Oswego County Economic Advancement Plan: Targeted Industry Analysis

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ECONOMIC DEVELOPMENT

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About Camoin Associates

Camoin Associates has provided economic development consulting services to municipalities, economic development agencies, and private enterprises since 1999. Through the services offered, Camoin Associates has had the opportunity to serve EDOs and local and state governments from Maine to California; corporations and organizations that include Lowes Home Improvement, FedEx, Volvo (Nova Bus) and the New York Islanders; as well as private developers proposing projects in excess of $600 million. Our reputation for detailed, place-specific, and accurate analysis has led to projects in 29 states and garnered attention from national media outlets including *Marketplace* (NPR), *Forbes* magazine, and *The Wall Street Journal*. Additionally, our marketing strategies have helped our clients gain both national and local media coverage for their projects in order to build public support and leverage additional funding. We are based in Saratoga Springs, NY, with regional offices in Portland, ME; Boston, MA; and Brattleboro, VT. To learn more about our experience and projects in all of our service lines, please visit our website at www.camoinassociates.com. You can also find us on Twitter @camoinassociate and on Facebook.

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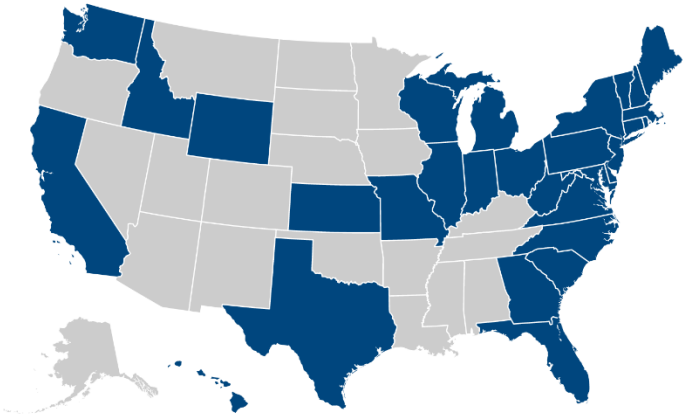

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Targeted Industry Clusters

To help understand industry niches and targeted opportunities in Oswego County, Camoin Associates examined business characteristics such as tangible assets, existing strengths, and workforce according to customized industry groupings or "clusters." This was based on our review of targeted industries previously identified by Operation Oswego County and regional economic development and planning organizations. We also identified the clusters through interviews with county stakeholders and our experience with targeted industry trends throughout Upstate New York, the Northeast, and the US. The following criteria guided our selection:

- Strengths of existing businesses in the county that have similar products and needs,
- Compatibility with assets and workforce skills in the county,
- Compatibility with education and training programs in place or being developed in the county,
- Unique resource needs or need for community support,
- Identification by one or more economic development organization or plan, including the Central New York Regional Planning Board, the Central New York Regional Economic Development Council, CenterState CEO, with particular weight to priorities of Operation Oswego County and the Oswego County IDA,
- Eligibility for assistance from county economic development efforts such as financial assistance from the Oswego County IDA, and potential suitability for incubator space,
- Information and perspectives from the Steering Committee and stakeholders, gathered during the tour and interviews.

Based on this process, we recommend four industry groupings to target as clusters:

Energy

Advanced Manufacturing

Food Processing

Tourism & Recreation

Energy: Oswego County manufactures electrons. This cluster includes all utilities related to power generation: nuclear, fossil fuel, hydroelectric, waste-to-energy, and solar. Generation assets are the core of the energy cluster in Oswego County, and related activities such as transmission, fuel production, and equipment, machinery and devices related to energy production are carried out elsewhere. Energy/Utilities provided 1,822 jobs, or 4.9% of jobs in the county in 2016. With a location quotient of 12.51 (with 1.00 being the national average), expertise is highly concentrated. The nuclear facilities, because of their importance to the county and the state, may cause the other generation capabilities to be overlooked. A major reason for study of energy as a cluster is to understand the breadth and scope of the assets in the county, and to recognize the flexible portfolio of "electron manufacturing" facilities.

Oswego County is also home to Sunoco's only ethanol plant, a biofuel facility that further rounds out the energy portfolio as an input to gasoline for transportation. As an indicator of innovation from unexpected sources, Sunoco is also building a malt barley facility, transferring its biofuel expertise into the craft brewing sector to meet demand for New York-grown supplies for local and regional brewers.

Advanced Manufacturing: County manufacturers are adopting advanced manufacturing techniques and partnering with educators on workforce development. This "cluster" can encompass any manufacturing activity in the county, as transitioning to new systems and production methods are needed to stay competitive regardless of industry, and many of the skills are transferrable. Manufacturing companies are job creators for Oswego County, particularly in primary and fabricated metals. A cluster approach identifies education, training, capital access, and site needs that are shared by multiple types of manufacturing.

Food Processing: Oswego County's location and transportation assets support efficient movement of raw foodstuffs and finished, perishable consumer products. Where other counties may have clusters in specific produce such as dairy, Oswego County hosts a range of manufacturers, not all of which rely on locally produced raw foodstuffs. Proximity to local apples is a significant asset for Champlain Valley, but K&N Foods and Grandma Brown's bring in supplies such as chicken and beans. The food processing cluster for Oswego County is small but can become stronger by leveraging sites, labor, logistics and transportation assets to attract a range of products to be manufactured. Growth in this cluster will contribute to the diversification of the county's economy.

Tourism and Recreation: ***Traveler spending in Oswego County totaled more than $146 million in 2016; this sector brings in substantial revenue for businesses and municipalities and enhances local quality of life.*** Oswego County has many successes in the tourism sector, leveraging superb natural and historic assets. Building on these successes will require understanding what is working well, what needs study or assistance, and how tourism and recreation businesses and activities weave through community life. Targeting the visitor experience in the *Economic Advancement Plan* can support attracting more ideas, entrepreneurship, and resources toward the cluster.

Major Cross-Cutting Themes

Taken all together, five major themes cut across all sectors and are important for future county economic growth and should be part of the Economic Advancement Plan. They are:

Workforce development – continuing and expanding the efforts to match education and training programs with employer needs, and working to attract more individuals to the programs.

Workforce retention – attracting and retaining professionals in engineering and accounting, where skills are in high demand and workers are recruited to other regions, or commute to Oswego County but live in Onondaga or Cayuga Counties where housing, education, and amenities are perceived to be better.

Quality of place – improving housing, education, and place-based amenities such as downtowns and village areas, and recognizing the value of underappreciated recreational assets such as Lake Ontario and outdoor activities such as fishing and snow sports.

Economic development infrastructure – continuing successful business advisement and assistance, financial support, and partnership, while making a stronger case countywide that these services promote the well-being of entire communities, not just individual companies.

New York State challenges – continuing to work to offset barriers to expansion and business formation that companies face across the state, including regulation, sales taxes, business taxes, and a substantial portion of real property taxation associated with state mandated programs and services.

Energy: Usable power (such as heat or electricity); also: the resources for producing such power.[1]

The Case for Promoting Expansion of Generating Capacity in Oswego County

Oswego County has a multifaceted portfolio of existing generation sources including nuclear, biofuel, waste-to-energy, hydropower, solar, and steam. Unlike many areas of the state, where support for new generation often excludes critical base-load sources like nuclear and natural gas in favor of less reliable wind and solar, the county communities demonstrate greater acceptance and understanding of the value of energy jobs and investment. This understanding emerged as a theme from the demonstrated success of the Upstate Energy Job Coalition's efforts, and from discussions with stakeholders who see opportunities, not danger, in expanding the county's energy assets.

Most of Oswego County's electricity is sold to National Grid and distributed through the statewide transmission grid to users both inside and outside of the county. Transmission lines, step-up and step-down transformers, and substations are critical components of the grid, and capacity constraints within the system can limit a generation facility's ability to sell power to regions that are heavy users. For example, in the New York City metropolitan area nearby generation capacity is insufficient to meet demand, and electricity is transmitted from power plants hundreds of miles distant.

In 2016, the New York Power Authority and New York State Electric & Gas Corporation completed the $120 million Marcy South Series Compensation Project to expand transmission capacity from Upstate generators to downstate users. A public-private partnership, New York Transco, plans, develops, constructs, and owns major high voltage transmission infrastructure, and will own part of the Marcy South project. As electricity generation increases in Oswego County, transmission capacity to high-demand regions should be monitored and encouraged well in advance so that the grid is ready to handle increased loads.

This section of the analysis reviews three energy producers in the county: nuclear, hydropower, and waste to energy, and discusses opportunities to become involved in energy storage advancements.

