	City/town	NYISO Zone	GIS Coordinates	Plant Vintage (Oldest Unit)	Primary Fuel	Nameplate Rating (MW)	2018 Capacity Factor (Aggregate)	2019 Capacity Factor (Aggregate)	Jobs	Local Property Taxes ($ per year)	Located in Potential EJ Area?	Grid Infrastructure	Potential Clean Energy Associated w/ Site	Active Repowering Proposal	Site Information
Indian Point	Entergy	Buchanan	H	41.26872, -73.95214	1973-08-01	UR	2,311	42.8%	82.5%	350 union, today; 120 as of 5/21; 100+ contr.	$32,000,000	No	CRIS (S/W): 2066.9 MW / 2066.9 MW Voltage at substation: 345 kV (double check) Local TO substation: Indian Point			Acreage: 240 Parcel zoning: M2, MD, R-15, others Assets (Buildings, Rail, Roads, Water): Marine access, gas lines, etc.
Roseton	Castleton Commodities Int'l	Newburgh	G	41.57106674384892, -73.9744060695401	1974-09-01	FO6	1,242	4.7%	1.3%		$2,500,000	N	CRIS (S/W): 1220.5 MW / 1220.5 MW Voltage at substation: 345kV Local TO substation: Roseton			Parcel zoning: I-Industrial Business Assets (Buildings, Rail, Roads, Water): Hudson River, Rte 9W, Roseton Generating Facility
Oswego 5+6 (Oswego Harbor Power)	NRG	Oswego	C	43.4586, -76.5319	1976-02-01	FO6	1,803.60	0.3%	0.1%	43	$3,200,000	Y	CRIS (S/W): 1685.5 MW / 1685.5 MW Voltage at substation: 345 kV Local TO substation: Oswego			Acreage: 93 Parcel zoning: I-Industrial Assets (Buildings, Rail, Roads, Water): Lake Ontario, NY-104, SUNY Oswego (nearby)
Somerset	Somerset Operating Company, LLC	Somerset	A	43.35889, -78.60472	1984-08-01	BIT	655.1	10.3%	6.0%	16	$500,000	N	CRIS (S/W): 686 MW / 686 MW Voltage at substation: 345 kV Local TO substation: Somerset	Large-scale solar		Acreage: 1,800 Parcel zoning: PUD Assets (Buildings, Rail, Roads, Water): Rail
Indeck-Yerkes	Indeck Energy Services	Tonawanda	A	42.96747763331424, -78.91749019338934	1990-02-01	NG	59.9	11.5%	4.8%		$135,000	Y, near	CRIS (S/W): 49.7 MW / 60.5 MW Voltage at substation: 230 kV Local TO substation: Huntley 230 kV			Parcel zoning: R3 (based on coord) Assets (Buildings, Rail, Roads, Water): Niagara River, I-190
Indeck-Oswego	Indeck Energy Services	Oswego	C	43.47175, -76.49347	1990-05-01	NG	57.4	12.7%	4.9%		$155,000	Y, near	CRIS (S/W): 51.6 MW / 66.7 MW Voltage at substation: 345 Local TO substation: Oswego			Parcel zoning: I: Industrial Assets (Buildings, Rail, Roads, Water): Lake Ontario, NY-104
Indeck-Silver Springs	Indeck Energy Services	Silver Springs	C	42.6544, -78.0772	1991-04-01	NG	56.6	15.8%	8.7%		$50,000	N	CRIS (S/W): 51.1 MW / 66.1 MW Voltage at substation: 115 kV Local TO substation: Silver Springs			Assets (Buildings, Rail, Roads, Water): N/A

Power Plant Inventory
Non-Gov't Plants – IPPs, IOUs, etc. (5 of 5)

Simple Power Plant Name	Owner/ Operator	City/town	NYISO Zone	GIS Coordinates	Plant Vintage (Oldest Unit)	Primary Fuel	Nameplate Rating (MW)	2018 Capacity Factor (Aggregate)	2019 Capacity Factor (Aggregate)	Jobs	Local Property Taxes ($ per year)	Located in Potential EJ Area?	Grid Infrastructure	Potential Clean Energy Associated w/ Site	Active Repowering Proposal	Site Information
Sterling	Seneca Power Partners / Alliance Energy Group	Sherrill	E	43.08034, -75.60096	1991-06-01	NG	65.3	4.6%	1.3%		$115,000	N	CRIS (S/W): 57.4 MW / 72.1 MW Voltage at substation: 115 kV Local TO substation: Oneinda			Parcel zoning: M1: Manufacturing Assets (Buildings, Rail, Roads, Water): NY-5, Water, Rail (near)
Castleton Energy Center	Castleton Power, LLC	Castleton	F	42.53955, -73.74521	1992-01-01	NG	72	20.8%	20.5%		$315,000	N	CRIS (S/W): 69.0 MW / 86.6 MW Voltage at substation: 115 kV Local TO substation: Castleton			Parcel zoning: I (industrial) Assets (Buildings, Rail, Roads, Water): Moordener Kill (river)
Selkirk	Selkirk Cogen Partners, L.P.	Selkirk	F	42.5744, -73.8592	1992-03-01	NG	446	10.6%	3.4%		$442,000	N	CRIS (S/W): 373.4 MW / 487.7 MW Voltage at substation: 115kV Local TO substation: JMC2+9TP			Acreage: 15.7 Parcel zoning: Heavy Industrial (I) Assets (Buildings, Rail, Roads, Water): NYS Route 32
Batavia	Seneca Power Partners / Alliance Energy Group	Batavia	B	42.9828, -78.1592	1992-06-01	NG	67.3	6.0%	1.6%		$175,000	N (but interim DAC)	CRIS (S/W): 57.1 MW / 71.7 MW Voltage at substation: 115 kV Local TO substation: Senecap 115 kV			Parcel zoning: Likely industrial Assets (Buildings, Rail, Roads, Water): NY-63, Rail (near)
Rensselaer	Castleton Commodities Int'l	Rensselaer	F	42.62534, -73.75008	1993-12-01	NG	96.9	0.5%	0.4%		$165,000	N (but interim DAC)	CRIS (S/W): 79 MW / 79 MW Voltage at substation: 34.5kV Local TO substation: Resselaer			Parcel zoning: I-2 (proposed) Assets (Buildings, Rail, Roads, Water): Hudson River, Hwy 20, Sprague Energy Power Station
Indeck-Olean	Indeck Energy Services	Olean	A	42.08594, -78.45425	1993-12-01	NG	90.6	16.0%	14.8%		$570,000	N (near interim DAC)	CRIS (S/W): 79.4 MW / 88.5 MW Voltage at substation: 115 kV Local TO substation: Olean			Parcel zoning: 12-General Industrial Assets (Buildings, Rail, Roads, Water): Southern Tier Expy
Saranac Energy	TransAlta Energy Marketing (U.S.) Inc.	Plattsburgh	D	44.7132, -73.4557	1994-06-01	NG	285.6	2.8%	3.1%		$420,000	N (near interim DAC)	CRIS (S/W): 253.7MW / 298.4 MW Voltage at substation: 115 kV Local TO substation: NorthEnd			Parcel zoning: I Assets (Buildings, Rail, Roads, Water): Adirondack Northway, Water, Rail

