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July 10, 2020

Via Email and Hand Delivery
Pamela Monroe, Administrator
New Hampshire Site Evaluation Committee
c/o New Hampshire Public Utilities Commission
21 South Fruit St., Suite 10
Concord, NH 03301-2429

Re: SEC Docket No. 2019-02, Application of Chinook Solar, LLC for a Certificate of Site and Facility for the Construction and Operation of a 30MW Solar Generating Facility in Fitzwilliam, New Hampshire – Revised Economic Impact Assessment

Dear Ms. Monroe:

Enclosed for filing with the Site Evaluation Committee in the above-captioned docket is a revised economic impact assessment. This replaces the economic impact assessment which was filed on October 18, 2019 as Appendix 18 of the Application.

We are enclosing nine hard copies and an encrypted thumb drive with the revised economic impact assessment.

If you have any questions, please do not hesitate to contact us. Thank you for your assistance.

Sincerely,

Douglas L. Patch

DLP/eac
Enclosures

cc (via email): Service List in SEC Docket 2019-02

2813023_1

Economic Impact Analysis of the Proposed 30 MW Chinook Solar Project in the Town of Fitzwilliam, NH

Prepared for Chinook Solar, LLC
By Seacoast Economics
May 2020

Disclaimer

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1. Executive Summary

- The Chinook Solar Project ("Project") is a proposed 30 Megawatt (MW) alternating current utility-scale solar project to be located on private land in the Town of Fitzwilliam in Cheshire County, NH. The Project is believed to be the first solar project in NH with a capacity greater than 5 MW.
- The number of U.S. utility-scale solar installations greater than 1 MW is growing at a rapid pace. From a capacity of 364 MW at 10 facilities in 1990 to 27,209 MW at 2,313 facilities in 2017, utility-scale solar capacity has grown at a 17.3% Compound Annual Growth Rate (CAGR). Almost 98% of the growth has occurred since 2010. As of 2017, U.S. Energy Information Administration statistics reported no solar installations greater than 1 MW in NH.
- Chinook Solar, LLC (Chinook Solar) has requested a macroeconomic impact assessment to be made part of the Project's New Hampshire Site Evaluation Committee (SEC) application describing the potential jobs, property value, recreation and tourism, and community services impact of the Project. All of these areas were researched by Seacoast Economics and the analysis and conclusions reached are contained within this study. This report examines the potential economic impact of the Project on the towns of Fitzwilliam, Rindge, and Jaffrey, and the overall state. The employment potential of Cheshire County to work on the construction phase of the Project was also assessed.

1.1. Macroeconomic Impact

- The Project is expected to support $19.5 million in economic value in NH over the next twenty years. The macroeconomic impact analysis indicates that the economic benefits of the Project will be the greatest during the construction phase of the Project. During construction, the Project is expected to support 95 NH-based full-time equivalent (FTE) jobs paying approximately $6.2 million in wages and supporting $8 million in economic value in NH. Of the FTE jobs anticipated, 60 are expected to be direct construction jobs, 7 are expected to be indirect jobs (examples include whole sale suppliers and engineering firms), and 22 are predicted to be induced jobs (examples include real estate, hospitals, and full-service restaurants) supported by the spending of salaries by direct and indirect workers on the Project.

Table 1: Change in economic activity in NH during the construction phase of the Project.

Impacts	FTE Employment	Earnings (Millions)	Economic Value Added (Millions)
Direct	66.1	$4.4	$5.1
Indirect	6.6	$0.5	$0.7
Induced	22.0	$1.3	$2.2
Total	**94.8**	**$6.2**	**$8.0**

- Prior to construction, expenditures for services in NH by Chinook Solar benefits the NH economy by supporting almost 11 FTE jobs receiving $0.8 million in earnings and $1.1 million in value added. Professional services and state government are expected to be areas that directly benefit the most.
- Long-term, on-going benefits from direct employment and contractor services for the Project, landowner lease payments, and tax/tax equivalent payments to local and state government are expected to result in approximately 6 to 7 FTE jobs paying $0.5 to $0.6 million in wages in NH during Project operations. This would be expected to support $0.6 to $0.7 million in economic value annually. Direct jobs supported by the Project

operations are expected to include jobs within state and local government due to the increased tax-related revenue from the Project. The range in economic activity is dependent on the extent to which the Town of Fitzwilliam directs payments to property tax relief or services expansion with services expansion resulting in slightly higher overall economic activity.

Table 2: Change in economic activity in NH during the operations phase of the Project.

Impacts	FTE Employment	Earnings (Millions)	Economic Output (Millions)
Direct	2.4 - 4.8	$0.3 - 0.4	$0.3 - 0.5
Indirect	0.0 - 0.2	$0.0	$0.0
Induced	2.2 - 3.3	$0.1 - 0.2	$0.2 - 0.3
Total	**5.7 - 7.1**	**$0.5 - 0.6**	**$0.6 - 0.7**

- To the extent that local area contractor firms from Cheshire County are employed on the Project during the construction phase, then the greater the extent that the $10.4 million in positive economic value would be expected to concentrate in local communities as opposed to throughout the overall state. There was no information available at the time of the economic analysis of the expected employment during construction of the Project in specific communities. Therefore the positive economic impact expected to occur within the state during construction was not directly attributed to any specific region in NH including the towns of Fitzwilliam, Jaffrey, and Rindge.
- An analysis of skilled labor availability indicated Cheshire County would be expected to be competitive in being awarded jobs during the construction period. Four specific industries possessing potential skills include: 1) power and communication line and related structure construction; 2) highway, street, and bridge construction; 3) electrical contractors and other wiring installation contractors; and 4) site preparation contractors. In 2018, approximately 320 people who may provide the types of construction services required for the Project were employed in Cheshire County.
- The Town of Fitzwilliam is expected to experience a positive net impact due to the increased tax-related revenue and land owner lease payments from the Project after it is constructed. The increased funding that would result from anticipated PILOT payments (assumed to be $300,000 annually in this study) would be a positive economic factor for the Town of Fitzwilliam. The funds would provide additional financial flexibility to the Town which could be applied in different combinations in the areas of property tax reduction and increased resources/services for the Town and would serve to enhance the welfare of the local population. State government would also benefit from tax payments from Chinook Solar estimated by NextEra Energy to be $160,000 annually.

1.2. Residential Property Value Impact

- An area of concern for homeowners is that the development of new electrical infrastructure in close proximity or within view of their homes may have a negative impact on the value of their property. There has been limited study of the impact of utility-scale solar on residential property values, but of the studies that have been performed, none have established a consistent relationship between utility-scale solar installations and residential home values. In addition, wind farms (renewable energy infrastructure that may have higher visual impacts than solar) have been well-studied and there has not been a meaningful, consistent relationship established between this form of renewable energy infrastructure and residential property values.
- Two studies of utility-scale solar released in 2018 were identified where appraisers performed matched-pair analysis to examine the impacts of utility-scale solar on residential property values. Kirkland (2018) conducted

matched-pair analysis of 22 residential properties around a 6.7 MW solar project in North Carolina and found there had been no impact on sale price for residential, agricultural, or vacant residential land that adjoins the existing solar projects. McGarr and Lines (2018) studied the value of a total of 87 residential properties with 17 adjoining properties and 70 comparable sales that adjoin 6 solar projects in Illinois and Indiana. This study did not find evidence of impact and also concluded that property proximity to panels did not have an impact either. Based on the literature review, it is asserted that there is not a consistent, observable relationship between utility-scale solar installations and residential home values.

- Residential market activity was reviewed in the Town of Moultonborough, NH for the time period before and after the construction of the 2 MW NHEC Project in 2017 (currently, one of the largest solar projects in NH). The purpose was to identify any changes in residential real estate activity that differed from the overall regional and national trends occurring the real estate market. An analysis of 166 sales totaling $92 million in Moultonborough between 2016 to 2019 did not indicate any broad changes in the real estate market. Total sales increased by $5.3 million (18.3%) in the year following the NHEC Project's construction. Statistical analysis of sales price to pre-sales assessed value did not indicate a negative relationship after the construction of the NHEC Project nor did it establish any relationship when considering distance of residence from the NHEC Project. Both of these statistical tests are supportive of the statement that the NHEC Project did not have any impact on single family home residential values in Moultonborough.
- The characteristics of the Project—specifically the low occurrence of visibility from properties around the Project and the diminutive aesthetic and operation characteristics of utility-scale solar—are expected to reduce the risk of negative impacts on property values from the Project. In addition, the Project will be built on land almost all of which will be owned by the Chinook Solar. Eighty percent of the total parcel area for properties that may have a potential view of the Project is owned by local/state government or non-governmental organizations (NGOs) or is privately-owned but undeveloped.
- Based on the analysis performed in this study examining the relationship between utility-scale solar and residential property values, it is not expected that the Project would have a wide-spread, consistent impact on property values in the Town of Fitzwilliam or surrounding communities. This finding is consistent with the literature review which also has not identified a consistent relationship between residential property values and solar projects or wind farms that are operating within compliance of their regulatory standards even when considering proximity and view. While this study does not rule out isolated impacts for properties due to the Project, it is unlikely that the Project would negatively impact the overall local real estate markets.

1.3. Tourism and Recreation Economic Impact

- This study did not identify any studies that had examined the relationship between utility-scale solar projects and tourism or recreation. There has been significant research performed analyzing the impact of wind farms on tourism. The majority of these studies have relied on surveys and there is no consensus on tourism and recreation impacts due to the construction of a wind farm. Several studies have indicated there is the potential for increased tourism and recreation visits due to eco-tourism or curiosity visits where visitors are attracted to views of a renewable energy resource.
- An intercept survey performed by T.J. Boyle specific to the Project at a resource of high recreational importance in NH, Mount Monadnock, indicated that only 1% of those surveyed may be slightly less likely to visit the recreational site if the Project were constructed.
- The Town of Fitzwilliam and the surrounding region provide many different recreational and tourism opportunities involving the outdoors. An analysis of business composition and measures of tourism-spending indicates that the region may be slightly more dependent than the overall state on tourism and recreation. An inventory constructed from resources highlighted on the Town of Fitzwilliam website resulted in a total of 7 visitor attractions in Fitzwilliam and 10 visitor attractions outside of Fitzwilliam. No resource was identified as being in

the Project footprint. Other than Mount Monadnock and Telemark Hill, none of the other tourism resources identified are believed to have a view of the Project. No businesses subject to the Meals and Rooms Tax are located in the Project footprint. The Project, due to its low visibility, would not be expected to impact any of the attractions identified. Therefore, it is highly unlikely that there would be a negative economic impact on tourism and recreation.

- Hunting appears to be an important activity in the Town of Fitzwilliam with a higher than average hunt kill ratio and is home to several organizations dedicated to hunting. At least 96 acres of parcels under the control of Chinook Solar are currently open to hunting through the current use recreation discount. The extent to which the Project marginally prevents access to previously accessible hunting areas may reduce economic activity related to hunting in the Town of Fitzwilliam. There is insufficient information to quantify the potential negative impact, but, if the Project were to limit previous levels of hunting activity, it would be expected to be a relatively small, negative impact that is most likely within the hundreds to thousands of dollars. Any actions that Chinook Solar takes to manage any potential loss of previously accessible hunting areas would be expected to mitigate any potential negative economic impacts from the Project related to hunting activity.
- An analysis of the 2 MW NHEC solar project constructed in 2017, did not give any indication of changes in tourism related expenditures in the region, or local motor vehicle traffic. In addition, hunting activity in Moultonborough did not appear to change after the NHEC Project was constructed. Given that it is currently one of the largest solar facilities in New Hampshire, these observations help support the statement that the Project is unlikely to negatively impact the tourism and recreation economy in the local region.
- During the construction period, it is expected that on the main routes, Routes 119 and 12, in the Town of Fitzwilliam, that there will be a 4 to 5% increase in traffic volume. Nextera Energy has stated that it does not expect there to be traffic delays. There was no evidence to indicate that the Project will cause traffic delays along major routes and therefore it is unlikely that the traffic associated with the construction will have a negative economic impact on tourism and recreation in the local area.
- Based on information obtained from the literature review, combined with actual observations of the characteristics of the local area around the Project, and observations of tourism-related activity around one of the currently largest utility-scale solar projects in NH, there is no evidence based on objective, economic data to indicate that the region will experience a significant negative economic impact in tourism and recreation from the Project.

1.4. Community Services Impact

- This analysis uncovered a few areas of potential community impact with potential costs in the Town of Fitzwilliam. The towns of Jaffrey and Rindge were not included in the community services and infrastructure impact assessment due to their limitied visiblity, distance from the Project, and the fact that they are not expected to receive any tax-related revenue from the Project.
- One area is near-term consulting assistance for the Town of Fitzwilliam to ensure that it is able to negotiate a PILOT and MOU with Chinook Solar, LLC that provides favorable terms for the Town, while also allowing Chinook Solar to economically pursue the Project. Other areas that may require additional resources during the construction phase (or shortly there after) include: assessment, legal, and engineering. In anticipation of these costs, Chinook Solar has provided the Town of Fitzwilliam with some funds to cover professional expenses. Additional funds could be the subject of further negotiations.
- An area of community impact related to public health and safety is long-term emergency management planning. Review of the Town Annual Reports indicates that members of the Town of Fitzwilliam Fire Department would likely be under-resourced in the event of a significant wildfire event, and that the Town participates in a mutual aid program to support the Town's emergency service needs. Additional financial resources may be required

to develop an emergency plan that identifies any resource gaps in the Town of Fitzwilliam fire services and that coordinates the resources of the departments in the mutual aid program in the event of an incident at the Project.

- The increased funding that would result from anticipated PILOT payments would be expected to positively impact community services and infrastructure for the Town. The funds would provide additional financial flexibility to the Town which could be applied in different combinations in the areas of property tax reduction and/or increased resources/services for the Town of Fitzwilliam. No other significant impacts were identified for community services and infrastructure.

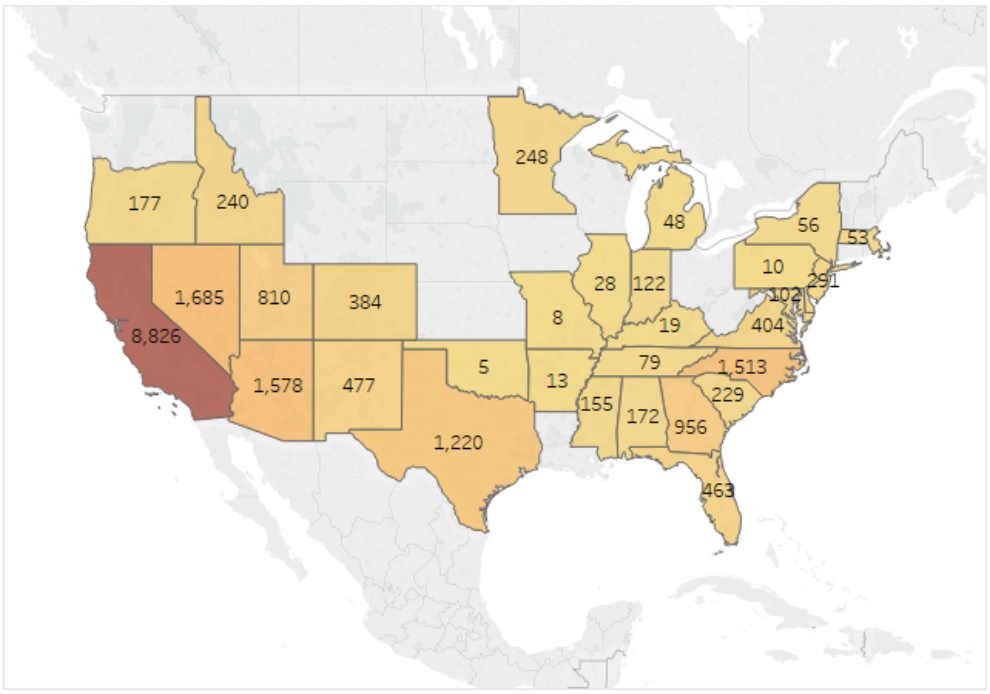
1.5. Findings

- The Chinook Project is expected to bring a net positive economic impact to the Town of Fitzwilliam, Cheshire County, and the overall state through construction activity and on-going operations. Overall, the Project has a low-visibility profile which would be expected to mitigate any potential impacts to housing or tourism/recreation even if negative impacts were known to be associated with utility-scale solar projects. However, there is no evidence based on observable economic data to indicate that any utility-scale solar facility, including the Project, would result in wide-spread, negative impact to real estate or tourism and recreation related resources. While it is possible that the Project could have an isolated impact on a property or tourism-related resource, it is not believed to be likely. The Project is expected to bring positive net benefit to the Town of Fitzwilliam that exceeds any potential additional costs to community services and infrastructure. Therefore, given the information reviewed in this study, the Project will not unduly interfere with the orderly development of the region.

2. Introduction

Distributed generation solar projects, one megawatt (MW) or greater installations that sell generated electricity directly to wholesale utility power purchasers, are being developed throughout the United States at a rapid pace. Larger solar installations, 5 MW or greater, have driven the overall U.S. solar market in terms of new installed capacity since 2012.[1] In 2017, 5 MW or greater projects accounted for nearly 60% of all new solar capacity with three out of every five states having one or more solar projects with a capacity equal to or greater than 5 MW. Total national installed capacity for projects of this scale in 2017 was 20,515 MWac.

Figure 1: Total MW of added solar capacity by state for systems larger than 5 MW from 2010 to 2017.



Source: Berkeley Lab, Utility-Scale Solar 2018 Edition

New Hampshire ("NH") has been the location for several ground-based solar array installations, including the $5 million 2 MW solar project installed in Moultonborough by the New Hampshire Electric Cooperative and the $2.6 million 0.944 MW installed at the wastewater treatment plant in Peterborough.[2] [3] However, to-date, it does not appear that a project larger than 5 MW has been installed in NH. This report examines the existing state of knowledge on the economic impacts of utility-scale solar projects in the United States and based on that analysis, combined with local economic information and modeling, projects the estimated economic impact of a new proposed 30 MW utility-scale solar project in NH.

[1] Utility-Scale Solar: Empirical Trends in Project Technology, Cost, Performance, and PPA Pricing in the United States - 2018 Edition, Lawrence Berkeley National Laboratory. Available on-line at https://emp.lbl.gov/sites/default/files/lbnl_utility_scale_solar_2018_edition_report.pdf

[2] Moultonborough Solar Array - 2 MW, New Hampshire Electric Co-op. Available on-line at https://www.nhec.com/moultonborough-solar-array/

[3] Solar Powered WWTP, Town of Peterborough, NH. Available on-line at http://www.peterboroughprojects.info/solar-powered-wwtp

2.1. Project Description

The Chinook Solar Project ("Project") is a proposed 30 MW alternating current utility-scale solar project to be located in the Town of Fitzwilliam in Cheshire County, NH. The proposed site is located to the east of the Town center (south of Route 119 and east of Route 12). The Project terrain is predominantly commercially harvested forest lands located adjacent to transmission corridors where the fenced-in project area is 129 acres including the substation. The technology to be used is 25 degree fixed-tilt solar photovoltaic modules. The Project was originally introduced by Ranger Solar to the Fitzwilliam Selectman's Board in April 2016.[4] Since that time, the Project has been acquired and developed by NextEra Energy Resources, LLC (NEER), a wholly owned subsidiary of Nextera Energy, LLC (NEE). The anticipated date of commercial operation is the fall of 2021. The ownership structure of the Project is Chinook Solar, LLC formed on November 20, 2015 and is a wholly-owned indirect subsidiary of NEER.

NEE is an electric power and energy infrastructure company in North America. Its subsidiary, NEER, is a competitive energy business and is the worlds largest generator of renewable energy from wind and solar sources. The company operates over 90 utility-scale projects in more than 30 states in the United States. As of December 31, 2018, the total net contracted generation for all assets, renewable and fossil-fuel based, was approximately 19,000 MW. The company trades on the New York Stock Exchange with a ticker symbol of NEE and in 2018 generated $5.7 billion in net income. The company is headquartered in Juno Beach, Florida.

Chinook Solar, LLC through a subcontract with TRC Environmental Corporation requested that Seacoast Economics perform a study of the economic characteristics of the Project and form an opinion as to the likely economic impacts of the Project on affected communities (defined in Section 2.3), the local region (defined in Section 2.3), and the State of NH based on objective findings. The study process and findings were formalized in this report to serve as the economic impact assessment required as part of the project review process for the NH Site Evaluation Committee (NH SEC) application.

2.2. Economic Impact Analysis Scope

The economic impact analysis of the Project on the region is limited to:

1. The job and Gross State Product (GSP) economic effect of the proposed facility on the NH economy ("Macroeconomic Impact")
2. The effect of the proposed facility on real estate values in the affected communities ("Real Estate Economic Impact");
3. The effect of the proposed facility on tourism and recreation ("Tourism & Recreation Economic Impact");
4. The effect of the proposed facility on community services and infrastructure ("Community Impact");

Specifically **excluded** from this analysis are: 1) the evaluation of the economic impacts of rare but high economic impact events including catastrophic events, and 2) modeling of changes in energy prices (including renewable energy credits) in the regional energy market. Rare events are challenging to evaluate and model and therefore not factored into the analysis. Energy prices are the result of complex interacting factors in the New England, national, and global

[4] Board Meeting Minutes, Board of Selectmen, Fitzwilliam, NH. Available on-line at https://fitzwilliam-nh.gov/vertical/sites/%7B5152AF08-0D8E-4832-8682-9F3DC8413E4B%7D/uploads/BOS042516.pdf

energy markets. In this analysis, no change in wholesale energy prices was assumed and therefore the economic modeling performed do not include wholesale energy prices. This is not believed to impact any of the findings of this study.

This analysis was performed independently and objectively. Any opinions and conclusions reached are based on the best available information on the relationship between utility-scale solar and factors in the economy and considers the findings of the full body of evidence collected during the process.

2.3. Potentially Affected Communities & Region

The NH SEC defines "Affected communities" as *"the proposed energy facility host municipalities and unincorporated places, municipalities and unincorporated places abutting the host municipalities and unincorporated places, and other municipalities and unincorporated places that are expected to be affected by the proposed facility, as indicated in studies included with the application submitted with respect to the proposed facility"*.[5] For the purposes of this study, as explained below, the communities to be studied for potential impact were the towns of Fitzwilliam, Jaffrey and Rindge.

These communities were selected for the following reasons: 1) the Project footprint is exclusively in the Town of Fitzwilliam and 2) the visual impact analysis performed by T.J. Boyle Associates, LLC for the Project indicates that the towns of Fitzwilliam, Jaffrey and Rindge may have locations with views within a 6-mile distance of the Project ("Chinook Solar, LLC Fitzwilliam, New Hampshire: Visual Impact Analysis Report", 2019). The remaining abutting towns of Troy and Richmond were not included as neither of these towns were modeled as having potential views of the Project in the visual impact analysis performed by T.J. Boyle Associates, LLC and are located 2 miles or greater away from the Project.

The towns of Fitzwilliam, Rindge, and Jaffrey are all located in Cheshire County, NH. Cheshire County is located in the southwestern corner of New Hampshire. The NH region ("Region") for analysis is defined as Cheshire County, NH. Figure 2 illustrates the location of the potentially affected communities in NH.

