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June 24, 2021

**VIA E-MAIL AND FIRST CLASS MAIL**

Emma Rodvien, Coordinator  
Energy Facility Siting Board  
89 Jefferson Boulevard  
Warwick, Rhode Island 02888

**Re: Docket No. SB-2021-01 – In Re: Revolution Wind, LLC’s Application to Construct and Alter Major Energy Facilities in North Kingstown, Rhode Island**

Dear Ms. Rodvien:

Enclosed for filing in the above-referenced docket is Revolution Wind, LLC’s (“Revolution Wind”) response to Data Request 1-1 from the Statewide Planning Program on June 9, 2021.

This filing includes a Motion for Protective Treatment of Confidential Information in accordance with R.I. Gen. Laws § 38-2-2(4) for a portion of Revolution Wind’s response to Data Request SPP 1-1. Revolution Wind seeks protection from public disclosure of certain confidential information contained in the Confidential Response to Data Request 1-1. Accordingly, Revolution Wind has provided the Board with an original and three complete, unredacted copies of the confidential document in a sealed envelope marked “**Contains Privileged and Confidential Information – Do Not Release,**” and has included three redacted copies of the document for the public filing.

Thank you for your attention to this matter.

Very truly yours,

Adam M. Ramos

AMR:cw  
Enclosures  
61111432 (77086.184111)

**SB-2021-01 Revolution Wind, LLC Application for Major Energy Facility****Updated June 23, 2013**

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REDACTED

SPP 1-1

Request:

What are the estimated local tax revenues that will accrue to the Town of North Kingstown and the State of Rhode Island as a result of the Revolution Wind Energy Project? We would like to know the initial revenue from operating year one and an annual average over a twenty-year period.

Response:

The local tax revenues that are estimated to accrue to the Town of North Kingstown (the "Town") from the Revolution Wind Project (the "Project") are for real property and tangible personal property taxes. The state tax revenues will come from state income tax, state sales/use tax, and state payroll tax. Revolution Wind, LLC's ("Revolution Wind") current understanding of those estimated tax revenues is summarized below. Additionally, Revolution Wind solicited an Advisory Opinion from Guidehouse on the Economic Development Benefits of the Proposed Revolution Wind Project (the "Guidehouse Report") describing the estimated economic impact of the Project. Revolution Wind has provided a copy of the Guidehouse Report as Attachment Statewide Planning 1-1.

**Real Estate Taxes** - The real property that will be utilized by Revolution Wind in connection with the Project will consist of easement interests and leasehold interests. Revolution Wind will not own any fee title interests in the real property associated with the Project. Certain of the real property used for the Project includes real property that will be the subject of a ground lease with the fee title owner, Rhode Island Commerce Corporation, Acting By and Through Its Agent and Attorney-in-Fact, Quonset Development Corporation ("QDC"), and is presently subject to a PILOT Agreement between the Town and QDC dated as of July 6, 2010, and amended by a First Amendment to Pilot Agreement dated as of August 17, 2016 (collectively, the "PILOT Agreement"). Under the terms of the PILOT Agreement, the Town would "accrue" an annual payment in lieu of real estate taxes equal to fifteen percent (15%) of the base rent due to QDC under the subject ground lease between QDC and Revolution Wind. The anticipated amounts payable under the current PILOT Agreement are:

**REDACTED**  
SPP 1-1, page 2

<u><b>Period</b></u>	<u><b>Amount</b></u>
Year 1	\$24,863
Annual 20-yr Average	\$32,169

**Personal Property/Tangible Property Taxes** - Under the Town's municipal tax regime, tangible or personal property taxes would be assessed on the personal property components of the Project at the rate of \$17.09 per thousand dollars of assessed value pursuant to R.I. Gen. Laws Section 44-5 et. seq. The assessed value of the tangible or personal property comprising the Project for the first operating year and the next twenty years has not been determined or declared at this time.

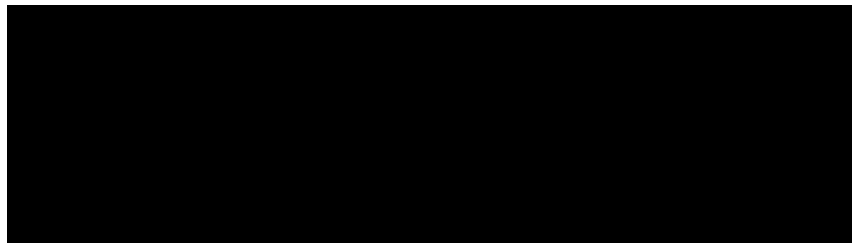
Notwithstanding the foregoing, Revolution Wind is engaged in discussions with the Town regarding the proposed terms for a community benefit agreement and replacement PILOT agreement that may address host community payments to the Town and payments in lieu of real estate and tangible or personal property taxes. That potential agreement may replace and supersede the information provided above. Definitive data or estimates of the tax revenue accruing to the Town from such arrangements are not yet available. Revolution Wind will provide an updated response once the necessary information is available.

**Personal Property/Tangible Property Taxes – Induced Local Tax Benefits** - Interconnecting the project to the existing electric grid will necessitate that The Narragansett Electric Company d/b/a National Grid ("TNEC") upgrade elements of its electric grid owned by TNEC. Those upgrades will generate additional tax revenues that TNEC will pay directly to the respective local municipalities where those upgrades will be located. To address the costs of those upgrades, Revolution Wind will enter into a Large Generator Interconnection Agreement, under which Revolution Wind will pay to TNEC the costs TNEC incurs in constructing, operating and maintaining those upgrades. As such, the Project will both induce and indirectly pay for these local tax benefits.

Until TNEC finalizes the extent and estimated costs of the electrical system upgrades it determines will be necessary, it is not possible to assess the value of the tangible or personal property comprising the upgrades for the first operating year and the next twenty years. Revolution Wind will provide an updated response once the necessary information is available.