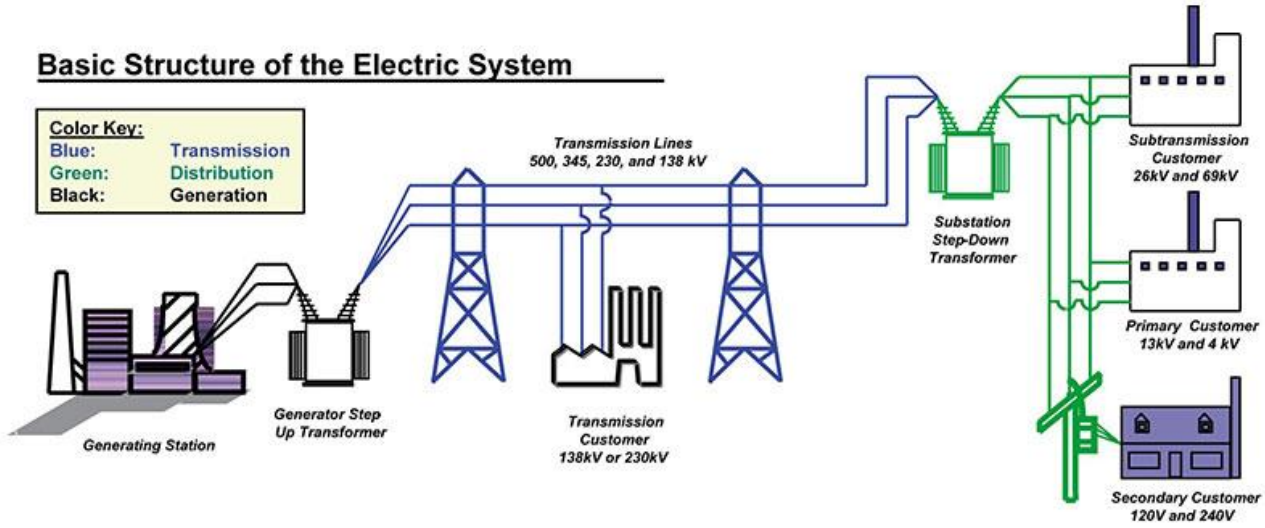

Image Source: Union of Concerned Scientists

[1] https://www.merriam-webster.com/dictionary/energy

Energy Storage

Key Findings

A major challenge with renewable energy sources such as wind, solar, and even hydropower is intermittancy; peak demand does not necessarily occur at the same time as peak production. The ability to generate power at times of maximum efficiency and store it for maximum demand is a critical research area. With a diverse portfolio of renewable generating capacity, Oswego County can become an efficient location for testing new storage technologies, and its demonstrated acceptance of energy as an industry can make it a promising location for storage facilities themselves. Furthermore, with the potential to turn its advanced manufacturing and machine shop reources into active clusters, the county can also participate as a manufacturer of components and equipment, leveraging a unique intersection of energy and manufacturing expertise.

According to the Energy Storage Association, the national trade association, storage technologies can be divided into six categories.[2]

- Solid State Batteries - a range of electrochemical storage solutions, including advanced chemistry batteries and capacitors
- Flow Batteries - batteries where the energy is stored directly in the electrolyte solution for longer cycle life, and quick response times
- Flywheels - mechanical devices that harness rotational energy to deliver instantaneous electricity
- Compressed Air Energy Storage - utilizing compressed air to create a potent energy reserve
- Thermal - capturing heat and cold to create energy on demand
- Pumped Hydro-Power – creating large-scale reservoirs of energy with water

Opportunities for Oswego County

Among these, flywheels and pumped hydro-power intersect with county strengths; pumped hydro-power is discussed on page 10, below. Flywheel technology uses electric energy and stores it as kinetic energy, spinning a flywheel, or rotor. When energy is needed, inertia allows the rotor to continue spinning and the kinetic energy of the spin is captured and converted back into electricity. Flywheel rotors are often made of carbon fiber or steel, and other system components are also created from machined metal.

The *Action Plan Matrix* includes an objective to use the NY Best consortium (New York Battery and Energy Storage Technology Consortium) as a resource for energy storage innovation information and networking (www.ny-best.org). The consortium of more than 150 manufacturers, academic institutions, utilities, technology and materials developers, start-ups, government entites, engineering firms, systems integrators and end-users has a mission to serve as an expert resource for energy storage-related companies needing assistance with growing in New York State. Members include National Grid and Syracuse University, where research is conducted. Commercialization of new technology is a major component of the NY-Best mission, one that integrates well with another *Action Plan Matrix* goal - to enhance entrepreneur development and connect innovators with county and regional resources across the business development continuum from idea to commercialization and second-stage growth.

NY-Best holds conferences[3], supports a test and commercialization center in Rochester, and publishes studies and reports on its web site.

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[2] http://energystorage.org/energy-storage/energy-storage-technologies, accessed 8/10/17

[3] As an example of a regional networking resource, the 2017 NY-BEST Energy Storage and Technology Conference will be held in Rochester on October 11. Government and non-profit registration is $150.

Nuclear Power Generation

Existing Assets

- Nine Mile Point Nuclear Generating Station, with two reactors and capacity of 1,900 MW[4]
- James A. Fitzpatrick Nuclear Power Plant, with one reactor and capacity of 882 MW

Both plants are operated by Exelon Generation, which acquired them from Entergy Corporation in 2016. Together, these facilities generate 15.1% of New York State's electric power, and 46.8% of the state's nuclear powered electricity. In 2016, these facilities were threatened with closure, as nuclear generation costs are currently uncompetitive compared to power generation using natural gas.[5] New York State views nuclear generation as a

[4] Generation capacity provided by Bergmann Associates. Capacity reporting for a nuclear facility can vary depending on the date of measurement, as it is tested periodically and exact conditions can vary. The MW capacity reported by Bergmann Associates differs slightly from that on the Exelon fact sheets in Attachment A, likely because of the date of the capacity report. According to the U.S. Nuclear Regulatory Commission, net capacity factor is "The ratio of the net electricity generated, for the time considered, to the energy that could have been generated at continuous full-power operation during the same period." https://www.nrc.gov/reading-rm/basic-ref/glossary/capacity-factor-net.html

[5] Nuclear advocates point out that the pricing of other generation methods, particularly fossil fuels, does not take into consideration enough of the downstream impacts, such as emissions or carbon generation, and that quantifying these impacts as costs would make nuclear more competitive.

necessary resource to reduce the use of fossil-fuels, while renewable sources, such as wind and solar, are developed. Therefore, the state has agreed to provide a subsidy to the Exelon plants to facilitate their continued operation.

Taken together, the county's nuclear facilities directly employ approximately 1,525 people, and for each of these workers, another 2.5 jobs in other industries are supported.[6] Wages at these facilities are generally well above county medians. Additional workers associated with periodic refueling make significant contributions as well. The recent refueling at the Fitzpatrick plant required "contract workers, and regional union labor, including pipefitters, boilermakers, electricians, laborers, and radiation protection technicians. The influx of more than 1,000 outside workers and their associated spending at local hotels, restaurants, gas stations and stores provide a major economic boost to the community."[7] Exelon Corporation earned Operation Oswego County's JOBS AWARD, presented at the organization's 2017 Annual Meeting.

As an illustration of the challenges facing nuclear generation assets elsewhere in the country, it is notable that like the facilities in Oswego County, Exelon's Clinton, IL plant was unable to compete with lower cost electricity production and in June 2016, Exelon announced plans to close it. In December, Exelon secured financial assistance from the State of Illinois and the plant is expected to remain open for the time being. [8],[9]

Nuclear energy capacity has been decreasing nationwide. Several reactors are being retired and there is growing uncertainty around the completion of new facilities in South Carolina and Georgia, the only sites where new capacity has been under construction. In August 2017, the South Carolina facility was declared abandoned by Scana Corp. because of cost overruns predicted to exceed 100%.[10] The gross capacity of the abandoned Scana Corp. project was estimated at 2,500 MW.

Georgia Power and the Southern Companies are constructing two units at the existing Vogtle plant site in Georgia, using a pressurized water reactor technology that is considered safer for operators and communities.[11] Operations may begin in 2020. It has been under construction since 2009, evidence of the long timeline for developing new nuclear capacity, even at existing facilities. This project, which is farther along than the South Carolina project, has also experienced cost overruns.

The Scana and the Vogtle projects were both undertaken by partnerships between state power authorities and private companies. In the case of the Scana, ratepayers were required to subsidize the plant before operation began, a situation that illustrates the cost challenges of constructing a multi-billion dollar plant. Given the publicity surrounding the abandonment, this situation is contributing to uncertainty about nuclear generation construction overall.

It is beyond the scope of this analysis to predict the future of nuclear energy in the U.S., but at this time it is likely that support for large-scale projects will continue to diminish, at least for the next several years, although success at the Vogtle project would likely improve public perception. Public perception is also complicated by tension between nuclear power's newfound desirability as a low-to-no carbon energy source, and longstanding opposition to the technology. Given the importance of local public acceptance, Oswego County is uniquely well positioned to benefit from trends in nuclear energy, including new technology and smaller scale projects. The success of Upstate Energy Jobs in preserving the Exelon facilities, and the open-mindedness of county residents toward nuclear power, are substantial assets to be leveraged.