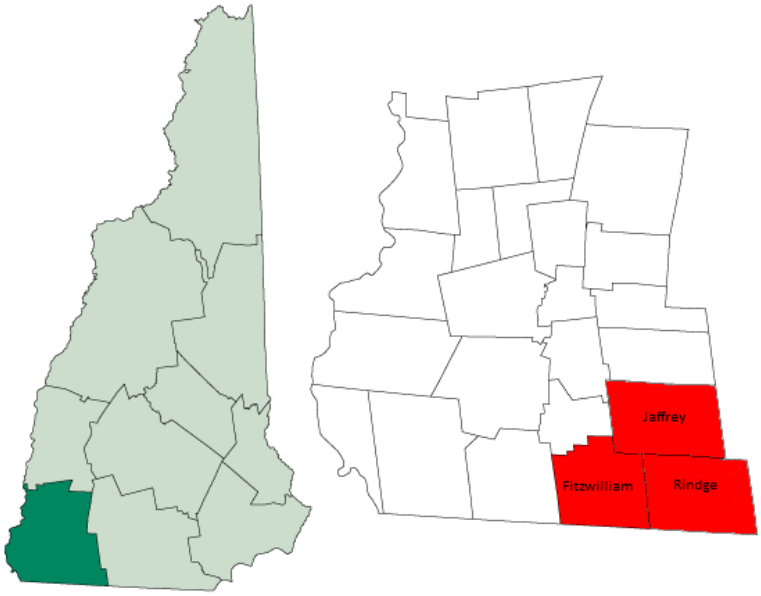
The Town of Fitzwilliam, the host community of the Project, is located in the southeastern corner of Cheshire County, NH. The Town is located on the border of Worcester County, Massachusetts abutting the towns of Royalston and Winchendon. The Town has a total area of 36.0 square miles (sq miles), of which 34.6 sq miles is land and 1.4 sq miles is water. Two major roadways, NH Routes 12 and 119, pass through the Town.

The Town of Rindge is located to the east of Fitzwilliam and has a total area of 40.0 sq miles, of which 37.2 sq miles is land and 2.8 sq miles is water. The Town of Jaffrey is located to the immediate north of Fitzwilliam and Rindge and has a total area of 40.0 square miles, of which 38.3 sq miles is land and 1.7 sq miles is water. Mount Monadnock, a significant scenic resource with an elevation of 3,165 feet above sea level is located in Jaffrey approximately 6 miles northeast of the Project.

In 2017, the Town of Fitzwilliam had a population of 2,300 and a density of 66 people per land sq. mile. The bordering towns of Jaffrey and Rindge have higher population densities at 139 and 161 people per land sq mile respectively. The Town of Fitzwilliam has a lower population density than the region and the state at -38% for Cheshire County with 108 people per land sq. mile and -56% for the State of New Hampshire with 149 people per land sq. mile. The overall population in the Town tends to be a little bit older than the region and the overall state. In 2017, the median age in Fitzwilliam was 50.2 years old compared to median ages for Cheshire County of 42.5 and

[5] Chapter Site 100 Organizational Rules. (2015, December). New Hampshire Site Evaluation Committee

Figure 2: Map of Cheshire County, NH and the towns of Fitzwilliam, Jaffrey, and Rindge.



Source: Derivative of work by Andrew Sawyer - Created from Boundary/Border Outline Files of the Libre Map Project which held a BY-SA creative commons license. Data originally from 2000 US Census boundary data., CC BY 2.5, https://commons.wikimedia.org/w/index.php?curid=1010744

NH of 42.7. Fitzwilliam has lower median household incomes when compared to Cheshire County and overall state with Fitzwilliam at $51,638, the county at $60,148 and NH overall at $71,305. Housing values in Fitzwilliam tend to be lower as well, having a median value of $170,200 while the county was $188,700 and the state was $244,900. Table 3 summarizes the demographics for the towns, region and state.

Table 3: Select 2017 demographic characteristics of the towns of Fitzwilliam, Jaffrey, and Rindge, Cheshire County and the State of NH.

Area	Population	Total Land Area (sq mi)	Population Density	Median Age (years)	Median Income	Total housing units	Median value
Fitzwilliam	2,294	34.6	66.3	50.2	$51,638	1,221	$170,200
Jaffrey	5,314	38.3	138.7	47.2	$59,968	2,539	$190,400
Rindge	6,005	37.2	161.4	32.2	$68,250	2262	$233,100
Cheshire County	76,109	707	107.7	42.5	$60,148	35,304	$188,700
State of NH	1,331,848	8,956	148.7	42.7	$71,305	627,619	$244,900

Source: 2013-2017 American Community Survey 5-Year Estimates

3. Utility-Scale Solar Energy

There is no universal-definition of what qualifies a solar project as "utility-scale".[6] Factors complicating this distinction are: 1) utility companies are becoming increasingly involved in distributed power generation (including solar) and 2) the panels used in a residential installation are similar to those used in utility-scale installations. Therefore it can be challenging to clearly categorize solar projects as being residential, commercial, or utility scale.

Four ways of categorizing utility-scale solar have been identified by the Ernesto Orlando Lawrence Berkeley National Laboratory (LBNL). They are:

- **EIA-860:** the U.S. Energy Information Administration (EIA) reports data on all generating plants of at least 1 MWac of capacity, regardless of ownership or whether or not they are interconnected in front of or behind the meter using the Form EIA-860. One interpretation of utility-scale could be any installation reported using the EIA-860 form.
- **Solar Market Insight:** These are widely recognized reports on solar market activity produced by Greentech Media and Solar Energy Industries Association (SEIA). The definition of utility-scale used in these reports is a project owned by or that sells electricity directly to a utility. The project type is defined by the offtake arrangement—the contractual agreement structure for generated power purchases—as opposed to the project size.
- **Investment Size:** Categorization is based on the amount of investment capital for a project with "higher" cost projects generally being considered to be "utility-scale". The threshold will vary by the investor and therefore is a less clear distinction.
- **LBNL:** The definition used by LBNL in its reporting on utility-scale solar market activity. They define utility-scale as any ground-mounted solar project that is larger than 5 MWac. The primary data source used is also the EIA-860 form.

NEE categorizes utility-scale solar projects as having a capacity greater than 10 MW.

The number of U.S. solar installations reported on form EIA-860 has grown from a total capacity of 364 MWac at 10 facilities in 1990 to 27,209 MWac at 2,313 facilities in 2017.[7] This is a 17.3% Compound Annual Growth Rate (CAGR) in capacity with almost 98% of the growth occurring since 2010.

Based on EIA-860 installations, New England did not have any solar installations greater than 1 MW until 2010 when 5 facilities with a total capacity of 5 MW were installed in Massachusetts. From that base, New England capacity has grown to 785 MW at 304 solar facilities by 2017. This is a 100% CAGR in capacity during that time period. In comparison, the overall nation experienced a 60% CAGR. Out of all EIA-860 installations, New England accounts for 3% of overall capacity.

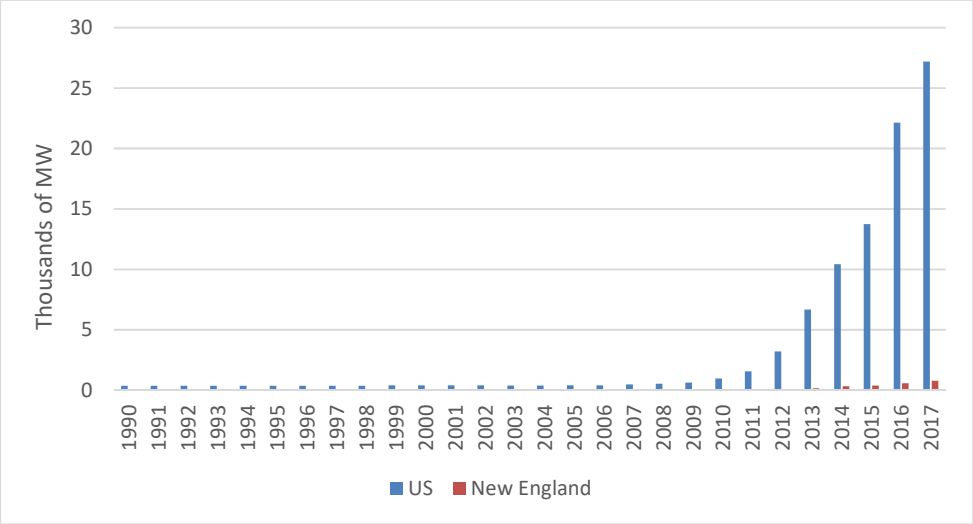
Table 4 lists the top five states by "large-scale" solar capacity with top ranked California far exceeding the next highest state Nevada by approximately a factor of 5. In New England, Massachusetts accounts for almost 70% of total installed solar capacity[8] and, as of 2017, was the only New England state to have an installation greater than 5

[6] Utility-Scale Solar: Empirical Trends in Project Technology, Cost, Performance, and PPA Pricing in the United States - 2018 Edition, Lawrence Berkeley National Laboratory. Available on-line at https://emp.lbl.gov/sites/default/files/lbnl_utility_scale_solar_2018_edition_report.pdf

[7] Detailed State Data, U.S. Energy Information Administration. Available on-line at https://www.eia.gov/electricity/data/state/

[8] Solar Power in New England: Concentration and Impact, ISO New England. Available on-line at https://www.iso-ne.com/about/what-we-do/in-depth/solar-power-in-new-england-locations-and-impact

Figure 3: Installed MW of solar >1 MW reported on EIA-860 from 1990 to 2017.



Source: U.S. Energy Information Administration

Table 4: Top five States by "large-scale" installed solar capacity in 2017.

State	Installed Capacity (MWs) installations >= 1 MWac	Installed Capacity (MWs) installations > 5 MWac
California	10,458	8,826
Nevada	2,192	1,685
Arizona	2,059	1,578
North Carolina	3,347	1,513
Texas	1,235	1,220

Source: U.S. Energy Information Administration, Berkeley Lab, Utility-Scale Solar 2018 Edition

MW. Maine, New Hampshire and Vermont lag the overall region with only 165 MW of total installed solar capacity as of 2017. None of these New England states had an installation with greater than 5 MW of capacity as of 2017. Total New England installed capacity greater than 1 MW was 785 MW and capacity greater than 5 MW was 53 MW.

3.1. ISO-New England Interconnection Requests

ISO New England (ISO-NE) is a non-profit organization responsible for operating the New England power grid, providing oversight for administering the region's wholesale electricity markets, and for power system planning. The Interconnection Queue is a resource maintained by ISO-NE that lists the current status of requests to either connect new generation to the New England regional power grid or increase capacity at existing generating facilities.[9] While there are caveats, the interconnection requests can be useful in identifying recently installed utility-scale solar in New

[9]Interconnection Request Queue, ISO New England. Available on-line at https://www.iso-ne.com/system-planning/transmission-planning/interconnection-request-queue/

Table 5: New England solar capacity (MW) in 2017.

State	Total PV Installations including residential	Total Installed Capacity (MW) including residential	Installed Capacity (MW) installations >= 1 MW (EIA-860)	Installed Capacity (MW) installations > 5 MW
Connecticut	29,512	366	34	0
Maine	3,598	33	6	0
Massachusetts	78,047	1,602	653	53
New Hampshire	7,330	70	0	0
Rhode Island	4,148	62	19	0
Vermont	9,773	257	74	0
Total	132,408	2,391	785	53

Source: U.S. Energy Information Administration, Berkeley Lab, Utility-Scale Solar 2018 Edition, ISO-New England

England and also provide an indicator of the potential development for new solar power generation in the region over the next several years.

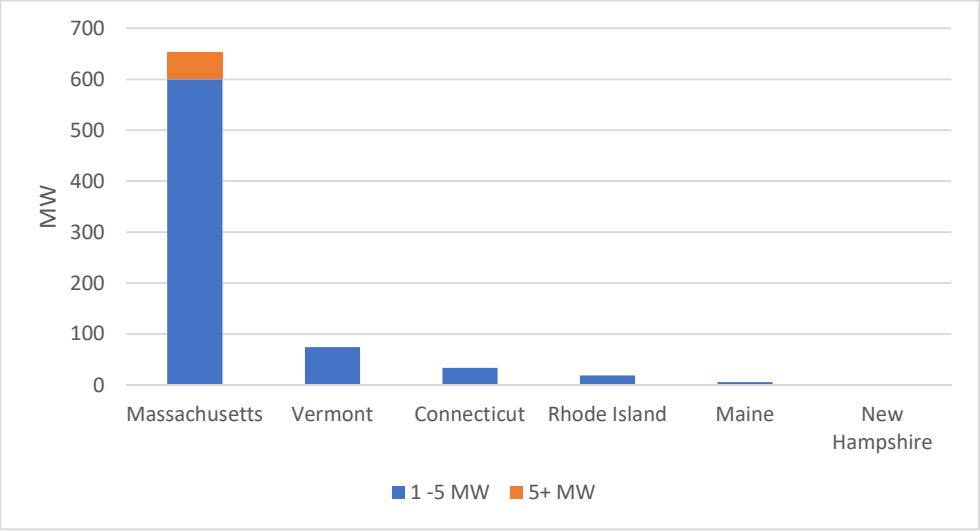
Interconnection requests often list a status that can indicate if a generating resource is under study, under construction, or in-service. One major limitation of using interconnection requests to predict future development is that not all proposed projects will be built. ISO New England indicates that historically almost 70% of proposed new capacity in the queue has not resulted in a completed project.[10] In addition, not all projects in the region are listed. These include new generating facilities that do not sell wholesale power on the grid. It is also important to note, that the "under study" status indicator in several cases appears to include the same "project" at multiple potential interconnection points or MW capacities. Therefore, the amount listed in the queue is expected to be larger than the actual amount that would be expected to be built.

Based on the Interconnection Queue as of February 2019, there are two facilities listed as in service: a 9.75 MW facility in East Brookfield, MA entering operation in December 2016 and NextEra's 19.9 MW Coolidge Solar facility constructed in Windsor, VT entering operation in December 2018. There are two 4.9 MW installations under construction in Hampden, MA with an unknown in-service date, and a 19.9 MW facility under construction in Hartford, CT with a stated in-service date of August 2020.

There are currently 30 solar PV projects with a total capacity of 1,063 MW listed with the status of "under study". Based on the current interconnection requests through 2020, there appears to currently be higher interest in Maine, New Hampshire and Vermont for utility-scale solar projects, and lower interest in southern New England. The information requests under-study, summarized in Table 7, appear to have multiple entries for similar projects. So this may inflate the actual MW of generation under study but does indicate that northern New England, including NH, may be expected to experience additional utility-scale capacity solar in the relatively near future.

[10] Interconnection Request Queue, ISO New England. Available on-line at https://www.iso-ne.com/system-planning/transmission-planning/interconnection-request-queue/

Figure 4: New England "large" solar capacity (MW) in 2017.



Source: U.S. Energy Information Administration, Berkeley Lab, Utility-Scale Solar 2018 Edition

Table 6: New England solar generation listed as in-service or under-construction with an interconnection to ISO-NE as of February 2019.

Actual or Expected In Service Date	Location	Capacity (MW)	Status
Dec 2016	East Brookfield, MA	9.75	In Service
Dec 2018	Windsor, VT	19.9	In Service
unknown	Hampden, MA	4.9	Under Construction
unknown	Hampden, MA	4.9	Under Construction
Aug 2020	Hartford, CT	19.9	Under Construction

Source: ISO-New England

3.2. New England Solar Forecast

The Distributed Generation Forecast Working Group of ISO New England develops a forecast of the anticipated solar capacity addition in each New England state.[11] The forecast process is informed by data analysis performed by ISO New England and from the input of state regulators and other stakeholders. The overall New England region is expected to nearly double its total solar capacity (including residential) from 2,400 MW in 2017 to 4,400 MW by 2022. New Hampshire is forecast to grow from a total base of 70 MW in 2017 to 137 MW in 2022 for a compound annual growth rate of 15%. This is expected to be slightly above the New England CAGR of only 13%. Vermont is expected to experience the slowest CAGR at only 8%.

[11] Final 2018 PV Forecast, ISO New England. Available on-line at https://www.iso-ne.com/static-assets/documents/2018/04/final-2018-pv-forecast.pdf

Table 7: Solar generation interconnection requests with a status of "under study" as of February 2019.

Anticipated In-service Year	CT		MA		ME		NH		VT		Total	
	Requests	Capacity	Requests	Capacity	Requests	Capacity	Requests	Capacity	Requests	Capacity	Requests	Capacity
2016					1	19.9			1	19.9	2	39.8
2018							1	65			1	65
2020			1	20	7	473.4	8	200	7	135	23	828.4
2021					1	15					1	15
2022					1	75					1	75
2023	1	19.9					1	19.9			2	39.8
Total	**1**	**19.9**	**1**	**20**	**10**	**583.3**	**10**	**284.9**	**8**	**154.9**	**30**	**1,063**

Source: ISO-New England

Table 8: ISO New England 2018 solar capacity forecast.

States	2017	2018	2019	2020	2021	2022	CAGR 2017 - 2022
CT	366	454	541	631	712	784	16%
MA	1,602	1,899	2,127	2,355	2,570	2,786	12%
ME	34	44	54	64	74	83	20%
NH	70	84	97	111	124	137	15%
RI	62	97	131	163	192	222	29%
VT	257	289	311	334	355	376	8%
New England	2,391	2,867	3,261	3,658	4,027	4,388	13%

Source: Distributed Generation Forecast Working Group of ISO New England

3.3. NH "Large-Scale" Solar Installations

There have been several larger solar installations in New Hampshire in terms of capacity, however, it is believed that none to date have exceeded the 5 MWac capacity mark. Table 9 is meant to be illustrative and lists several large solar installations identified when conducting this study. This list is unlikely to be exhaustive and may not include all solar projects of similar magnitude.

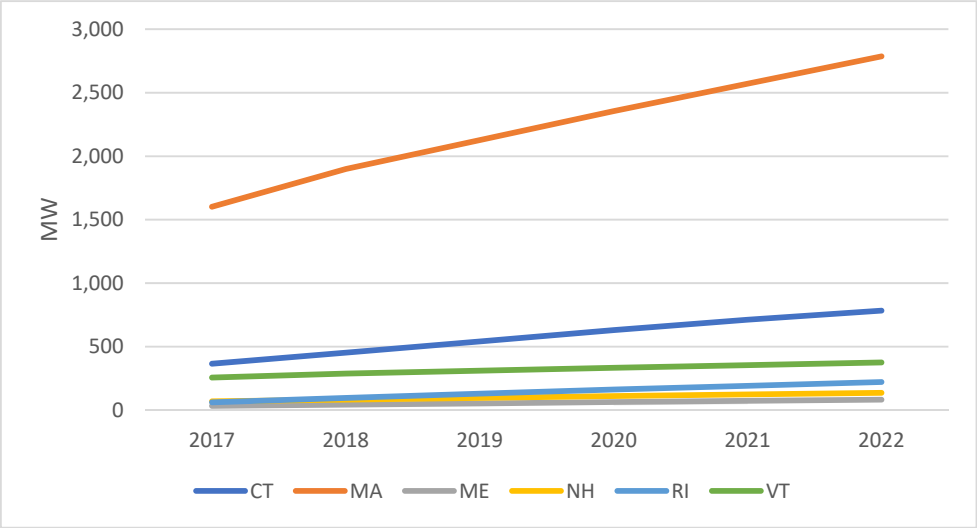
One of the largest solar projects in the state is the 2 MW facility located in Moultonborough, NH owned by the NH Electric Coop. Figure 6 shows the NHEC solar project. In 2017, the New Hampshire Electric Cooperative (NHEC) constructed what is believed to be the largest solar project in NH at that time. The 2 MW ground-mounted photovoltaic system consists of 8,000 panels.[12] The total project cost was stated to be $5 million dollars and was financed by New Clean Energy Renewable Bonds (NCREBs) made available by the U.S. Treasury Department for public sector renewable energy projects.

Other noteworthy installations include the 1 MW rooftop solar array installed at Worthen Industries, the 0.9 MW ground mounted solar array at the Peterborough Wastewater Treatment Plant (Figure 7), and the 0.5 MW rooftop installation at Boston-Manchester Regional Airport. There have also been numerous installations at municipal facilities throughout NH above the 0.1 MW range.[13] In addition, to the Chinook Solar Project, other recently

[12] NHEC Breaks Ground on States Largest Solar Array, New Hampshire Electric Co-op. Available on-line at https://www.nhec.com/nhec-breaks-ground-states-largest-solar-array/

[13] NH Energy Dashboard (V.1.2), Clean Energy NH. Available on-line at https://www.nhenergy.org/nh-energy-dashboard.html

Figure 5: ISO New England 2018 solar capacity forecast.



Source: Distributed Generation Forecast Working Group of ISO New England

proposed utility-scale solar projects include a 5 MW facility in Concord[14] and a 20 MW facility in the Town of Milford.[15] NextEra Energy is also currently developing a 10 MW project in Concord, NH.

Table 9: Examples of large solar projects in NH by capacity as of March 2019.

Name	Date Installed	Town	County	Capacity (MW)	Type	Panel Footprint (acres)
NHEC	2017	Moultonborough	Carroll	2	Ground Mounted	10.5
Worthen Industries	2017	Nashua	Hillsborough	1	Rooftop	1.87
Peterborough Wastewater Treatment Plant	2015	Peterborough	Hillsborough	0.944	Ground Mounted	3.8
Boston-Manchester Airport	2012	Manchester	Hillsborough	0.525	Rooftop	2.15

[14]Solar Wolf Energy to Install 5MW Solar Farm in NH, PR Newswire, Jan 15, 2019. Available on-line at https://www.prnewswire.com/news-releases/solar-wolf-energy-to-install-5mw-solar-farm-in-nh-300777706.html

[15]Milford Eyeing Plans for 120-Acre Solar Farm, NHPR, Dec. 7, 2018. Avaliable on-line at https://www.nhpr.org/post/milford-eyeing-plans-120-acre-solar-farm#stream/0

Figure 6: 2 MW NHEC Solar Project in Moultonborough, NH.

Figure 7: 0.9 MW Solar Project in Peterborough, NH.

4. Macroeconomic Impact Analysis

Utility-scale solar development provides the opportunity for economic benefits and job opportunities from the associated manufacturing, studies, permitting, sales and distribution of materials, construction, and on-going operation and maintenance activities. The economic benefits of solar for local communities include the creation of local jobs, increased tax revenues, and generation of land and lease income for land owners. It is important to note that in this analysis it is assumed that none of the components needed to construct the Project are manufactured in NH. It is not believed to be likely that any key components are manufactured in NH and the Project sponsors have not provided any information to indicate any manufacturing will take place in NH. Therefore, as discussed below, the majority of employment benefit comes from anticipated in-state construction jobs required to build the Project.

4.1. Economic Impact Analysis

The technique used to estimate the economic activity in this study is called economic impact analysis. Economic impact analysis describes how spending from a particular project, event, or industry flows through a study area (e.g. a county, group of counties, state, or group of states) and it can be useful in estimating how an economic change—such as the loss of an existing industry or the addition of a new industry—would be expected to affect the wider local or regional economy in the study area.

Economic impact analysis begins with evaluating the change in gross output or expenditures of businesses that are "directly impacted" by the change of interest. Increased expenditures by these businesses (referred to as **direct** expenditures) trigger a series of additional spending flows throughout other sectors of the local economy as businesses spend on 1) payroll and benefits, and 2) supplies, equipment, and service contracts with local vendors (referred to as **indirect** expenditures). The purchase of goods and services from local vendors supports the hiring of workers at those firms and also provides funds to enable those firms to purchase additional goods and services from suppliers situated further down the supply chain.

The activity at companies involved in direct or indirect expenditures results in their employees earning salaries and wages. A portion of their wages will be spent on local goods and services at different industries including: health care, retail, and leisure (referred to as household spending or **induced expenditures**). This round of spending by employees helps support workers in those industries who then will spend portions of their incomes locally which, in turn, triggers another round of spending.

This entire chain of spending is referred to as the "ripple" or "multiplier" effect. The rounds of spending and re-spending do not continue indefinitely but typically diminish rapidly. The impacts of the initial economic activity rapidly leave or "leak" out of the local economy through the imports of goods and services produced in other regions, savings, spending in areas outside the local economy, and taxes.