**REDACTED**  
SPP 1-1, page 3

**State Income Tax** - Revolution Wind's joint venture partners, Orsted North America, Inc. and Eversource Investment, LLC, will pay income tax to the State of Rhode Island on their respective shares of project income throughout the life of the project. Based on the current state income tax rate of 7%, estimated amounts payable are:



**State Sales/Use tax** - The Project has not yet estimated what its sales tax obligation might be. Revolution Wind will provide an updated response once the necessary information is available.

**State Payroll Tax** – Revolution Wind has not estimated the payroll tax revenues that the Project will generate.



**Guidehouse**

# **Advisory Opinion on the Economic Development Benefits of the Proposed Revolution Wind Project**

Prepared for:

**DWW Rev I, LLC**

**Prepared by:**

Bruce Hamilton

Valerie Nubbe

Guidehouse Inc.

**September 2020**



## Advisory Opinion on the Economic Development Benefits of the Proposed Revolution Wind Project

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## **Advisory Opinion on the Economic Development Benefits of the Proposed Revolution Wind Project**

### **Disclaimer**

This report was prepared by Guidehouse Inc. ("Guidehouse"),<sup>1</sup> for VHB, Inc. at the request of DWW Rev I, LLC. The work presented in this report represents Guidehouse's professional judgment based on the information available at the time this report was prepared. Guidehouse is not responsible for the reader's use of, or reliance upon, the report, nor any decisions based on the report. GUIDEHOUSE MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESSED OR IMPLIED. Readers of the report are advised that they assume all liabilities incurred by them, or third parties, as a result of their reliance on the report, or the data, information, findings and opinions contained in the report.

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<sup>1</sup>On October 11, 2019, Guidehouse LLP completed its previously announced acquisition of Navigant Consulting Inc. We recently renamed Navigant Consulting Inc. as Guidehouse Inc.



## Advisory Opinion on the Economic Development Benefits of the Proposed Revolution Wind Project

### 1. Executive Summary

This advisory opinion was prepared by Guidehouse at the request of DWW Rev I, LLC to assist with the evaluation of direct, indirect, and induced jobs, associated earnings, output and economic value added that will result from the proposed Revolution Wind Farm Project (“Project”). The Project is further described in Section 2.1 below. This analysis evaluates resulting economic benefits in three locations: Rhode Island, Connecticut, and the entire United States (US).<sup>2</sup>

In Rhode Island, as shown in Table 1-1, the Value Added that is attributable to the potential project is approximately \$321 million in the construction phase (starting in 2021) and approximately \$70 million on an annual basis in the operations phase (in 2020 dollars). The Project will support an estimated 3,059 local job-years<sup>3</sup> during the construction phase and approximately 233 additional local annual jobs during the operations phase, which is expected for a 20-year period beginning in 2023.

**Table 1-1. Summary of Jobs and Investment Impacts in Rhode Island**

Project Phase	Impact Categories	Jobs	Earnings (Millions USD)	Output (Millions USD)	Value Added (Millions USD)
Construction	Direct	1,020	\$79.1	\$88.5	\$81.8
	Indirect	1,412	\$103.2	\$445.9	\$177.1
	Induced	627	\$39.0	\$106.6	\$61.7
	<b>Total</b>	<b>3,059</b>	<b>\$221.4</b>	<b>\$641.1</b>	<b>\$320.6</b>
Operations (Annual)	Direct	58 <sup>4</sup>	\$4.9	\$4.9	\$4.9
	Indirect	18	\$1.5	\$51.4	\$47.5
	Induced	156	\$10.8	\$29.3	\$17.6
	<b>Total</b>	<b>233</b>	<b>\$17.2</b>	<b>\$85.7</b>	<b>\$70.0</b>

Notes: Earnings, Output and Value-Added figures are in millions of 2020 dollars. Construction job figures are in job years, which are full-time equivalent (FTE) jobs multiplied by the number of construction years. Operations jobs are FTEs for a period of one year. The analysis does not include impacts associated with spending of wind farm profits. Totals may not add up due to independent rounding.

<sup>2</sup> Note: Results for the US are inclusive of the benefits to Rhode Island and Connecticut

<sup>3</sup> Job-years during the construction phase are defined as full-time equivalent (FTE) jobs multiplied by the number of construction years.

<sup>4</sup> Orsted estimated 32 FTE direct jobs in Rhode Island in the operations phase while the JEDI model projected 58 FTE.



## Advisory Opinion on the Economic Development Benefits of the Proposed Revolution Wind Project

In Connecticut, as shown in Table 1-2, the Value Added that is attributable to the Project is approximately \$96.4 million in the construction phase (starting in 2021). The project will also support an estimated 797 local job-years<sup>5</sup> during the construction phase.

**Table 1-2. Summary of Jobs and Investment Impacts in Connecticut**

Project Phase	Impact Categories	Jobs	Earnings (Millions USD)	Output (Millions USD)	Value Added (Millions USD)
Construction	Direct	420	\$45.3	\$60.3	\$48.3
	Indirect	211	\$19.8	\$51.5	\$28.7
	Induced	166	\$12.1	\$31.0	\$19.4
	<b>Total</b>	<b>797</b>	<b>\$77.1</b>	<b>\$142.8</b>	<b>\$96.4</b>
Operations (Annual)	Direct	0	\$0.0	\$0.0	\$0.0
	Indirect	0	\$0.0	\$0.0	\$0.0
	Induced	0	\$0.0	\$0.0	\$0.0
	<b>Total</b>	<b>0</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$0.0</b>

Notes: Earnings, Output and Value-Added figures are in millions of 2020 dollars. Construction job figures are in job years, which are full-time equivalent (FTE) jobs multiplied by the number of construction years. Operations jobs are FTEs for a period of one year. The analysis does not include impacts associated with spending of wind farm profits. Totals may not add up due to independent rounding.

<sup>5</sup> Job-years during the construction phase are defined as full-time equivalent (FTE) jobs multiplied by the number of construction years.