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[6] Direct employment is from Exelon's 2017 fact sheets, in Attachment A. Indirect jobs estimate per each direct job is from EMSI.
[7] "FitzPatrick Nuclear Power Plant Begins Refueling To Support Continued Operation," *Oswego County Today*, 1/17/17.
[8] http://www.exeloncorp.com/newsroom/clinton-and-quad-cities-retirement, accessed 8/11/17
[9] http://www.powermag.com/exelon-chief-is-optimistic-despite-current-nuclear-market-turmoil/, accessed 8/11/17
[10] https://www.wsj.com/articles/south-carolina-seeks-ways-to-salvage-nuclear-project-1502125431, accessed 8/7/17
[11] https://www.georgiapower.com/about-energy/energy-sources/nuclear/overview.cshtml, accessed 8/11/17

Nuclear Opportunities for Oswego County

New nuclear technology development – county stakeholders expressed strong interest in attracting "next generation nuclear." Two centers of nuclear research in New York State, located at the Rensselaer Polytechnic Institute in Troy and Brookhaven National Laboratory in Brookhaven on Long Island, are in densely populated areas where reactor prototyping or facilities expansion is both costly and will likely be met with substantial local opposition. In the case of Brookhaven, proximity to other high-value equipment like the supercollider may also be an impediment. Oswego County could become an appealing partner for research institutions. New nuclear technologies being developed to address safety and cost include:

- Next generation nuclear, large scale: High-temperature gas-cooled reactors operate at a higher efficiency with lower waste and significantly improved safety, but are not yet under development.[12] Pilot projects have begun to be developed in China and Saudi Arabia. In January 2016, the U.S. Department of Energy announced that the firm X-energy won a $40 million grant to develop a High Temperature Gas-Cooled reactor.
- New technology: Thorium molten-salt reactors use a technology developed in the U.S. in the 1950s, but not commercialized or used for domestic energy production. This technology is believed to be substantially safer than the systems currently deployed, but challenges remain, including the corrosive qualities of the salt used for cooling. China is undertaking a project that is not expected to come online until 2030.[13]

Small Modular Reactor Deployment: Next generation nuclear, small scale: Advanced Small Modular Reactors (SMRs) are considered by the U.S. Dept. of Energy (DOE) to be a key part of its goal to develop safe, clean, and affordable power options. These models produce up to 300 MW and can be fabricated at a factory and shipped to the plant site by rail or truck. They use a light water coolant, similar the technology already employed in the Exelon plants. Information from a DOE publication on SMRs is included as Attachment B.

SMR technology, like existing nuclear plants, would fill the required "baseload" capacity for the NYS electric grid. As the state pushes more strongly into renewables it has been focusing on highly intermittent power sources such as solar and wind, but particularly with battery capacity still inadequate for long-term storage of large amounts of power, these intermittent sources must be supported by sound baseload capacity to prevent service disruptions. With Indian Point and its 1,900 MW scheduled to come off line in 2021, baseload capacity will shrink unless new facilities are added.

Oswego County may be an ideal site for SMRs, which the DOE states are expected to be deployed in the next 10 -15 years. A test site should be explored that secures at least one SMR for the Exelon site within 5-7 years to ensure that new technology is introduced, and the current expert workforce secured, within the current window of concern about a new closer threat. The *Action Plan Matrix* recommends continuing the productive relationship with Exelon and monitoring the regulatory approval process for SMRs.

Uncertainty in New York State Baseload Energy Future: Plans to replace Indian Point's capacity, that have been announced so far, include the $2.2 billion Champlain Hudson Power Express Project, which proposes to purchase up to 1,000 MW of hydro-electric power from Quebec, transmitting it along the state's eastern border, including under waterways and through or near the densely populated Hudson Valley Region to reach the metropolitan New York City Area, which had benefitted from the Indian Point generation capacity. This project is not fully underway, and

[12] http://www.ngnpalliance.org/index.php/htgr and http://web.mit.edu/pebble-bed/Presentation/HTGR.pdf, accessed 8/14/17
[13] https://www.technologyreview.com/s/602051/fail-safe-nuclear-power/, accessed 8/14/17

while the state is apparently confident that no service disruptions will occur as a result of the closure, the picture is not entirely clear at this time.

In addition, Oswego County's generating capacity, in this uncertain period, can be promoted as a significant resource for the state. A transmission bottleneck in the Marcy/Oneida County area has recently been resolved, but transmission capacity is a resource to be monitored and, where necessary, pushed for, as infrastructure necessary to the county's ability to support the state's energy portfolio by exporting electrons.

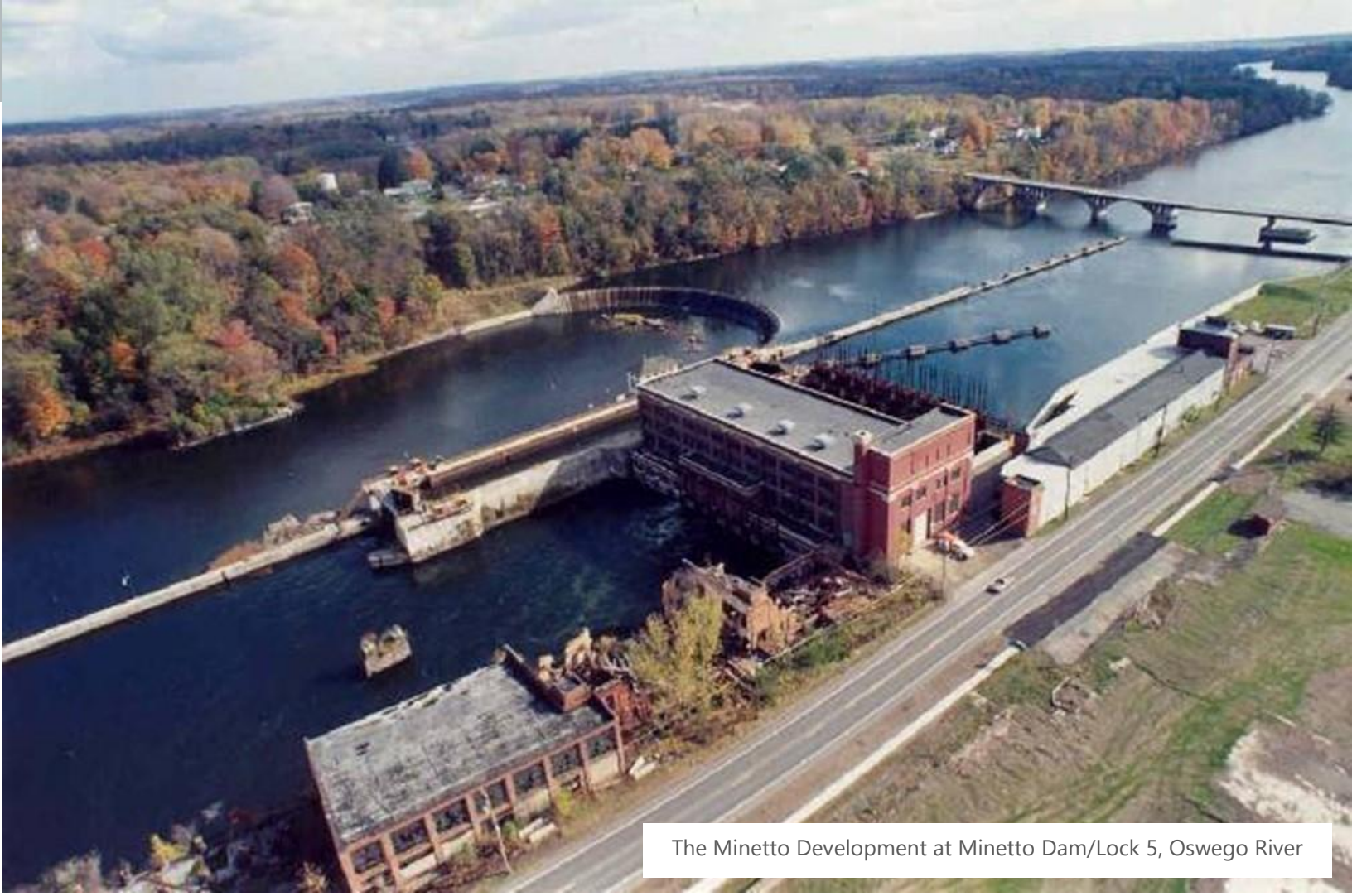
Early Site Permitting: The U.S. Nuclear Regulatory Commission (NRC) has implemented an Early Site Permit (ESP) Application process whereby the NRC "approves one or more sites for a nuclear power facility, independent of an application for a construction permit or a combined license. An ESP is valid for 10 to 20 years from the date of issuance, and can be renewed for an additional 10 to 20 years."[14] Exelon received an ESP for its Clinton, IL site in 2007.

U.S. Department of Energy Funding Opportunities in 2018 – As part of its Small Modular Nuclear Reactors (SMR) initiative, the U.S. Dept. of Energy posted the following announcement[15] "U.S. Industry Opportunities for Advanced Nuclear Technology Development: In FY 2018, the Department plans to issue a multi-year cost-shared funding opportunity to provide a direct vehicle to support innovative, domestic nuclear industry-driven concepts that have high potential to improve the overall economic outlook for nuclear power in the U.S. Funding for this funding opportunity will enable the development of existing, new, and next-generation reactor designs, with a focus on SMR technologies.

The scope of the funding opportunity will be very broad and will include opportunities to develop manufacturing techniques, perform design finalization / address other regulatory issues, develop Instrumentation and Control systems, and other needs identified by industry. The funding opportunity will provide awards sized and tailored to address a range of technical, design and regulatory issues impeding the progress of advanced reactor development, including SMRs."