Effects evaluated in economic impact analysis:

- **Direct effects**:
  - The direct activity of the economic change.
  - Typically defined in terms of output or employment.
- **Indirect effects**:
  - The impacts of firms that supply the activity defined in the direct effect.

  - Also called a Type I multiplier.

- **Induced effects**:
  - The impacts of spending by households receiving income based on both the direct and indirect effects.
  - Also called a Type II multiplier.

4.2. Methodology and Assumptions

The Project is evaluated in three phases: development, construction and on-going operations (post-construction). All dollar values in the impact analysis are stated in 2019 dollars. In this economic analysis, the following analytical tools are used: 1) the IMPLAN model[16], and 2) spreadsheet modeling. The IMPLAN model is a system of software and databases produced by the IMPLAN Group, LLC that is widely used and accepted for regional input-output economic modeling.[17] The IMPLAN model is described in greater detail in section 4.2.1. The direct, indirect, and induced economic and employment multipliers are specific to the State of New Hampshire under study and utilize 2017 year data available through IMPLAN. Additional spreadsheet modeling relies on information provided by Chinook Solar, data from the IMPLAN model, and employment data available through the U.S. Bureau of Labor Statistics.

The term "supported" is used in reference to jobs associated with the Project. This is because the Project may result in additional hiring that otherwise would not have occurred or it may support the continued employment of those already employed. The economic model estimates an amount of work needed to support the associated Project activity and the extent that the work generated "ripples" through the economy via associated spending and increased job activity.

The overall approach is a list of NH-based line item expenses are provided by Chinook Solar for the three phases. Each budget line item is assigned a NAICS code if appropriate and mapped to IMPLAN inputs.[18] Line items are categorized to IMPLAN types, primarily to either industry output to a sector or labor income. Labor income line items consider only the calculation of the induced effects and not indirect effects for industries where all materials are expected to be sourced external to the region. Direct jobs for expenses classified as labor income are calculated by dividing the expected expense by the IMPLAN labor income per worker for the appropriate industry sector.

IMPLAN impact estimates for the development,construction and post-construction period were only at the state-level, not the town or county level. The IMPLAN model generates estimates for all jobs including part-time. The full-time-equivalent (FTE) for direct, indirect, and induced employment is calculated by adjusting the model output utilizing the conversion procedure provided by IMPLAN.[19]

Development Phase

The development phase is defined as the period of time when planning and development for the Project occurs but before active construction of the Project commences. Economic activity for this time period was modeled using a budget for NH-based costs provided by Chinook Solar. This budget included expenditures in the areas of legal

[16] IMPLAN. Available on-line at https://www.implan.com/

[17] Understanding IMPLAN: The Application and Data. Available on-line at https://blog.implan.com/understanding-implan-application-and-data

[18] 536 Sector Industries, Conversions, Bridges, & Construction - 2013-2017 Data. Available on-line at https://implanhelp.zendesk.com/hc/en-us/articles/115002997573-536-Sector-Industries-Conversions-Bridges-Construction-2013-2017-Data

[19] https://implanhelp.zendesk.com/hc/en-us/articles/115002782053-IMPLAN-to-FTE-Income-Conversions

services, civil engineering and state-related expenses including permitting. The budget includes expenditures that have already occurred as of the date of this report and expenditures that are expected to occur.

The budgeted areas are mapped to inputs to the IMPLAN model. The type and specification of inputs for modeling development economic activity are provided in table 10. Dollar amounts for the model inputs are not included for confidentiality reasons.

Table 10: Implan input specifications for NH-based development expenses.

Budget Area	IMPLAN Type	IMPLAN Specification
Legal	Industry Output	447 - Legal Services
Civil eng.	Industry Output	449 - Architectural, engineering, and related services
State	2017 Institutional Spending Pattern	12001 - State/Local Govt NonEducation

Construction Phase

The construction phase is defined as the period of time when active construction of the Project commences up until and including the commissioning of the Project. Chinook Solar provided a budget for NH-based costs expected to occur during the construction phase. This period of time is estimated to be approximately 1 year. The type and specification of inputs for modeling construction economic activity are provided in table 11. Dollar amounts for the model inputs are not included for confidentiality reasons.

Table 11: Implan input specifications for NH-based construction expenses.

Budget Area	IMPLAN Type	IMPLAN Specification
Electrical	Labor Income	58 - Construction of other new non-residential structures
Civil	Industry Output	56 - Construction of new highways and streets
Fencing	Industry Output	58 - Construction of other new non-residential structures
Racking	Labor Income	58 - Construction of other new non-residential structures
Seeding	Industry Output	469 - Landscape and horticulture
Staking/Flagging	Industry Output	449 - Architectural, engineering, and related services
Timbering	Industry Output	16 - Commercial logging
Traveler lodging	Industry Output	499 - Hotels and motels, including casino hotels
Traveler meals	Industry Output	501 - Full-service restaurants
Traveler incidentals	Industry Output	405 - Retail - General merchandise stores

Chinook Solar does not expect that significant components of the facility equipment—e.g. mounting hardware, modules, electrical, and inverter—would be manufactured or purchased locally. Therefore, the IMPLAN modeling did not include any economic activity for these areas.

NEE provided an estimate of the number of travelling workers for an 8-month period during the construction phase. GSA per diem reimbursement rates are believed to be a reasonable proxy for estimating lodging ($96 per day per worker), meal ($50 per day per worker), and incidental expenses ($18 per day per worker) paid by those workers within NH. It was assumed by Seacoast Economics that all lodging expenditures were at NAICS 721110 Hotels (except Casino Hotels) and Motels, all meals expenditures were at NAICS 722511 Full-Service Restaurants, and all incidental expenditures were at NAICS 452 General Merchandise Stores.

Post-construction Phase

The post-construction phase is defined as the period of time after the construction of the Project. Chinook Solar provided a budget for NH-based costs expected to occur during the post-construction phase. The budget is an annual

estimate. Chinook Solar also provided estimates of taxes, and land lease payments for the on-going operations phases. To calculate the on-going economic impact, the IMPLAN model is run using an estimated net annual PILOT payment of $300,000 (based on the analysis discussed in section 4.4), state taxes of $160,000, and land lease payments of $30,000. The type and specification of inputs for modeling post-construction economic activity are provided in table 12. Dollar amounts for the budget-based inputs are not included for confidentiality reasons.

Table 12: Implan input specifications for NH-based post-construction expenses.

Budget Area	IMPLAN Type	IMPLAN Specification
Solar	Labor Income	44 - Electric power generation - Solar
Contractor	Industry Output	58 - Construction of other new non-residential structures
Utilities	Industry Output	48 - Electric power generation - All other
Pilot (no new spend)-	Household Income	10005 - Households 50-70k
Pilot (new spend)-	2017 Institutional Spending Pattern	12001 - State/Local Govt NonEducation
Land lease	Household Income	10005 - Households 50-70k
Taxes	2017 Institutional Spending Pattern	12001 - State/Local Govt NonEducation
Admin lodging	Industry Output	499 - Hotels and motels, including casino hotels
Admin meals	Industry Output	501 - Full-service restaurants
Admin incidentals	Industry Output	405 - Retail - General merchandise stores

- the PILOT was applied to different IMPLAN specifications for each of the two scenarios, all other factors were the same.

Two scenarios were developed. In the first scenario (no new spending), it assumes that the Town of Fitzwilliam does not increase spending by the amount of the PILOT payment. Under this scenario, property taxes would be assumed to decrease by the amount of the PILOT payment which was modeled as an increase in household income. In the second scenario (new spending), it assumes that the Town of Fitzwilliam does increase spending by the amount of the PILOT payment. Under this scenario, the payment was modeled as an increase in revenue to the Fitzwilliam.For both scenarios, the IMPLAN model was used to calculate direct, indirect, and induced employment, earnings, and economic value added.

Labor Market Pool

Separately the potential for Cheshire County to supply construction labor required for the Project was assessed. Table 13 lists industries directly identified as being utilized in PV construction, based on the North American Industry Classification System (NAICS). NAICS is a system of classifying industries and is used in the U.S. for collecting business activity statistics.[20] This list of industries was used to determine location quotients for the different types of direct construction employment expected to be seen in the Project. Location quotients can indicate the potential of the local workforce (Cheshire County) to work on the Project. Location quotients— described in Section 4.2.2—were calculated to identify industries that might be considered to exhibit "strength" in the local region.

Table 13: Industries associated with PV construction for assessing labor markets.

NAICS	Category Description
23713	Power and Communication Line and Related Structures Construction
23731	Highway, Street, and Bridge Construction
23821	Electrical Contractors and Other Wiring Installation Contractors
23891	Site Preparation Contractors

[20]Introduction to NAICS, United States Census Bureau. Available on-line at https://www.census.gov/eos/www/naics/

4.2.1 IMPLAN

IMPLAN[21] is a system of software and databases produced by the IMPLAN Group, LLC. that is widely used and accepted for local and regional economic modelling.[22] [23] IMPLAN was originally developed in 1976 by the US Forest Service, the Federal Emergency Management Agency, and the Bureau of Land Management to allow for analysis of private and public sector decisions on local, state and regional economic impacts. IMPLAN Group, LLC was formed to privatize the development and maintenance of IMPLAN data and software.

IMPLAN compiles and aggregates national and regional economic and demographic data to calculate inter-industry linkages and the relationships between changes in demand for goods and services, and the associated economic activity at the local, state and regional levels. IMPLAN utilizes input-output (I-O) accounts to model how the more than 500 industries that comprise the U.S. economy interact. Input-output (I-O) analysis quantifies the relationships of how industries provide input to and use output from each other. IMPLAN data and accounts follow the accounting conventions used by the U.S. Bureau of Economic Analysis (BEA) when developing an Input-Output (I-O) model of the U.S. economy as well as formats recommended by the United Nations.

The IMPLAN program uses an ordered series of steps to build the model starting with selection of a study-area. The study-area can be at the county level (including multiple counties), the state level (including multiple states), and the national level. The IMPLAN model allows substitution of data at each stage of the process which can serve to increase the robustness of the model. The model can also have its import and export functions modified and industry groupings changed. IMPLAN also allows for the creation of aggregate models consisting of industries grouped together to streamline the modeling process.

The creation of the study-area database constructs a descriptive and prescriptive model. The descriptive model describes the transfer of money between industries and institutions. This model provides data tables on regional economic accounts that capture local economic interactions. These tables describe the local economy in terms of the flow of dollars from purchasers to producers within the study-area region. The descriptive model also produces trade flows involving the movement of goods and services within a study-area and the outside world (regional imports and exports).

The prescriptive model is a set of input-output multipliers that estimate total regional activity based on a change entered into the IMPLAN model. Multiplier analysis is used to estimate the regional economic impacts resulting from a change in final demand. New industries or commodities can be introduced to the local economy, industries or commodities may be removed, and reports can be generated to show the consequences (on output, employment, and value-added) of various impacts. Impacts include: output, labor income, value added, and employment. Impacts can be in terms of direct and indirect effects (commonly known as Type I multipliers), or in terms of direct, indirect, and induced effects.

IMPLAN is a regional economic analysis software application that is designed to estimate the impact or ripple effect (specifically backward linkages) of a given economic activity within a specific geographic area through the implementation of its Input-Output model. IMPLAN provides the estimated Indirect and Induced Effects of the given economic activity as defined by the users inputs. Some Direct Effects may be estimated by IMPLAN when such information is not specified by the user. By design, the following key limitations apply to Input-Output Models such as IMPLAN and should be considered by analysts using the tool:

[21] IMPLAN. Available on-line at https://implan.com

[22] Using Implan to Assess Local Economic Impacts. University of Floarida IFAS Extension. Available on-line at https://edis.ifas.ufl.edu/fe168

[23] A comparison of three economic impact modles for applied hospitality and tourism research. Tourism Economics. December 2018

Feasibility: The assumption that there are no supply constraints and there is fixed input structure means that even if input resources required are scarce, IMPLAN will assume it will still only require the same portion of production value to acquire that input, unless otherwise specified by the user. The assumption of no supply constraints also applies to human resources, so there is assumed to be no constraint on the talent pool from which a business or organization can draw. Analysts should evaluate the logistical feasibility of a business outside of IMPLAN. Similarly, IMPLAN cannot determine whether a given business venture being analyzed will be financially successful.

Backward-linked and Static model: I-O models do not account for forward linkages, nor do I-O models account for offsetting effects such as cannibalization of other existing businesses, diverting funds used for a project from other potential or existing projects, etc. Like the model, prices are also static: Price changes cannot be modeled in IMPLAN directly; instead, the final demand effects of a price change must be estimated by the analyst before modeling them in IMPLAN to estimate the additional economic impacts of such changes.

Table 14: IMPLAN summary measures of regional economic activity.

Measure	Description
Output	The value of production by industry in a calendar year. Output is measured by sales or receipts and other operating income plus the change in inventory. For retailers and wholesalers output is equal to gross margin not gross sales.
Labor Income	All forms of employment income, including employee compensation (wages and benefits) and proprietor income.
Value Added	The difference between total output and the cost of intermediate inputs. It is a measure of the contribution to Gross Domestic Product (GDP) and equals output minus intermediate inputs. Value added consists of compensation of employees, taxes on production and imports less subsidies, and gross operating surplus.
Employment	The annual average of monthly jobs in an industry and includes both full-time and part-time workers.

Table 15: Examples of underlying data sources for the IMPLAN model.

Source	Data
U.S. Bureau of Labor Statistics (BLS)	Census of Wages and Employment (CEW) County Business Patterns
U.S. Department of Census	Annual Survey of Manufacturers (ASM) Construction Spending (Value Put in Place)
Bureau of Economic Analysis (BEA)	Regional Economic Information System (REIS) National Income and Product Accounts (NIPA) Gross State Product (GSP) series Output series

Labor Income

Labor Income is the sum of Employee Compensation (wages and benefits) and Proprietor Income.[24] [25] Labor Income represents the total value of all forms of employment income paid throughout a defined economy during a specified period of time. It reflects the combined cost of total payroll paid to employees (e.g. wages and salaries, benefits, payroll taxes) and payments received by self-employed individuals and/or unincorporated business owners (e.g. capital consumption allowance) across the defined economy. Employee Compensation in IMPLAN is the total payroll cost of wage and salary employees to the employer. This includes wages and salaries, all benefits (e.g., health, retirement) and payroll taxes (both sides of social security, unemployment insurance taxes, etc.). Also referred to as fully-loaded payroll.

4.2.2 Location Quotients

A location quotient (LQ) is an economic statistic that measures a region's specialization for a given economic measure (e.g. gross product or employment) relative to a larger geographic area (usually the overall nation). One of the most frequent applications of a LQ is the ratio of an industry's share of a region's employment—region could be a town, county, counties, state, states, etc.— relative to its share of total national employment.

$$LQ = \frac{\frac{e_i}{e}}{\frac{E_i}{E}} \tag{1}$$

$e_i = Industry\ regional\ employment$
$e = Total\ regional\ employment$
$E_i = Industry\ national\ employment$
$E = Total\ national\ employment$

For example, a LQ of 1.0 in an industry—such as wholesale merchants—indicates that the region and typically the nation (as the larger geographic area) are equally specialized in wholesale merchant activity; while a LQ above 1.0 indicates that the region exhibits a "strength" in wholesale merchant activity evidenced by its higher concentration than the nation . Conversely, a LQ below 1.0 indicates that the region exhibits a "weakness" in wholesale merchant activity evidenced by its lower concentration than the overall nation.[26]

LQs can help reveal what makes a particular region "unique" by highlighting the industries that differ from the overall nation. LQs can also be used to identify the *export orientation* of an industry. A value above 1.0 would indicate that the industry is export oriented as it would be believed to be supplying more than the local needs of the region's economy. Conversely, a value below 1.0 would indicate that the industry is not export oriented. Exports can be a source of economic growth for an economy.

[24] Employee Compensation. IMPLAN Group. Available on-line at https://implanhelp.zendesk.com/hc/en-us/articles/115009666268-Employee-Compensation

[25] Understanding Labor Income (LI), Employee Compensation (EC), and Proprietor Income (PI). IMPLAN Group. Available on-line at https://implanhelp.zendesk.com/hc/en-us/articles/360024509374-Understanding-Labor-Income-LI-Employee-Compensation-EC-and-Proprietor-Income-PI-

[26] What are location quotients (LQs)?, U.S. Department of Commerce. Available on-line at http://www.bea.gov/

4.3. NH Economic Impact Analysis

The Project is expected to support $19.5 million in increased economic value to NH over the next twenty years or $0.65 million per MWac during that time period. The construction phase of the Project is the time period when there will be the greatest economic activity and benefits for the NH economy. The total impact on the NH economy during the construction phase is expected to be approximately 95 FTE jobs receiving $6.2 million in earnings and $8.0 million in added economic value.

During the development phase of the Project, the contribution to the NH economy is expected to be 10.6 FTE jobs receiving $0.8 million in earnings and $1.1 million in value added. Professional services and state government are expected to be areas that directly benefit during the development phase. Tables 16 and 17 highlight the expected employment and economic impacts that occur in NH during this time period.

Table 16: Change in economic activity in NH during the development phase of the Project.

Impacts	FTE Employment	Earnings (Millions)	Economic Value Added (Millions)
Direct	6.1	$0.5	$0.7
Indirect	1.7	$0.1	$0.2
Induced	2.9	$0.2	$0.3
Total	**10.6**	**$0.8**	**$1.1**

Table 17: Top 15 Industries by by FTE job impact during the development phase of the Project.

Rank	IMPLAN Industry	Direct	Indirect	Induced	Total
1	447 - Legal services	2.1	0.0	0.0	2.2
2	449 - Architectural, engineering, and related services	1.7	0.1	0.0	1.8
3	533 - * Employment and payroll of local govt, non-education	1.2	0.0	0.0	1.2
4	531 - * Employment and payroll of state govt, non-education	0.6	0.0	0.0	0.6
5	440 - Real estate	0.0	0.2	0.2	0.4
6	501 - Full-service restaurants	0.0	0.1	0.1	0.2
7	464 - Employment services	0.0	0.2	0.0	0.2
8	502 - Limited-service restaurants	0.0	0.0	0.1	0.2
9	482 - Hospitals	0.0	0.0	0.2	0.2
10	454 - Management consulting services	0.0	0.1	0.0	0.2
11	395 - Wholesale trade	0.0	0.0	0.1	0.1
12	400 - Retail - Food and beverage stores	0.0	0.0	0.1	0.1
13	503 - All other food and drinking places	0.0	0.0	0.1	0.1
14	405 - Retail - General merchandise stores	0.0	0.0	0.1	0.1
15	468 - Services to buildings	0.0	0.0	0.0	0.1

During the construction phase, the Project is expected to directly support 59.6 FTE NH construction jobs. Table 18 highlights the economic activity expected to occur during the construction phase of the Project. In addition, to the direct construction employment benefits, the Project is expected to support approximately 6.6 indirect and 22 induced NH-based jobs during the construction. These jobs magnify the employment impact of the Project. Examples of industries with indirect jobs predicted by the model included: wholesale trade, architectural and engineering services, and real estate. Examples of industries with induced jobs predicted by the model included general merchandise stores,

grocery stores, hospitals, and restaurants. Table 19 lists the top 15 industries in terms of employment predicted by the IMPLAN model during the construction phase.

Table 18: Change in economic activity in NH during the construction phase of the Project.

Impacts	FTE Employment	Earnings (Millions)	Economic Value Added (Millions)
Direct	66.1	$4.4	$5.1
Indirect	6.6	$0.5	$0.7
Induced	22.0	$1.3	$2.2
Total	**94.8**	**$6.2**	**$8.0**

Table 19: Top 15 Industries by by FTE job impact during the construction phase of the Project.

Rank	IMPLAN Industry	Direct	Indirect	Induced	Total
1	58 - Construction of other new nonresidential structures	40.6	0.0	0.0	40.6
2	56 - Construction of new highways and streets	11.7	0.0	0.0	11.7
3	16 - Commercial logging	7.3	0.0	0.0	7.3
4	501 - Full-service restaurants	2.7	0.1	1.0	3.9
5	499 - Hotels and motels, including casino hotels	2.3	0.0	0.0	2.3
6	440 - Real estate	0.0	0.3	1.2	1.5
7	395 - Wholesale trade	0.0	0.8	0.7	1.5
8	482 - Hospitals	0.0	0.0	1.3	1.3
9	469 - Landscape and horticultural services	0.8	0.1	0.2	1.0
10	502 - Limited-service restaurants	0.0	0.0	0.8	0.9
11	449 - Architectural, engineering, and related services	0.5	0.4	0.1	1.0
12	400 - Retail - Food and beverage stores	0.0	0.0	0.8	0.8
13	405 - Retail - General merchandise stores	0.1	0.0	0.7	0.8
14	475 - Offices of physicians	0.0	0.0	0.7	0.7
15	503 - All other food and drinking places	0.0	0.1	0.4	0.5

In the on-going operating phase (post construction), the economic and jobs impact of the Project are diminished but still positive. The Project is expected to contribute between $0.6 to $0.7 million in value annually to NH. The Project is expected to support an estimated 5.7 to 7.1 new FTE jobs.

There is expected to be a slightly lower economic benefit if the Town of Fitzwilliam does not use the PILOT revenue to fund an expansion of services. The benefit expected would be 2.4 direct FTE jobs, 0.0 indirect FTE jobs and 3.3 induced FTE jobs. During this time period the jobs are expected to receive $0.5 million annually in earnings. Table 20 lists the annual economic activity expected under the no new spending scenario after the Project is put into service.

There is expected to be slightly higher economic benefit if the Town of Fitzwilliam chooses to use the PILOT revenue to fund an expansion of services. The benefit expected would be 4.8 direct FTE jobs, 0.2 indirect FTE jobs and 2.2 induced FTE jobs. During this time period the jobs are expected to receive $0.6 million annually in earnings. Table 21 lists the annual economic activity expected under the new spending scenario after the Project is put into service.

Under either scenario, one of the primary areas for direct job creation for the on-going phase would be increases in state and local government. This is due to the increased tax-related revenue from the Project with 0.9 FTE jobs under the no new spending scenario and 2.7 FTE jobs under the new spending scenario. Tables 22 and 23 highlight the top 15 industries by job impact under each scenario.

Table 20: Change in annual economic activity in NH after the construction of the Project under the no new spending by the Town of Fitzwilliam scenario.

Impacts	FTE Employment	Earnings (Millions)	Economic Output (Millions)
Direct	2.4	$0.3	$0.3
Indirect	0.0	$0.0	$0.0
Induced	3.3	$0.2	$0.3
Total	**5.7**	**$0.5**	**$0.6**

Table 21: Change in annual economic activity in NH after the construction of the Project under the new spending by the Town of Fitzwilliam scenario.

Impacts	FTE Employment	Earnings (Millions)	Economic Output (Millions)
Direct	4.8	$0.4	$0.5
Indirect	0.2	$0.0	$0.0
Induced	2.2	$0.1	$0.2
Total	**7.1**	**$0.6**	**$0.7**

Table 22: Top 15 Industries by FTE job impact after the construction phase of the project under the no new spending scenario.