## Advisory Opinion on the Economic Development Benefits of the Proposed Revolution Wind Project

In the entire US, as shown in Table 1-3, the Value Added that is attributable to the project is approximately \$652.9 million in the construction phase (starting in 2021) and approximately \$85.0 million on an annual basis in the operations phase (in 2020 dollars). The project will support an estimated 5,290 local job-years<sup>6</sup> during the construction phase and approximately 365 additional local annual jobs during the operations phase.

**Table 1-3. Summary of Jobs and Investment Impacts in the United States**

Project Phase	Impact Categories	Jobs	Earnings (Millions USD)	Output (Millions USD)	Value Added (Millions USD)
Construction	Direct	1,410	\$124.0	\$148.9	\$129.8
	Indirect	2,146	\$187.0	\$747.3	\$343.1
	Induced	1,734	\$109.8	\$343.0	\$180.1
	<b>Total</b>	<b>5,290</b>	<b>\$420.8</b>	<b>\$1,239.1</b>	<b>\$652.9</b>
Operations (Annual)	Direct	58	\$4.9	\$4.9	\$4.9
	Indirect	39	\$3.2	\$57.4	\$48.2
	Induced	268	\$18.9	\$58.9	\$31.9
	<b>Total</b>	<b>365</b>	<b>\$27.1</b>	<b>\$121.2</b>	<b>\$85.0</b>

Notes: Earnings, Output and Value-Added figures are in millions of 2020 dollars. Construction job figures are in job years, which are full-time equivalent (FTE) jobs multiplied by the number of construction years. Operations jobs are FTEs for a period of one year. The analysis does not include impacts associated with spending of wind farm profits. Totals may not add up due to independent rounding.

<sup>6</sup> Job-years during the construction phase are defined as full-time equivalent (FTE) jobs multiplied by the number of construction years.



## Advisory Opinion on the Economic Development Benefits of the Proposed Revolution Wind Project

## 2. Introduction

### 2.1 Project Description

DWW Rev I, LLC (DWW Rev I), a 50/50 joint venture between Orsted North America Inc. (Orsted NA)<sup>7</sup> and Eversource Investment LLC (Eversource), proposes to construct and operate the Project. The wind farm will consist of up to 100 wind turbines with an aggregate operating capacity ranging between 704 and 880 MW. For the purposes of this analysis, we assumed 89 turbines with an aggregate capacity of 712 MW.

The wind farm portion of the Project will be located in federal waters on the Outer Continental Shelf in the designated Bureau of Ocean Energy Management Renewable Energy Lease Area, approximately 20 statute miles (mi) (17.4 nautical miles [nm], 30 kilometers [km]) south of the coast of Rhode Island (see Figure 2-1). Other components of the Project will be located in state waters of Rhode Island and onshore in North Kingstown, Rhode Island. The proposed interconnection location for the Project is the existing Davisville Substation, which is owned and operated by National Grid and located in North Kingstown, Rhode Island.<sup>8</sup>

The Project will specifically include the following offshore and onshore components:

#### **Offshore:**

- Up to 100 Wind Turbine Generators connected by a network of Inter-Array Cables;
- Up to two Offshore Substations connected by a Link Cable; and
- Up to two submarine export cables, generally co-located within a single corridor.

#### **Onshore:**

- A landfall location located at Quonset Point in North Kingstown, Rhode Island;
- Up to two underground transmission circuits, co-located within a single corridor; and
- A new Onshore Substation located adjacent to the existing Davisville Substation with up to two interconnection circuits connecting to the existing substation.

Project construction is expected to begin in 2021 with offshore construction starting in 2022.

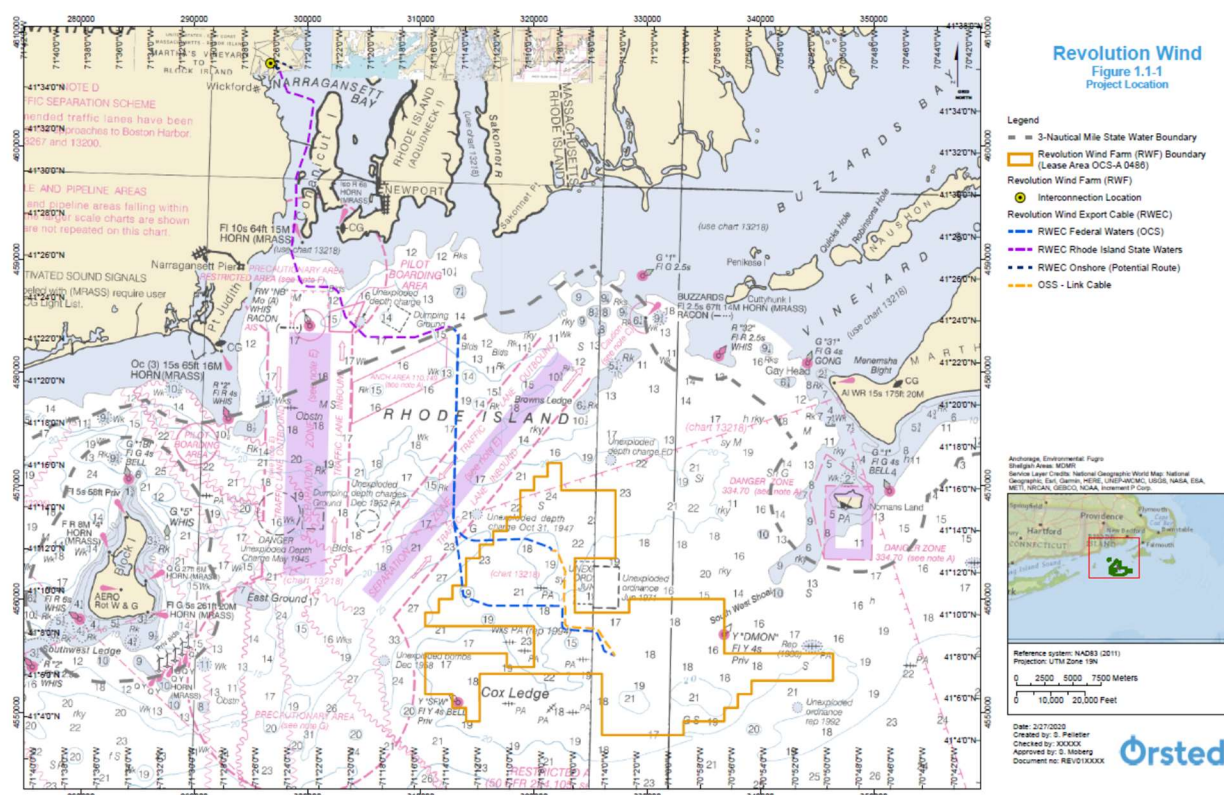
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<sup>7</sup> Note that in October 2018, Deepwater Wind LLC was acquired by Orsted North America Inc.