Replacement of nuclear energy – Nuclear generation, even SMRs, has a longer deployment and installation timeline than most other forms of electric generation, so while nuclear is a unique strength for the county, it is not the sole choice for increasing the state's supply. Oswego County is well positioned to promote itself as a location for new gas-powered facilities, which may continue to be the most cost-effective method of generating baseload energy for a decade to come. These facilities are putting the greatest price pressure on nuclear generation and despite the state's push for renewables, they are the most likely to provide electricity when nuclear facilities are decommissioned, as is intended for the Indian Point facility in the Hudson Valley. Energy expertise and community comfort with the industrial profile of large plants is a significant asset. Potential opportunities for siting other facilities is an important factor in recognizing that the county has an "energy cluster" and not just a variety of different production facilities.

[14] https://www.nrc.gov/reactors/new-reactors/esp.html, accessed 8/14/17
[15] https://www.energy.gov/ne/nuclear-reactor-technologies/small-modular-nuclear-reactors, accessed 8/8/17



The Minetto Development at Minetto Dam/Lock 5, Oswego River

Hydroelectric Power Generation

Existing Assets

Ten hydroelectric power facilities capable of generating a total of 97.4 megawatts:

Varick 8 MW	Granby 10 MW	Phoenix 3.2 MW
High Dam 11.9 MW	Fulton 1.3 MW	Lighthouse Hill 8 MW
Minetto 10 MW	Oswego Falls West 3 MW	Bennetts Bridge 36 MW
	Oswego Falls East 6 MW	

Key Findings

Competition for customers and financial support is high in the energy sector:

- Hydroelectric power is expensive to generate. Throughout the industry, hydroelectric power costs more to generate at this time than electricity generated by natural gas, chiefly because of the current relatively low cost of natural gas. As a result, even when demand for electricity rises overall, demand for hydroelectric power may not increase in regions where natural gas-fired plants are able to supply enough power. Hydroelectric plants may be idled.
- Hydroelectric power competes with other renewables for government subsidies. Many government efforts, particularly in New York State, provide subsidies and incentives for the creation of renewable energy

sources such as hydroelectric, solar, and wind. Where programs prioritize investments in new energy assets rather than maintaining existing ones, hydroelectric plants, many of which are decades old and would benefit from upgrades, are disadvantaged in favor of trendier sources.

Successful hydroelectric facilities nationwide are able to:

- Negotiate successfully with regulators about rates, environmental regulations, and connections to the electric grid.
- Optimize their existing assets (location and water volume) by upgrading technology and where possible managing upstream water flows. Like many renewables, hydroelectric power generation relies on external events such as rainfall that cannot be controlled by management; the ability to generate and sell more power when water flow is high can increase revenues. Energy storage, even low-tech solutions such as pumped storage, can help smooth out facility revenue by providing electricity to sell even when water flows are too low to maximize use of the turbines.
- Connect directly to customers located nearby, lowering the cost of electricity by avoiding the additional charges added when power is purchased from a grid.

Hydroelectric power generation is a small sector in Oswego County but has key assets:

- Within this industry, siting of new facilities is challenged by environmental concerns, with communities believing renewables are desirable in theory, but unsightly on their river. Oswego County has ten facilities already in place, and improvements to these are likely to be accepted by their communities, making the county a more attractive location for investment in hydropower than new "greenfield" sites in other regions.
- Small facilities like those in Oswego County, which experience uneven revenues because of water flow, are good candidates for technologies for better power management. While advancing battery storage technology can adapt to various facility sizes, some of Oswego County's facilities are also likely to have nearby vacant land that could be used for a pumped storage system, where water is pumped uphill during periods of high electricity production, and released when flows are lower to increase generation capacity.
- Hydroelectric is a small sector, with 21 jobs currently categorized as hydroelectric as of 2016, 16 of which have been added since 2006. As an example of the economic importance of these jobs, earnings average $98,650 at Brookfield facilities[16], and for every 1 job within the industry another 2.31[17] jobs are created in supporting areas such as mechanics, equipment replacement, and community amenities.

Opportunities for Oswego County

- Hydropower facilities are underutilized in the current market because of the low price of natural gas generation, but NY State's Clean Energy Standard aims to increase the amount of electricity generated by low to no-carbon sources like hydropower and includes the potential for funding upgrades to existing small hydropower facilities. Several such facilities are present in the county.
- Direct connections to hydropower for commercial users can be explored, and sites close enough to the facilities could be promoted as locations for industries with high energy usage because direct connections to the power source avoid some of the fees and transmission costs associated with purchasing power off the grid, offsetting the higher unit cost of hydropower.

[16] Source: Operation Oswego County
[17] Source: EMSI

Waste to Energy Electric Generation

Existing Assets

Oswego County Department of Solid Waste, est. 6 MW generated.

The Oswego County Department of Solid Waste operates a 6 MW Energy Recovery Facility, with a processing capacity of 200 tons per day that generates steam for an adjacent Interface Solutions Plant and electricity to power the Energy Recovery plant itself. Excess electricity can be sold to National Grid.

Key Findings

Successful waste to energy facilities nationwide are able to:

- Maintain competitive pricing on the "tip fees" that haulers pay to deliver waste to a facility. Waste is a key input for energy generation, but waste haulers often operate in a highly competitive environment where customers – commercial and residential – are sensitive to the cost of service. Haulers must consider the cost of delivery to more distant facilities as well as the charges for offloading.
- Economically dispose of the ash generated by the incineration process. Not all landfills in New York State are permitted to accept the ash, and hauling it long distances adds to a facility's operating costs.
- Vertically integrate waste collection, incineration, and ash disposal. Since the *Carbone v. Clarkstown* decision by the New York State Supreme Court's Appellate Division in 1994, municipalities have been prohibited from engaging in "flow control," or dictating to haulers where waste may be sent. This became a challenge for incineration facilities that could not attract enough waste without lowering tip fees below a level where the facility could operate. Oswego County's municipal system of collection, incineration, and delivery of ash

to the landfill creates a vertically integrated system with a sufficiently steady supply of waste, and a nearby option for ash disposal.

Waste disposal is expected to become an increasing challenge for growing communities:

- Nationwide and regionally, demand for waste disposal is expected to grow from both increased consumer consumption and industrial activity.
- Accommodating environmental requirements and federal, state, and local regulations is a challenge, particularly in densely populated areas. Siting a new disposal facility, or expanding an existing transfer station or landfill, is frequently strongly opposed by communities who object to truck traffic, noise, and odor.

Opportunities for Oswego County

Waste to energy fits within the NYS energy and environmental vision in two ways:

- Methane generated by the decomposition of organic waste in landfills is deemed by New York State to be a major source of greenhouse gas. The governor recently announced a statewide Methane Reduction Plan. The plan focuses more on burning methane at landfills, not burning waste to reduce organics in landfills. However, the county's waste to energy facility should be considered part of the methane reduction efforts, given that it reduces the creation of methane by incinerating organics rather than having them decompose. With the plan in its early stages, there may be opportunities to obtain funding for expansion or upgrades at the plant.
- Waste to energy is a renewable energy source and although it is not "fashionable" like solar and wind, it remains eligible for some programs and subsidies as part of a renewable portfolio.

Oswego County's facility may be able to expand its service:

- Currently, the county facility generates electricity for a directly connected customer, Interface Solutions. During the tour of the county, the potential to expand service to hot water was discussed. This would reduce their need to bring in processed water from the municipal system. It would also reduce the amount of heat that is released into the Oswego River.
- Technology upgrades to increase efficiency for electricity, hot water, and potentially steam could encourage another industry to co-locate, particularly if there is (1) unused capacity; and/or (2) an opportunity to use the state's new interest in methane to obtain funding for improvements.

Advanced Manufacturing: Use of innovative technologies to create existing products and the creation of new products. Advanced manufacturing can include production activities that depend on information, automation, computation, software, sensing, and networking.[18]

Novelis

The Case for Advanced Manufacturing in Oswego County

Oswego County has a stronger manufacturing sector than the Central New York Region, not just by numbers and percentages of jobs, but because of the engagement and innovation of the companies in the county. The education community is increasingly focused on manufacturing careers and has been developing innovative programs to reach a broad spectrum of students, from young people in high school to disengaged workers. A statewide and super-regional push for "STEM" education, jobs, and initiatives to introduce advanced manufacturing techniques is generating excitement. This push indicates the possibility of funding and other financial support.

Advanced manufacturing has been identified by Operation Oswego County as an industry to target for expansion and location in the county. Previous analyses and reports, as well as interviews with stakeholders and manufacturing leaders in Oswego County, show that the county has substantial strength in the sectors of aluminum, paper packaging, machine shops, heat transfer equipment, and air filters and environmental products.

Biospherix

In addition to providing high quality jobs, advanced manufacturing requires high levels of capital and while this is, as noted below, often a challenge for small and new companies, capital investment has multiplier effects through the local economy, including the purchase of additional goods and services and commercial real property taxes. The effects of capital investment are particularly important when new equipment and technology reduce the workers needed to produce the same or more output. Many communities face this tension between desirable levels of capital investment and disappointing job creation numbers. Recognizing the multiplier and tax benefits from advanced manufacturing investment is important in evaluating the contribution of an advanced manufacturing project in the county.

The goal for advanced manufacturing as a targeted industry in Oswego County is to understand, connect, and promote existing assets that continue to provide support for the growth of companies already in the county, and to

[18] https://www.manufacturing.gov/news-2/news/glossary-of-advanced-manufacturing-terms, accessed 8/14/17

help them adopt and benefit from advanced manufacturing tools. Oswego County can aim to become known as the place in the region where existing companies are welcomed and where new ventures can grow from startup to production.