Rank	IMPLAN Industry	Direct	Indirect	Induced	Total
1	44 - Electric power generation - Solar	0.9	0.0	0.0	0.9
2	533 - Employment and payroll of local govt, non-education	0.6	0.0	0.0	0.6
3	531 - Employment and payroll of state govt, non-education	0.3	0.0	0.0	0.3
4	58 - Construction of other new nonresidential structures	0.3	0.0	0.0	0.3
5	440 - Real estate	0.0	0.0	0.2	0.2
6	482 - Hospitals	0.0	0.0	0.2	0.2
7	501 - Full-service restaurants	0.0	0.0	0.2	0.2
8	502 - Limited-service restaurants	0.0	0.0	0.1	0.1
9	400 - Retail - Food and beverage stores	0.0	0.0	0.1	0.1
10	395 - Wholesale trade	0.0	0.0	0.1	0.1
11	405 - Retail - General merchandise stores	0.0	0.0	0.1	0.1
12	475 - Offices of physicians	0.0	0.0	0.1	0.1
13	503 - All other food and drinking places	0.0	0.0	0.1	0.1
14	407 - Retail - Nonstore retailers	0.0	0.0	0.1	0.1
15	504 - Automotive repair and maintenance, except car washes	0.0	0.0	0.1	0.1

Table 23: Top 15 Industries by FTE job impact after the construction phase of the Project under the new spending scenario.

Rank	IMPLAN Industry	Direct	Indirect	Induced	Total
1	533 - Employment and payroll of local govt, non-education	1.8	0.0	0.0	1.8
2	531 - Employment and payroll of state govt, non-education	0.9	0.0	0.0	0.9
3	44 - Electric power generation - Solar	0.9	0.0	0.0	0.9
4	58 - Construction of other new nonresidential structures	0.3	0.0	0.0	0.3
5	440 - Real estate	0.0	0.0	0.1	0.2
6	501 - Full-service restaurants	0.0	0.0	0.1	0.1
7	502 - Limited-service restaurants	0.0	0.0	0.1	0.1
8	64 - Maintenance and repair construction of highways, streets, bridges, and tunnels	0.1	0.0	0.0	0.1
9	482 - Hospitals	0.0	0.0	0.1	0.1
10	395 - Wholesale trade	0.0	0.0	0.1	0.1
11	400 - Retail - Food and beverage stores	0.0	0.0	0.1	0.1
12	405 - Retail - General merchandise stores	0.0	0.0	0.1	0.1
13	412 - Transit and ground passenger transportation	0.1	0.0	0.0	0.1
14	503 - All other food and drinking places	0.0	0.0	0.0	0.1
15	62 - Maintenance and repair construction of nonresidential structures	0.0	0.0	0.0	0.1

4.4. Fiscal Impact on the Town of Fitzwilliam

As of the date of this report, Chinook Solar, LLC has not yet formalized a Payment In Lieu of Taxes (PILOT) agreement with the Town of Fitzwilliam. However, NextEra Energy has signed a $500,000 PILOT agreement with the Town of Hinsdale, NH for its 50 MW AC Chariot Solar project.[27] In this analysis, the assumption was made that this linearly scales to a $300,000 annual PILOT payment (based on $10,000 per MWac) to the Town of Fitzwilliam. A similar magnitude PILOT payment, even if not exactly $300,000 would not materially change the findings of this analysis.

The scenario analysis demonstrates two possible approaches the Town could undertake in respect to the PILOT payment of either increasing services or reducing property taxes paid by others. Both uses of funds generate a positive economic impact with increased spending have a slightly higher jobs and economic value supported impact (5 jobs vs. 4 jobs, and $0.5 million vs $0.4 million)

Under state law, the NH Department of Revenue Administration utilizes the "PILOT Value" of the solar project for equalization, therefore the Project will make payments under the terms of the PILOT agreement signed with Fitzwilliam and those payments will be dispersed between municipal, county and school tax uses as would any other tax bill. Calculating the change in municipal, county and school tax was beyond the scope of this study.

4.5. Construction Capacity in the Local Region

Employment patterns—based on data collected by the U.S. government—in Cheshire County were reviewed to determine if the local area economy has the skilled labor capacity necessary to participate in the construction of the Project. Four specific industries (based on the NAICS classification system) that have the potential skills are: 1) Power and Communication Line and Related Structure Construction, 2) Highway, Street, and Bridge Construction, 3) Electrical Contractors and Other Wiring Installation Contractors, and 4) Site Preparation Contractors. In 2018, there were approximately 320 individuals employed in approximately 50 firms in Cheshire County that may provide the types of construction services required for the Project.[28]

Due to disclosure rules of the U.S. government (requiring a minimum number of firms to be within a reporting region), there is insufficient information on the two companies involved in power and communication line construction situated in Cheshire County. Given the estimated work demand of 58 NH-based construction jobs relative to the size of the regional solar-related construction labor pool of 320 individuals, it appears that there is potentially an adequate local construction labor force to participate in aspects of the Project.

Location quotients or LQs (discussed further in Section 4.2.2) were calculated to indicate the "strength" of a specific industry in a region. Based on a review of LQs, it appears that Cheshire County has a strength in electrical contractors (LQ of 1.7), but a weakness in site preparation (LQ of 0.6). Any of the firms identified in Cheshire County could competitively bid on the Project, however, based on the LQ analysis, one would expect that electrical contractors in Cheshire County would be more likely to participate in the Project and that site preparation firms from Cheshire County would be less likely to be involved in the Project. NextEra Energy has not provided any additional information to indicate the types of local region firms that are most likely to be involved in the Project.

[27] Selectmen's PUBLIC HEARING Minutes January 30, 2017, Town of Hinsdale. Avaliable on-line at https://www.town.hinsdale.nh.us/vertical/sites/%7B8C942171-06B1-40C3-B454-A57F3BF70DA5%7D/uploads/Minutes-PUBLIC_HEARING-20170130(1).pdf

[28] Calculated by Seacoast Economics from the Bureau of Labor Statistics Quarterly Census of Employment and Wages. Data available at https://www.bls.gov/cew/

Table 24: Potential PV construction labor pool in Cheshire County, NH in 2018.

Industry	Employees	Total Wages (Millions)	Average Annual Wage	Location Quotient
Power & Communication Line	-	-	-	-
Highway, Street, and Bridge Construction	69	$4.2	$60,780	0.9
Electrical & Other Wiring Installation	154	$8.1	$53,158	1.7
Site Preparation	99	$4.6	$47,230	0.6
Cheshire County	26,825	$1,265	$47,158	

Source: U.S. Bureau of Labor Statistics 2018

4.6. Macroeconomic Conclusion

During the construction phase, economic activity associated with the Project will support an estimated $8.0 million in economic value added to the local area economy. The Project is expected to create a total of approximately 95 FTE jobs in NH paying $6.2 million in wages and benefits during the construction phase. Of the 95 jobs supported by the Project, approximately 60 are expected to be direct construction jobs for the Project. The overall economy in NH is expected to benefit by $8 million during this period.

On a recent similar solar project in Vermont, the 20 MW Coolidge project, NEE found that 85 out of a total 130 construction jobs (65%) were locally-based. The direct construction jobs estimate for the Project is of similar magnitude and this information helps support the construction jobs estimate of this analysis.

Long term, on-going benefits will be from local purchases of goods and services by Chinook Solar, land owner lease payments, and tax/tax equivalent payments to local and state government which would result in an annual increase of 6 to 7 FTE jobs and $0.6 to 0.7 million in economic value in NH.

A $300,000 PILOT payment would provide an economic benefit to the Town of Fitzwilliam. These funds would provide flexibility to the town and could be allocated to increase community services or to help offset property taxes.

An analysis of Cheshire County suggests that there is an adequate labor force to participate in the Project and that the region may exhibit a strength in electrical contractors. Electrical contractors may be an area of the local labor force that is more likely to participate in the Project. In addition, highway, street, and bridge construction and site preparation contractors may also be available to meet the work requirements of the Project.

5. Real Estate Economic Impact Analysis

The construction of new electric power infrastructure projects can create concerns among the citizens of hosting and abutting communities about local economic impacts.[29] [30] Citizens in hosting communities of utility-scale solar power projects may have concerns about the potential visual impacts of the project (Carlisle, Solan, Kane, & Joe, 2016; Sullivan & Abplanalp, 2014). Local property owners may be fearful that potential negative impacts from a solar project could cause a reduction in value of their homes.[31] [32]

Residential properties can be thought of as a bundle of characteristics that have value (square footage, number of bedrooms and bathrooms, plot size, condition, etc.). Location and the characteristics of that location also have value. The view from a property is a characteristic that has been shown to have positive value when it is perceived to be pleasant or desirable—such as a view of the ocean or a mountain vista—and negative value when it is perceived to be unpleasant or undesirable—such as a view of a landfill(Anderson, Williamson, & Wohl, 2017; Bond, Seiler, & Seiler, 2002; Des Rosiers, 2002). Therefore, any electric power infrastructure that impacts a property view may factor into the market value of the property.

The possible negative impacts of energy projects on residential property values can be divided into the following four categories:

- **Area** - A general negative perception of an energy project may adversely affect property values in the local community regardless of whether any specific property has a view of or other perceptible impacts from the project.
- **View** - Property values with views of the energy project may be devalued because of the potential visual impact of the view that existed prior to facility installation.
- **Nuisance** - Nuisance refers to perceived operating characteristics of an energy generating resource that may reduce the enjoyment of a nearby property owner. An example of a renewable generating type that has been implicated with nuisance is wind. Property values in close proximity of the turbines could be devalued due to factors, such as turbine noise, and shadow flicker. Shadow flicker occurs when a specific set of conditions (location, wind direction, sun height) combine to cause the turbine blades to cast shadows over a property.[33]
- **Anticipation** - Property values in the local community may decline before, during, and immediately after construction of an energy project due to existing property owners fear that the project will negatively impact the area. This impact would occur before the actual operating characteristics of the project are known.

The "bundled" value of all of the characteristics of a property is expected to be revealed when a buyer and a seller engage in a marketbased transaction for that property. Therefore, the different potential impacts can be tested for objectively by looking at arms-length property transactions, as was the case in this study.

[29] Why The Northern Pass Project Matters, StateImpact. Available on-line at https://stateimpact.npr.org/new-hampshire/tag/northern-pass/

[30] Advantages and Challenges of Wind Energy, Office of Energy Efficiency & Renewable Energy. Available on-line at https://www.energy.gov/eere/wind/advantages-and-challenges-wind-energy

[31] Company says solar farms will not affect property values, The Regiser-Mail. Available on-line at https://www.galesburg.com/news/20180402/company-says-solar-farms-will-not-affect-property-values

[32] Canyon View Estates Residents Continue To Fight Against Solar Farm, KHTS . Available on-line at https://www.hometownstation.com/santa-clarita-latest-news/canyon-view-estates-residents-continue-to-fight-against-solar-farm-video-207723

[33] Update of UK Shadow Flicker Evidence Base, Department of Energy and Climate Change. Available on-line at http://www.decc.gov.uk/assets/decc/what%20we%20do/uk%20energy%20supply/energy%20mix/renewable%20energy/ored/1416-update-uk-shadow-flicker-evidence-base.pdf

Area impact for utility-scale solar can be indicated if there is an overall decline in the real estate market of a community when taken into the context of the behavior of the overall real estate market. If close proximity (nuisance impact) to a solar project is a factor, than one should observe a reduced value for homes close to the project relative to other similar properties located further away from the project. Anticipation impacts would be expected to result in reduced sales prices that occur during the period of time in between when the community becomes aware of a solar project and construction completion of the project.

In this section of the report, several different sources of information will be considered to help answer the questions:

- Is there evidence that utility-scale solar projects have a negative impact on a region's real estate market?
- Based on the findings of this analysis, is it likely that the Project will have a negative impact on the region's economy by disrupting the orderly development of the region's real estate markets?

The approach taken to answer these questions was to: 1) conduct a literature review, 2) examine single family home property transactions in the immediate area surrounding one of the largest existing solar installations in NH, and 3) analyze properties in the Town of Fitzwilliam. The intention is to move from what can be learned more generally about utility-scale solar and then apply that information in a context that is specific to the unique characteristics of NH and its local communities within the Project region.

To support this analysis, property sales and parcel records between January 2016 through March 2019 for communities of interest were obtained from the Warren Group[34], a New England-based firm that collects real estate transaction activity which includes arms-length (warranty deed) single family home transactions .

5.1. Literature Review

There has been limited research on the impacts of utility-scale solar projects on adjacent and nearby property values. The current body of research on renewable energy facilities has primarily been directed towards understanding the general relationship between wind farms and residential real estate values. In this section, studies reviewed on wind, and utility-scale solar will be summarized.

Three overarching research strategies in the literature have been employed to attempt to isolate the impacts of renewable energy facilities on property values: 1) attitudinal surveys, 2) appraisal studies, and 3) statistical studies. Attitudinal studies involve surveying attitudes and perceptions of different stakeholders in regard to infrastructure impacts. Appraisal studies are performed by licensed appraisers and often feature comparison methodologies to attempt to isolate infrastructure impacts on actual property transactions. Statistical studies employ a variety of statistical techniques on a large number of observed property transactions in order to attempt to isolate infrastructure impacts from other factors. These studies focus on "statistical significance"—meaning that the measured outcome is reliable—and employ mathematical techniques such as regression and analysis of variance to try and uncover reliable outcomes.

[34] Real Estate Records Search - New England Database, The Warren Group. Available on-line at https://www.thewarrengroup.com/business/data-solutions/re-records/

5.1.1 Wind Farm Literature

The substantial body of research performed in international, national, and regional studies of utility-scale wind farms using sales transaction analysis based approaches has not found evidence of systematic, widespread changes in property values associated with wind power projects (Hoen & Atkinson-Palombo, 2016; Hoen et al., 2015; Lang, Opaluch, & Sfinarolakis, 2014; Vyn & McCullough, 2014). Attitudinal surveys of homeowners and experts have been mixed as evidenced in some pre and post construction surveys of wind farms. Some surveys have found an expectation by survey respondents that property values will decline as a result of a wind farm. Magnusson (2014) provides additional discussion and analysis of twenty studies investigating the relationship between property values and wind farms. The studies reviewed are believed to be objective as they base their conclusions on statistical analysis of collectively of over 250,000 property transactions. These studies included properties that had clear views of wind turbines and ones that were located in close proximity to wind turbines (under a half mile).

Two studies performed by the Ernest Orlando Lawrence Berkeley National Laboratory have been among the most noteworthy investigations of the topic in the United States in terms of the rigor of the statistical analysis and the volume of property transactions: (1) A Spatial Hedonic Analysis of the Effects of Wind Energy Facilities on Surrounding Property Values in the United States (Hoen et al., 2015), and (2) The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis (Hoen, Wiser, Cappers, Thayer, & Sethi, 2009). Both of these studies reviewed a large number of property transactions near wind power projects. A total of 51,276 and 7,459 transactions respectively including wind projects in Illinois, Iowa, Minnesota, New Jersey, New York, Ohio, Oklahoma, Oregon, Pennsylvania, Texas, Washington, and Wisconsin. Neither study found any consistent relationship between residential property values and commercial wind power projects following the construction of the projects.

Regional studies in New England have similarly confirmed that commercial wind project do not appear to impact residential property values. Three studies— one in Massachusetts (Hoen & Atkinson-Palombo, 2016), one in Rhode Island (Lang et al., 2014); and one that included Vermont (Sterzinger, Beck, & Kostiuk, 2003)—reviewed the relationship between residential property values and commercial wind power projects. The study of residential properties near wind power projects in Massachusetts reviewed 122,198 property transactions; the study in Rhode Island reviewed 48,554 property transactions; and the study in Vermont reviewed 2,788 property transactions. These three New England-based studies of residential property transactions found no relationship between residential property values and commercial wind power projects.

Within New Hampshire, two studies have examined the relationship between residential property values and utility-scale wind power projects. Magnusson (2014) reviewed 2,593 single family home sales (88 post-construction) from January 2005 to November 2011 in communities surrounding the Lempster Wind Power Project. Magnusson (2013) reviewed 382 single family home sales (132 post-construction) from January 2008 to July 2013 in communities surrounding both the Lempster Wind Power Project and the Groton Wind Farm. Both of these studies concluded that there was no relationship between residential property values and the presence of these commercial wind power projects.

5.1.2 Utility-Scale Solar Literature

To date, there has been limited research on the impact of utility-scale solar and its impact on real estate values. Table 25 lists the studies of utility-scale solar that were reviewed. Out of the studies identified, three were attitudinal-based and two were appraisal-based. There were no large-scale statistically-based studies identified when conducting the literature search for this study.

Table 25: Utility-scale solar studies reviewed.

Study	Year	Type	Description	Finding
Idaho National Laboratory	2013	Attitudinal	Phone survey of southern California (n=695)	43% of respondents expect there to be a negative impact on property values
Carlisle et al.	2015	Attitudinal	Phone survey: National (n=619) and Southwest U.S. (n=405)	70% of respondents expect there to be a negative impact on property values
Kirkland	2018	Appraisal	Matched pair of residential properties in North Carolina (n=22)	No impact
Al-Hamoodah et al.	2018	Attitudinal	Survey of residential property assessors (n = 37)	Mixed from negative to no to positive; if impacts within 100 feet
McGarr & Lines	2018	Appraisal	Paired sales of rural and suburban residential properties in Indiana and Illinois (n=87)	No impact

Attitudinal Studies

Three attitudinal studies were identified. As discussed in Section 5.1, attitudinal studies are based on surveys of opinions and not actual observations of real estate transactions. Idaho National Laboratory (2013) and Carlisle, Kane, Solan, Bowman, and Joe (2015) examined the perception of the general public on the impact of utility-scale solar projects on residential real estate values. Al-Hamoodah et al. (2018) surveyed residential property assessors on their opinion of the impact of utility-scale solar on residential property values.

Carlisle et al. (2015) surveyed a total of 1,024 respondents nationally—with 405 of those respondents residing in the southwestern states of Arizona, California, New Mexico, Nevada and Utah—to understand acceptance of utility-scale solar projects by the public. Out of the total responses 40% strongly believed and 30% somewhat believed (total of 70%) that utility scale solar would decrease property value if there was a view of the facility from the property. Idaho National Laboratory (2013) surveyed residents in southern California in 2013 and found that 23% expected a slight decrease in property value and 19% expect a large decrease in property value if a property had a view of a large-scale solar facility for a total of 43% expecting some degree of decrease in property value. Both of these studies indicate that a significant proportion of the U.S. population may believe that utility-scale solar projects will have some impact on the value of real estate.

Al-Hamoodah et al. (2018) analyzed a national survey of residential property assessors—400 were contacted with 37 total responses—to gain insight into assessor's perception of the impact of utility-scale solar on residential property values. The survey had New England representation, 5 respondents were from Connecticut, Massachusetts, and Vermont representing 14% of the total responses. The assessors were asked to estimate the property value impacts for a hypothetical 1.5 MW, 20 MW, and 102 MW solar project. The responses were mixed ranging from a negative impact to no impact to a positive impact as a result of proximity and size of the solar project.

For a 20 MW facility—a similar magnitude to the Chinook Solar Project at 30 MW—the average expected real estate value decrease if the home is within 100 feet is -10% and the median was 0%. Forty-four percent of assessors expected a negative impact at 100 feet while 56% did not expect a negative impact. At 1 mile, only one assessor

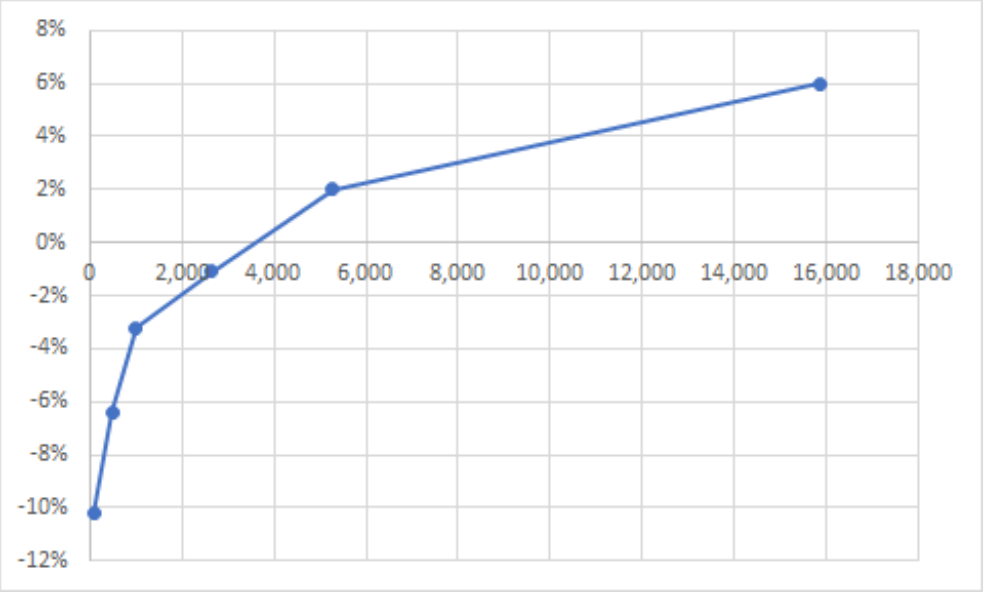
expected negative impact and at 3 miles, none of the assessors expected any negative impact (Table 26).

Table 26: Aggregate assessor expected change in residential property value due to proximity of a hypothetical 20 MW utility-scale solar facility as a function of distance in feet.

Size	Mean	Median	Min	Max
100 feet	-10%	0%	-30%	5%
500 feet	-6%	0%	-20%	5%
1000 feet	-3%	0%	-15%	1%
0.5 mile	-1%	0%	-10%	1%
1 mile	2%	0%	-5%	6%
3 miles	6%	0%	0%	8%

Source: Al-Hamoodah et al. (2018)

Figure 8: Average assessor expected change in residential property value due to proximity of a hypothetical 20 MW utility-scale solar facility.



Source: Al-Hamoodah et al. (2018)

Overall, survey responses were more likely to be negative if the assessor had not previously assessed a home near a utility-scale solar facility. The majority of assessors with experience assessing homes near solar installations did not adjust property values due to the presence of utility-scale solar. On average, respondents that have assessed near solar installations (n = 10) estimated that home value would decline on average by 3% and those who have not (n =6) estimate a 19% decrease when within 100 feet of a 20MW installation. The responses of these two groups converge at a half mile.

Respondents were asked to indicate if they have adjusted a homes value due to proximity to a solar installation. Only one respondent out of 18 that had assessed homes near solar facilities, indicated they had made an adjustment based on proximity to a utility-scale solar installation. This respondent estimated a negative impact of 10%, 15%, and 25% for homes within 100 feet of a 1.5MW, 20MW and 102MW installation, respectively.

Appraisal Studies

Two studies were identified that had used appraisers and matched-pair analysis to examine the impacts of utility-scale solar on residential property values: Kirkland (2018), and McGarr and Lines (2018).

Kirkland (2018) conducted a matched-pair analysis of 22 residential properties that were sold in 2013 and 2014 in the immediate area of the 6.7 MW AM Best Solar Farm in Goldsboro, North Carolina. Figure 9 shows a satellite image taken of the Best Solar Farm project. The footprint of the project is approximately 30 acres and the properties evaluated were in the Spring Garden subdivision located to the west of the project. Homes adjoining the solar project included ones that were approximately 280 feet from the closest point on the home to the closest point on a solar panel in the project. The 2010 census listed the population of the City of Goldsboro at 36,000 with a population density of 1,575 per square mile and a median family income of $59,844.

The median sales price for a property adjoining the solar project was $253,000 and the median sales price for a property nearby to the solar project was $249,000 (2% lower). The stated conclusion was that "there has been no impact on sale price for residential, agricultural, or vacant residential land that adjoins the existing solar farms". Kirkland also noted that in conducting the study, a number of owners who adjoin the solar project were contacted and that none of those contacted expressed concern about the solar project.

Figure 9: AM Best Solar Farm in Goldsboro, NC.