<sup>8</sup> Upgrades to the existing Davisville Substation and electrical grid beyond the substation may be necessary. Potential upgrades are not known at this time as the required Independent System Operator feasibility and system interconnection studies are not complete. The execution of any upgrades at the existing substation and of the broader electrical grid, and the specific, permitting, engineering, and design requirements to achieve the upgrades, will be performed by National Grid.



## Advisory Opinion on the Economic Development Benefits of the Proposed Revolution Wind Project



## 2.2 Analysis Approach

Guidehouse prepared this evaluation of direct, indirect, and induced jobs, associated earnings, output and economic value added that will result from the Revolution Wind Project, as defined in Section 2.1 above. Direct jobs and economic impact are those resulting from on-site labor and professional services; indirect are a result of local revenues, equipment, and supply chain impacts; and induced are local expenditures from those receiving payments within the first two categories or increased household spending by workers.

To assess the economic value that will result from the development of the Project, Guidehouse conducted an analysis using the Jobs and Economic Development Impact (“JEDI”) Offshore Wind Model. The JEDI Offshore Wind Model<sup>9</sup> is an economic modeling tool developed by the National Renewable Energy Laboratory (“NREL”) that allows users to demonstrate the economic impact to a given state or region of the construction and operation of an offshore wind project.

Guidehouse used the JEDI model to estimate the jobs and economic development benefits that will result from the Project. The primary source for the model inputs was DWW Rev I, who

<sup>9</sup> Available here: <https://www.nrel.gov/analysis/jedi/wind.html>



## **Advisory Opinion on the Economic Development Benefits of the Proposed Revolution Wind Project**

provided capital and operating budgets including costs, employment, and percent local data that are specific to the Project.<sup>10</sup> Guidehouse then integrated this data into the JEDI model format.

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<sup>10</sup> Although Guidehouse did not do a detailed due diligence on the data provided by DWW Rev I, our independent review of the data indicates that the values are consistent with what we could expect for a project of this magnitude and we did not find any apparent anomalies in the data.





## Advisory Opinion on the Economic Development Benefits of the Proposed Revolution Wind Project

### 3. Methodology

#### 3.1 JEDI Offshore Wind Model

The JEDI models rely on the widely recognized and well-known input/output (I/O) multiplier data provided by the Minnesota Impact Analysis for Planning (IMPLAN) Group. Offshore wind is a recent addition to this suite, which also includes biofuels, coal, concentrating solar power, natural gas, solar photovoltaics, land-based wind, and marine/hydrokinetic power.<sup>11</sup> JEDI uses a methodology similar to "analysis by parts" to simulate a customized offshore wind industry with the IMPLAN multipliers by aggregating industry sectors into relevant categories for offshore wind.<sup>12</sup> Please refer to [Appendix A](#) for more information on the JEDI models.

JEDI requires detailed estimates of project expenditures and the share of each individual expenditure line item that is procured locally. These data must be developed for both the construction and operations period of the plant life cycle. As offshore wind is only a nascent industry in the U.S. and only one project has been completed in the U.S. (Orsted NA's Block Island Wind Farm), the JEDI Offshore Wind Model relies on projected costs for individual Project elements. This analysis evaluates resulting impacts for the construction and operations of the Project.

JEDI requires expenditure data that approximates the expected engineering, material, and office costs as well as labor requirements for proposed infrastructure projects to estimate the economic impact within the Rhode Island, Connecticut, and US economies. JEDI captures all monetary transactions for expenditures and consumption. Inputs to JEDI include projected capital and operational costs and the percentage local assumptions for each line item. In this report, percentage local means the percentage of expenditures that will occur in the state of Rhode Island, Connecticut, or the entire US.

JEDI's outputs include estimates of the effects of a change in one or several economic activities on the regional, state, or local economy. Under the JEDI framework, economic activities include Jobs, Earnings, Output, and Value Added.

**Direct jobs** are defined as on-site labor and professional services. On-site labor is given in job-years. Job-years are defined as full-time equivalent (FTE) jobs multiplied by the number of construction years. Construction jobs are given as FTE job-years since they are spread over a multi-year construction period. Some construction jobs will last only a portion of a year while others may last the entire expected construction period of three years. Operations jobs are given as annual FTE jobs over the entire operating period.

**Indirect jobs** are driven by the increase in demand for goods and services from direct on-site project spending including business and companies like construction material and component

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<sup>11</sup> NREL's JEDI models are publicly available spreadsheet tools that apply state-specific IMPLAN year 2014 multipliers. The JEDI analysis tools were developed by NREL in conjunction with MRG & Associates. For more information on the JEDI tools, see [Appendix A](#) or <https://www.nrel.gov/analysis/jedi/>

<sup>12</sup> The 14 categories include: 1. Agriculture 2. Construction 3. Electrical equipment 4. Fabricated metals 5. Finance, insurance, and real estate 6. Government 7. Machinery 8. Mining 9. Other manufacturing 10. Other services 11. Professional services 12. Retail trade 13. Transportation, communication, and public utilities 14. Wholesale trade



## Advisory Opinion on the Economic Development Benefits of the Proposed Revolution Wind Project

suppliers, analysts and attorneys involved with project feasibility assessments or contract negotiations, equipment or replacement part manufacturers and others.