County support for advanced manufacturing as a targeted industry can assist with:

- ✓ *Technology transfer and commercialization*
- ✓ *Access to capital to upgrade and replace equipment to develop the new products and processes*
- ✓ *Access to skilled workers who can operate computerized equipment, have technical abilities such as welding, and observe safety protocols*
- ✓ *Creation of a task force or working group to leverage and promote the more than 30 machine shops in the county, as discussed in the Action Plan Matrix.*

Advanced Manufacturing Assets - Workforce

The table below highlights aspects of the manufacturing sector in Oswego County, compared with the Central NY and Upstate Regions. The county has a larger percentage of manufacturing jobs than the other regions, and nearly the same percentage of skilled (Some College up to Associate's Degree) workers. In addition, a higher percentage of production occupations within manufacturing show that Oswego County is already a place for "making."

Manufacturing Sector in Oswego County, Central NY, and Upstate NY			
	Oswego County	Central NY	Upstate NY
Total Population	123,565	802,051	7,190,613
Working Age Population (16 - 64+) as Percent of Total Population	69%	67%	67%
Education and Skills: Some college up to Associate's Degree	29%	30%	30%
Education and Skills: Bachelor's Degree	11%	17%	17%
Manufacturing Jobs, 2016	3,257	30,605	322,975
Manufacturing Jobs as a Percent of All Jobs	9%	8%	7%
Production Occupation Jobs	2,284	20,553	178,650
Production Jobs as a Percent of Manufacturing Jobs	70%	67%	55%
Production Occupation Wages	$42,645	$35,969	$36,228

Sources: EMSI, ESRI

Advanced Manufacturing Assets – Education and Training

The *Existing Conditions Analysis* discussed the many education and training initiatives in the county and highlighted those created in response to employer needs, as well as in partnership with county employers. Companies implementing advanced manufacturing techniques often require "Middle Skills" workers, who have the training, ability, and desire to work in a modern manufacturing environment, but have not necessarily completed a four-year degree. A major asset for the county for advanced manufacturing is the development of programs that are career and job focused and are accessible for county residents. The following are examples of such programs:

Certificates

- The Center for Instruction, technology and Innovation (CiTi) offers programs to earn a certificate for certified nurse assistant, 10-hour OSHA training, air brakes training, CDL-A tractor trailer, heating, HVAC, welding, etc.
- The Center for Career and Community Education (CCCE) has a certificate degree program through Cayuga Community College that leads to an advanced manufacturing Certificate. The program is 33 credit hours and focuses on Manufacturing Processes and Materials, Machine Tools, Computer Aided Design, Solid Modeling and Advanced CAD/CAM. It offers hands-on learning, high tech labs and faculty who are experienced in the industry.
- Bryant and Stratton College offers programs to earn a certificate in accounting, medical billing, health management, human resources, paralegal, etc.

Workforce Training and Entrepreneurship

- CiTi offers a variety of workforce training that does not necessarily result in obtaining a certificate.
- Operation Oswego County offers training and networking classes in areas such as small business, woman entrepreneurial skills and general employment opportunities.
- Manufacturer's Association of Central NY (MACNY) offers training, network and support for manufacturing jobs. Some of the training covers topics such as leadership and supervisory skills, management, supply chain, safety, human resources, and apprenticeship trades.

Advanced Manufacturing in the County – Successes and Challenges

This section of the analysis reviews the results of industry research and interviews with county stakeholders and manufacturing leaders. It identifies what is working well to attract and support manufacturing and what is challenging.

Interviewees were not specifically asked to discuss advanced manufacturing, but the need to adopt new technology and leaner processes, to pay for new and more efficient equipment, and to attract and retain skilled workers arose as strong themes.

Oswego County's Attraction for Manufacturers

- Experience of existing companies: The communities are generally willing to approve new building and expansion efforts and are welcoming to manufacturing. There are opportunities to interact with other manufacturers.
- Financial support from the county: Operation Oswego County and the Oswego County IDA provide a range of financial supports, including tax abatements and Small Business Administration (SBA) loan origination. They will work intensively with a company to implement the support package.
- Financial support from local banks: Local banking institutions demonstrate the ability and willingness to see a business as a partner, not just a set of numbers or ratios.
- Transportation: highways and the Port of Oswego facilitate moving raw materials and finished goods.

- Educational institutions: SUNY Oswego, Cayuga Community College/ CiTi are responsive, innovative, and actively seek partnerships with manufacturing companies to develop training and career paths that match job needs. The Advanced Manufacturing Institute at Cayuga Community College's Fulton Campus is expected, like other programs at this campus, to attract students from throughout the region, increasing the size and diversity of the workforce available to employers.

Challenges Manufacturers Face in the County

- Access to capital: It is difficult to obtain financing or funding for innovation, such as venture capital or matching funds. Commercial banks have demonstrated willingness to partner with county businesses, but must work within capital and regulatory constraints. NYS grant programs have substantial paperwork requirements, are slow to reimburse investment, and typically only cover a small percentage of a project.
- Companies that are growing or adopting advanced manufacturing techniques need to buy new equipment and advanced control systems, making the need for capital more acute.
- Scaling up new ideas: Taking innovation from idea to production is costly and challenging for existing companies as well as startups.
- Job creation requirements: The Oswego County IDA was highly spoken of by stakeholders, for the organization's cooperation and its willingness to support a manufacturing enterprise. However, an IDA is required to focus strongly on the number of jobs created or retained.[19] This overlooks the value of capital investment and other outcomes such as the re-use of a vacant or underutilized facility. This issue arises throughout New York State as manufacturers adopt "leaner" processes and advanced manufacturing methods that use fewer employees. As a result, fewer jobs may be created per dollar of capital investment.
- Competition for investment: Facilities in the county that are owned by a larger outside company have to compete internally for resources against plants in lower cost regions. In these cases, "business attraction" may actually mean not just targeting new companies, but having the tools to demonstrate cause for investment to an existing company.
- Energy: The cost of electricity is high in the county, as it is throughout the state. Even though a large amount of electricity is generated in the county, most manufacturers have to purchase it through the electric grid instead of directly, working with through National Grid and NYS regulations.
- Attracting and retaining professionals: Specifically, Engineers and Certified Public Accountants.
- Attracting young people: Several stakeholders discussed a lack of interest among young people in manufacturing careers, a concern echoed by trades stakeholders who represent associated careers such as plumbers or carpenters. Education efforts such as CiTi may be underutilized.

[19] The Office of the NYS Comptroller regularly evaluates individual IDAs and the state as a whole based on the number of jobs created or retained per dollar of financial benefit. This can pressure organizations to focus solely on jobs, and create challenges in generating support for projects that add few jobs but have other benefits.

Food Processing: any of a variety of operations by which raw foodstuffs are made suitable for consumption, cooking, or storage.

Food processing generally includes the basic preparation of foods, the alteration of a food product into another form (as in making preserves from fruit), and preservation and packaging techniques.[20]

The Case for Food Processing Manufacturing in Oswego County

During our tour of the county, Camoin Associates learned that the City of Fulton once smelled like chocolate, an effect of the Nestlé plant in the city center. The closure of that plant and the Birds Eye frozen foods facility drained hundreds of jobs from the county and diminished the well-being of several communities. It did not drain the county of a workforce that is familiar with food processing techniques, safety, and equipment. The K&N foods facility, for example, has excess refrigeration capacity as well as square footage in its building.

While some New York counties have strong clusters in a single industry, Oswego County's food processing businesses are diverse, which is a strength for an industry where external factors such as weather and crop prices can create volatility in revenues and profitability. The county's agriculture is also not dominated by one or two crops, but a wide variety including fruit, apples, onions, milk, soy, corn, and grains.

Most county produce is shipped out for processing despite the industry's preference to locate closer to raw foodstuff production. With its workforce, agriculture, and existing diversity of businesses, the county has in place critical elements to renew this industry.

Industry Basics[21]

The food processing and manufacturing industry transforms livestock and agricultural products into products for intermediate or final consumption. The industry is generally considered mature, with revenue expected to grow at a low rate over the coming years. While overall, the industry is experiencing low growth, certain niche sectors are growing rapidly by manufacturing innovative products that meet new consumer demand for healthy, convenient, and natural products. Examples of these high growth areas of the industry include "Greek" yogurt, organic frozen meals, and luxury pet foods. [22]

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[20] https://www.britannica.com/topic/food-processing, accessed 8/14/17

[21] Portions of the industry basics discussion are drawn from prior analyses performed by Camoin Associates.

[22] US Department of Commerce. (2010). *Industry Outlook: Food Manufacturing NAICS 311.* US Department of Commerce.