Power Plant Inventory
Public/Gov't Plants (1 of 4)

Simple Power Plant Name	Owner/ Operator	City/town	NYISO Zone	GIS Coordinates	Plant Vintage (Oldest Unit)	Primary Fuel	Nameplate Rating (MW)	2018 Capacity Factor	2019 Capacity Factor	Jobs	Local Property Taxes ($ per year)	Located in Potential EJ Area?	Grid Infrastructure	Potential Clean Energy Associated w/ Site	Site Information
Barrett	National Grid	Island Park	K	40.61, -73.65	1956-11-01	NG	669.2	24.5%	24.3%		$42,000,000	N (very near)	CRIS (S/W): 695.1 MW / 780.3 MW Voltage at substation: 138 kV Local TO substation: Barrett	OSW landing point for Empire Wind 2	Acreage: 127 acres Assets (Buildings, Rail, Roads, Water): Rail, Water
Northport	National Grid	Northport	K	40.92357, -73.34232	1967-03-01	NG	1,564	19.6%	14.8%		$46,000,000	N	CRIS (S/W): 1,603.2 MW / 1,607.4 MW Voltage at substation: 138 kV Local TO substation: Northport		Acreage: 275 Assets (Buildings, Rail, Roads, Water): LI Sound (water)
Port Jefferson	National Grid	Port Jefferson	K	40.9497, -73.07851	1958-11-01	FO6	498	8.8%	7.3%		$32,000,000	N	CRIS (S/W): 494.4 MW / 514.5 MW Voltage at substation: 138 kV Local TO substation: Port Jefferson	Storage	Parcel zoning: WP Assets (Buildings, Rail, Roads, Water): LI Sound (water), NY-25A
Southampton	National Grid	South Hampto	K	40.9, -72.38198	1963-03-01	FO2	11.5	1.5%	2.1%			N	CRIS (S/W): 10.3 MW / 13.5 MW Voltage at substation: 69 kV Local TO substation: Southhampton	Storage	Parcel zoning: LI40–Light Industrial Assets (Buildings, Rail, Roads, Water): Southampton Bypass, LIRR (Southampton)
Shoreham	National Grid	Shoreham	K	40.95429, -72.86716	1971-07-01	FO2	171.5	0.7%	0.4%		$1,500,000	N	CRIS (S/W): 156.7 MW / 176.7 MW Voltage at substation: 138 kV Local TO substation: Shoreham/ Wildwood/Brookhaven		Acreage: 57 Parcel zoning: A Assets (Buildings, Rail, Roads, Water): LI Sound (water)
Southold	National Grid	Southold	K	41.1059, -72.3761	1964-08-01	FO2	14	1.5%	1.4%		$106,000	N	CRIS (S/W): 12.3 MW / 16.1 MW Voltage at substation: 69 kV Local TO substation: Southhold/Peconic		Assets (Buildings, Rail, Roads, Water): Moores Drain (water),

Power Plant Inventory
Public/Gov't Plants (2 of 4)

Simple Power Plant Name	Owner/ Operator	City/town	NYISO Zone	GIS Coordinates	Plant Vintage (Oldest Unit)	Primary Fuel	Nameplate Rating (MW)	2018 Capacity Factor	2019 Capacity Factor	Jobs	Local Property Taxes ($ per year)	Located in Potential EJ Area?	Grid Infrastructure	Potential Clean Energy Associated w/ Site	Site Information
East Hampton	National Grid	E Hampton	K	40.96171, -72.21028	1962-12-01	FO2	27.3	5.8%	6.1%			N	CRIS (S/W): 25.2 MW / 30.4 MW Voltage at substation: 69 kV Local TO substation: Buell/Bridgehampton		Parcel zoning: A or CI Assets (Buildings, Rail, Roads, Water): LIRR (near), water
Glenwood	National Grid	Glenwood	K	40.8275, -73.6478	1967-04-01	FO2	232	4.5%	4.0%		$23,000,000	N (near interim DAC)	CRIS (S/W): 206.3 MW / 259.0 MW Voltage at substation: 138 kV Local TO substation: Shore Road	Storage	Acreage: plant–0.5 acre; plot–28 acres Assets (Buildings, Rail, Roads, Water): Hempsted Bay (water)
Holtsville	National Grid	Holtsville	K	40.81704, -73.06627	1974-07-01	FO2	567	0.9%	0.4%		$18,400,000	N	CRIS (S/W): 550.2 MW / 699.7 MW Voltage at substation: 138 kV Local TO substation: 8kW West Bus/Holbrook	Storage	Acreage: Parcel zoning: L Industrial 1 Assets (Buildings, Rail, Roads, Water): LI Expy
West Babylon 4	National Grid	West Babylon	K	40.694797, -73.351909	1971-08-01	FO2	52.4	0.4%	0.7%		$1,200	N	CRIS (S/W): 49 MW / 64 MW Voltage at substation: 69 kV Local TO substation: West Babylon	Storage	Acreage: 3-acre substation Parcel zoning: G–Light Industrial District Assets (Buildings, Rail, Roads, Water): Santapogue Creek
Far Rockaway (Bayswater and Jamaica Bay Energy Centers	Hull Street	Queens	J	40.6097, -73.7622	7/1/2002	FO2 KE	121	14.20%	12.00%		$2,600,000	Y	CRIS (S/W): 108.9 MW / 148.8 MW Voltage at substation: 69 kV Local TO substation: Far Rockaway	Storage	Parcel zoning: M3-1 Assets (Buildings, Rail, Roads, Water): Motts Basin, Bayswater Energy Center
Greenport (Hawkeye)	Haugland Group	Greenport	K	41.10603, -72.37616	2003-07-02	FO2	54	5.10%	6.40%		$565,000	N	CRIS (S/W): 51.9 MW / 52.4 MW Voltage at substation: 69 kV Local TO substation: Southhold/Peconic		Parcel zoning: P-D Park District Assets (Buildings, Rail, Roads, Water): NY-25
Wading River	National Grid	Shoreham	K	40.95, -72.86	8/1/1989	FO2	238.5	0.60%	0.50%		$13,200,000	N	CRIS (S/W): 243.8 MW / 318.5 MW Voltage at substation: 138 kV Local TO substation: Shoreham		Parcel zoning: Assets (Buildings, Rail, Roads, Water): LI Sound, NY 25-A