**Induced jobs** are driven by the local expenditures of those receiving payments within the first two job categories or increased household spending by workers.

**Labor Earnings** encompass the additional earnings (wages and employer paid benefits) associated with the additional local jobs

**Gross Output** is the sum value of all goods and services at all stages of production (i.e., as a raw material and as a finished product) resulting from the project.

**Value Added** is the best indicator of economic development benefits to the local economy. The sum total of value added of all enterprises and self-employed in a given state comprises that state's GDP. These values are the sum of earnings from capital and labor or the difference between total gross output and the cost of intermediate inputs. It is comprised of payments made to workers, proprietary income, other property type income, indirect business taxes, and taxes on production and imports less subsidies.

These terms are further defined in [Appendix A](#). Table 3-1 shows the categories of jobs and investment impacts that are included in the analysis, along with examples of expenditures in each category.

**Table 3-1. Categories of Jobs and Investment Impact**

Impact Categories	Construction	Operations
Direct	<ul style="list-style-type: none"> <li>Project development (engineering, design, permitting, surveys, and other professional services)</li> <li>Onsite labor including contractors and crews hired to construct the Project</li> </ul>	<ul style="list-style-type: none"> <li>Onsite labor for operation and maintenance of the Project (plant technicians, operators, management, and administration)</li> </ul>
Indirect	<ul style="list-style-type: none"> <li>Turbine and supply chain (inter-industry purchases of materials, equipment, manufacturing, and other services)</li> </ul>	<ul style="list-style-type: none"> <li>Local revenue (sales and property taxes and ROI for local owners)</li> <li>Supply chain (components, off-site labor)</li> </ul>
Induced	<ul style="list-style-type: none"> <li>Increased spending of household earnings from Project development and on-site labor impacts as well as turbine and supply chain impacts. This includes increased business at local restaurants, hotels, and retail establishments, childcare providers and service providers.</li> </ul>	

## 3.2 Data Collection

DWW Rev I provided Guidehouse with the raw cost, employment, and percent local data for Rhode Island, Connecticut, and the total US as the primary inputs to the JEDI model. Data was



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provided in three basic categories: Project descriptive data, capital costs, and operations & maintenance (O&M) costs.

Capital expenditures are expected to occur during the period 2021-2023 for the Project according to the Project schedules. Capital expenditures are expected to be a total of approximately \$2.76 billion. Plant operation is expected for a 20-year period beginning in 2023. Annual operation and maintenance costs are expected to total approximately \$43 million during this period.

### 3.3 Assumptions

- All operation and maintenance costs are averaged over total years of operation and assumed to be the same for each year (\$43.2 million, in constant 2020\$).
- Based on DWW Rev I's provided data, 100% of the operations and maintenance staff are assumed to be local. Wind farm onsite full-time labor potentially consists of field technicians, daily operations staff, administration, and management.
- Economic impacts during the operations phase represent impacts that result from wind farm O&M. Guidehouse assumed a breakdown of O&M material and services costs based on JEDI model default inputs.
- Wind turbines and related equipment are exempt from sales tax in Rhode Island according to the provisions of RI Title 44 § 44-18-30.<sup>13</sup> For expenses in Connecticut, sales tax is assumed to apply at a rate of 6.35%.<sup>14</sup> Sales tax for the turbine and materials costs were split between Connecticut and Rhode Island based on the relative portions of the Capital Expenditures (approximately 96% in Rhode Island and 4% in Connecticut).
- All operations jobs are assumed to be in Rhode Island. Therefore, wages are based on 2018 data from US Bureau of Labor Statistics for Rhode Island mean reported wages for operations labor.<sup>15</sup> Operations occupations include mechanical engineering technicians, power plant operators, operating engineers, office and administrative support occupations, supervisors of office and administrative support, and general and operations managers. Wages were converted from 2018 to 2020 dollars using an annual inflation rate of 2.7%. All jobs are assumed to have a 37.6% employee payroll overhead cost.
- Construction jobs are assumed to be primarily in Rhode Island and Connecticut. Therefore, wages are based on May 2018 data from US Bureau of Labor Statistics for Rhode Island and Connecticut mean reported wages for construction labor.<sup>16</sup> Construction occupations include construction laborers, electrical power-line installers and repairers, operating engineers and construction equipment operators, and

<sup>13</sup> See <http://webserver.rilin.state.ri.us/Statutes/TITLE44/44-18/44-18-30.HTM>

<sup>14</sup> See <https://portal.ct.gov/DRS/Businesses/New-Business-Portal/Managing-Sales-Tax#rates>

<sup>15</sup> See <https://www.bls.gov/oes/2018/may/oessrcst.htm>

<sup>16</sup> See <https://www.bls.gov/oes/2018/may/oessrcst.htm>



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construction managers. A weighted average of wages from Rhode Island and Connecticut based on the labor installation estimates in each state was used to approximate the total US average wages. Wages were converted from May 2018 to January 2020 dollars using an annual inflation rate of 2.5%.<sup>17</sup> All jobs are assumed to have a 37.6% employee payroll overhead cost.

- As the substation is located in Rhode Island, Rhode Island state property taxes are assumed to apply at a rate of 1.7% as provided by DWW Rev I.
- Additional spending outside of Rhode Island and Connecticut but within the US is expected for the Project. Accordingly, results for the total US are calculated separately using multipliers that apply to the entire US, rather than summing the benefits from Rhode Island and Connecticut. The economic benefit results for the US are inclusive of the benefits to Rhode Island and Connecticut.