Nationally, food processing and manufacturing businesses are facing shrinking margins and increasing competition. Additionally, changes to food safety regulations, changes in consumer preferences, energy costs, and impact of the businesses on the environment are challenging the industry.[23] Commodity prices having been falling in the period leading up to this study, but past jumps in commodity prices have negatively impacted small producers. To address these challenges, as well as control costs, secure national contracts, increase market share, and expand product offerings, food processing and manufacturing firms have focused on merging and acquiring new companies. The industry has also been investing heavily in technology to reduce its reliance on low-skill workers.[24,25]

Food Processing Assets

- A diverse agricultural economy: Oswego County has approximately 657 farms with an estimated 94,209 total acres. Farming is unusually diversified. Livestock, milk, grains, and fruit and vegetable crops have approximately equal market values - $25.1 million for livestock and animal products and $22.5 million for crops. The only other counties with significant farming sectors (more than $20 million) that are nearly balanced in this way are all in the Hudson Valley, with access to major metropolitan markets: Rensselaer, Columbia, and Dutchess Counties.[26]
- Transportation: The Route 81/481 corridor provides efficient transportation even for fresh foods, with more than 140,000 people less than an hour away in Syracuse.
- Underutilized facilities: K&N foods has excess space and refrigeration capacity.

Challenges

- The loss of major employers: This may have weakened the perception of food processing as a viable industry in the county.
- Small business hurdles: Smaller food processing companies, and those working to increase production and expand markets, can face difficulties common to many small businesses, including obtaining capital.
- Industry challenges: The industry experiences challenges such as shrinking margins, increased competition, and food safety regulations that disadvantage small businesses compared with larger ones.

Opportunities for Oswego County

- Regional trends: Small batch and artisanal production, growing and supported regionally, is considered manufacturing and can benefit from access to county business support in the form of incubator space and financial assistance.

  Existing middle skills and hands-on training: The county's advanced manufacturing and other BOCES and CiTi initiatives provide a model for education, promoting and expanding educational resources for food processing workers, working with employers in this industry, as with other types of manufacturing. These resources may also provide retraining opportunities for dislocated workers who need to learn new techniques.
- Infrastructure for expansion: Wastewater treatment capacity is critical to the food processing industry. The County of Oswego Industrial Development Agency is assisting Champlain Valley Specialty, which processes and packages local apples, with the development of a wastewater treatment system. This will support a

[23] Ibid.
[24] IBISWorld Industry Report 31141. Frozen Food Production in the US.
[25] IBISWorld Industry Report 31151. Dairy Product Production in the US.
[26] U.S. Census of Agriculture (2012) *County Data – New York.*

planned expansion at the company from approximately 200 to a projected 400 jobs. Wastewater infrastructure is discussed in more detail in the *Infrastructure Analysis* and the *Action Plan Matrix*.

- Startups and incubators: Food processing is an eligible industry for incubator space, such as the facility planned for the former Price Chopper in the City of Oswego. Opportunities to share commercial kitchen equipment, small batch processing, and relatively low capital intensity can make food processing and production startups good candidates for small business programs already in place in the county.

  The *Action Plan Matrix* includes strategies and actions for the proposed creation of a craft beverage industry, and the creation or attraction of more unique, locally-based food production.

- Crossover innovations: Sunoco's malt barley facility is an example of manufacturing expertise transferring to food, in this case a key ingredient for craft brewers. Oswego County's business community, where leaders know and interact with each other, is well positioned to uncover opportunities.

Tourism 1: the practice of traveling for recreation. 2: the guidance or management of tourists. 3a: the promotion or encouragement of touring; 3b: the accommodation of tourists[27]

The Case for Tourism in Oswego County

Key Findings

Tourism is an important economic sector for many communities as it brings outside dollars that support a variety of service, entertainment, and retail businesses. Natural, cultural, and other tourism-related assets also contribute to a high quality of place for residents and workers – making the community a more attractive place to live, work, and visit.

As showcased in the county's tourism logo, "it's great outdoors" is a sentiment shared by a variety of individuals including residents, the local workforce, visiting family members, business travelers, SUNY Oswego parents, and second homeowners.

For example, the 33,789 fishing licenses sold in the county to out-of-state and international visitors represents 62% of total anglers on the river and demonstrates the county's strength in fishing-related tourism. In addition to the licenses, these visitors are paying for lodging, food, transportation, guide services, and necessities such as flies and other equipment. This visitor spending supports a number of businesses and services related to this sector, which is enjoyed by local anglers as well as visitors.

Focusing on tourism as a targeted industry recognizes the county's successes and identifies opportunities to strengthen and grow this sector.

Economic Impact of Tourism in Oswego County[28]

$146 million traveler spending	*$17 million state and local tax revenue*	*3,153 jobs*
$42 million "angler impact"	*Over 33,789 visitor fishing licenses sold*	*62% of anglers on the Salmon River are from outside NYS*

Oswego County's tourism sector is growing. Traveler spending increased 6.8% from 2015-16. A 1% increase in the occupancy tax rate helped increase receipts; however, revenue would have grown 7% from the tax regardless of the increased occupancy tax rate. The full economic impact report is included as Attachment C.

New York State is divided into 11 tourism regions, which are not contiguous with the regions established for the Regional Economic Development Councils. Oswego County is included in the Thousand Islands Region for tourism, and in the Central New York Region for other state economic development purposes. It will remain important for Oswego County to maintain a strong presence within both of these groups. Despite the assignment to the Thousand Islands tourism region, Oswego County projects seeking funding through the state's Consolidated Funding Application (CFA) process will be reviewed by the CNY Regional Economic Development Council. Continuing to make the case for the economic importance of tourism to Oswego County will support future funding requests.

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[27] "Tourism." Merriam-Webster.com. Merriam-Webster, n.d. Web. 22 Aug. 2017.
[28] All data in this section from the Oswego County Tourism Office, 7/17/17

Opportunities for Oswego County

- **Expanded definition of visitor:** Oswego County tourism is strongly oriented around fishing and the outdoors, specifically attracting visitors from outside the county to enjoy these attractions. Other visitors include family and friends visiting residents, business travelers, and parents of SUNY Oswego students, many of whom travel far enough that an overnight or weekend stay is practical. These types of visitors can be targeted with information about local amenities, encouraging them to extend their visits and expand the number and type of activities in which they can participate. Owners of second homes are also an important market, since they are already present in the county. Because they are likely to be retired or on vacation they should be encouraged to behave like "tourists," by frequenting local eateries, or taking part in activities such as visiting Fort Ontario or the Fish Hatchery during their stay. They can often be identified by researching tax rolls for out-of-county mailing addresses.
    - Visitors in the county for reasons other than tourism can be particularly affected by a sense of place and appeal of the environment in which they are engaging in their primary activities. Attractive amenities, well-planned signage, strategic marketing, and interesting businesses can encourage visitors to extend their stays to explore the community and, in turn, increase spending.
    - Specific projects in the City of Oswego Downtown Revitalization Initiative that are likely to draw out these visitor market segments include a Complete Streets makeover to create pedestrian-friendly blocks, development of the commercial segments of the Harbor View Square, improvements to the Pocket Park on Market Street, improvements to the River Walk, and support for local businesses that includes exterior and upper floor renovation to finish commercial properties. The indoor water park would become a prominent attraction that will extend visitor stays as well.
- **Crossover tourism:** Tourists are often divided into market segments based on the activity that primarily draws them to a community. Encouraging these visitors to engage in other available activities begins with understanding what else that market segment enjoys. The Tourism Crossover Matrix, below, was developed by Camoin Associates to show activities enjoyed by different types of visitors. An example of effective crossover marketing is the Tailwater Lodge, where fisherman experience superb angling but they, and any accompanying partners, also enjoy the high quality food and beautiful surroundings associated with resorts; these features appeal to both fisherman and non-fisherman and give them a reason to visit.
    - Just as many activities appeal to multiple visitor segments, visitor segments enjoy multiple activities even if, as noted with anglers, there may be one primary draw into a community. Identifying and promoting "crossover" activities can expand the time and money these visitors spend in the county.
    - As an example, boaters putting in at the Wright's Landing Marina or Oswego Yacht Club could visit Fort Ontario. At less than 2 miles away, the destination is also accessible by walk or bicycle. The Oswego Marina, on the east side of the river, is a short 15-minute walk to Fort Ontario.
    - While performing research on Upstate New York tourism over the past few years, Camoin Associates has developed a Tourist Activity Crossover Matrix. This matrix is not community-specific and can be applied to visitor types in Oswego County. It is included on the following page. The four market segments include:
        - Culture and Heritage – visitors tend to be affluent and are attracted by museums, art galleries, historic sites, and cultural festivals. They tend to be older (average age is 60 years old) and outdoor activities enjoyed include scenic walks and wildlife viewing, gardens, and golf. These visitors are more likely to travel during the "shoulder" seasons of spring and fall

when families are constrained by school-year schedules and would be attracted by Fort Ontario and the proposed Marine Sanctuary.

- Knowledge Seekers and Families – this group looks for many of the same activities as Culture and Heritage but they are likely to be younger, to have families, and to be slightly less affluent. They can be more outdoor-oriented as well. Families of SUNY Oswego students and prospective students fit within this group. Not all members of a family want to engage in the same activities, or spend a whole day doing it, and a range of options – water sports, fishing, shopping, dining, and spas – can be important.
- Outdoor Recreation, Non-Motorized – these visitors include anglers and people who use boats primarily to fish. Canoeing, hiking, biking, and camping are also enjoyed. Both Culture and Heritage and Knowledge Seeker groups also enjoy these activities, and the crossover opportunity can lie with ensuring, for example, that Heritage and Culture visitors to Fort Ontario have information about trails, canoeing, and other outdoor activities.
- Outdoor Recreation, Motorized – snowmobile riders and recreational boaters are included in this group. Demographically, they have higher incomes, and recreational boaters can be somewhat older, sharing some characteristics of Culture and Heritage. Outdoor recreation enthusiasts tend to choose between non-motorized and motorized activities. Snowmobilers are less likely to cross-country ski. A crossover business opportunity can be to cater to both winter groups and understand the needs of different markets. The outdoors and good food, including craft brewing, are examples of shared interests.