Power Plant Inventory
Public/Gov't Plants (3 of 4)

Simple Power Plant Name	Owner/ Operator	City/town	NYISO Zone	GIS Coordinates	Plant Vintage (Oldest Unit)	Primary Fuel	Nameplate Rating (MW)	2018 Capacity Factor	2019 Capacity Factor	Jobs	Local Property Taxes ($ per year)	Located in Potential EJ Area?	Grid Infrastructure	Potential Clean Energy Associated w/ Site	Site Information
Pilgrim (Edgewood)	J-Power	Brentwood	K	40.7861, -73.2931	8/1/2002	NG	100	12.40%	6.90%			Y	CRIS (S/W): 91.8 MW / 91.8 MW Voltage at substation: 69 kV Local TO substation: Brentwood		Parcel zoning: Residential Assets (Buildings, Rail, Roads, Water): N/A
Pouch	NYPA	Staten Island	J	40.6182, -74.06849	2001	NG	47	14.50%	12.10%	4		Y	CRIS (S/W): 47 MW / 47 MW Voltage at substation: 138 kV Local TO substation: Fox Hills	See PEAK MOU; NYPA VISION2030	Acreage: 1.15 Parcel zoning: M2-1 Assets (Buildings, Rail, Roads, Water): Water
Vernon Blvd.	NYPA	Queens	J	40.7537, -73.9508	2001	NG	94	7.8%	4.3%	4		Y	CRIS (S/W): 90 MW / 90 MW Voltage at substation: 138 kV Local TO substation: Vernon	See PEAK MOU; NYPA VISION2030	Acreage: 3.27 Parcel zoning: M3-1 Assets (Buildings, Rail, Roads, Water): East River, Ed Koch Queensboro Bridge (river)
Kent/North 1st	NYPA	Brooklyn	J	40.7171, -73.9664	2001	NG	47	13.0%	7.7%	4		Y	CRIS (S/W): 46.9 MW / 46.9 MW Voltage at substation: 138 kV Local TO substation: North/1st River St., ConEd	See PEAK MOU; NYPA VISION2030	Acreage: 1.35 Parcel zoning: M3-1 Assets (Buildings, Rail, Roads, Water): East River
Gowanus 5-6/Joseph Seymour Power Plant	NYPA	Brooklyn	J	40.66306, -73.99992	2001	NG	94	14.6%	9.3%	4		Y	CRIS (S/W): 91.5 MW / 91.5 MW Voltage at substation: 138 kV Local TO substation: Gowanus 138 kV	See PEAK MOU; NYPA VISION2030	Acreage: 1.65 Parcel zoning: M3-1 Assets (Buildings, Rail, Roads, Water): Gowanus Canal, I-278
Harlem River Yard	NYPA	Bronx	J	40.7991, -73.9156	2001	NG	94	5.0%	3.5%	4		Y	CRIS (S/W): 91.2 MW / 91.2 MW Voltage at substation: 138 kV Local TO substation: Hellgate Annex 138 kV	See PEAK MOU; NYPA VISION2030	Acreage: 1.83 Parcel zoning: M3-1 Assets (Buildings, Rail, Roads, Water): East River, I-278, Randall's Island Connector
Hell Gate	NYPA	Bronx	J	40.799, -73.9094	2001	NG	94	4.9%	3.5%	4		Y	CRIS (S/W): 90 MW / 90 MW Voltage at substation: 138 kV Local TO substation: Hellgate Annex 138 kV	See PEAK MOU; NYPA VISION2030	Acreage: 2.64 Parcel zoning: M3-1 Assets (Buildings, Rail, Roads, Water): East River

Power Plant Inventory
Public/Gov't Plants (4 of 4)