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<sup>17</sup> Using Bureau of Labor Statistics CPI Inflation Calculator, available online here: [https://www.bls.gov/data/inflation\\_calculator.htm](https://www.bls.gov/data/inflation_calculator.htm)



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### 4. Results

#### 4.1 Rhode Island Economic Impacts

A summary of the Project's potential overall economic benefits for Rhode Island including Value Added, local jobs, Labor Earnings, and Gross Output is shown in Table 4-1.

**Value Added.** The total Rhode Island Value Added from the project is \$320.6 million during the expected two-year construction phase and \$70.0 million per year (in 2020 dollars) during the operations phase.

Based on the JEDI analysis, the Project is expected to account for a total of 3,059 job-years in the construction phase and 233 FTE jobs on an annual basis during the operations phase. These additional jobs result from the increased spending in Rhode Island.

**Direct jobs.** The Project will result in 1,020 FTE local direct job-years in the development and construction phase and 58 FTE local direct annual jobs in the operations phase. 1,020 FTE job-years during the 2-year construction phase is equivalent to 510 jobs each lasting 2 years. "Local" is defined by jobs in Rhode Island.

**Indirect jobs.** The Project will result in 1,412 FTE local indirect job-years in the construction phase and 18 FTE local indirect annual jobs in the operations phase.

**Induced jobs.** The Project will result in 627 FTE local induced job-years in the construction phase and 156 FTE local induced annual jobs in the operations phase.

**Labor Earnings.** Labor Earnings total to \$221.4 million in the construction phase and \$17.2 million per year in the operations phase (in 2020 dollars).

**Gross Output.** Local Gross Output is estimated as \$641.1 million in the construction phase and \$85.7 million annually in the operations phase (in 2020 dollars).



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**Table 4-1. Summary of Jobs and Investment Impacts in Rhode Island**

Project Phase	Impact Categories	Jobs	Earnings (Millions USD)	Output (Millions USD)	Value Added (Millions USD)
Construction	Direct	1,020	\$79.1	\$88.5	\$81.8
	Indirect	1,412	\$103.2	\$445.9	\$177.1
	Induced	627	\$39.0	\$106.6	\$61.7
	<b>Total</b>	<b>3,059</b>	<b>\$221.4</b>	<b>\$641.1</b>	<b>\$320.6</b>
Operations (Annual)	Direct	58 <sup>18</sup>	\$4.9	\$4.9	\$4.9
	Indirect	18	\$1.5	\$51.4	\$47.5
	Induced	156	\$10.8	\$29.3	\$17.6
	<b>Total</b>	<b>233</b>	<b>\$17.2</b>	<b>\$85.7</b>	<b>\$70.0</b>

Notes: Earnings, Output and Value Added figures are in millions of 2020 dollars. Construction job figures are in job years, which are full-time equivalent (FTE) jobs multiplied by the number of construction years. Operations jobs are FTEs for a period of one year. The analysis does not include impacts associated with spending of wind farm profits. Totals may not add up due to independent rounding.

## 4.2 Connecticut Economic Impacts

A summary of the Project's potential overall economic benefits for Connecticut including Value Added, local jobs, Labor Earnings, and Gross Output are shown in Table 4-2.

**Value Added.** The total Value Added from the Project is \$96.4 million during the expected two-year construction phase.

Based on the JEDI analysis, the Project is expected to account for a total of 797 job-years in the construction phase. These additional jobs result from the increased spending in Connecticut.

**Direct jobs.** The Project will result in 420 FTE local direct job-years in the development and construction phase. 420 FTE job-years during the 2-year construction phase is equivalent to 210 jobs each lasting 2 years. "Local" is defined by jobs in Connecticut.

**Indirect jobs.** The Project will result in 211 FTE local indirect job-years in the construction phase.

**Induced jobs.** The Project will result in 166 FTE local induced job-years in the construction phase.

<sup>18</sup> Orsted estimated 32 FTE direct jobs in Rhode Island in the operations phase while the JEDI model projected 58 FTE.



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**Labor Earnings.** Labor Earnings total to \$77.1 million (in 2020 dollars) in the construction phase.

**Gross Output.** Local Gross Output is estimated as \$96.4 million (in 2020 dollars) in the construction phase.

**Table 4-2. Summary of Jobs and Investment Impacts in Connecticut**

Project Phase	Impact Categories	Jobs	Earnings (Millions USD)	Output (Millions USD)	Value Added (Millions USD)
Construction	Direct	420	\$45.3	\$60.3	\$48.3
	Indirect	211	\$19.8	\$51.5	\$28.7
	Induced	166	\$12.1	\$31.0	\$19.4
	<b>Total</b>	<b>797</b>	<b>\$77.1</b>	<b>\$142.8</b>	<b>\$96.4</b>
Operations (Annual)	Direct	0	\$0.0	\$0.0	\$0.0
	Indirect	0	\$0.0	\$0.0	\$0.0
	Induced	0	\$0.0	\$0.0	\$0.0
	<b>Total</b>	<b>0</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$0.0</b>

Notes: Earnings, Output and Value Added figures are in millions of 2020 dollars. Construction job figures are in job years, which are full-time equivalent (FTE) jobs multiplied by the number of construction years. Operations jobs are FTEs for a period of one year. The analysis does not include impacts associated with spending of wind farm profits. Totals may not add up due to independent rounding.

### 4.3 US Total Economic Impacts

A summary of the Project's potential overall economic benefits for the entire US including Value Added, local jobs, Labor Earnings, and Gross Output are shown in Table 4-2.

**Value Added.** The total Value Added from the Project is \$652.9 million during the expected two-year construction phase and \$85.0 million per year (in 2020 dollars) during the operations phase.

Based on the JEDI analysis, the Project is expected to account for a total of 5,290 job-years in the construction phase and 365 FTE jobs on an annual basis during the operations phase. These additional jobs result from the increased spending in the US.