Source: Google Earth

McGarr and Lines (2018) studied the value of a total of 87 residential properties with 17 adjoining properties and 70 comparable sales that adjoin 6 solar projects in Illinois and Indiana. The projects range in size from 1 to 20 MW and are located in rural and suburban regions. Table 27 provides summary statistics of the projects included in their analysis. The properties evaluated included a home within 145 feet of a solar project's panels. The study concluded that "since the Adjoining Property Sales (Test Area Sales) for the existing solar farms analyzed were not adversely affected by their proximity to solar projects, that the properties surrounding other solar farms operating in compliance with all regulatory standards will similarly not be adversely affected, in either the short or long term periods". The study included interviews with county assessors and local real estate professionals and did not indicate that any of those interviewed had reported a relationship between the presence of solar farms in their area and a change in property values.

Table 27: Study locations in McGarr and Lines (2018).

Project	Location	Date Completed	MW	Project Footprint (Acres)	Type	Adjoining Sales
Grand Ridge Solar Farm	Lasalle County, Illinois	2012	20	160	Rural	1
Rockford Solar Farm	Winnebago County, Illionois	2012	2.6	182	Agricultural & Industrial	2
Dominion Indy Solar Farm III	Marion County, Illinois	2013	8.6	134	Suburban	8
Portage Solar Farm	Porter County, Indiana	2012	1.5	56	Residential	2
IMPA Frankton Solar Farm	Madison County, Indiana	2014	1	13	Rural	2
Valparaiso Solar Farm	Porter County, Indiana	unknown	unknown	28	Rural	2

5.1.3 Literature Findings

Solar projects are similar to wind farms in that they both are renewable energy infrastructure that can occur in close proximity to residences. However, solar projects do not have the same type of visual impacts and operating characteristics as wind farms. Solar projects have a much lower height profile, and do not have moving parts that can cause nuisance phenomenon such as shadow flicker. Properly functioning solar projects are also not expected to have audible sound production discernible above ambient noise levels outside their permitted areas.[35]

It is therefore reasonable to infer that observations applying to the impacts of wind farms on property values would at most have the same magnitude of expected impact as utility-scale solar projects. Based on the reasoning that solar visual impacts in some visual categories are diminutive compared to those of wind farms it may be reasonable to assume that any impacts would be less. The literature—taken in its entirety—has never established a consistent, wide-spread impact on property values due to wind farms. Based on the logic presented it is believed to be reasonable to assume that solar projects will similarly not have a consistent, wide-spread impact on property values.

Based on the attitudinal surveys reviewed it appears there is a portion of the U.S. population that believes that utility-scale solar negatively impacts residential property values. However, it is important to note, that these are opinions and that consistent negative impacts have not manifested themselves in actual property transactions for similar electrical infrastructure as discussed in section 5.1.1. This position is supported by the fact that two studies of utility-scale solar that have used actual property transactions (appraisal-based) were unable to identify any property value impacts due to presence of utility-scale solar.

While large-scale statistically-based studies have not been conducted for utility-scale solar as they have been for wind, it is not believed that this alters the findings of the literature analysis, as the attitudinal and appraisal-based studies of residential property value impact and utility-scale solar are consistent with that observed in the overall body of research on renewable energy infrastructure and residential property values.

The conclusion drawn is that the existing literature base does not indicate widespread, consistent patterns of impact

[35] Study of Acoustic and EMF Levels from Solar Photovoltaic Projects, Tech Environmental, Inc. Available on-line at https://files.masscec.com/research/StudyAcousticEMFLevelsSolarPhotovoltaicProjects.pdf

on residential property values as a result of the development of utility-scale solar projects operating within compliance of their regulatory standards. It is important to note, that none of the studies considered rule out the possibility that an individual property may experience an impact from any form of electrical infrastructure, including utility-scale solar.

5.2. Sales Analysis of NHEC 2MW Moultonborough Facility

While utility-scale solar projects are relatively new to New England and NH, the 2MW NH Electric Coop solar project ("NHEC Project") in the Town of Moultonborough provides the opportunity to examine the behavior of the residential real estate market in a NH community hosting a large-scale ground mounted solar project. Moultonborough is a town in Carroll County, NH and is in-part bounded by Lake Winnipesaukee. The town has a land area of 74.6 square miles and a population of 4,044 in 2010 for a density of 74.9 people per square mile. Median family income in 2010 was $51,729.

A total of 166 arms-length single family home sales transactions were reviewed to determine whether the NHEC Project had any perceptible impacts on residential property values in the local community (Table 10). Construction on the facility began in June 2017 with completion in the latter part of 2017. This allows for an observation of prices over time from 2016 (pre-construction) through 2017 (in-construction) and all of 2018 up to early 2019 (post-construction).

A six-mile obstructed viewshed was developed by T.J.Boyle using national land cover data for the area around the NHEC Project. The use of national land cover data may overestimate potential views and therefore is considered to be conservative. In August 2019, publicly-accessible areas where the viewshed provided by T.J. Boyle indicated a view is possible were visited by a member of Seacoast Economics. None of the publicly-accessible locations that were visited (Route 171, Castle in the Clouds, Zermott Street, Bald Knob Trail) appeared to have an actual view of the NHEC Project.

Figure 10 shows the obstructed viewshed (for a six mile range) pre-construction, during construction, and post-construction sales in the Town of Moultonborough. The blue markers indicate sales that occurred in 2016 and 2017 and the pink markers indicate sales that occurred in 2018 and 2019.

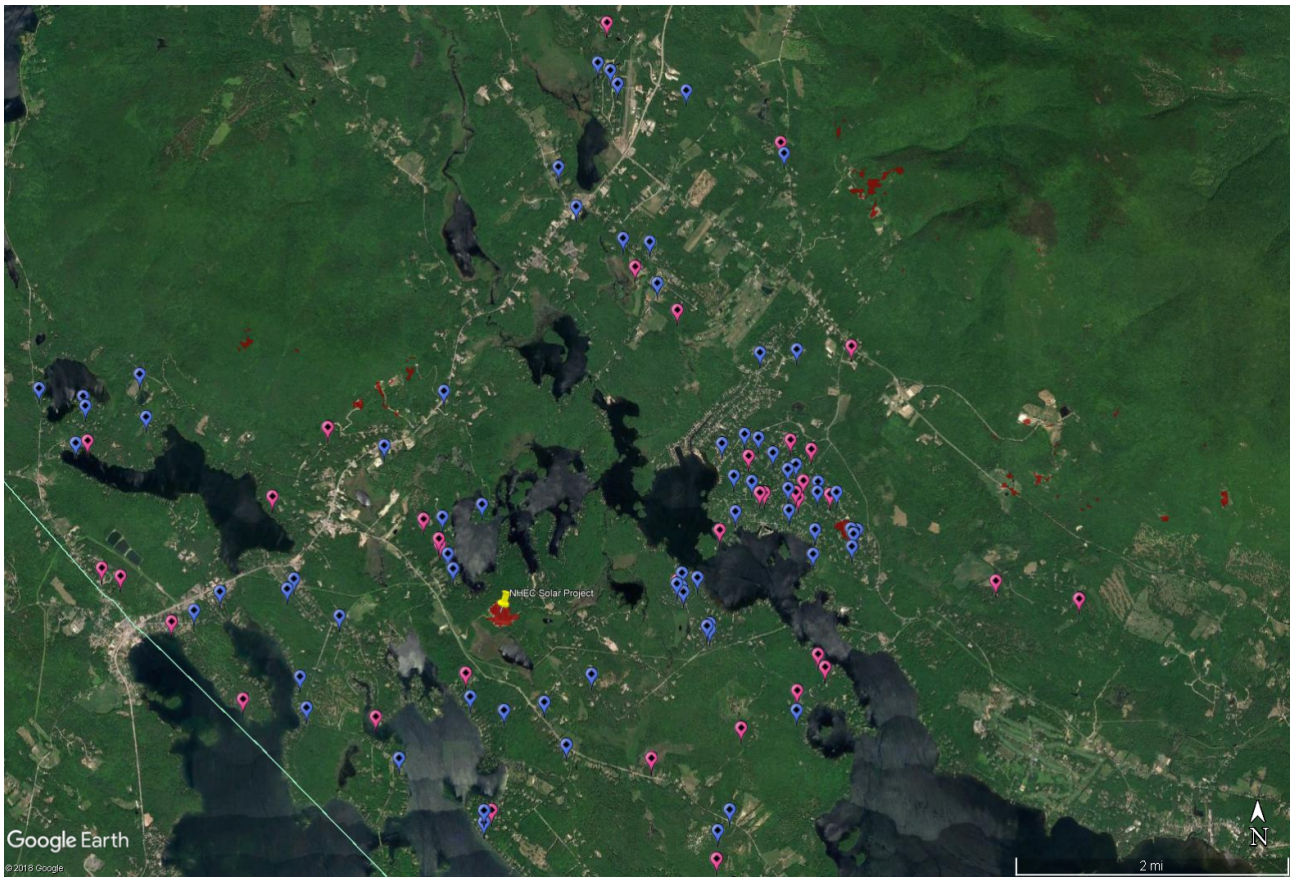
The sales show clustering in specific areas, however, there does not appear to be any noticeable difference between the geographic distribution of single family home sales before and during project construction, compared to sales during the operational period of the facility (Table 28). Furthermore, in examining post-construction property sales, especially those within closer distance of the facility, it does not appear that any of these properties have a view of the facility. This is due to the high vegetative buffer (as indicated by Google Earth satellite imagery and the on-site experience) both surrounding the NHEC Project and the vegetative buffers surrounding the properties with potential view.

This observation of the low-visibility of the NHEC Project is supported by an article in the Laconia Daily Sun published in July 2018. "Now you'll see the Co-ops biggest secret, Co-op Communications Administrator Seth Wheeler chuckled as he opened the access gate off Hanson Road for a visitor. Truth be told, more deer, which inhabit the nearby woods, have seen the state's largest solar farm than humans who live on Moultonborough Neck. The solar farm cannot be seen from any roads, and since it is surrounded by 40-plus acres of swamp, wetlands and woods, even for its nearest neighbors it's out of sight."[36]

[36] NH Co-op's solar facility adds green energy to the power grid, The Laconia Daily Sun, Jul 18, 2018. Available on-line at https://www.laconiadailysun.com/news/local/nh-co-op-s-solar-facility-adds-green-energy-to/article_0665ba00-89e8-11e8-8f5b-837f3e02b338.

Even when considering the low visibility, it is still believed that this facility is still the most relevant current example in NH to examine for property value impacts.

Figure 10: Distribution of sales around the 2 MW NHEC Project grouped by years 2016-2017 (blue pins - pre and during construction) and years 2018-2019 (pink pins - post construction) with 6 mile obstructed viewshed (dark red).



Source: T.J. Boyle, The Warren Group, Seacoast Economics

In 2016, there were 48 transactions totaling $25.8 million ($539k average sales price). In 2017, there were 60 transactions totaling $29.1 million ($486k average sales price). In 2018, 53 transactions totaling $34.5 million ($650k average sales price) and in the first quarter of 2019, there were 5 transactions totaling $3.0 million ($599k average sales price). Total sales increased by $3.2 million (12.7%) from 2016 to 2017. Total sales increased by $5.3 million (18.3%) from 2017 to 2018. One would not expect to observe an increase in total sales dollars transacted if the construction of the Solar Project had an overall negative impact on Moultonborough's real estate market during its operation.

Figure 11 shows the plotted average sales price with the associated standard error of the mean per year for single family homes in Moultonborough. The standard error of the mean is a measure of the standard deviation of the prices of houses sold each year and is a statistic that can be used to help in comparing the sales across years. The average sales price decreased slightly in 2017 but then increased sharply in 2018 and was also elevated during the first quarter of 2019 relative to 2016 and 2017. The increase in sales price is expected to be due to the overall real estate market conditions occurring in the community and would seem unlikely to indicate a change to market values caused by the NHEC Project.

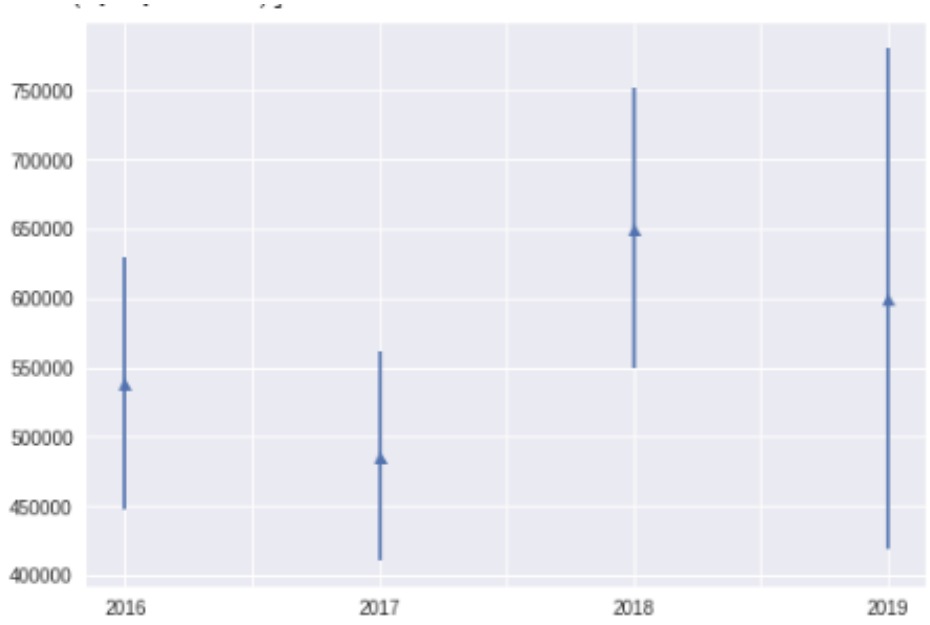
html

Table 28: Arms-length single family home sales transactions from Jan 2016 to Mar 2019 in Moultonborough, NH.

Year	Count	Average Sales Price	Average Assessed Value	Total Sales
2016	48	$ 538,796	$ 563,103	$ 25,862,198
2017	60	$ 485,774	$ 494,678	$ 29,146,463
2018	53	$ 650,480	$ 531,181	$ 34,475,415
2019	5	$ 599,400	$ 635,720	$ 2,997,000
Total	**166**	**$ 557,115**	**$ 530,366**	**$ 92,481,076**

Source: The Warren Group, Seacoast Economics

Figure 11: Average single family home sales price in Moultonborough by year from 2016 to 2019 with standard error of the mean.



Source: The Warren Group, Seacoast Economics

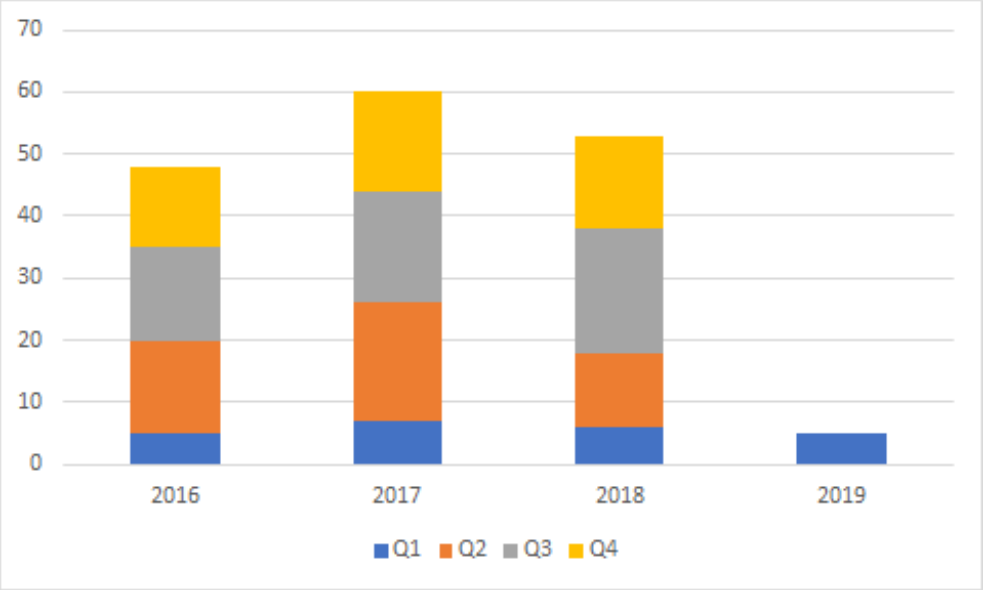
Figure 30 shows the sales volume by year and by quarter. Single family home sales volume in 2017 (60 sales) and 2018 (53 sales) were elevated relative to 2016 (48 sales). While sales volume did contract in 2018 relative to 2017 (down 12%) as discussed previously price appreciation still led to a higher overall total sales amount transacted in 2018. This slowing in the number of sales transactions in 2018 is similar to the reduction in growth trend observed overall in Carroll County which had warranty deed single family home sales of 418 in 2016, 482 in 2017, and 479 in 2018. The slowdown is also consistent with an observed national trend of slowing real estate sales in 2018.[37] [38] The number of sales during the first quarter of 2019 was similar to first quarter of the previous years. In 2017, there were seven sales; the sales volume decreased slightly in 2018 and 2019 relative to 2017. However, the sales level during the first quarter of 2019 is the same as 2016.

Approach

[37] The 2018 year in review for housing: A pivotal year for the market, Bankrate. Available on-line at https://www.bankrate.com/mortgages/year-in-review-for-housing-market/

[38] Housing has peaked. Here are the reasons the market has cooled. Union Leader, Dec. 14, 2018. https://www.unionleader.com/news/business/housing-has-peaked-here-are-the-reasons-the-market-has/article_6567a266-2ce5-5471-a050-8b38391b2de8.html

Figure 12: Count of single family home sales in Moultonborough by year by calendar quarter.



Source: The Warren Group, Seacoast Economics

This study utilized two different statistical tests to attempt to isolate any change in property values due to the NHEC Project: linear regression and an unpaired two-sample t-test. Linear regression models the relationship between a dependent variable y for one explanatory variable x and is a widely-used statistical test. The t-test was selected for this analysis because it is well-established and specifically tests for differences among the averages of independent samples. T-tests are robust statistical tests that have been specifically applied to evaluating factors that may have an impact on property values.[39]

The approach followed utilizing assessed value as the "expected" value to compare to sales price. Assessors would be familiar with the characteristics and dynamics of the properties in the communities they assess and the expectation is that assessed value should show a strong relationship to fair market value observed in arms-length sales transactions.

This study took the following approach.

1. The first step was to determine if pre-sale assessed values showed a relationship to sales prices using linear regression for all arms-length sales. Statistical analysis showed a correlation (0.788 R^2) between the deed price (price of sale) and the pre-sale assessed valuation (Figure 13). This supports the use of the pre-sale assessed value as the "expected" deed price.

2. Area impact was tested by comparing post-construction sales (2018 - March 2019) with those that occurred during pre or in-construction (2016 - 2017). An unpaired two-sample t-test statistical analysis was performed on the calculated difference between sales price and pre-sale assessed value for each home that sold during those two time periods. This would indicate whether or not the sales price relative to assessed value changed after the construction of the NHEC Project. Assessed values were evaluated for changes over the same time period by also using a two-sample unpaired t-test. This would indicate whether assessed values in houses sold had change significantly over that time period.

[39]Examples include: Mulley, C. and Chi-Hong, T., "How much does new transport infrastructure add to land values? Evidence from the bus rapid transit system in Sydney, Australia" Institute Of Transport And Logistics Studies, September 2013; McGrew, Jr., J C., and Monroe, C. B., "An introduction to statistical problem solving in Geography," Waveland Press, Inc., Second Edition, 2009.

3. View impact was not tested in this analysis. It does not appear that any of the properties sold in Moultonborough after the construction of the Project have a clear view of the NHEC Project. Therefore it was not possible to perform a statistical analysis of view impact.

4. Proximity impact was tested using linear regression analysis by evaluating post-construction sales for a correlation between distance and the calculated difference between sales price and the pre-sale assessed value.

5. Anticipation impact was not tested statistically but the observations of sales price and volume activity during the construction period of 2017 are not consistent with an anticipation impact.

Seacoast Economics obtained property sales and parcel records for the Town of Moultonborough from the Warren Group. The Warren Group—located in Boston, MA—provided property transaction data occurring from 2016 to March 2019. The Warren Group is an organization that has collected and compiled data on real estate sales and ownership in New England since 1872.

Property transactions were filtered to only include warranty deed sales transactions of single-family homes. Warranty deed sales are arms-length transactions and are deemed to be the best overall indicator of residential property market prices. An arms-length transaction is one in which the parties are independent, have no relationship to each other, and are on equal footing (meaning the parties have equal bargaining power and equal information about the transaction). This type of transaction reveals the true and fair market value of a real estate property.

These properties were geocoded by the Warren Group and Google Earth was used to geomap the coordinates provided for each sales transaction. In several cases, Google Earth did not appear to correctly map the property location. Sales that were geocoded outside of Moultonborough were discarded only in the proximity analysis (37 out of 166 total sales). This is believed to be reasonable because when those properties were included it did not change the findings of the proximity analysis.

Statistical Analysis

To understand area impact, a comparison of the sales price to the pre-sale assessed value during the post construction period relative to the pre and in construction period indicated that there was a statistically-significant difference at a p of 0.04. The average difference between the sales price and pre-sale assessed value was greater after the construction of the NHEC Project ($105,822 post-construction vs $2,918 pre/in-construction). Across these two time periods, the pre-sale assessed value did not exhibit a statistically significant difference at p of 0.74. This indicates that for houses sold that the pre-sale assessed value was not significantly different either before or after the construction of the NHEC Project. As discussed above, the increase observed is believed to be the result of market conditions favoring price appreciation and not the result of the construction of the NHEC Project. This analysis supports the statement that the NHEC Project did not negatively impact the property values of the overall community in Moultonborough.

Any proximity impact would be observable by looking at the correlation between the distance of a home from the NHEC Project and the corresponding difference between sales price and pre-sale assessed value. There was no correlation between the distance and calculated sales to pre-sale assessed value (0.003 R^2) as shown in figure 14. This analysis would indicate that nuisance factors, such as noise, were either not present or not present at a level that altered market activity after the construction of the NHEC Project given that visibility is highly unlikely to be a potential impact factor. A limitation of this analysis is that the nearest property transaction is approximately 0.5 mile from the NHEC Project. As Al-Hamoodah et al. (2018) indicates that, on average, assessors are of the opinion that if there were any negative impacts, they most likely would be less than 0.5 miles from the Project. The analysis of sales in Moultonborough did not contain observations that could either support or refute that belief.

Findings

Table 29: Difference in sales price and pre-sale assessed value for the pre/in and post construction periods.

	Pre/In-construction	Post-construction
Mean	2918.09	105882.81
SD	315478.10	266380.54
SEM	30356.89	34977.48
N	108	58
t	2.1131	
df	164	
two-tailed P	0.0361	

Table 30: Pre-sale assessed value for the pre/in and post construction periods.