Simple Power Plant Name	Owner/ Operator	City/town	NYISO Zone	GIS Coordinates	Plant Vintage (Oldest Unit)	Primary Fuel	Nameplate Rating (MW)	2018 Capacity Factor	2019 Capacity Factor	Jobs	Local Property Taxes ($ per year)	Located in Potential EJ Area?	Grid Infrastructure	Potential Clean Energy Associated w/ Site	Site Information
Brentwood	NYPA	Islip/ Suffolk County	K	40.7865, -73.2927	2001	NG	47	14.7%	13.0%	2		Y	CRIS (S/W): 47.1 MW / 47.1 MW Voltage at substation: 69 kV Local TO substation: Brentwood LIPA on 69 kV	See NYPA VISION2030	Acreage: 4.4 Assets (Buildings, Rail, Roads, Water): Edgewood Energy Power Station (nearby)
Greenport	Village of Gree	Greenport	K	41.10111, -72.37194	1957-06-06	FO2	6.8	0.0%	0.0%			N	CRIS (S/W): 58.0 MW / 58.5 MW Voltage at substation: Local TO substation:	See: NYPA VISION2030	Parcel zoning: B Assets (Buildings, Rail, Roads, Water): Water and rail near
Astoria CC 1 and 2 (Zeltmann)	NYPA	Queens	J	40.7889, -73.9069	2006-01-01	NG / ULSD	576	42.4%	48.7%	47		Y	CRIS (S/W): 492 MW / 540 MW Voltage at substation: 138 kV Local TO substation: Astoria West 138 kV	See: NYPA VISION2030	Acreage: 46.8 for full complex Assets (Buildings, Rail, Roads, Water): East River
Astoria Energy II	Astoria Energy LLC / Eastern Gen. Co.	Queens	J	40.78132, -73.89662	2011-07-01	NG	660	47.6%	47.1%		$577,000	Y	CRIS (S/W): 576.0 MW / MW Voltage at substation: Local TO substation:	See: NYPA VISION2030	Parcel zoning: M3-1 Assets (Buildings, Rail, Roads, Water): East River
Flynn	NYPA	Holtsville	K	40.8158, -73.064	1994-05-01	NG / ULSD	170	42.7%	26.2%	18		N	CRIS (S/W): 135 MW / 168.4 MW Voltage at substation: 138 kV Local TO substation: Holtsville Substation	See: NYPA VISION2030	Acreage: 15.87 Parcel zoning: L Industrial 1 Assets (Buildings, Rail, Roads, Water): LI Expy
Freeport	Freeport Electi	Freeport	K	40.6561, -73.5922	1949-08-01	FO2	29.2	0.10%	0.10%			Y	CRIS (S/W): 125.2 MW / 128.2 MW Voltage at substation: Local TO substation:		Parcel zoning: Industrial Assets (Buildings, Rail, Roads, Water): Sunrise Hwy, Rail
Freeport Equus Power	Freeport Electric	Freeport	K	40.6439, -73.5683	2004-03-01	NG	60.5	5.0%	2.5%		$600,000	N (near interim DAC)	CRIS (S/W): 50.3 MW / 50.3 MW Voltage at substation: 69 kV Local TO substation:		Parcel zoning: Industrial B Assets (Buildings, Rail, Roads, Water): Meadowbrook State Pkwy, Stadium Park Canal
Charles P Keller	Village of Rock	Rockville Cent	K	40.6331, -73.6375	1942-09-01	FO2	31.4	0.70%	0.30%			N (near interim DAC)	CRIS (S/W): 31.1 MW / 31.1 MW Voltage at substation: Local TO substation:		Assets (Buildings, Rail, Roads, Water): N/A
Jamestown	Jamestown BP	Jamestown	A	42.09375, -79.24808	1951-08-01	NG	101	15.20%	18.40%		$160,000	Y	CRIS (S/W): 85.4 MW / 85.4 MW Voltage at substation: Local TO substation:		Parcel zoning: L-M Light Manufacturing Assets (Buildings, Rail, Roads, Water): Chadakoin River, Rail (near)

Power Plants – Supplemental Materials

Power Plant Subgroup: Public Policy Drivers

Key policies and regulations

- **CLCPA** – 70% of load supplied by renewable resources by 2030, 100% of load supplied by zero-emissions resources by 2040; future sector-specific GHG emissions regulations to be promulgated by NYSDEC
  - NYISO on CLCPA: "*Transformation of the power grid, necessitating examination of market structures, planning processes, flexible load, and investment in bulk power system infrastructure*."
- **CO2 Performance Standards** for Major Electric Generating Facilities (NYSDEC)
  - As of April 2020, all coal-fired generation facilities deactivated; no reliability needs associated with these deactivations
- **Regional Greenhouse Gas Initiative** (RGGI) Regulations – adopted 12/1/2020
  - Program updates will reduce carbon dioxide emissions cap by 30% from 2020 to 2030, expand applicability to currently exempt peaking units below current 25 MW threshold (down to 15 MW)
- DEC **"Peaker Rule"** Ozone Season Regulations
  - Compliance obligations phased in between 2023 and 2025, affecting 3,300 MWs of peaking unit capacity
  - 2020 NYISO Reliability Needs Assessment (RNA) identified resource adequacy needs starting in 2027 and transmission security needs starting in 2024. Additionally, the NYISO's first quarterly short-term assessment of reliability (STAR) report (Q3 2020) identified an additional transmission security need in New York City starting in 2023.
- New York City – **Residual Oil Elimination**
  - Eliminate combustion of fuel oil numbers 6 and 4 in New York City by 2020 and 2025, respectively (2,946 MW affected)

