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The Economic Impact of the Millstone Power Station in Connecticut

Prepared for Dominion Nuclear Connecticut, Inc.
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Statement of Findings

Dominion Nuclear Connecticut, Inc. (Dominion) operates the Millstone Power Station (Millstone) in Waterford, Connecticut. The station is responsible for approximately \$1.55 billion in annual economic impact in the state of Connecticut, supporting approximately 3,974 jobs annually in the state.¹

The economic impact results from both Dominion's capital expenditure at Millstone and the ongoing operation of the facility. Based on the annual average expenditure, Dominion's capital spending produces \$79.8 million yearly in economic impact for Connecticut, supporting 305 jobs. The ongoing operation of the station produces a total of \$1.47 billion in annual economic impact in the state, supporting a total of 3,670 jobs. The economic impact from both the capital expenditure and ongoing operation include estimated direct, indirect, and induced impacts in spending and employment.²

In addition, Millstone Power Station can generate total tax revenue of \$39.8 million per year for state and local governments in Connecticut. In order to be conservative, only tax revenue from the direct impact is estimated.

Background

Dominion operates the Millstone Power Station in Waterford, Connecticut, near the city of New London. Millstone is a nuclear-powered generating station with two operational units with a total generation capacity of 2,111 megawatts. Millstone generated more than 17.4 million megawatt-hours of emission-free electricity in 2015, enough to serve the yearly electricity needs of approximately 1.99 million homes.³ Millstone is one of the 75 largest employers in the state of Connecticut.⁴ In July 2016, Dominion contracted Chmura Economics & Analytics (Chmura) to conduct a study, analyzing the annual economic impact of the Millstone Power Station in Connecticut.

The economic impact of Millstone comes from two sources: (1) the ongoing operation of the power-generating station, and (2) the annual capital expenditure Dominion spends in the state. For both

¹The annual economic impact estimated in this report represents the average level of operation over the past 3-6 years. Due to fluctuations in the power station operation, the economic impact of a specific year will deviate from this average.

² Direct impact is defined as the primary economic activity generated by the project under consideration. For capital expenditure, this refers to the total amount spent by Dominion on the station, including its spending on labor, construction materials, equipment, and professional services such as engineering and financial services. The indirect impact is the secondary economic activity generated by the project via demand for products from suppliers. An example of an indirect impact is a power station utilizing truck companies to transport supplies and materials. The induced impact is economic activity generated when the workers at the power station and their suppliers spend their earnings as consumers. When Dominion hires more workers, the increased household income benefits retail, restaurants, and doctors' offices in the region where those employees live or work.

³ Source: Dominion. This figure is estimated based on the average annual per-home usage for Connecticut as reported by the U.S. Energy Information Administration

⁴ Source: Connecticut Department of Labor, at: <http://www1.ctdol.state.ct.us/lmi/empsearch.asp>.

sources, the direct, indirect, and induced impacts in spending and employment are estimated. Chmura uses IMPLAN Pro® model⁵ to simulate the economic impact of capital spending and station operation. In addition, Chmura also reports state and local government tax revenue generated by Millstone.

Economic Impact in Connecticut

From 2011 to 2016, Dominion is expected to invest \$505.8 million in the Millstone Power Station, averaging \$84.3 million per year.⁶ It is assumed that a similar level of capital expenditure will persist in the future. Of this, 12% is expected to be spent on soft costs such as architecture, engineering, and other professional services; 26% is estimated to be spent on equipment; and the remaining 62% is expected to be spent on facility construction or improvement.⁷

Although Dominion will use regional firms for supplies and services whenever possible, not every product and service needed is available in the state of Connecticut. Consequently, some of the services and products will be purchased from firms located outside the state. For example, the majority of equipment spending are paid to businesses outside Connecticut. Using information from Dominion, it is estimated that 58% of the capital expenditure is expected to be spent within the state.

Table 1 summarizes the estimated annual economic impact from Millstone's capital expenditure and operation in Connecticut. For capital expenditure, from 2011 to 2016, Dominion's investment can generate an average total economic impact (including direct, indirect, and induced impacts) of \$79.8 million per year, supporting 305 jobs in the state. Among total economic impact from capital expenditure, \$49.2 million is the estimated direct spending in the state,⁸ supporting 155 jobs, mostly in construction and equipment manufacturing.⁹ The indirect impact from capital expenditure in Connecticut is estimated to be \$10.3 million, which can support 43 jobs per year in the state. The induced impact in the state is expected to be \$20.3 million, associated with 107 jobs per year.

⁵ *IMPLAN Professional* was created in the 1970s by the U.S. Forestry Service and is widely used by economists to simulate the impact of specific events on regional economies.

⁶ Source: Dominion. The 2016 figures include the budgeted amount, while figures for 2011 and 2015 are actual expenditure amounts.

⁷ Source: Dominion.

⁸ This number is smaller than Dominion's capital expenditure of \$84.3 million per year, as some is assumed to be spent among out-of-state vendors. Chmura utilizes the data provided by Dominion to arrive at this estimate.