	Pre/In-construction	Post-construction
Mean	506421.36	540193.31
SD	607877.31	643363.08
SEM	58493.02	84477.71
N	108	58
t	0.3344	58
df	164	
two-tailed P	0.7385	

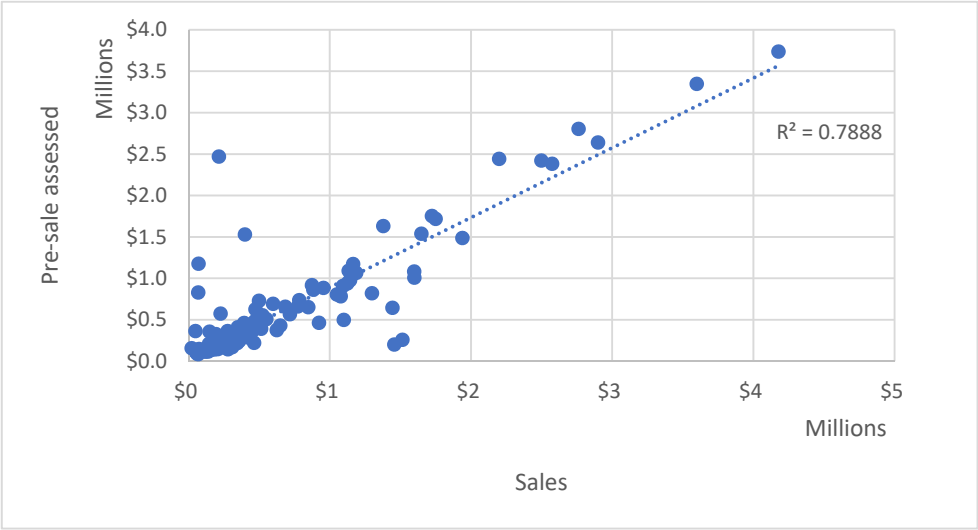
Residential market activity was reviewed in the Town of Moultonborough for the time period before and after the construction of the NHEC Project. The purpose was to identify any changes in residential real estate activity that differed from the overall regional and national trends occurring in the real estate market. After an examination of the arms-length single family home sales in Moultonborough, there is no evidence to indicate that market activity was different than otherwise might have been expected during that time period.

Total single family home sales by dollars have progressively increased from 2016 through 2018. This is not what one would expect to see if there was a negative change in overall market activity in the community. While sales volumes in 2018 and the first quarter of 2019 were lower relative to 2017, they appear consistent with an observed market trend of a slowdown in sales volume at the regional and national level.

The obstructed viewshed analysis combined with visual inspection does not indicate that many properties (if any) would be expected to have a view of the NHEC Project. Observations of geographical sales patterns in Moultonborough indicate that post-construction sales are occurring in a similar areas as to the sales transactions that were occurring before the facility was constructed. One might expect that if the new solar project was having a negative impact on real estate transactions, there could be an alteration of sales distribution in areas where the project is visible.

Analysis of sales using robust statistical techniques did not indicate that the property values in the overall community experienced any negative impact due to the construction of the NHEC Project. There was also no indication of a change in property value due to distance of a home from the NHEC Project (between 0.5 and 5 miles) as a result of the NHEC Project.

Figure 13: Correlation of pre-sale assessed values to sales for all sales.



Source: The Warren Group, Seacoast Economics

5.3. Local Community Parcel Analysis

The analysis in previous sections has considered the impact of utility-scale solar based on information not specific to the Chinook Project. In this section, the specific characteristics of the local communities that may be impacted by the Project are considered. The goal would be to identify any characteristics of the Project and/or local communities that would raise questions about the appropriateness of applying generalized findings to the Project. This section focuses on characteristics of the parcels that are in close proximity to the Project or have been identified as having a potential view of the Project within a six mile range.

5.3.1 Project Footprint

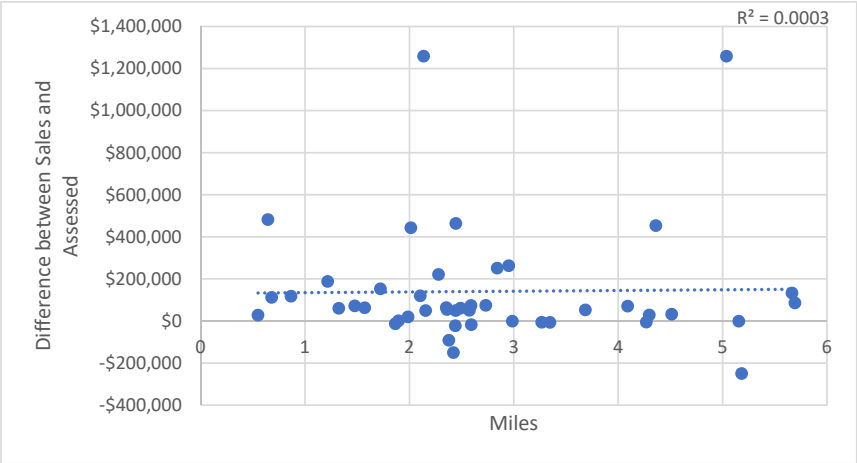
There are 7 properties in the Project footprint in Fitzwilliam. The 6 properties to be purchased by Chinook Solar are lots 12-03, 12-04, 12-05, 12-29, and 12-50 and the 1 property to be leased by NEE is lot 8-24. The total land area in the parcels based on assessment records is 583 acres with a total assessed value of $368,819. All of the parcels feature land in current use status.

The fenced Project area including the substation is estimated by T.J. Boyle to be 128.79 acres. The Project would occupy approximately 22% of the area of the parcels participating in the Project

The total area of Fitzwilliam is 23,040 acres and the total 2017 gross assessed value of all property in Fitzwilliam was $290.3 million. The area of the parcels participating in the Project is 2.5% of the total area of Fitzwilliam and the fenced Project area would be approximately 0.6% of the total area of Fitzwilliam. The total assessed value of the participating parcels is 0.13% of the total gross assessed value of the Town.

Five of the properties in the Project footprint have not been developed at a total of 406 acres. Two of the undeveloped properties, for a total of 96 acres, are receiving a recreation discount, which allows the public to use the land in specific ways, including for hiking and hunting. Two of the properties currently have single family housing units on them.

Figure 14: Correlation of difference between sales price and pre-sale assessed values with distance for post-construction sales.



Source: The Warren Group, Seacoast Economics

Table 31: Parcels in the Project footprint.

Town	Parcel Id	Acres	Building	Features	Taxable Land	Total	Land Use	Site	Currrent Use	Recreation Discount
Fitzwilliam	08-24-000	106.2	$ 143,900	$ 11,400	$ 81,261	$ 236,561	1F Res	Average	Yes	No
Fitzwilliam	12-03-000	50.6	$ -	$ -	$ 1,926	$ 1,926	UNMNGD OTHER	UNDEVELOPED	Yes	Yes
Fitzwilliam	12-04-000	45	$ -	$ -	$ 1,713	$ 1,713	UNMNGD OTHER	UNDEVELOPED	Yes	Yes
Fitzwilliam	12-05-000	135	$ -	$ -	$ 9,737	$ 9,737	FARM LAND	UNDEVELOPED	Yes	No
Fitzwilliam	12-06-000	48	$ -	$ -	$ 3,822	$ 3,822	1F Res	UNDEVELOPED	Yes	No
Fitzwilliam	12-29-000	71.5	$ 46,400	$ 23,000	$ 37,760	$ 107,160	1F Res	Average	Yes	No
Fitzwilliam	12-50-000	127	$ -	$ -	$ 7,900	$ 7,900	FARM LAND	UNDEVELOPED	Yes	No

Source:Avitar Associates, Vision Government, Seacoast Economics

5.3.2 Composition of parcels with a potential view

A total of 96 parcels (including the 7 parcels participating in the Project) were identified as having a potential view of the Project from at least one point within the property based on the obstructed viewshed analysis performed by T.J. Boyle. There are 69 parcels in Fitzwilliam, 8 in Jaffrey, and 19 in Rindge for a total assessed property value of $15.5 million. The total assessed value for the parcels were $8.6, $2.7, and $4.2 million in Fitzwilliam, Jaffrey, and Rindge respectively. Figure 15 shows each of the parcels identified by T.J. Boyle from their obstructed viewshed analysis.

The total area of parcels that may have a potential view from at least one point on the property is 5,659 acres (including participating parcels). However, the total calculated area of visibility by T.J. Boyle is 379.2 acres or 7% of total parcel area. The total area within a six-mile distance of the Project is 69,400 acres, and therefore the potential area with a view is 0.5% of the total possible area. When adjusted by excluding participating parcels, the area of potential visibility is approximately 250 acres out of 5,076 acres of non-participating parcels or 5% of non-participating parcel area. A visual inspection of the obstructed viewshed indicated view in undeveloped areas. This would be expected to further reduce view potential.

Eighty percent of the total parcel area is either owned by local/state government or non-governmental organizations (NGOs) or is privately held but undeveloped. Local/state government and NGO owned land accounts for 45% of total parcel area and privately held but undeveloped land accounts for 35% of total parcel area. The remaining 20% of total parcel area are residential, commercial or other use with single family residences accounting for 17% of total parcel area.

For all parcels with a potential view, 4 parcels are commercial/industrial at 10% of total assessed value for parcels. Other categories are multi-family (1 at 2% of value), NGO/Government (10 at 25% of value), single-family (38 at 56% of value) and privately owned but undeveloped (40 at 6% of value).

Table 32: Count of parcels with a potential view of Project by town and category.

	Town			
Category	Fitzwilliam	Jaffrey	Rindge	Total
Commercial/Industrial	2		2	4
Multifamily			1	1
NGO/Government	6	4		10
Other	1	1	1	3
Single Family	25	3	10	38
Undeveloped	35		5	40
Total	**69**	**8**	**19**	**96**

Source: T.J. Boyle, Seacoast Economics

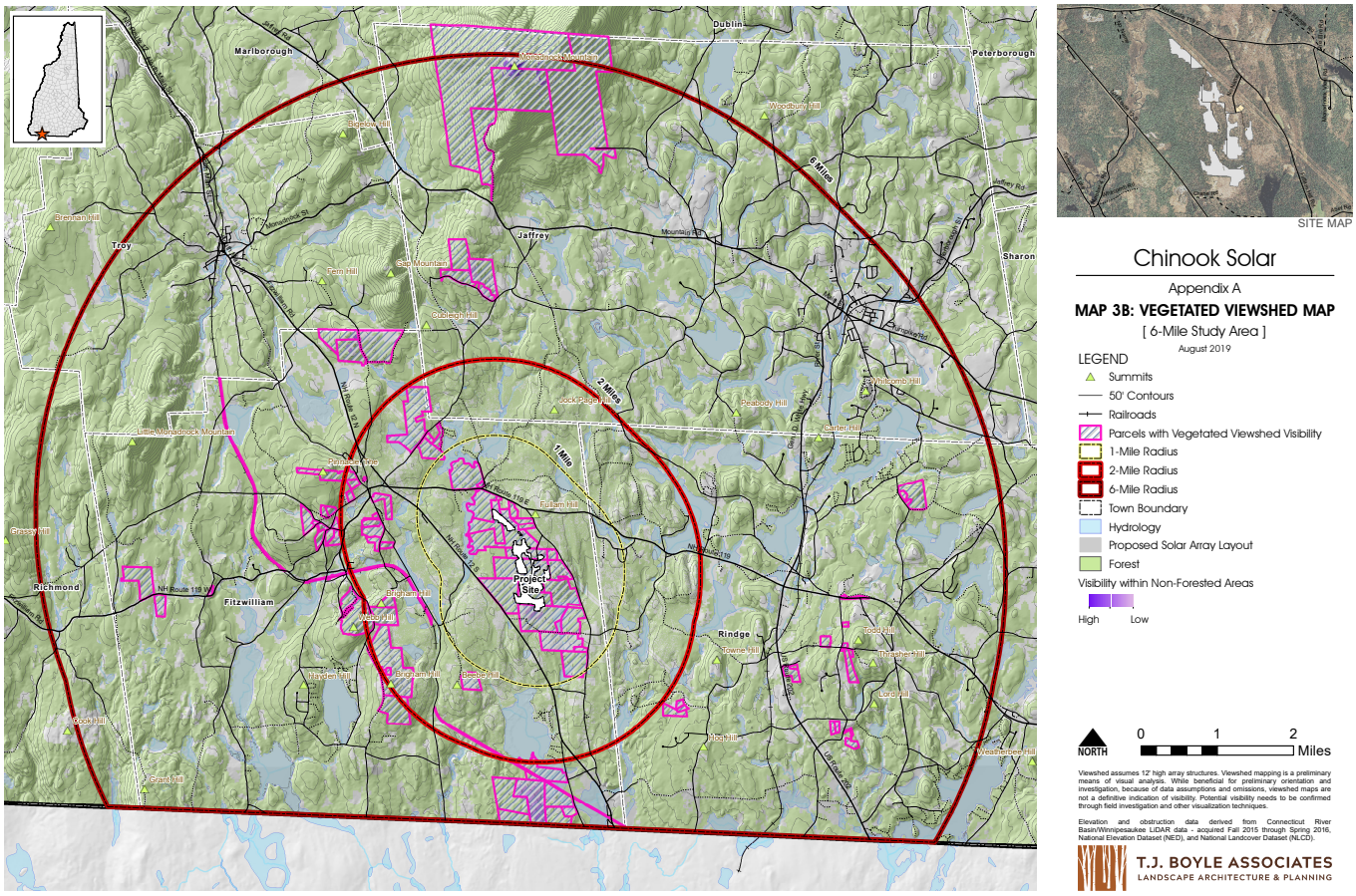
Table 33: Area of parcels (acres) with a potential view of Project by town and category.

	Town			
Category	Fitzwilliam	Jaffrey	Rindge	Total
Commercial/Industrial	116		21	137
Multifamily			2	2
NGO/Government	344	2,138		2,482
Other		61	58	119
Single Family	766	127	51	944
Undeveloped	1,921		53	1,974
Total	**3,148**	**2,326**	**185**	**5,659**

Source: T.J. Boyle, Seacoast Economics

In considering only single family residences, there were 38 identified as having a potential view of the Project from at

Figure 15: Parcels with potential view based on obstructed viewshed analysis.



Source: T.J. Boyle

least one point on the parcel, There are 25 in Fitzwilliam (including the 2 parcels participating in the Project), 3 in Jaffrey, and 10 in Rindge for a total assessed property value of $8.7 million (approximately 56% of the total assessed value of all parcels with a potential view of the Project). The total assessed value for the parcels were $5.7, $0.9, and $2.1 million in Fitzwilliam, Jaffrey, and Rindge respectively. This was 2.6%, 0.2% and 0.5% of the total assessed value in 2017 (residential land + residential buildings) of the towns of Fitzwilliam, Jaffrey and Rindge respectively. The average acreage per single family residence was 24.8 acres.

Table 34: Assessed value of parcels with a potential view of Project by town and category.

Category	Town			Total
	Fitzwilliam	Jaffrey	Rindge	
Commercial/Industrial	$ 100,796		$ 1,428,800	$ 1,529,596
Multifamily			$ 322,300	$ 322,300
NGO/Government	$ 2,145,500	$ 1,796,600		$ 3,942,100
Other	$ -	$ 2,400	$ 30,868	$ 33,268
Single Family	$ 5,741,538	$ 868,200	$ 2,118,500	$ 8,728,238
Undeveloped	$ 657,760		$ 303,738	$ 961,498
Total	**$ 8,645,594**	**$ 2,667,200**	**$ 4,204,206**	**$ 15,517,000**

Source: T.J. Boyle, Avitar Associates of New England, Vision Government Solutions, Inc , Seacoast Economics

Table 35: Assessed value of parcels with single family residences that have a potential view of the Project by town.

Town	Number of Properties	Property Assessed Value	Total Town Residential Assessed Value (2017)	% of Assessed Value
Fitzwilliam	25	$ 5,741,538	$ 217,094,819	2.6%
Jaffrey	3	$ 868,200	$ 355,218,194	0.2%
Rindge	10	$ 2,118,500	$ 441,482,773	0.5%
Total	38	$ 8,728,238	$ 1,013,795,786	0.9%

Source: T.J. Boyle, Avitar Associates of New England, Vision Government Solutions, Inc , Seacoast Economics

Table 36: Parcels with potential view based on obstructed viewshed analysis in Town of Fitzwilliam.

Town	In Footprint	Parcel Id	Distance from nearest point of visibility to Project (feet)	Acres	Building	Features	Taxable Land	Total	Land Use
Fitzwilliam	NO	0 -0 -000	7,870	n/a	n/a	n/a	n/a	n/a	n/a
Fitzwilliam	NO	04-01-000	14,101	49	$ -	$ -	$ 1,704	$ 1,704	UNMNGD OTHER
Fitzwilliam	NO	04-02-000	12,860	97.5	$ -	$ -	$ 3,857	$ 3,857	UNMNGD OTHER
Fitzwilliam	NO	04-03-000	11,727	100	$ -	$ -	$ 19,078	$ 19,078	1F Res
Fitzwilliam	NO	04-04-000	11,530	15	$ -	$ -	$ 526	$ 526	UNMNGD OTHER
Fitzwilliam	NO	04-18-000	10,490	91	$ -	$ -	$ 2,848	$ 2,848	UNMNGD OTHER
Fitzwilliam	NO	04-21-000	11,744	58	$ -	$ -	$ 1,613	$ 1,613	UNMNGD PINE
Fitzwilliam	NO	04-22-000	13,548	51	$ -	$ -	$ 1,684	$ 1,684	UNMNGD OTHER
Fitzwilliam	NO	04-22-001	14,056	10	$ 92,800	$ 24,200	$ 68,400	$ 185,400	1F Res
Fitzwilliam	NO	07-20-000	10,557	2.9	$ -	$ -	$ 7,500	$ 7,500	1F Res
Fitzwilliam	NO	07-22-000	10,023	3.3	$ -	$ -	$ 2,500	$ 2,500	1F Res
Fitzwilliam	NO	07-23-000	9,449	226.5	$ -	$ -	$ 14,824	$ 14,824	UNMNGD PINE
Fitzwilliam	NO	07-23-002	10,290	76.5	$ -	$ -	$ 2,535	$ 2,535	MNGD OTHER
Fitzwilliam	NO	07-31-000	6,505	32.5	$ 109,600	$ 3,100	$ 56,944	$ 169,644	1F Res
Fitzwilliam	YES	08-24-000	0	106.2	$ 143,900	$ 11,400	$ 81,261	$ 236,561	1F Res
Fitzwilliam	NO	08-26-004	1,476	53.5	$ -	$ -	$ 2,945	$ 2,945	UNMNGD OTHER
Fitzwilliam	NO	08-30-004	4,066	6.61	$ -	$ -	$ 36,590	$ 36,590	1F Res
Fitzwilliam	NO	08-31-000	2,379	77.7	$ -	$ -	$ 17,273	$ 17,273	UNMNGD OTHER
Fitzwilliam	NO	08-41-000	4,184	59	$ -	$ -	$ 2,465	$ 2,465	UNMNGD OTHER
Fitzwilliam	NO	09-19-000	24,600	69	$ -	$ -	$ 107,700	$ 107,700	EXEMPT-MUNIC
Fitzwilliam	NO	10-15-005	23,614	17.6	$ -	$ -	$ 870	$ 870	UNMNGD OTHER
Fitzwilliam	NO	10-31-000	20,034	4	$ 103,200	$ 11,500	$ 37,700	$ 152,400	1F Res
Fitzwilliam	NO	11-07-000	10,190	119	$ -	$ -	$ 195,600	$ 195,600	1F Res
Fitzwilliam	NO	11-17-003	12,109	11.26	$ 167,900	$ 6,800	$ 44,150	$ 218,850	1F Res
Fitzwilliam	NO	11-18-000	11,444	5	$ -	$ -	$ 34,400	$ 34,400	1F Res
Fitzwilliam	NO	11-19-000	12,140	1.8	$ 60,300	$ 11,500	$ 37,300	$ 109,100	1F Res
Fitzwilliam	NO	11-24-000	10,737	7.3	$ -	$ -	$ 46,600	$ 46,600	EXEMPT-MUNIC
Fitzwilliam	NO	11-33-000	8,402	17.2	$ -	$ -	$ 947	$ 947	UNMNGD OTHER
Fitzwilliam	NO	11-34-001	8,833	44	$ -	$ -	$ 1,696	$ 1,696	MNGD HARDWD
Fitzwilliam	NO	11-40-001	7,511	8	$ 187,100	$ 15,300	$ 55,800	$ 258,200	1F Res
Fitzwilliam	NO	12-02-000	93	116	$ -	$ 16,100	$ 84,096	$ 100,196	COM/IND
Fitzwilliam	YES	12-03-000	0	50.6	$ -	$ -	$ 1,926	$ 1,926	UNMNGD OTHER
Fitzwilliam	YES	12-04-000	0	45	$ -	$ -	$ 1,713	$ 1,713	UNMNGD OTHER
Fitzwilliam	YES	12-05-000	0	135	$ -	$ -	$ 9,737	$ 9,737	FARM LAND
Fitzwilliam	YES	12-06-000	0	48	$ -	$ -	$ 3,822	$ 3,822	1F Res
Fitzwilliam	NO	12-27-000	1,635	0.2	$ -	$ -	$ 600	$ 600	UTILITY-ELEC
Fitzwilliam	NO	12-28-000	28	125.5	$ -	$ -	$ 62,400	$ 62,400	EXEMPT-MUNIC
Fitzwilliam	YES	12-29-000	0	71.5	$ 46,400	$ 23,000	$ 37,760	$ 107,160	1F Res
Fitzwilliam	NO	12-34-002	375	11.6	$ -	$ -	$ 617	$ 617	UNMNGD OTHER
Fitzwilliam	NO	12-38-000	127	11.5	$ -	$ -	$ 2,084	$ 2,084	FARM LAND
Fitzwilliam	NO	12-38-001	307	11.5	$ -	$ 4,500	$ 20,620	$ 25,120	1F RES
Fitzwilliam	YES	12-50-000	0	127	$ -	$ -	$ 7,900	$ 7,900	FARM LAND
Fitzwilliam	NO	12-54-000	721	12.29	$ -	$ -	$ 1,018	$ 1,018	FARM LAND
Fitzwilliam	NO	12-59-000	19	37.6	$ -	$ -	$ 7,797	$ 7,797	1F Res
Fitzwilliam	NO	12-60-000	49	79	$ 24,400	$ 500	$ 61,686	$ 86,586	1F Res
Fitzwilliam	NO	15-01-000	12,364	27	$ 284,400	$ 40,300	$ 46,030	$ 370,730	1F Res
Fitzwilliam	NO	15-03-006	11,296	6.6	$ -	$ -	$ 362	$ 362	1F Res
Fitzwilliam	NO	15-03-007	11,288	5.9	$ 146,800	$ 5,500	$ 34,536	$ 186,836	1F Res
Fitzwilliam	NO	15-05-000	9,755	8.4	$ 343,600	$ 27,200	$ 74,300	$ 445,100	1F Res
Fitzwilliam	NO	15-06-012	9,837	47.52	$ -	$ 100,000	$ 56,647	$ 156,647	1F Res
Fitzwilliam	NO	15-53-004	6,980	142.7	$ -	$ -	$ 7,575	$ 7,575	1F Res
Fitzwilliam	NO	15-54-001	5,902	35.26	$ 75,000	$ 9,400	$ 68,224	$ 152,624	1F RES WTRFRNT
Fitzwilliam	NO	15-60-000	7,974	25.16	$ 266,300	$ 41,400	$ 79,023	$ 386,723	1F RES
Fitzwilliam	NO	16-02-000	1,704	3	$ 86,500	$ 40,200	$ 45,100	$ 171,800	1F RES
Fitzwilliam	NO	16-03-000	1,855	100	$ 28,800	$ 10,800	$ 79,564	$ 119,164	1F RES WTRFRNT
Fitzwilliam	NO	18-20-000	14,732	121.2	$ 216,700	$ 58,800	$ 56,678	$ 332,178	1F Res
Fitzwilliam	NO	18-20-001	14,451	50	$ 218,700	$ 28,600	$ 41,954	$ 289,254	1F Res
Fitzwilliam	NO	18-20-002	15,009	51.9	$ -	$ 2,600	$ 4,187	$ 6,787	1F Res
Fitzwilliam	NO	29-24-000	8,129	16.5	$ 174,400	$ 11,500	$ 49,345	$ 235,245	1F Res
Fitzwilliam	NO	30-05-000	11,046	11	$ -	$ -	$ 47,500	$ 47,500	EXEMPT-MUNIC
Fitzwilliam	NO	30-06-000	10,732	16	$ 1,565,200	$ 79,000	$ 76,900	$ 1,721,100	EXEMPT-MUNIC
Fitzwilliam	NO	31-13-000	7,811	12.76	$ 148,000	$ 43,200	$ 71,466	$ 262,666	1F Res
Fitzwilliam	NO	31-13-001	8,211	20.64	$ 353,500	$ 16,000	$ 50,343	$ 419,843	1F Res
Fitzwilliam	NO	31-14-000	7,904	2.75	$ 139,400	$ 3,000	$ 48,500	$ 190,900	1F Res
Fitzwilliam	NO	32-20-000	10,064	6.9	$ 181,000	$ 46,100	$ 39,874	$ 266,974	1F Res
Fitzwilliam	NO	33-23-000	9,029	0.38	$ 118,400	$ 4,600	$ 32,600	$ 155,600	1F Res
Fitzwilliam	NO	35-37-000	5,997	12.04	$ -	$ -	$ 73,200	$ 73,200	1F RES WTR ACS
Fitzwilliam	NO	35-40-000	6,235	6	$ 141,200	$ 21,400	$ 69,400	$ 232,000	1F RES WTR ACS
Fitzwilliam	NO	99-01-000	11,466	115.3	$ -	$ -	$ 160,200	$ 160,200	EXEMPT-STATE

Source: T.J. Boyle, Avitar Associates, Vision Government, Seacoast Economics

Table 37: Parcels with potential view based on obstructed viewshed analysis in towns of Jaffrey and Rindge.