Power Plant Subgroup: Grid Overview

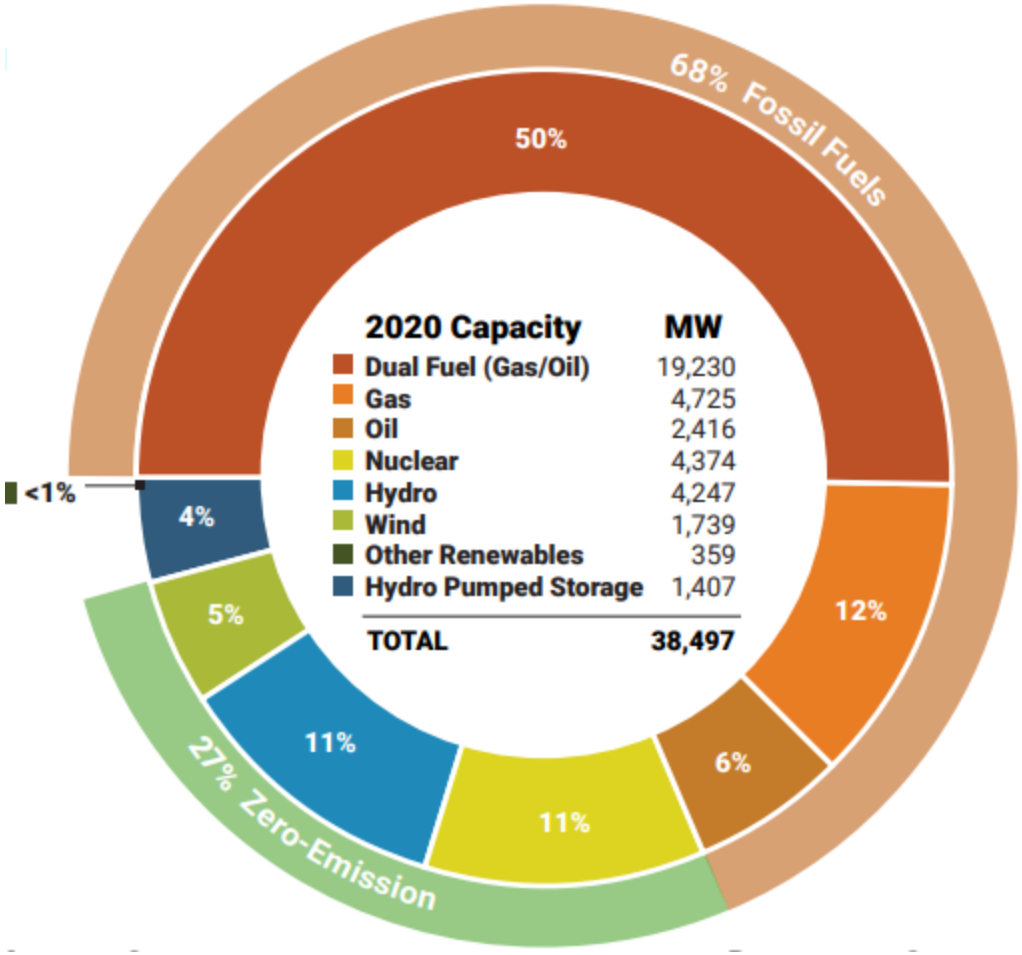
New York State generation fleet basics

> 38,497 MW installed summer capacity
  - 26,371 MW fossil fuel-based generation

> Approx. 500 discrete generation *facilities* serving bulk power system, ~150 of which are emitting resources

> 53% of generation *units* older than 1980
  - NYISO thresholds for capacity "nearing retirement": gas turbines older than 47 years old (1973); steam turbines older than 62 years old (1958)
    - Gas Turbines – 76 out of 106 units (72%)
    - Steam Turbines – 11 out of 46 units (24%), +12 in next decade

> 84% of transmission facilities older than 1980 (by mileage)



NYCA Summer Installed Capacity (NYISO 2020 Power Trends)

Sources: 2020 NYISO Gold Book; 2020 NYISO Power Trends

Power Plant Subgroup: Age of the Power Plant Fleet

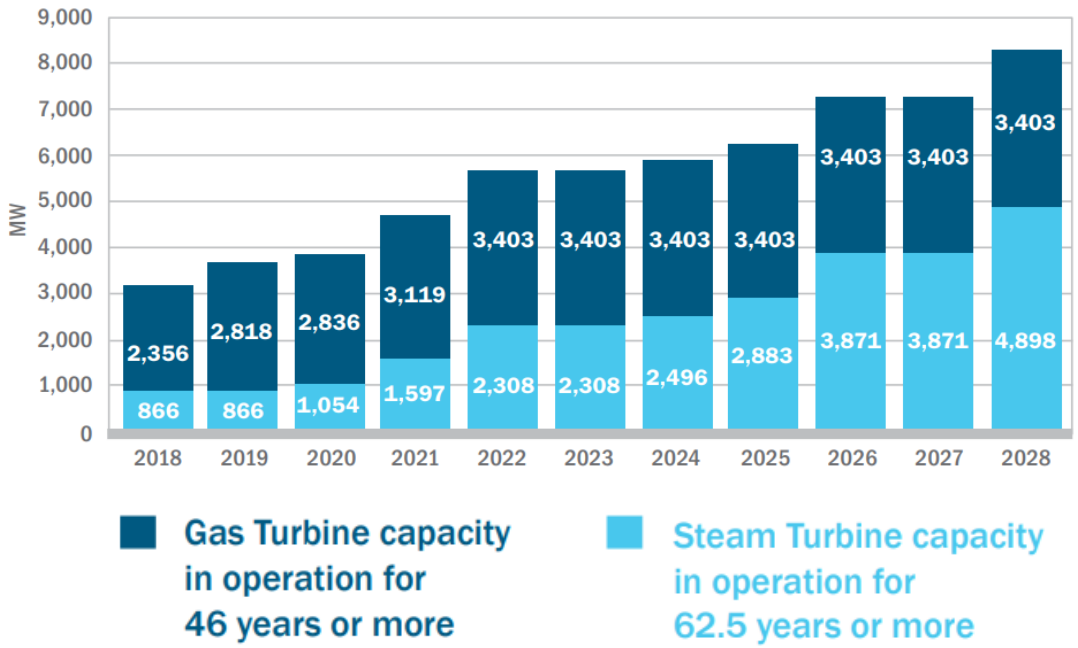
Gas Turbines & Steam Turbines "Nearing Retirement" (Fossil Fuel resources)

> NYISO, 2018 Power Trends Report – growing amount of gas- and steam-turbine capacity reaching age threshold
  - In 2018, 866 MW of steam-turbine generating capacity in New York State was 62.5 years or older — an age at which, nationally, 95% of such capacity has ceased operations.
  - For gas turbines, 2,356 MW of capacity in New York State was 46 years or older. Nationally, 95% of capacity using this technology has deactivated by this age.
  - By 2028, more than 8,300 MW of gas-turbine and steam-turbine based capacity in New York will reach an age beyond which 95% of these types of capacity have deactivated.

> But: 35% of New York's current generating capacity has been added since 2000

"While there have been significant additions to New York's generating capacity since 2000, power plants age like all physical infrastructure. The need to maintain, upgrade, or replace aging generation infrastructure requires attention."

Aging Fossil Fuel Nameplate Capacity: Gas Turbines & Steam Turbines Nearing Retirement



Sources: 2018 NYISO Power Trends

Site Reuse Case Study

Poletti Plant – Retired gas- and oil-fired facility, Queens, NY

Opportunities:

- Onsite Clean Energy, assisting with integration of renewable energy
- Test-bed for clean energy technologies

According to NYPA, the adaptive reuse of its former power plant site for energy storage is "a first step" in using its assets as a catalyst and test bed for clean energy technologies

Con Edison Contracts Its Biggest Battery to Date in New York City

A 400-megawatt-hour battery from 174 Global Power will balance NYC's energy needs with increasing offshore wind power capacity.