⁹ Dominion estimated that the number of people working on the capital expenditure projects at the station averaged 127 full-time equivalent (FTE) workers per year from 2011 to 2016, including 45 FTE Dominion employees. The direct employment impact in Table 1 is larger than this figure for two reasons. First, the employment estimate from the IMPLAN model includes both full- and part-time workers, and the sum of full- and part-time employment is larger than FTE. Second, the direct employment estimate in Table 1 includes estimated employment off-site, such as jobs in equipment manufacturing or engineering services.

Table 1: Economic Impact of Millstone Power Station in Connecticut

		Direct	Indirect	Induced	Total
Capital Expenditure (Annual Average, 2011-16)	Spending (\$Million)	\$49.2	\$10.3	\$20.3	\$79.8
	Employment	155	43	107	305
Ongoing Operation (Annual Average, 2014-16)	Spending (\$ Million)	\$1,010.4	\$255.3	\$208.6	\$1,474.2
	Employment	1,010	1,322	1,337	3,670
Total Annual Impact	Spending (\$ Million)	\$1,059.6	\$265.5	\$228.9	\$1,554.0
	Employment	1,165	1,366	1,444	3,974

Note: Impacts are measured in the year when they occur. Numbers may not sum due to rounding

Source: IMPLAN Pro 2014, Dominion, and Chmura

For the ongoing operation, Chmura estimates that the total annual economic impact (direct, indirect, and induced) from the ongoing operation of Millstone is \$1.47 billion, supporting 3,670 jobs in the state. In terms of direct impact, the power station employs an estimated 1,010 permanent workers, with an associated direct economic impact of \$1.01 billion per year.¹⁰ An additional indirect impact of \$255.3 million and 1,322 jobs per year benefits other Connecticut businesses that are the contractors and suppliers for the Millstone operation.¹¹ The number of Connecticut jobs supported due to the induced impact is estimated to reach 1,337, with associated spending of \$208.6 million per year.

Combining capital expenditure and ongoing operation, the total annual economic impact of the Millstone Power Station is estimated at \$1.55 billion, supporting 3,974 jobs in the state of Connecticut.

Employment at the Millstone Station

The employment numbers estimated in Table 1 include Dominion employees and contractors in both capital investment projects and operations. They also include jobs supported by the Millstone elsewhere in the state, outside of the station. A large portion of those jobs are physically located in the station.

In 2016, the Millstone Station employed 1,060 FTE (full-time equivalent) workers, with 1,005 FTE employees involved in operations and maintenance, and 55 FTE employees involved in capital investment projects. The average payroll (salaries, overtime pay, and benefits) of Dominion employees is estimated to be

¹⁰ Direct spending represents gross output of the generating station estimated by the IMPLAN model based on projected employment. The direct employment of 1,010 includes both full- and part-time Dominion employees, which was estimated based on an annual average of 994 FTE operation and maintenance employees from 2014 to 2016, provided by Dominion.

¹¹ The indirect employment of 1,322 includes contractors working at Millstone and vendors elsewhere in Connecticut. Dominion data indicate that an annual average of 404 FTE contractors work at Millstone, for regular operation and maintenance as well as for the outage work. The total indirect employment impact is larger than the number of contractors working at Millstone because Dominion also spends on other state suppliers who work off-site. In addition, Dominion suppliers also purchase from their own vendors in the state, which is also included in the estimated indirect impact.

\$168,365 per FTE worker in 2016. Meanwhile, there are 491 FTE contractors working on-site at Millstone. Among those, 316 FTE contractors work in operations and maintenance, 70 FTE contractors in outage service, and 105 FTE contractors in capital investment projects.

From 2014 to 2016, the 3-year average number of Dominion FTE employees for Millstone Station is 1,036, with 994 FTE employees working in operations and maintenance, and 42 FTE employees in capital investment projects. The 3-year average payroll is \$170,600 from 2014 to 2016 per FTE for Dominion employees. In the past three years, there are an annual average of 508 FTE contractors working on-site at Millstone, with 304 FTE contractors in the areas of operation and maintenance, 99 FTE contractors in outage service, and 105 FTE contractors in capital investment projects.

Tax Revenue for State and Local Governments

The Millstone Power Station also generates tax revenue for the state of Connecticut and the town of Waterford. From 2014 through 2016, Dominion estimates that the Millstone Power Station can generate total tax revenue of \$39.8 million per year for the state and local governments. The major tax revenue includes individual income tax, sales and use tax, and property tax.

Appendix: Impact Analysis Glossary

IMPLAN Professional—an economic impact assessment modeling system. It allows the user to build economic models to estimate the impacts of economic changes in states, counties, or communities. It was created in the 1970s by the Forestry Service and is widely used by economists to estimate the impact of specific events on the overall economy.

Input-Output Analysis—an examination of business-business and business-consumer economic relationships capturing all monetary transactions in a given period, allowing one to calculate the effects of a change in an economic activity on the entire economy (impact analysis).

Direct Impact—economic activity generated by a project or operation. For construction, this represents activity of the contractor; for operations, this represents activity by tenants of the property.

Indirect Impact—secondary economic activity that is generated by a project or operation. An example might be a new office building generating demand for parking garages.

Induced (Household) Impact—economic activity generated by household income resulting from direct and indirect impacts.

Ripple Effect—the sum of induced and indirect impacts. In some projects, it is more appropriate to report ripple effects than indirect and induced impacts separately.

Multiplier—the cumulative impacts of a unit change in economic activity on the entire economy.