**Direct jobs.** The Project will result in 1,410 FTE local direct job-years in the development and construction phase and 58 FTE local direct annual jobs in the operations phase. 1,410 FTE job-years during the 2-year construction phase is equivalent to 705 jobs each lasting 2 years. "Local" is defined by jobs in the US.

**Indirect jobs.** The Project will result in 2,146 FTE local indirect job-years in the construction phase and 39 FTE local indirect annual jobs in the operations phase.



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**Induced jobs.** The Project will result in 1,734 FTE local induced job-years in the construction phase and 287 FTE local induced annual jobs in the operations phase.

**Labor Earnings.** Labor Earnings total to \$420.8 million in the construction phase and \$27.1 million per year in the operations phase (in 2020 dollars).

**Gross Output.** Local Gross Output is estimated as \$1.24 billion in the construction phase and \$121.2 million annually in the operations phase (in 2020 dollars).

**Table 4-3. Summary of Jobs and Investment Impacts in the US**

Project Phase	Impact Categories	Jobs	Earnings (Millions USD)	Output (Millions USD)	Value Added (Millions USD)
Construction	Direct	1,410	\$124.0	\$148.9	\$129.8
	Indirect	2,146	\$187.0	\$747.3	\$343.1
	Induced	1,734	\$109.8	\$343.0	\$180.1
	<b>Total</b>	<b>5,290</b>	<b>\$420.8</b>	<b>\$1,239.1</b>	<b>\$652.9</b>
Operations (Annual)	Direct	58	\$4.9	\$4.9	\$4.9
	Indirect	39	\$3.2	\$57.4	\$48.2
	Induced	268	\$18.9	\$58.9	\$31.9
	<b>Total</b>	<b>365</b>	<b>\$27.1</b>	<b>\$121.2</b>	<b>\$85.0</b>

Notes: Earnings, Output and Value Added figures are in millions of 2020 dollars. Construction job figures are in job years, which are full-time equivalent (FTE) jobs multiplied by the number of construction years. Operations jobs are FTEs for a period of one year. The analysis does not include impacts associated with spending of wind farm profits. Totals may not add up due to independent rounding.





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### 5. Discussion

#### 5.1 Summary of Project Benefits

In summary, Table 5-1 shows the total jobs and value-added benefits for Rhode Island, Connecticut, and the total US.

In Rhode Island, approximately \$393.3 million (pre-tax) will be spent locally over the two-year construction phase, and \$70.0 million will be spent locally on an annual basis over the twenty-year operation phase. According to the JEDI model results, this spending will result in approximately 3,059 job-years and \$320.6 million value added during construction and 233 FTE jobs and \$70.0 million value added during operation.

In Connecticut, approximately \$77.9 million (pre-tax) will be spent locally over the two-year construction phase. According to the JEDI model results, this spending will result in approximately 797 job-years and \$290.8 million value added during construction.

In the total US, approximately \$471.2 million (pre-tax) will be spent within the country over the two-year construction phase, and \$43.2 million will be spent locally on an annual basis over the twenty-year operation phase. According to the JEDI model results, this spending will result in approximately 5,290 job-years and \$652.9 million value added during construction and 365 FTE jobs and \$85.0 million value added during operation.

**Table 5-1. Comparison of Project Benefits by Location**

Project Phase	Impact Categories	Rhode Island		Connecticut		Total US	
		Jobs	Value Added (Millions USD)	Jobs	Value Added (Millions USD)	Jobs	Value Added (Millions USD)
Construction	Direct	1,020	\$81.8	420	\$48.3	1,410	\$129.8
	Indirect	1,412	\$177.1	211	\$28.7	2,146	\$343.1
	Induced	627	\$61.7	166	\$19.4	1,734	\$180.1
	<b>Total</b>	<b>3,059</b>	<b>\$320.6</b>	<b>797</b>	<b>\$96.4</b>	<b>5,290</b>	<b>\$652.9</b>
Operations (Annual)	Direct	58 <sup>19</sup>	\$4.9	0	\$0.0	58	\$4.9
	Indirect	18	\$47.5	0	\$0.0	39	\$48.2
	Induced	156	\$17.6	0	\$0.0	268	\$31.9
	<b>Total</b>	<b>233</b>	<b>\$70.0</b>	<b>0</b>	<b>\$0.0</b>	<b>365</b>	<b>\$85.0</b>

Notes: Earnings, Output and Value Added figures are in millions of 2020 dollars. Construction job figures are in job years, which are full-time equivalent (FTE) jobs multiplied by the number of construction years. Operations jobs are FTEs for a period of one year. The analysis does not include impacts associated with spending of wind farm profits. Totals may not add up due to independent rounding.

<sup>19</sup> Orsted estimated 32 FTE direct jobs in Rhode Island in the operations phase while the JEDI model projected 58 FTE.



## **Appendix A. Background on JEDI Model**

Economic development occurs when a specific area or region of interest secures new sources of investment and when at least a portion of those investments is captured by local businesses and individuals. Economic development analysis seeks to track new investments in a specific location, distinguish different types of expenditures in those regions, and then examine the impact of those investments in the given locality. For those expenditures that are local, the impacts entail the initial investment plus potential downstream effects in the supply chain and in the consumer and retail sectors of the economy. If an expenditure associated with a given project is not captured locally, it is treated as economic leakage and has no economic development value for the region of interest.

Economic development activity is typically estimated using input-output (I/O) models. I/O models apply historical relationships between demand (i.e., specific expenditures within a given sector of the economy) and the resulting economic activity to estimate how new expenditures will affect economic development metrics.

Although some I/O models incorporate dynamic elements, many are static—they measure inter-industry relationships for a given time period—and linear—they assume that any change in demand, regardless of magnitude, has the same proportional result. However, the inter-industry relationships utilized in I/O modeling tend to change only gradually over a long period of time, and I/O modeling is a widely used methodology for measuring economic development activity.