Town	In Footprint	Parcel Id	Distance from nearest point of visibility to Project (feet)	Acres	Building	Features	Taxable Land	Total	Land Use
Jaffrey	NO	205-10	16,654	61	$ -	$ -	$ 2,400	$ 2,400	Other
Jaffrey	NO	205-11	16,322	40	$ 333,300	$ -	$ 43,700	$ 377,000	Single Fam
Jaffrey	NO	206-19	14,877	15.1	$ 184,300		$ 53,200	$ 237,500	Single Fam
Jaffrey	NO	206-20	16,174	72	$ 193,100	$ -	$ 60,600	$ 253,700	Single Fam
Jaffrey	NO	213-3.1	30,598	1035.7	$ -	$ -	$ 640,800	$ 640,800	Non Profit 00
Jaffrey	NO	213-5	24,808	183	$ -	$ -	$ 149,300	$ 149,300	Non Profit 00
Jaffrey	NO	215-1	28,832	250	$ -	$ -	$ 169,400	$ 169,400	Town 00
Jaffrey	NO	219-7	29,783	669.5	$ -	$ 195,300	$ 641,800	$ 837,100	State 01
Rindge	NO	1-11-1	11,632	4.2	$ 186,500	$ -	$ 45,600	$ 232,100	1 Family
Rindge	NO	1-11-14-A	11,609	17	$ -	$ -	$ 2,669	$ 2,669	WHITE PINE 7
Rindge	NO	1-11-2	11,589	4.3	$ 118,900	$ -	$ 45,900	$ 164,800	1 Family
Rindge	NO	11-2	25,000	58.4	$ 3,600	$ -	$ 27,268	$ 30,868	Vac W Imp
Rindge	NO	11-2-6	24,805	5.3	$ 82,700	$ -	$ 68,400	$ 151,100	1 Family
Rindge	NO	2-51-4-2	23,346	12.03	$ 115,400	$ -	$ 69,100	$ 184,500	1 Family
Rindge	NO	2-52-1	21,886	5.4	$ -	$ -	$ 44,300	$ 44,300	FARM
Rindge	NO	2-52-2	21,521	7	$ 266,000	$ -	$ 54,000	$ 320,000	1 Family
Rindge	NO	6-43-1	20,761	2.98	$ 127,600	$ -	$ 51,600	$ 179,200	1 Family
Rindge	NO	6-47	19,397	10.4	$ 137,500		$ 73,900	$ 211,400	1 Family
Rindge	NO	6-49A-4-5	17,583	3.09	$ 476,800	$ -	$ 71,300	$ 548,100	Industrial
Rindge	NO	6-49B	17,329	17.7	$ 765,600	$ -	$ 115,100	$ 880,700	REST CLUBS
Rindge	NO	6-57	20,938	25.5	$ -	$ -	$ 1,969	$ 1,969	WHITE PINE 6
Rindge	NO	6-57-1	20,764	0.66	$ 144,100	$ -	$ 183,600	$ 327,700	1 Family
Rindge	NO	6-58	21,204	1.5	$ 135,800	$ -	$ 40,700	$ 176,500	1 Family
Rindge	NO	6-69-5	20,466	2.91	$ 129,500	$ -	$ 41,700	$ 171,200	1 Family
Rindge	NO	6-74	21,541	1.6	$ -	$ -	$ 54,800	$ 54,800	UNDEV LAND
Rindge	NO	6-75	20,733	3	$ -	$ -	$ 200,000	$ 200,000	DEVEL LAND
Rindge	NO	6-82	20,528	2	$ 244,300	$ -	$ 78,000	$ 322,300	APT 4 to 7

Source: T.J. Boyle, Avitar Associates, Vision Government, Seacoast Economics

5.3.3 Parcel Analysis Conclusion

The parcel analysis indicates the Project has a potential visual impact on 89 properties located outside of the Project footprint in the towns of Fitzwilliam, Jaffrey, and Rindge. The research literature has not established a relationship between property values and utility-scale solar, nor has extensive study of wind power projects established a consistent, reliable relationship between property values and renewable energy infrastructure. However, if one does assume that there may be negative impact from utility-scale solar, the physical characteristics of the Project and the surrounding topology reduce the potential for visual impacts on properties in the area. Chinook Solar is purchasing 6 of the 7 properties where panels are to be located. The purchase of these properties limits the number of properties that are in close proximity to the Project and therefore would be expected to limit the potential for negative impact. In addition, potential impact may be further limited by the large amount of potentially-viewable parcel acreage (80%) owned by NGOs, local or state government and private landowners that is undeveloped.

5.4. Sales Activity in the Town of Fitzwilliam

Based on the parcel analysis, the majority of potentially impacted properties is located in the Town of Fitzwilliam, therefore only sales activity in Fitzwilliam was analyzed. Single family home and mobile home sales (warranty deed only) from Jan 2017 to March 2019 were reviewed. This analysis also seeks to determine if there were any observable anomalies which might make it more susceptible to any factor that could negatively impact real estate sales.

Over this time period, 67 single family residences totaling $12.4 million and 29 mobile home sales totaling $2.3 million were sold for a total of $14.7 million in sales. The average home sales price was $184,735 and the average mobile

home was $79,151. For both types of residences, the average sales price was above the average assessed value which indicates that homes are transacting for prices above assessors expectation of value for a home. Table 38 highlights the average sales and assessed value for homes in Fitzwilliam in 2017, 2018, and 2019 (up to and including March).

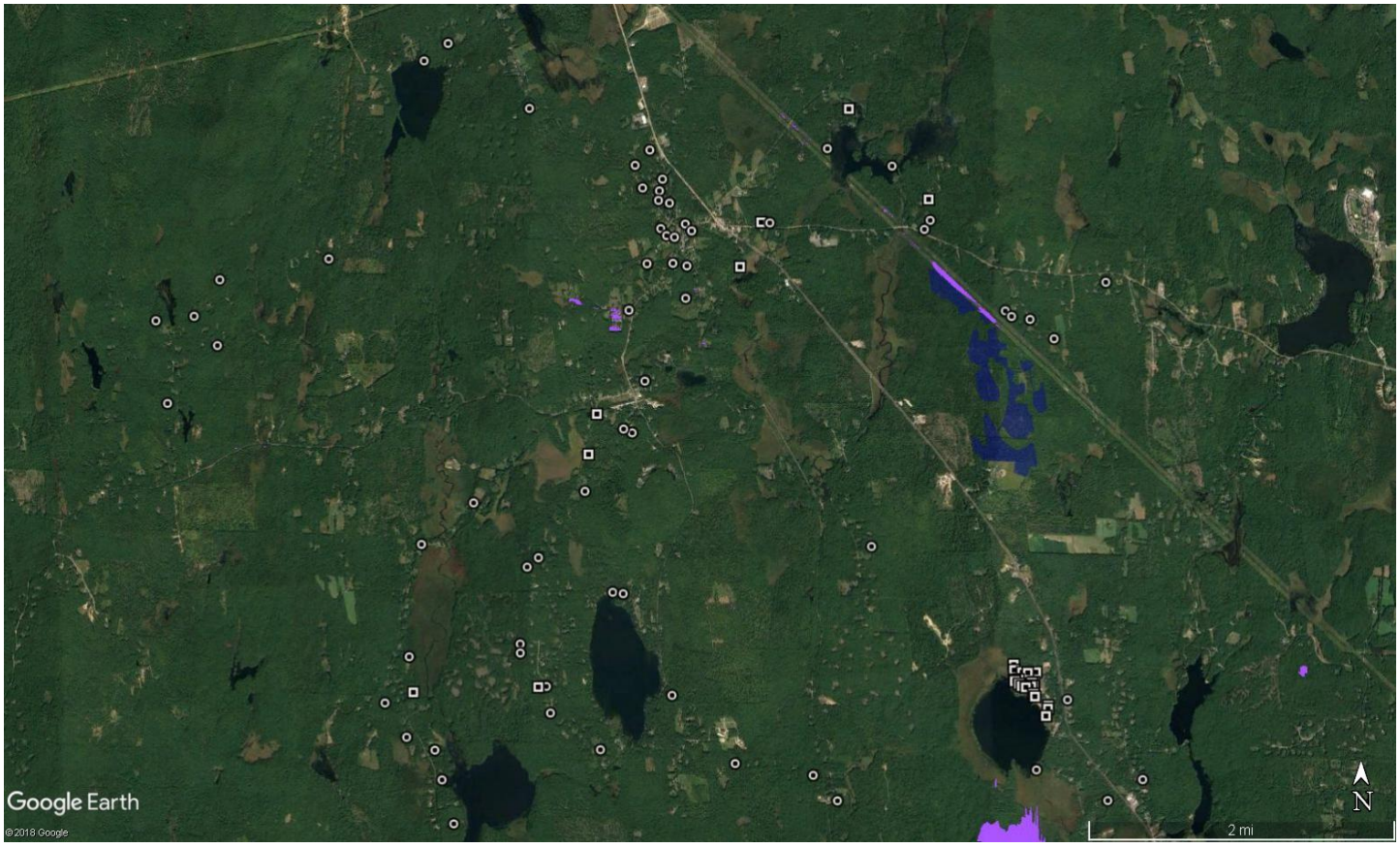
Table 38: Sales of residential housing in the Town of Fitzwilliam.

	1-Fam Res				Mobile Home			
Year	Count	Total Sales	Average Sales Price	Average Assessed Value	Count	Total Sales	Average Sales Price	Average Assessed Value
2017	28	$ 5,247,064	$ 187,395	$ 125,350	17	$ 1,553,400	$ 91,376	$ 27,794
2018	36	$ 6,456,646	$ 179,351	$ 118,950	10	$ 661,966	$ 66,197	$ 24,690
2019	3	$ 673,533	$ 224,511	$ 133,600	2	$ 80,000	$ 40,000	$ 33,200
Total	**67**	**$ 12,377,243**	**$ 184,735**	**$ 122,281**	**29**	**$ 2,295,366**	**$ 79,151**	**$ 27,097**

Source: Warren Group, Seacoast Economics

Figure 16 shows a plot of the mobile home and single family homes from Jan 2017 to Mar 2019. None of the home transactions during this period appeared to have occurred in an area with an expected view of the Project. In fact, the general area in the Project footprint, with the exception to the northeast of the Project, does not appear to have a high sales volume.

Figure 16: Distribution of residential Sales in the Town of Fitzwilliam relative to the Project footprint and vegetated viewshed.



Source: Warren Group, T.J. Boyle, Seacoast Economics

5.5. Real Estate Conclusion

A logical approach moving from general (literature review) to more specific (sales analysis of single family home sales around one of the largest utility-scale solar installations in NH) to Project-specific (parcel analysis in the local communities around the Project) has not identified any consistent patterns that would lead to the conclusion that the Project would be expected to have any impact (either positive or negative) on the real estate markets in the local communities surrounding the Project.

To address the two research questions:

Is there evidence that utility-scale solar projects have a negative impact on a region's real estate market?

As discussed in the Section 5.1.3, a consistent, statistical relationship between real estate values and the presence of electrical utility infrastructure including utility-scale solar has not been established. Furthermore, a large utility-scale solar project in NH, the 2MW NHEC solar project in Moultonborough, does not provide any evidence of an impairment to residential market activity due to the facility. This is a NH-specific example that supports the generalized finding obtained from the current body of literature research, which includes two studies of residential sales transactions immediately around utility-scale solar installations. There currently is no evidence from actual sales transactions of a change in property values due to utility-scale solar installations.

Based on the findings of this analysis, is it likely that the Project will have a negative impact on the region's economy by disrupting the orderly development of the region's real estate markets?

The characteristics of the Project—specifically the low occurrence of visibility from properties around the Project and the diminutive aesthetic and operation characteristics of utility-scale solar—are expected to reduce the risk of negative impacts on property values from the Project. In addition, the Project will be built on land almost all of which will be owned by the Chinook Solar. Eighty percent of the total parcel area for properties that may have a potential view of the Project is owned by local/state government or non-governmental organizations (NGOs) or is privately-owned but undeveloped. Given that no broader relationship has been established between utility scale solar and residential property values and considering the characteristics of the Project, it is not expected that there will be wide-spread impacts to the local real estate markets due to the Project. There is always the possibility that one or more properties may perceive negative impact, but it is unlikely that the Project would negatively impact the overall local real estate markets.

6. Tourism & Recreation Economic Impact Analysis

Tourism is New Hampshires second largest industry generating $5.5 billion annually in spending by over 39 million visitors and employing 68,000 workers.[40] It is an industry demonstrating growth. Between fiscal year (FY) 2014 and FY 2012, traveler and tourist spending increased by 12% which exceeded the 8% growth experienced nationwide in tourism during the same time period. In FY 2014, traveler spending supported $2.4 billion in supply industries, was the largest export sector in terms of employment, and resulted in a total impact on the state economy of $15.2 billion (Lee, 2015). Overall, total tourism spending was $3.1 billion (62% of all tourism-related purchases) in NH for services at the hospitality and leisure sector; and $1.2 billion (24% of all tourism-related purchases) for purchases at retail stores.

New Hampshire continues to experience strong growth in tourism. Visitor activity for the 2018 fall season was estimated to be 3 million out-of-state visitors (4.5% increase from previous year) spending $1.4 billion (5% increase from previous year) in New Hampshire.[41]

Given the importance of the tourism and recreation industry to the NH economy, an area of interest is understanding how utility-scale solar may impact tourism and recreation in the Region. The relationship between tourism and recreation and utility-scale solar has not been well-studied. However, there is existing research devoted to understanding the impact of renewable energy infrastructure, primarily wind turbines, on tourism. Given the relative limited amount of direct research in this area, it may be challenging to identify a reliable estimate of a generalizable relationship between utility-scale solar and tourism and recreation economic activity

6.1. Approach

The analysis in this section of the study focuses on the potential impact of utility-scale solar on tourism and recreational activities. Utility-scale solar may have a negative economic impact if aesthetics are negatively impacted and as a result, visitation to a region decreases. Conversely, utility-scale solar may have a positive economic impact if the view of utility-scale solar increases tourism and recreation related visits. For example, ecotourism (visits driven by those interested in renewable energy) or curiosity visits may drive increased visitation to areas that have views of utility-scale solar.

Tourism economic impact can be challenging to directly measure. However, there are several different objective available indicators of tourism and recreation-related economic activity including: NH meals and rentals tax; the number of tourism/recreation related establishments; and regional motor vehicle traffic. As hunting is one form of recreation that may be occurring in the area of the Project, hunting kill statistics were also collected for the local area.

In addition, a tourism/recreation resource inventory for the immediate region around the Project was constructed to identify any resources that might experience economic impacts from the Project.

The following logical approach was taken towards developing an opinion as to the potential impacts on tourism and recreation in the Town of Fitzwilliam and surrounding local communities from the Project. An emphasis of analysis was visit resources identified as important by the Town of Fitzwilliam.

[40] New Hampshire Travel Council. Available on-line at https://newhampshiretravelcouncil.wildapricot.org/

[41] N.H. Tourism Officials Forecasting 300,000 Visitors Over Columbus Day Weekend, NHPR. Available on-line at https://www.nhpr.org/post/nh-tourism-officials-forecasting-300000-visitors-over-columbus-day-weekend

Initially, a literature review was performed to establish what is the generally-accepted, contemporary thought on the relationship between utility-scale solar and tourism/recreation economic activity. The next step was to collect observable indicators of tourism activity, e.g. meals and rooms tax, to provide objective measures of potential economic impact.

Several economic indicators were also collected for the immediate area around the 2MW NHEC solar project. Given that it is currently one of the largest ground mounted solar installations in NH, it is believed to be one of the closest example in NH to the Project to analyze for any changes in tourism and recreational economic activity.

Motor vehicle traffic can serve as an indirect indicator of recreation and tourism economic activity. While it is not easy to estimate the amount of motor vehicle volume that is related to recreation and tourism, it can be used to observe any large or long-term changes in traffic to an area that may be caused by some fundamental change. Therefore a significant change in an area that impacts visitation would be expected to be observable in altered traffic volumes. This study considers general visitor flows at select locations based on annual average daily traffic (AADT) in New Hampshire to help inform any potential impact. The use of AADT is an accepted approach in the academic literature for analyzing and evaluating tourism activity (Smith, 1985). The NH Department of Transportation (NHDOT) intermittently samples at defined collection locations to estimate average annual daily traffic volume (AADT) on roads and makes this data publicly available.

The final step was to draw upon what was learned from the literature review, the current market analysis of Fitzwilliam and the surrounding area and the information obtained on the NHEC Project to create an informed conclusion of the likelihood and magnitude of the economic impacts from the Project. The goal was to develop an estimate of the marginal change (what the difference between the current state and an estimated future state) to tourism and recreation activity in the region that could be reasonably expected to occur as a result of the Project.

This analysis was performed independently and objectively. Any opinions and conclusions reached are based on the best available research on the relationship between utility-scale solar and tourism/recreation economic activity and consider the findings of the full body of evidence collected during the process.

Limitations

An analysis was performed of traffic volumes during the construction period and the relationship between traffic congestion and tourism was investigated. It was beyond the scope of this study to consider granular details including construction traffic patterns, staging and laydown areas or to develop a Traffic Management Plan.

This study did not examine how the Project could potentially impact any specific species. Instead discussion of wildlife impact in this report is in the context of outdoor recreation. None of the conclusions and findings from this study are dependent on any specific animal species and estimates of wildlife impact are beyond the scope of this study.

Community-based recreation is an important form of recreation, however, it was believed to be more associated with the services provided by the community and not economic activity generated by visitor activity. Therefore, community-based recreation was not considered in this analysis, with the exception of any community-based recreation occurring within the Project footprint.

None of these limitations are believed to change the overall findings and conclusions of this study.

6.2. Literature Review

This study could not identify any studies examining the relationship of tourism with utility-scale solar. Instead, the current body of research on renewable energy infrastructure was reviewed. A focused area of research has been understanding the relationship between wind farms and tourism. While not an exact match, it is believed that the information contained in the literature on wind farm research related to tourism and recreation can provide some insight into how utility-scale solar might impact tourism in the local area around the Project.

In addition, Chinook Solar, LLC commissioned an intercept survey to assess evaluation of potential visual change and effect on future use on Mount Monadnock which is anticipated to have a distant view of the Project. In this section, the literature on wind in relation to tourism and recreation and the intercept survey will be examined with a summary of findings at the end of the section.

6.2.1 Wind Farm Literature

Studies indicate that there are conflicting views both among members of the tourism industry and also among tourists on whether wind farms are positive or negative for tourism(Frantal & Kunc, 2011; NFO System Three, 2002). The visual impact of both the turbines and associated infrastructure is one of the main social impacts of a wind farm and could potentially have a negative impact on tourism in a region if views of turbines decrease the appeal of visiting an area. However, observations of international wind farms have actually identified several instances of a positive economic impact on tourism and specifically eco-tourism. One definition of eco-tourism is "responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education". Eco-tourism is one of the fastest growing segments of the global tourism industry (Hill & Gale, 2009).

Several studies have examined the impact on tourism from wind farms in areas of high tourism dependency with a focus on survey-based research. However, some studies have used objective tourism statistics in their analysis. An in-depth review of past research on off-shore wind farms impact on tourism is available at Toussaint (2016). An illustrative sampling of the literature is provided below.

Aitchison (2004) conducted a survey to measure the potential impact on visitor numbers, tourist experience and tourism expenditure of a proposed 60 MW (20 turbine) on-shore wind farm in North Devon, England. A total of 86.7% (n=170) of respondents in North Devon stated that the presence of a wind farm would neither encourage nor discourage them from visiting. A further 7.2% (n=14) of those surveyed said that a wind farm would either marginally encourage or strongly encourage them to visit the area. While 6.1% (n=12) of those surveyed said that a wind farm would either marginally discourage or strongly discourage them from visiting. Aitchison (2004) found "(t)he figures related to impact on numbers of tourists indicate that there would be no overall financial loss in tourism-related earnings as a result of the wind farm development."

Lilley, Firestone, and Kempton (2010) surveyed randomly sampled, out-of-state tourists (n = 1,076) at beaches in Delaware, USA in 2007. Respondents were shown wind turbine project photo-simulations at several distances and asked about the effect development would have on visitation. Approximately 45% stated that they would switch beaches if an off-shore wind project was located 1 mile from the coast and 26% would switch beaches if an off-shore wind farm was 6 miles from the coast. The stated avoidance is less than the increased attraction to a beach with offshore wind turbines located 6 miles from the coast; and the percentage stating they would likely pay to take a boat tour of a wind farm. The authors found there may be some negative impact on tourism based on surveyed preferences that may be offset by an increased preference for visiting beaches with wind turbines.

Aitchison (2012) reviewed nine studies performed from 1996 to 2008 and found that on average 9% of tourists (range from 1% to 17% across all studies) indicated the presence of a wind farm may discourage them from visiting an area. The conclusion reached in the study was "the findings from both primary and secondary research relating to the actual and potential tourism impact of wind farms indicate that there will be neither an overall decline in the number of tourists visiting an area nor any overall financial loss in tourism-related earnings as a result of a wind farm development". Nichols Tourism Group (2015) found a similar magnitude of prospective New Hampshire visitors (12%) consider the presence of wind turbines to be a critical or very important barrier to visitation.

The economic impacts of wind farms on Scottish tourism (2008) conducted a survey of travelers (n = 380) in four regions of Scotland that account for 12% of tourist activity and 24% of current or proposed wind farms at the time of the study. Of those surveyed, 75% were neutral to positive about wind farms and 25% were negative. Based on the attitudes of those surveyed, an economic model predicted that Scottish tourism revenues would be 0.18% lower than they would have been if there were no wind farms in Scotland. The study concluded "Overall there is no evidence to suggest a serious negative economic impact of wind farms on tourists."

Parsons and Firestone (2018) conducted a stated-preference survey of the beachgoing population on the U.S. East Coast (n = 1,725). Using an internet-based survey, respondents were shown visual simulations of a 100 turbine (600 MW) wind power project at distances from 2.5 to 20 miles and then were asked if the projects might affect their beach experience and cause them to change their trip plans. The survey results suggest that an offshore wind power project would be expected to affect many beachgoers' experience, change trip behavior, and generate curiosity trips. For projects 7.5 miles and nearer, almost all beaches experience a net loss with some popular beaches experiencing over $100 million in welfare loss. At distances 12.5 miles or greater, the negatives are largely washed out by trip gain and curiosity trips, which, in many instances result in a net positive gain. Supporting this finding, Beer, Rybar, and Kalavsky (2018) found that renewable energy sources can serve as an attraction and may increase the number of visitors to an area.