This matrix can be used to identify crossover activities that appeal to the county's existing visitor base. Winter snowmobilers can be targeted by fishing charter companies. Birders (scenic and wildlife views) are likely to enjoy historic sites, hiking, and "pampering" amenities at hotels or spas. In addition to serving as a guide for targeted promotion, it can also highlight proposed projects with the widest appeal, which may help inform decisions about resource allocation and funding.

- Activities supporting the traditional and expanded understanding of tourism are woven throughout the *Action Plan Matrix* and include: a Craft Brewing business competition, highlighting the unique cultural fit between the county's employers and workforce outdoor lifestyles, publishing performance measures for economic advancement and diversification, and working with SUNY Oswego to engage their alumni and increase use of the campus outside of the academic year.

- **Places to stay and to hold events**: Encouraging visitors to stay longer and to engage in additional activities must be supported by adequate lodging amenities such as hotels, inns, bed and breakfasts, and camping areas, including campgrounds suitable for recreational vehicles. At the present time, additions and renovations are focused mostly in the City of Oswego. Many visitors choose lodging in the nearby cities of Syracuse or Watertown because of lack of space in central and eastern Oswego County – or because of a perceived lack of space. Oswego County understands the need to encourage growth in lodging, and continuing to focus on these assets and their critical role in increasing tourism spending is important.

  A related problem is event space, both number of facilities and availability in rural areas of the county. Pulaski's Tailwater Lodge and the Lake Ontario Conference Center in the City of Oswego, which is attached to the Best Western Captain's Quarters, both offer high quality space and service and are in different parts of the county, but events must be scheduled well in advance because of competition for the space. Smaller events such as bridal or baby showers or family reunions have limited choices. This can be a key market for crossover tourism, when family and friends travel to the county for a special gathering. Support for lodging should include gathering spaces as well.

Tourism Crossover Matrix, Upstate New York Region				
	Culture and Heritage	Knowledge Seekers and Families	Outdoor Recreation, Non-Motorized	Outdoor Recreation, Motorized
Museums & Art Galleries	●	●		
Theatres & Performing Arts	●			
Historic Sites, Communities, & Landmarks	●	●		
Architecture & Archeology	●	●		
Cultural Festivals & Fairs	●	●		
Community & Family Festivals & Fairs		●		
Scenic & Wildlife Views Including Birding	●	●		
Gardens & Arboreta	●			
Camping		●	●	
Canoeing/Kayaking		●	●	
Cross Country Skiing		●	●	
Golfing	●	●	●	
Fishing		●	●	●
Mountain Biking		●	●	
Whitewater Rafting			●	
ATV Riding				●
Snowmobile Riding				●
Swimming		●		
Backpacking & Hiking	●			
Road Biking		●		
Hunting		●		
Spas & Pampering	●			
Horse Trails			●	

Created by Camoin Associates

Trends in Tourism & Applications for Oswego County

The following is a summary of trends in tourism based on Camoin Associates' experience working with communities on growing their tourism sector throughout New York and the Northeast.

Immersion Experiences & Learning by Doing – Cultural and heritage leisure travelers are looking for more than information they could easily find on the internet. They are looking for an experience, a challenge, a chance to engage or give back. They want to learn-by-doing, but not feel like they are learning. Hands-on experiences formerly associated with children's museums are being incorporated into visitor experiences for all ages. Current descriptions of Oswego County's historic sites focus on what is available to be seen, so where there are also activities or demonstrations that those could be highlighted. Crossover activities such as biking to an historic site can enhance the immersion.

Wineries, Distilleries, Breweries, & Cideries - This industry has grown rapidly since the 1990s with the widespread cultivation of cold hard grape varieties. Additionally, over the past several years, New York has been working to promote its micro-alcohol industry by enacting legislation to incentivize the creation of new breweries, cideries, and distilleries; streamline regulations; and reinforce linkages with agriculture and tourism. This industry is a good fit for Oswego County, and a Craft Beverage competition is included in the *Action Plan Matrix*.

Partnering and Packaging – As easy as it is to plan a trip using the internet, many people still like to have travel arrangements and itineraries laid out for them to minimize their own decision making. This is largely why the cruise line industry has experienced an annual compound growth rate of 7% despite all of the negative press in recent years.[29] Packaging involves combining a number of products to create a visitor experience. This is a growing trend in the tourism industry as the tourism market becomes increasingly competitive. Businesses and tourism organizations are using partnerships and packages to create experiences designed to target specific visitor markets.

Digital Marketing - Marketing today is about storytelling. This is nothing new for tourism-based organizations but because businesses of all types are now using storytelling to attract customers, organizations and businesses need to find new creative ways to set themselves apart. Many are doing this with the help of digital technology such as social media, blogs, YouTube channels, interactive websites, Wi-Fi, and mobile-based applications. VisitOswegoCounty.com offers itineraries for visitors such as the "Historic Maritime District" that identify activities and amenities such as eatery locations. In addition to spreading your message to large networks, these channels naturally encourage visitors help tell the story based on their own unique experiences.

Technology to Enhance the Visitor Experience and Tell Better Stories - Emerging technologies such as Aurasma (www.aurasma.com) are being used to provide unique visitor experiences. Instead of competing with mobile phones, many sites are embracing digital technology and encouraging visitors to use their hand-held devices to enhance their experience. For example, taking a picture of a particular object or scene with a user's phone can make that object come to life. New technologies like this allow storytelling through the perspective of the characters, which is another emerging trend in tourism across the U.S.

[29] Source: Growth of the Cruise Line Industry: http://www.cruisemarketwatch.com/growth/

Attachment A – Exelon Fact Sheets for Nuclear Facilities in Oswego and Wayne Counties

- Nine Mile Point Nuclear Station, Scriba, Oswego County
- James A. Fitzpatrick Nuclear Power Plant, Scriba, Oswego County
- Ginna Nuclear Power Plant, Ontario, Wayne County

Reports downloaded 8/10/17 from www.exeloncorp.com/locations/powerplants

Exelon Generation

Nine Mile Point Nuclear Station

Generation

- Number of units ..... 2 operating units
- Total site net MW generation ..... 1,907 MW
- 2016 net generation ..... 15,465,754 MWh
- 2016 capacity factor ..... 92.7 percent
- Customers served ..... More than 1 million homes

Type and Manufacturer of Reactor

- Boiling Water Reactor ..... General Electric

Ownership

- Exelon Nuclear ..... Unit 1: 50.01 percent
Unit 2: 41.01 percent
- Électricité de France ..... Unit 1: 49.99 percent
Unit 2: 40.99 percent
- Long Island Power Authority ..... Unit 2: 18.00 percent

Construction

- Consulting engineer ..... Unit 1: Niagara Mohawk Power Corp.
Unit 2: Stone & Webster
- When units entered commercial service ..... Unit 1: 1970
Unit 2: 1988
- Operating License ..... Unit 1 is licensed to operate until 2029 and Unit 2 until 2046

Site Features

Site Size:
Approximately 900 acres

Location:
On the shores of Lake Ontario, in the Township of Scriba, N.Y., about seven miles northeast of Oswego and 50 miles north of Syracuse

Number of employees:
Approximately 925

Annual payroll:
Approximately $110 million

2016 tax payments:
Approximately $29.3 million

Signature Events/ Key Sponsorships	
Annual Progressive Agriculture Safety Day	Provide comprehensive safety training for hundreds of Oswego middle school students on how to prevent injuries by recognizing potential hazards around the house and farm.
Oswego County Opportunities	Provided continued support for this human service which serves 30,000 people each year through more than 50 programs providing services such as: assistance for the homeless, educational services, independence for the disabled and safety for the abused.
ARISE Call-N-Ride Program	Chief contributor to program which provides curb-to-curb service for the elderly and those with special needs in Oswego County.

Other Plant Information/Events

In addition to the signature events above, Nine Mile Point sponsors many area organizations and local community events. In 2016, Nine Mile Point provided financial and volunteer support to many groups, including:

- Adopt-A-Highway efforts
- United Way of Greater Oswego County
- Holiday giving "Adopt-A-Family" campaigns through Catholic Charities providing food and gifts to more than 400 local families in need
- American Red Cross Blood Drives

Exelon Generation

James A. FitzPatrick Nuclear Power Plant

Generation

- Number of units ..... 1 operating unit
- Total site net MW generation ..... 838 MW
- 2016 net generation..... 4.1 million mwh
- 2016 capacity factor..... 87.3 percent
- Customers served ..... Over 800,000 homes

Type and Manufacturer of Reactor

- Boiling Water Reactor ..... General Electric

Ownership

- Exelon Nuclear ..... 100 percent

Construction

- Plant builder/engineer..... Stone & Webster Engineering Corp.
- When construction began..... 1970
- When unit entered commercial service.....July 28, 1975
- Operating License.....Licensed to operate until 2034

Site Features

Location:
South shore of Lake Ontario in the Town of Scriba, Oswego County, NY

Number of employees:
Approximately 600

Annual payroll:
Approximately $65 million

2016 tax payments:
Approximately $12 million

Signature Events/ Key Sponsorships

FitzPatrick contributes annually to numerous community and charitable organizations. Each year employees give generously to the community including local United Way chapters. The plant also sponsors Oswego County Soil & Water Districts Envirothon and Plant a Tree programs. The Envirothon is a hands-on environmental program for high school students in grades 9 through 12. The students work in teams to learn about aquatics, current environmental issues, forestry, soils and wildlife. Through the Plant-a-Tree program, tree seedlings and educational materials are provided to 5,000 Oswego County elementary school students. Both programs provide hands-on opportunities to educate on the importance of being environmental stewards.