JEFF ST. JOHN | DECEMBER 16, 2020

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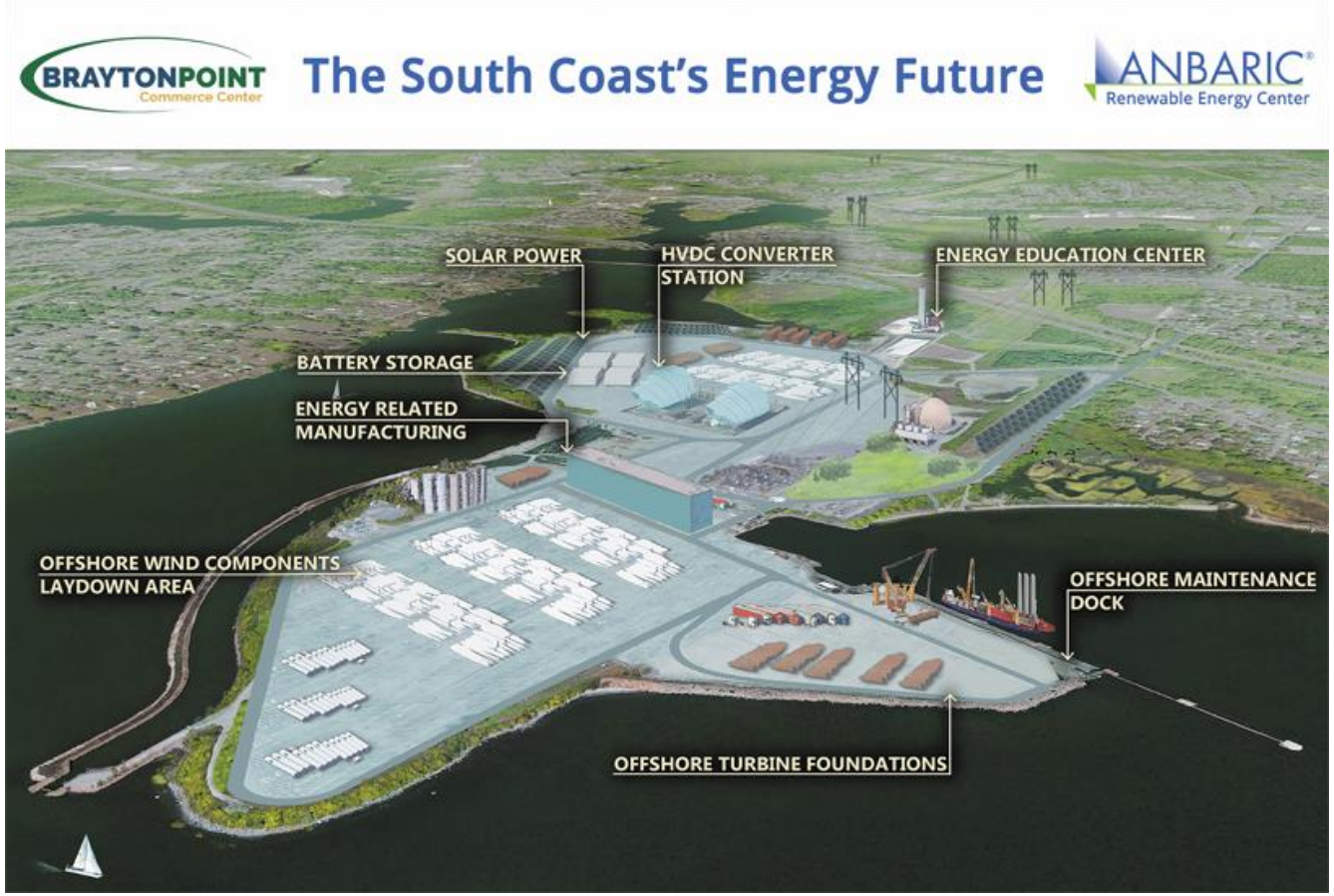
A former power plant site in Queens will host a 100-megawatt battery being built by 174 Power Global under contract to Con Edison. (Credit: Getty Images)

Site Reuse Case Study

Brayton Point – Retired Coal Facility, Somerset, MA

Opportunities:

- Onsite Clean Energy
- Renewable Interconnection
- Staging and Manufacturing
- Port/Marine Use



Site Reuse Case Study

Potrero Power Station – Retired Gas/Diesel Facility, San Francisco, CA

Power Play

Low-carbon neighborhood takes root at former power station site on San Francisco waterfront

By Matt Hickman • June 2, 2020 • Development, News, West

Opportunities:

- Commercial/mixed-use: housing (30% affordable), retail, office and life sciences space, educational and childcare facilities (with reuse of existing building structures)
- Green-space/park infrastructure: 6 acres of public green space, with a YMCA
- Transit: primary thoroughfares will be car-free, with extensive bike and cycling trails and a shuttle system that will provide frequent access to the nearest BART station

Site Reuse Case Study

Widows Creek Plant – Retired Coal Facility, Jackson County, Alabama

Google to convert Alabama coal plant into renewable-powered data centre

Technology company says it will open 14th data centre at Widows Creek site in Jackson County that will be powered with 100% renewable energy

"*At Widows Creek, we can use the plants' many electric transmission lines to bring in lots of renewable energy to power our new data center*". The company said the center will create between 75 and 100 highly technical jobs, with potential for growth in the future.

Opportunities:

- Information technology, energy-intensive use (data center)
- Interconnection/delivery of renewable energy
- Commercial: office space for technical jobs

Site Reuse Case Studies

State Line Energy Plant – Retired Coal Facility, Hammond, Indiana (15 miles from Chicago)

Northwest Indiana defunct coal plant site slated for massive data center

<u>Opportunities</u>:

- Information technology, energy-intensive use (data centers; smart greenhouse)
- Onsite Clean Energy
- Commercial: technology hub/ incubator office space

The "21st century" development will include a tech incubator, renewable energy, and greenhouse warmed by waste heat.