NREL has developed a set of I/O models known as the Jobs and Economic Development Impacts (JEDI) models. The JEDI models are Excel-based models that estimate the economic impacts of constructing and operating power plants, fuel production facilities, and other projects at the local (usually state) level. These models rely on the widely recognized and well known I/O multiplier data provided by the Minnesota IMPLAN Group. Offshore wind is the latest addition to this suite, which already includes biofuels, coal, concentrating solar power, natural gas, solar photovoltaics, wind, and marine/hydrokinetic power.<sup>20</sup> The Offshore Wind JEDI model is specifically tailored to offshore wind facilities and calculates the economic impact to a given region of the construction and operation of an offshore wind project.

### **A.1 Model Inputs**

The JEDI Offshore Wind Model works in a similar way to other models in the JEDI family, allowing the user to specify general characteristics about the wind project such as capacity, number of turbines, distance from shore, water depth, etc., as well as specific cost components that are part of the construction or operations phase of the project.

Calculations can be based either on the entered cost data or on default inputs, which are derived from industry norms. The model asks for several categories of expenditure as well as the percentage of expenditures that will happen locally (in this case meaning in the state

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<sup>20</sup> NREL's JEDI models are publicly available spreadsheet tools that apply state-specific IMPLAN year 2014 multipliers. The JEDI analysis tools were developed by NREL in conjunction with MRG & Associates. For more information on the JEDI tools, see <https://www.nrel.gov/analysis/jedi/>



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of Rhode Island). If project-specific inputs are not available, the model comes with default inputs so a result can be generated with incomplete data.

JEDI model defaults are based on interviews with industry experts and project developers.<sup>21</sup> Economic multipliers contained within the model are derived from Minnesota IMPLAN Group's IMPLAN regional input-output software and state data files. The IMPLAN database contains county, state, zip code, and federal economic statistics which are specialized by region, not estimated from national averages, and can be used to measure the effect on a regional or local economy of a given change or event in the economy's activity. IMPLAN is based on input-output tables, employment and wage data, data on trade flows, and data on how personal income is spent. Input-output tables are compiled at the national level by the Bureau of Economic Analysis (BEA), an agency within the Department of Commerce. State and county specific input-output tables are derived by adjusting the BEA national tables by adjusting the distribution of production among industries, based on employment data by industry, and deriving imports and exports to and from the state through a combination of the input-output relationships and trade flow data.

### A.2 Model Outputs

Based on project-specific inputs from the user, the model estimates job creation, earnings, and output (total economic activity) for a given power generation project. This includes the direct, indirect, and induced economic impacts on the state economy associated with its construction and operation phases. By determining the regional economic impacts and job creation for a proposed power facility, the JEDI Offshore Wind Model can be used to answer questions about the impacts of offshore wind power in a given state, region, or local community.

NREL's JEDI models present outputs for the following economic metrics:

- *Jobs* – Additional jobs resulting from the increased final spending.
- *Earnings* – The additional earnings (wages and employer paid benefits) associated with the additional jobs.
- *Output* – The additional output that drives the increase in jobs. Output is defined more broadly than other metrics of economic activity, including value added or GDP; output is the sum value of all goods and services at all stages of production (i.e., as a raw material and as a finished product).
- *Value Added* – The difference between total gross output and the cost of intermediate inputs. It is the sum total of earnings of capital and labor, comprised of payments made to workers, proprietary income, other property type income, indirect business taxes, and taxes on production and imports less subsidies. The sum total of value added of all enterprises and self-employed in a state comprises that state's GDP.

JEDI models classify results into three categories: direct, indirect, and induced. Direct results are defined as on-site labor and professional services. These are the impacts from dollars spent on labor by companies engaged in development and on-site construction and

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<sup>21</sup> Default values are based on analysis of proprietary data provided by NREL, Guidehouse, Green Giraffe Energy Bankers, Ocean & Coastal Consultants, and the U.S. Department of Labor Bureau of Labor Statistics. In those instances where data from the sources was not an exact match for the system parameters, the best available information was used to derive appropriate values.



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operation of power generation and transmission. These results do not include materials—only labor. With its exclusive emphasis on labor, JEDI's first tier of impacts is narrower than typical direct economic impacts. Companies or businesses that fall into this category include project developers, environmental and permitting consultants, road builders, concrete-pouring companies, construction companies, tower erection crews, crane operators, and O&M personnel.

Indirect effects are reported in JEDI as local revenues, equipment, and supply chain results. These results are driven by the increase in demand for goods and services from direct on-site project spending. Businesses and companies included in the second tier of economic activity include construction material and component suppliers, analysts and attorneys who assess project feasibility and negotiate contract agreements, banks financing the projects, all equipment manufacturers (i.e., blade manufacturers), and manufacturers of replacement and repair parts.

Induced effects are the third and final category and are driven by the local expenditures of those receiving payments within the first two categories or increased household spending by workers. These are often associated with increased business at local restaurants, entertainment, and retail establishments, as well as child care providers or any other entity affected by the increased economic activity and spending occurring in the first two tiers.

JEDI model results are displayed in two different time periods: construction and operations. Construction period results are inherently short-term. Jobs are defined as full-time equivalents (FTE), or 2,080-hour units of labor. (One construction period job equates to one full-time job for one year.) Equipment manufacturing jobs, such as tower manufacturing, are included in construction period jobs as it is ultimately new construction that drives equipment manufacturing. All employment related to the construction of the project is reported in FTE. Operations period results are long-term, for the life of the project, and are reported as annual FTE jobs and economic activity. Operation period impacts continue to accrue throughout the operating life of the project.

JEDI results are not intended to be a precise forecast; they are an estimate of potential activity resulting from a specific set of projects or scenarios. In addition, JEDI results presuppose that projects are financially viable and can be justified independent of their economic development value. Importantly, results generated by the JEDI models are gross (not net) results. They do not consider potential increases or decreases in electricity rates resulting from investments in new infrastructure, nor do they consider whether the respective projects displace economic activity elsewhere.