Other Plant Information/Events

FitzPatrick and its employees contributed to several organizations in 2016, including:

- Harborfest
- Oswego Bookmobile
- Habitat for Humanity
- Project Smart
- Friends of Oswego County Hospice
- 22 Oswego County Schools
- Boy Scouts
- Syracuse Rescue Mission
- Catholic Charities
- Human Concerns

exeloncorp.com

Exelon Generation

Ginna Nuclear Power Plant

Generation

- Number of units ..... 1 operating unit
- Total site net MW generation ..... 576 MW
- 2016 net generation ..... 5,042,062 MWh
- 2016 capacity factor ..... 99.6 percent
- Customers served ..... Approximately 500,000 homes

Type and Manufacturer of Reactor

- Pressurized Water Reactor ..... Westinghouse

Ownership

- Exelon Nuclear ..... 50.01 percent
- Électricité de France ..... 49.99 percent

Construction

- Plant Builder ..... Westinghouse
- Consulting engineer ..... Bechtel Power Corporation
- When construction began 1966
- When unit entered commercial service ..... Unit 1: 1970
- Operating License ..... Unit 1 is licensed to operate until 2029

Site Features

Site Size:
Approximately 426 acres

Location:
Ontario, N.Y. approximately 20 miles northeast of Rochester along the south shores of Lake Ontario

Number of employees:
Approximately 600

Annual payroll:
Approximately $66 million

2016 tax payments:
Approximately $9 million

Signature Events / Key Sponsorships	
Dollars for Scholars	Ginna funds scholarship programs for local high school students.
Big Brothers/Big Sisters	Ginna sponsors and coordinates after-school activities designed to encourage interest in math and science.
Ducks Unlimited	Ginna protects our shared natural environment through conservation and sustainable practices.

Other Plant Information/Events

In addition to the organizations above, Ginna provided financial and volunteer support to many groups, including:

- Festival in the Park
- United Way
- Wayne County Action Program
- Red Cross Blood Drives
- Local Food Pantries

Attachment B – Dept. of Energy Information on Small Modular Reactors

Benefits of Small Modular Reactors (SMRs)

Presented at www.energy.gov/ne/benefits-small-modular-reactors-smrs, accessed 8/14/17

Small modular reactors offer a lower initial capital investment, greater scalability, and siting flexibility for locations unable to accommodate more traditional larger reactors. They also have the potential for enhanced safety and security compared to earlier designs. Deployment of advanced SMRs can help drive economic growth.

Modularity: The term "modular" in the context of SMRs refers to the ability to fabricate major components of the nuclear steam supply system in a factory environment and ship to the point of use. Even though current large nuclear power plants incorporate factory-fabricated components (or modules) into their designs, a substantial amount of field work is still required to assemble components into an operational power plant. SMRs are envisioned to require limited on-site preparation and substantially reduce the lengthy construction times that are typical of the larger units. SMRs provide simplicity of design, enhanced safety features, the economics and quality afforded by factory production, and more flexibility (financing, siting, sizing, and end-use applications) compared to larger nuclear power plants. Additional modules can be added incrementally as demand for energy increases.

Lower Capital Investment: SMRs can reduce a nuclear plant owner's capital investment due to the lower plant capital cost. Modular components and factory fabrication can reduce construction costs and duration.

Siting Flexibility: SMRs can provide power for applications where large plants are not needed or sites lack the infrastructure to support a large unit. This would include smaller electrical markets, isolated areas, smaller grids, sites with limited water and acreage, or unique industrial applications. SMRs are expected to be attractive options for the replacement or repowering of aging/retiring fossil plants, or to provide an option for complementing existing industrial processes or power plants with an energy source that does not emit greenhouse gases.

Greater Efficiency: SMRs can be coupled with other energy sources, including renewables and fossil energy, to leverage resources and produce higher efficiencies and multiple energy end-products while increasing grid stability and security. Some advanced SMR designs can produce a higher temperature process heat for either electricity generation or industrial applications.

Safeguards & Security / Nonproliferation: SMR designs have the distinct advantage of factoring in current safeguards and security requirements. Facility protection systems, including barriers that can withstand design basis aircraft crash scenarios and other specific threats, are part of the engineering process being applied to new SMR design. SMRs also provide safety and potential nonproliferation benefits to the United States and the wider international community. Most SMRs will be built below grade for safety and security enhancements, addressing vulnerabilities to both sabotage and natural phenomena hazard scenarios. Some SMRs will be designed to operate for extended periods without refueling. These SMRs could be fabricated and fueled in a factory, sealed and transported to sites for power generation or process heat, and then returned to the factory for defueling at the end of the life cycle. This approach could help to minimize the transportation and handling of nuclear material. Light water-based SMRs are expected to be fueled with low enriched uranium, i.e., approximately 5 percent U-235, similar to existing large nuclear power plants. The "security by design" concepts being applied to these technologies are

expected to increase SMR resistance to theft and diversion of nuclear material. Also, reactor cores for these light water SMRs can be designed to burn plutonium as a mixed oxide (MOX) fuel. Further, SMRs based on non-light water reactor coolants could be more effective at dispositioning plutonium while minimizing the wastes requiring disposal.

U.S. Industry, Manufacturing, and Job Growth: The case for SMR economic competitiveness is rooted in the concept that mass manufacture of modular parts and components will reduce the cost per kilowatt of electricity on par with current generating sources. There is both a domestic and international market for SMRs, and U.S. industry is well positioned to compete for these markets. DOE hopes that the development of standardized SMR designs will also result in an increased presence of U.S. companies in the global energy market. If a sufficient number of SMR units were ordered, it would provide the necessary incentive to develop the appropriate factory capacity to further grow domestic and international sales of SMR power plants.

Economic Development: SMR deployment to replace retiring electricity generation assets and meet growing generating needs would result in significant growth in domestic manufacturing, tax base, and high-paying factory, construction and operating jobs. A 2010[1] study on economic and employment impacts of SMR deployment estimated that a prototypical 100 MWe SMR costing $500 million to manufacture and install would create nearly 7,000 jobs and generate $1.3 billion in sales, $404 million in earnings (payroll), and $35 million in indirect business taxes. The report examines these impacts for multiple SMR deployment rates, i.e., low (1-2 units/year), moderate (30 units/year), high (40 units/year), and disruptive (85 units/year). The study indicates significant economic impact would be realized by developing an SMR manufacturing enterprise at even moderate deployment levels.

[1] Economic and Employment Impacts of Small Modular Reactors, June 2010, Energy Policy Institute of the Center for Advanced Energy Studies

Attachment C – Oswego County Tourism Economic Impact

Oswego County Tourism Office
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Oswego County Tourism: Economic Impact

- Traveler spending in Oswego County totaled $146,013,000 in 2016, an increase of 6.8 % over 2015 (Empire State Development).
- Total occupancy tax collected between Dec. 1, 2015 and Nov. 30, 2016 was $470,641.44. The Oswego County Legislature approved a 1% increase in the occupancy tax rate which went into effect in December of 2015; however, even without the increase in the occupancy tax rate, occupancy tax receipts would have grown 7% over 2015.
- The tourism industry generated $16,967,677 in state and local taxes (sales, occupancy and property taxes) in Oswego County in 2016 (Empire State Development).
- An estimated 3,153 jobs in Oswego County are supported by direct and indirect tourist expenditures. Tourism labor income totaled $63,444,000 in Oswego County in 2016 (Empire State Development).
- 9.3% percent of all employment in Oswego County is generated by tourism (Empire State Development).
- Oswego County Tourism website (www.visitoswegocounty.com) received 384,443 page views in 2016. Top viewed page was fishing report with 53,992 views.
- In 2016 www.visitoswegocounty.com was visited by residents of all 50 states and 147 nations. The leading nations outside the U.S. are Russia, Canada, UK, Brazil, India, Germany, Italy and France.
- In 2015 there were 33,789 fishing licenses sold in Oswego County to out-of-state and international visitors. This number does not include online sales made on the DEC website.
- The Salmon River is by far the most heavily fished of the Lake Ontario tributary streams in NYS. Between Sept. 1, 2011 and May 15, 2012, more than 1.5 million angler hours were spent fishing the Salmon River, according to the Lake Ontario Tributary Creel Survey conducted by the NYS DEC. DEC estimated that 200,000 people fished the Salmon River annually.
- 62 percent of anglers fishing the Salmon River are from outside on NYS. Top 10 states of residency are PA, NJ, CT, MA, VT, CN, NH, MD, VA and ME.
- Total angler impact on the Oswego County economy was $42,623,006 in 2007 (NYS DEC)

Oswego County Department of Community Development, Tourism and Planning

7-17-17

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