Power Plants Site Reuse: Case Studies

Mt. Tom plant – Retired Coal Facility, Holyoke, MA

Opportunities:

- Onsite Clean Energy
  - Solar and Energy Storage

Issue:

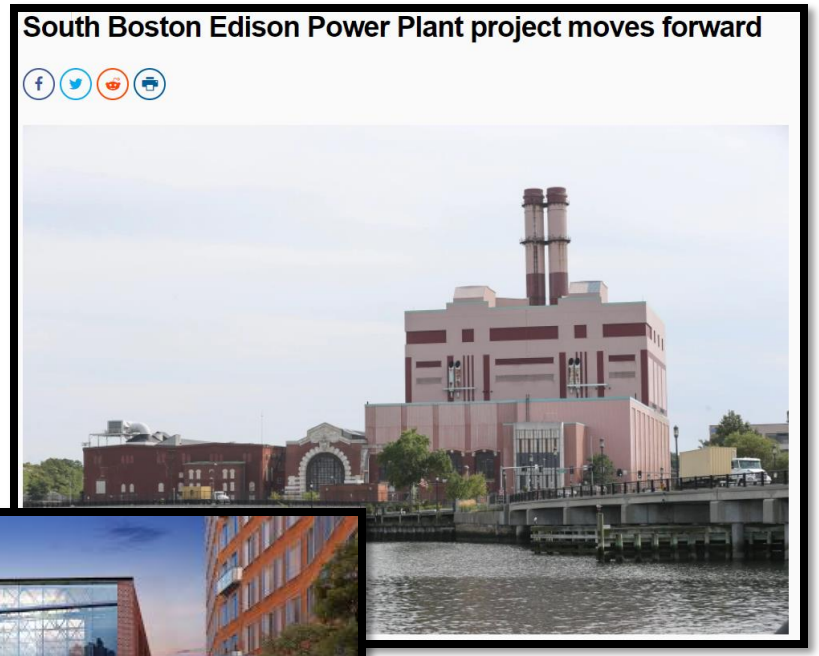
- Parcel ownership
  - Municipal utility ownership of plant sped redevelopment

From coal plant to solar farm: Power storage site sees grand opening in Holyoke

Updated Jan 29, 2019; Posted Sep 25, 2018

Site Reuse Case Studies

Boston Edison – Retired Oil/Gas Facility, Boston, MA



Opportunities:

- Commercial/mixed-use: housing, retail, office space, R&D/lab space (reuse of existing structures – four turbine halls)
- Green-space/park infrastructure: 6 acres of open space, including new 2.5-acre public park along the waterfront with programmable zones, recreational amenities
- Transit support: $10 million to the MBTA to improve transit service around the site

Site Reuse Case Studies

The Plant – Long-deactivated coal facility, Yonkers, NY

Opportunities:

- Commercial/mixed-use: maker space, offices, convening/exhibition space, and incubator to gather individuals working on climate solutions
- Green-space/park infrastructure

Issues:

- Site was dormant/vacant for ~half a century
- Development has encountered obstacle of required parking minimums, where to site parking vis-à-vis adjacent park
- Community planning voice/benefits: questions re: access to jobs by Yonkers residents, risk of displacement of low income Yonkers residents, (lack of) affordable housing, height of buildings/view impacts

The Yonkers Power Plant, built in 1907 along the Hudson River, was built to electrify the Grand Central Railroad.

Site Reuse Case Studies

Moorburg Station – Retired coal-fired facility, Hamburg, Germany

Opportunities:

- Onsite clean fuel development (green hydrogen)
  - 100 MW electrolyzer would turn solar and wind into hydrogen by 2025
- Port/Marine: site also has port facilities that can be used as an import terminal for ships

Issues:

- Local planning and engagement: any input (positive or adverse) from neighboring residents and community groups?

Retired German Coal Plant to Get New Life as a Hydrogen Hub

By Jesper Starn
January 22, 2021, 5:14 AM EST

- Vattenfall repurposing Moorburg station with Mitsubishi, Shell
- 1,600-megawatt plant in Hamburg halted at the end of last year

The coal-fired Moorburg power plant in Hamburg. *Photographer: Joern Pollex/Getty Images*

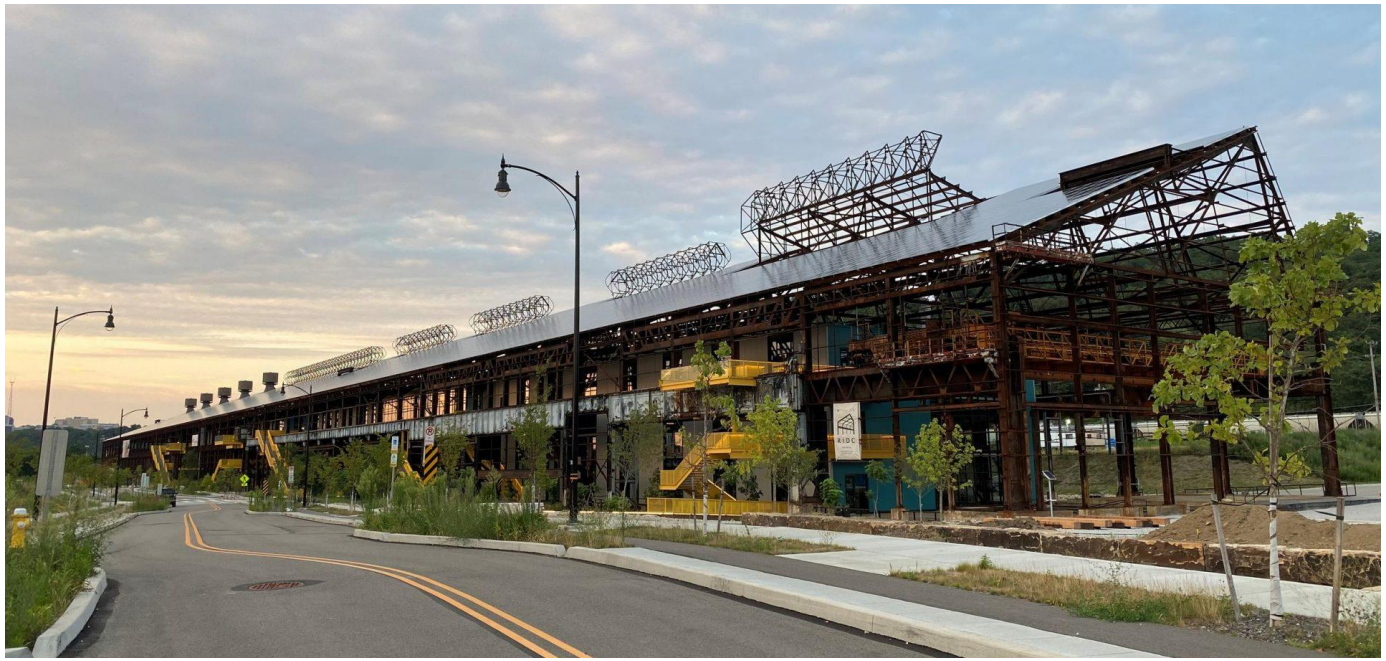
Site Reuse Case Studies

LTV Coke Works – Former Steel Mill, Pittsburgh, PA [not a power plant, but interesting model]

The largest solar array of its kind in the U.S. now sits atop a former Pittsburgh steel mill

Kiley Koscinski/WESA

AUGUST 24, 2020 | 2:21 PM



The former steel mill is now home to robotics manufacturing nonprofits and one of several autonomous vehicle developers based in Pittsburgh

Opportunities:

- Onsite Clean Energy
- Commercial: technology hub/ incubator office space, supporting manufacturing and R&D; reuse of existing building structure

Other Site Reuse Case Studies

- **BELOIT COLLEGE (WI):** An Alliant Energy coal plant has been transformed into the Powerhouse student center at Beloit College. This building now houses a swimming pool, an auditorium, a fitness center, a café, and an events space. The project, funded by local donors and alumni, cost a collective $38 million. The power plant had ceased generating in 2005 and was shut down in 2010.

- **WEST HEATING PLANT (MA):** The West Heating Plant, constructed by the U.S. government in 1948, was decommissioned in 2000. However, in June of 2013, The Georgetown Company and the Levy Group acquired the Plant. The developers plan to convert the site to a Four Seasons-managed 60-70 residence condominium along with a public park and bridge connecting the park to the Georgetown Waterfront. Their plan also includes a historic preservation strategy.

- **CENTRALIA (WA):** TransAlta, an energy provider, has proposed the conversion of the Centralia coal mine into the Tono Solar Project. If built, this project would represent one of the largest solar projects in the state, generating as much as 180 MW of electricity.

Other Site Reuse Case Studies

- **AUSTIN SEAHOLM POWER PLANT (TX):** This power plant was active until 1989, when the Austin City Council authorized its decommissioning as well as Adaptive Reuse. The City Council in 2005 chose Seaholm Power, LLC for the redevelopment project. The site has been converted to mixed-use, with retail, residential, and office space as well as public plaza and outdoor terrace. The buildings all have LEED Gold certification as well as AEGB 3 Star ratings, in addition to other sustainable building features including rainwater harvesting. The initial sale required reimbursement of the City of all eligible incentives, totaling $11.5 million. The current tax base has been estimated to exceed $100 million.

- **OREGON MUSEUM OF SCIENCE AND INDUSTRY (OR):** This museum sits along the south waterfront of Portland on a 17-acre site. The site was formerly the host to a sawdust-fired power plant. The museum preserved the original turbine and smokestack buildings.

- **POWER HOUSE (MO):** A 1928 steam-heat power plant was converted in 2006 by CannonDesign to its St. Louis headquarters. Vacant for about 25 years, the company purchased the facility and converted it to an office space for its 100-employee team in the city. The redevelopment pursued LEED Gold certification.

Background on NYISO Generator Interconnection Process

- The purpose of the generator interconnection process is to (1) evaluate impacts of proposed generation on the New York Transmission System and distribution system, as applicable, (2) identify and cost allocate upgrade facilities required to meet reliability requirements (i.e., System Upgrade Facilities) and, for projects requesting Capacity Resource Interconnection Service (CRIS), System Deliverability Upgrades required to meet deliverability requirements.
- Not all proposed generator interconnections fall under the New York Independent System Operator's (NYISO's) interconnection procedures or under Federal Energy Regulatory Commission's (FERC's) jurisdiction. Some proposed generator interconnections instead fall under the procedures of the local TO and/or under State jurisdiction. Jurisdiction is often a threshold issue for proposed small generation projects, but can be an issue for large generation projects as well.
- Generating facilities that intend to participate in the NYISO's wholesale markets and are connecting to transmission facilities, or to portions of the distribution system on which there are already wholesale generator that have a capacity of 20 MW or less, will be subject to the Small Generator Interconnection Procedures.
- Generating facilities that have a Generating Facility Capacity of more than 20 MW and intend to participate in the NYISO wholesale markets will be subject to the Large Facilities Interconnection Procedures.
- For more information, the NYISO has compiled an introductory and a high-level summary of various NYISO interconnection procedures, which can be found here: https://www.nyiso.com/documents/20142/3625950/UG-21-TEI+Guide-v1.0-Final.pdf/2c727b38-9b4f-1d29-d967-1736d37aca28?t=1608300294768

Background on NYISO Generator Deactivation Process

- A Market Participant must provide the NYISO with a minimum of 365 days prior notice before its Generator that has a nameplate rating that exceeds 1 MW may be Retired or enter into a Mothball Outage. For a generator entering into an Installed Capacity (ICAP) Ineligible Forced Outage, the information must be submitted within 20 days.

- NYISO's review of generator deactivation is part of the Short Term Assessment of Reliability, which is performed on a quarterly basis in coordination with the Responsible Transmission Owners. The ISO will conduct the necessary reliability studies to review the impact on the reliability of the Bulk Power Transmission Facilities (BPTFs) that would result from the Generator that has a nameplate rating that exceeds 1 MW being Retired, entering into a Mothball Outage, or being unavailable due to an ICAP Ineligible Forced Outage. The Responsible Transmission Owner(s) will conduct the necessary reliability studies to review the impact on the reliability of the non-BPTFs that are part of the New York State Transmission System, which studies the ISO will review and verify.

- For complete information on the process and procedures, refer to NYISO Open Access Transmission Tariff Attachment FF – Generator Deactivation Process.