Two studies were identified researching the impact of wind farms on tourism in New England. Noblet et al. (2016) investigated the potential change in tourism if an off-shore wind farm was built near Monhegan Island, Maine. The other study, Gottlob (2013) is noteworthy in that it is specific to NH and that it was one of the only studies investigating the relationship between wind farms and tourism to base its findings on actual economic data.

Noblet et al. (2016) conducted an intercept survey of visitors to Monhegan Island, Maine in 2014. Simulations of two turbines located 5 miles from the coast were shown to visitors. Over 90% of visitors would continue visiting the island at current or increased levels if the wind turbines were constructed. The study concluded that the proposed turbines would be expected to have little negative impact on visitation patterns to Monhegan Island and not have a significant economic impact.

Gottlob (2013) examined and compared economic trends in the region before and after the construction of the Lempster Wind Power Project located in Sullivan County, NH. This is New Hampshire's first wind farm (24 MW from 12 turbines), which commenced operations in 2008. The purpose was to determine if there was any evidence of the Lempster Wind Power Project impacting tourism activity in NH. The study reviewed publicly-available data of spending on accommodations, food services, recreational activities, traffic volumes, and changes in employment.

Gottlob (2013) found that the introduction of the Lempster Wind Project appeared to have had minimal impact on meals and rooms sales in the region. Growth in tourism-related employment in the project region was as the same or greater than the majority of other regions in the state. State park revenues grew more at the state parks closest to the Lempster Wind region than aggregate state park revenues, with the largest increase at the park closest to Lempster Wind, Pillsbury State Park. Weekend traffic volume in the Lempster Wind region indicated that the presence of the wind farm has not reduced visits to the region. An overall conclusion was that "there were no impacts

or any impacts have been too small to be discernible in the data."

6.2.2 Mount Monadnock Intercept Report (2019)

The Project is expected to be visible at a distance of approximately 6 miles from the summit of Mount Monadnock which is a popular scenic resource in NH. Mount Monadnock is in a state park designated by the NH Division of Parks and Recreation as a high use park. In State Fiscal Year 2017, the park brought in $575k in total adjusted revenue through operations and concession sales.[42] During the first eight months of 2018, the Park was used by 51,523 visitors.[43]

The company T. J. Boyle Associates conducted an intercept survey of summit visitors (n = 84) between October 13 and 21, 2017 to determine their perceptions of the proposed visual change of the Project ("Chinook Solar LLC Visual Assessment Intercept Survey on the Mount Monadnock Summit", 2019). Two-thirds of visitors had hiked to the summit previously with 75% having traveled 99 miles or less to the site. The survey included simulations of the potential view after constructing the Project. Ninety-nine percent of the respondents indicated that the visual change would have no effect on their future use of Monadnock State Park and 1% indicated that it may slightly make them less likely to visit (a 3 rating on a scale of 1 to 7 where 1 was extremely less likely to return and 4 was no effect)

6.2.3 Conclusions from Literature Review

This study did not identify any studies that had examined the relationship between utility-scale solar projects and tourism and recreation. There has been significant research performed analyzing the impact of wind farms (a renewable resource with potentially higher visual impact than solar) on tourism. The majority of these studies have relied on surveys and there is no consensus on tourism and recreation impacts due to the construction of a wind farm. Several studies of wind farms have indicated there is the potential for increased tourism and recreation visits due to eco-tourism or curiosity visits where visitors are attracted to views of a wind farm.

An example of a large-scale wind farm driving tourism activity is Whitelee Wind Farm, which is the UK's largest onshore wind farm at 539 MW (215 turbines). The facility includes a visitor center and 80 miles of trails open to hiking, bicycling and horseback riding. As of 2016, over 500,000 visitors have visited since the farm's opening in 2009.

There were no studies identified on the impact of utility-scale solar on tourism. However, an intercept survey specific to the Project and a resource of high recreational importance, Mount Monadnock, indicated that only 1% may be slightly less likely to visit the site if the Project were constructed. This is considerably lower than the reported 9% that may be discouraged to visit a wind farm discussed in Aitchison (2012). This would indicate that the characteristics of the Project make it less likely to discourage visitation and this may be more broadly applicable to utility-scale solar in general.

Drawing on the research performed in relation to tourism and wind farms, there is no conclusive evidence to suggest that renewable energy infrastructure has a significant economic impact (either positive or negative) on tourism. This

[42] Fiscal Year 2017 Financial Report, NH Division of Parks and Recreation. Available on-line at https://www.nhstateparks.org/getmedia/d5f67894-17bf-4411-a4d5-a9b6ec4a7093/Reports-FY17-Parks-Report-FINAL-1-31-18rev022318.pdf

[43] Monadnock Advisory Commission Meeting Minutes, September 20, 2018. Available on-line at https://www.nhstateparks.org/getmedia/359fcd4d-abad-4498-8708-a92712b2c478/CommitteeMAC-minutes-092018.pdf

finding coupled with the results of the intercept survey are not indicative of the Project having an adverse economic impact on tourism.

6.3. Economic Indicators

In this study several indicators were analyzed to help understand the current state of tourism-related economic activity in the Town of Fitzwilliam and the surrounding region. These following indicators were reviewed: the meals and rentals tax, number of businesses in industries associated with tourism, and establishments subject to meals and rental tax.

County Meals and Rentals Tax

The meals and rentals tax (MRT) is a 9% tax assessed upon consumers in NH for activities such as utilizing hotels and other sleeping accommodations, eating at food establishments, and renting motor vehicles. This measure can provide some insight into tourism activity as room rental and eating prepared meals is an activity that many tourists engage in. Not all revenue reported by the MRT is associated with tourism, e.g. room rentals for business trips and meals eaten away from home by residents are also included, but it still can be a useful indicator of visitor economic activity. One limitation to the data is that the reporting body, the State of NH Office of Strategic Initiatives, only provides statistics related to MRT at the county level, but not at the town level.

In 2018, the total receipts generated by NH businesses subject to the NH MRT was $4 billion (6% increase from 2017).[44] In 2018, Cheshire County generated $120 million in receipts subject to NH MRT (1.5% increase from 2017) of which $102 million was in meals-related revenue (up 1.5% from 2017) and $18 million in rentals-related revenue (up 1.5% from 2017). In comparison, the overall state had $3.26 billion in meals-related revenue (up 5.3% from 2017) and $700 million in rentals-related revenue (up 9.3% from 2017). Out of NH's ten counties, Cheshire County was second to last for combined receipts generated from meals and rentals activity with only Sullivan County less at a total of $46 million in combined meals and rental receipts in 2018.

It is expected that a portion (not estimated) of the rooms and meals tax is due to tourism related activity in Cheshire County. However, the lower growth in meals and sales receipts in the County when compared to the overall State may indicate that this region may not be attracting the same level of tourism growth. However, the region is still experiencing overall growth in revenue from meals and rentals.

Tourism and Recreation Businesses

Two separate measures to identify the number of businesses associated with tourism in the region were obtained. One measure is the number of businesses that are associated with specific tourism-related industries as measured by the United States Census Bureau. The industries identified as tourism-related in this study were: 1) accommodation and food services; 2) agriculture, forestry, fishing, and hunting; 3) arts, entertainment, and recreation; and 4) retail trade. There are businesses that one would not often consider to be associated with tourism and recreation also within these industries, but this is a common level of granularity provided through statistics collected by the U.S. government available at the town level. This also does not include all businesses that might be associated with tourism and recreation if they occur in other industries. The purpose of this measure is to give a general indicator of the business orientation towards tourism in an area.

The other measure of tourism and recreation related businesses is the number of establishments in a town that are

[44] Economic Data, NH Office of Strategic Initiatives. Available on-line at https://www.nh.gov/osi/data-center/economic.htm

subject to the NH rentals and meals tax. This provides some indication of the number of businesses that could be impacted by changes in tourism and recreation related visitation. Comparison of these two measures with other towns, and larger regions such as the county or state, can provide an indication of the dependence of an area on businesses associated with tourism.

In 2016, there were 16 establishments in the Town of Fitzwilliam, 41 establishments in the Town of Jaffrey, and 38 establishments in the Town of Rindge that were in business sectors commonly associated with tourism and recreation based on statistics obtained through the U.S. Census Bureau. Regionally, Cheshire County has a higher presence of tourism-related industry sectors in all sectors with the exception of accommodation and food services relative to the overall State (9.1% vs 9.8% in accommodation and food services, 0.5% vs. 0.4% in agriculture, forestry, fishing, and hunting, 2.4% vs. 2.1% in arts, entertainment, and recreation, 18.3% vs. 15.8% in retail trade). This indicates that Cheshire County's economy may be more oriented towards tourism and recreation when compared to the overall state.

Table 39: Establishments in industries commonly associated with tourism and recreation in 2016.

	Establishments					Percentage of Total Establishments			
	Accommodation & food services	Agriculture, forestry, fishing & hunting	Arts, entertainment, & recreation	Retail trade	All Sectors	Accommodation & food services	Agriculture, forestry, fishing & hunting	Arts, entertainment, & recreation	Retail trade
Fitzwilliam	7	2	0	7	49	14.3%	4.1%	0.0%	14.3%
Jaffrey	16	1	5	19	158	10.1%	0.6%	3.2%	12.0%
Rindge	11	0	2	25	123	8.9%	0.0%	1.6%	20.3%
Cheshire County	172	10	46	348	1,899	9.1%	0.5%	2.4%	18.3%
State of NH	3,702	141	797	5,997	37,868	9.8%	0.4%	2.1%	15.8%

Source: U.S. Census Bureau

The Town of Fitzwilliam has a higher percentage of its businesses associated with accommodation and food services (14.3%) relative to Cheshire County (9.1%) and the State of NH (9.8%). The town also appears to have a higher percentage of businesses (4.1%) involved in agriculture, forestry, fishing, and hunting than Cheshire County (0.5%) and the State of NH (0.4%).

Establishments subject to Meals and Rentals tax

There were 14 establishments in Fitzwilliam, and 29 in Jaffrey, and 34 in Rindge that were listed as being operators for the purposes of the collection of the meals and rental tax as of March 4, 2019.[45] Out of all of the establishments listed, none of the establishments are in the footprint of the Project. This indicates that the area in the footprint of the Project has a low exposure to tourism and recreation generated revenue.

6.4. Tourism and Recreation

"Chinook Solar, LLC Fitzwilliam, New Hampshire: Visual Impact Analysis Report" (2019) identified areas of scenic resources including scenic byways, designated rivers, conservation/public lands, recreation trails, historic locations and parks and other recreational areas. These areas would be expected to attract tourism and recreation-based visitation in the area. In conducting this study, T.J. Boyle used publicly available databases as the source for this information. They found that "(o)verall, there are 54 identified scenic resources, of which 13 are public roads, and

[45] Meals and Rooms (Rentals) Tax, New Hampshire Department of Revenue Administration. Available on-line at https://www.revenue.nh.gov/meals-rooms/index.htm

16 are properties assessed with the current use recreation adjustment. The scenic resources with obstruction visibility are in Fitzwilliam (32), Jaffrey (14) and Rindge (8)." They also found that "the Visual Impact Assessment found that visibility of the Project would be extremely minimal. No significant visibility was identified within 2 miles of the Project. Other than visibility from Mt. Monadnock, only isolated views were identified throughout the remainder of the study area, and the analysis determined the Project would not result in unreasonable adverse impacts to the aesthetics of these areas."

T.J. Boyle does note, in *Section C.3 Other Tourist Destinations* of their report that an existing spatial database has not been identified for these type of resources. To supplement the work performed, other tourist destinations were identified in an inventory by Seacoast Economics to provide additional context on potential tourism and recreation impacts. These additional sites were analyzed by Seacoast Economics using the obstruction viewshed provided by T.J. Boyle & Associates. This analysis is independent of the work performed by T.J. Boyle & Associates.

A publication "Fitzwilliam New Hampshire" available via the Local Attractions section of the Town of Fitzwilliam website highlights many of the recreation and tourism opportunities available in the Town and the immediate surrounding area.[46]. An excerpt describing the tourism and recreation opportunities for the "Fitzwilliam New Hampshire" publication is listed below.

> *Today Fitzwilliam is home to several charming bed & breakfasts, numerous antique shops, and the annual July Antiques Show on the Fitzwilliam Common. We've been dubbed the antiques mecca of southwestern New Hampshire.*
>
> *We also offer a host of year-round recreational activities. In winter, there's cross-country skiing and snowshoeing trails, sledding, ice-fishing, and snowmobiling. Fitzwilliam is also home to beautiful Rhododendron State Park, the largest stand of rhododendron north of the Carolinas, and several spring-fed lakes and ponds for summer swimming, canoeing, kayaking, and fishing.*
>
> *Hiking and mountain climbing attract many to come back year after year. Nearby Gap Mountain offers a short climb with a spectacular view of Mt. Monadnock at the top. Mt. Monadnock is just 4 miles away in Jaffrey. It's the most climbed mountain in the world without road access to its summit. The Metacomet-Monadnock trail runs through the northwest corner of Fitzwilliam, providing a chance for real backcountry hiking.*

6.4.1 Tourism/Recreation Resources Inventory

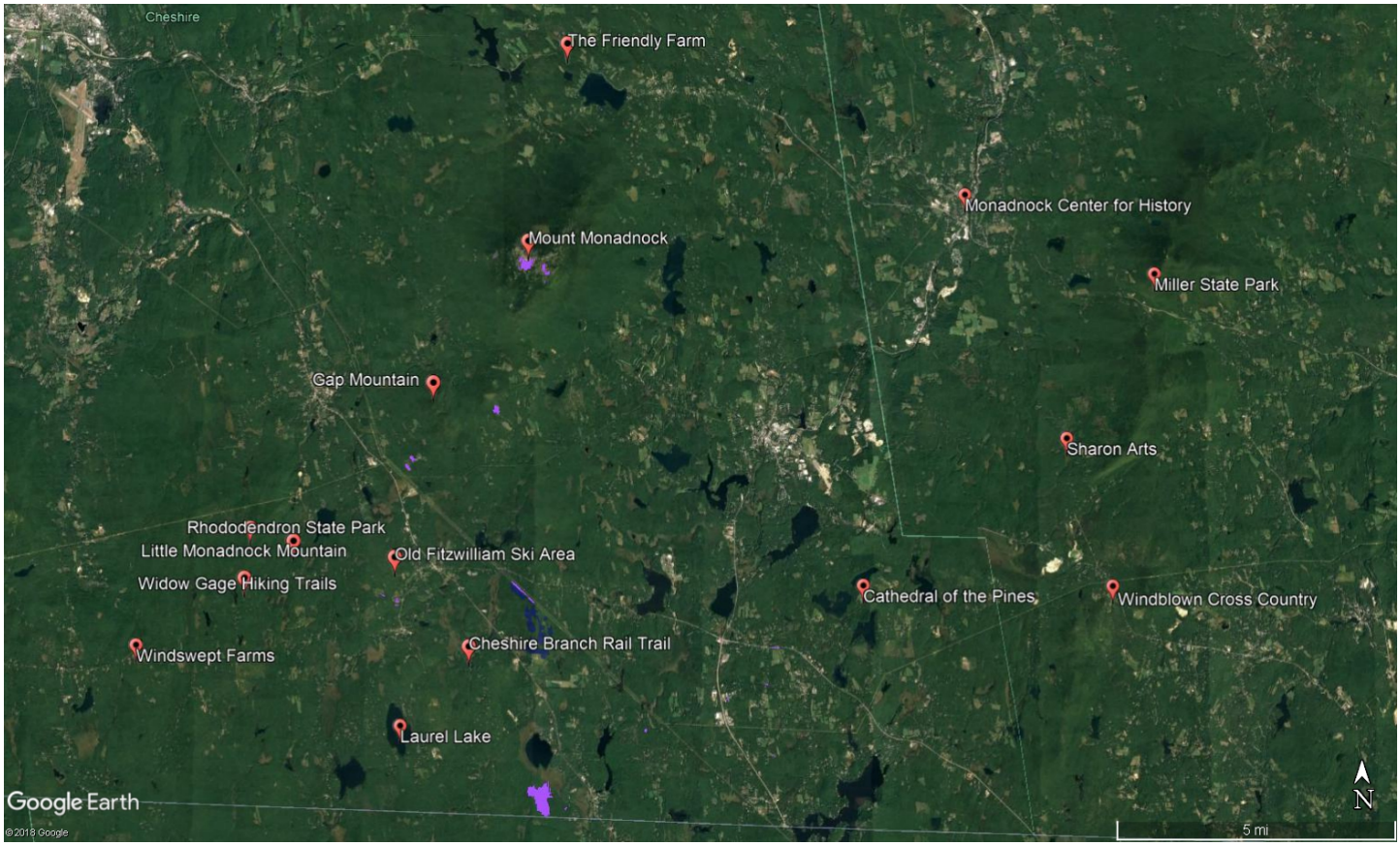
An inventory was developed to identify tourism/recreation resources that contribute to economic activity in the local area as highlighted through the Town of Fitzwilliam website. A total of 7 visitor attractions in Fitzwilliam and 10 visitor attractions outside of Fitzwilliam were identified. Table 40 on page 69 and Figure 17 on page 68 lists and depicts the resources identified. This is not meant to be an exhaustive list and specifically excludes accommodation, dining and retail establishments even though these are important parts of the recreation/tourism economy. The rationale for exclusion of these establishments is that the obstructed viewshed did not indicate any commercial establishments in Fitzwilliam or Jaffrey and only one dining based location in Rindge might have potential views. Analysis was limited to the locations highlighted by the Town of Fitzwilliam, as it is believed that those responsible for identifying tourism and recreation opportunities in the Town of Fitzwilliam would be the most knowledgeable on what local resources would be expected to attract tourism and recreation visits to their community.

[46] Fitzwilliam New Hampshire, Town of Fitzwilliam. Available on-line at https://fitzwilliam-nh.gov/vertical/sites/%7B5152AF08-0D8E-4832-8682-9F3DC8413E4B%7D/uploads/Fitzwilliam_Business_and_Leisure(2).pdf

This inventory also does not include a separate listing of areas of historical or cultural places separate from what was highlighted on the Town of Fitzwilliam website. However, the Public Archaeology Laboratory, Inc. conducted a survey of historical resources in the 2 mile area surrounding the Project. The conclusion of the survey was: "(b)ased on the visual analysis prepared by Chinook Solar's visual consultant (see Figures 14 - 15), no direct or indirect effects to historic properties are anticipated from the Project, as the topography and vegetation limit visibility of the Project site. Therefore, no further survey is recommended as part of this Project." This would indicate that the Project would not economically impact any tourism in the area related to visiting sites of high cultural or historical significance to the community.

The inventory of places of tourism and recreation significance did not indicate any of these areas were located within the Project footprint. Based on the obstructed viewshed analysis Mount Monadnock and Telemark Hill are anticipated to have view of the Project.

Figure 17: Tourism and recreation opportunities listed on Town of Fitzwilliam website as of April 2019 with obstructed view (purple).



Source: Town of Fitzwilliam website

Table 40: Tourism and recreation opportunities listed on Town of Fitzwilliam website as of April 2019.

Attraction	Description from Town of Fitzwilliam website or attraction website	Distance to Project (Miles)	Anticipated View
Cathedral of the Pines	Situated on a hilltop with a panoramic view of the Grand Monadnock, the Cathedral of the Pines is a breathtaking open-air cathedral and meeting space on 236 acres. Our historic monuments honor the service of American men and women—both military and civilian. We welcome visitors from all over the world to participate in our events and to explore the extraordinary sanctuary grounds, meditate in outdoor chapels and gardens, and learn our history.	5.8	No
Cheshire Fair Grounds	None on site	10.5	No
Fitzwilliam/Cheshire Branch Rail Trail	An old railway right of way from Winchendon, MA to Keene, NH and further north to Walpole, NH (33 miles total) has been transformed into a flat gravel trail. The trail runs past multiple ponds, rivers, and former quarries. Walking, running, mountain bike riding, XC skiing, and snowmobiles are welcome. Parking can be found at Rockwood Pond, the Depot, and where the trail crosses Rhododendron Rd, Royalston Rd, West Lake Rd, East Lake Rd, and NH Rte 12 at State Line Circle.	1+	No
Gap Mountain South Trail and North Trail	Gap Mountain is named for the "gap" between the middle and south peaks. The north and middle peaks provide excellent views of Mount Monadnock and the surrounding area. The best time of year to hike to the summit is in mid-July when the blueberries are ripe.	3.5	No
Laurel Lake	Swimming, fishing, boating, and public boat ramp with parking	2.7	No
Little Monadnock Hiking Trail to Summit	The Little Monadnock Trail branches from the Rhododendron State Park loop and climbs for one mile, where it joins the M+M Trail on open ledges near the summit. There is a vista of Mt. Monadnock at the junction of the two trails. Turning south on the M+M leads to the true summit of Little Monadnock about a half-mile away	4.7	No
Metacomet-Monadnock (M+M) Hiking Trail	The Metacomet-Monadnock Trail is a 114-mile-long hiking trail that traverses the Metacomet Ridge of the Pioneer Valley region of Massachusetts and the central uplands of Massachusetts and southern New Hampshire. It winds through Fitzwilliam, intersecting with trails in the Widow Gage Town Forest and continuing up and over Little Monadnock Mountain.	4+	No
Miller State Park	Miller State Park is located on the 2,290-foot summit and flank of Pack Monadnock in Peterborough and is the oldest state park in New Hampshire. A winding 1.3-mile paved road leading to the scenic summit is open for visitors to drive in summer and on spring and fall weekends. Three main hiking trails ascend Pack Monadnock to the summit. The best known is the Wapack Trail, which is a 21-mile footpath that extends from Mt. Watatic in Ashburnham, Massachusetts to North Pack Monadnock in Greenfield. It is believed Native Americans named the area's mountains, and that "pack" means little. On clear days views reach to Mount Washington, the skyscrapers of Boston, and the Vermont hills.	12.5	No
Monadnock Center for History & Culture	The Monadnock Center connects residents and visitors to the history and culture of the Monadnock Region of New Hampshire.	10.5	No
Mount Monadnock State Park	Many people come to the region to climb Mount Monadnock, "the most climbed" mountain in the world. While there are dozens of trails on the mountain, there are six major routes to the top	5.8	Yes
Rhododendron State Park	Walking and hiking trails in a 2,723-acre park located on Little Monadnock Mt, containing a 16-acre stand of native Great Rhododendron. A 0.6 mile-long universal-ly accessible trail encircles the grove allowing visitors to observe, close up, the fragrant clusters of white and pink blossoms	3.9	No
Sharon Arts Center Gallery	The Sharon Arts Center was founded in 1946 as a vibrant space where artists and the public come together to work, learn, shop and appreciate fine art. Our tranquil, wooded campus is set in rural Sharon in New Hampshire's stunning Monadnock region, and our galleries and shop are located nearby in lively, quaint downtown Peterborough. NHIA offers classes, workshops, and exhibitions at the Center, which also serves as the peaceful, retreat-like residency site for one of our graduate programs.	9.8	No
The Friendly Farm	Imagine a place where people and animals mingle comfortably. Where you and your family can enjoy farm animals at their best - in a clean, natural and relaxed atmosphere. Such a place is The Friendly Farm.	9.4	No
The Pinnacle Hiking and Skiing Trails	Only a short walk from the Fitzwilliam Common down Richmond Rd is the old Fitzwilliam ski area. While there is no designated "trail" up the hill, you can easily hike through the field and up the former ski slopes. There is a nice view looking back toward Fitzwilliam village partway up the hill. There are many trails that lead off from the ski slopes for snowshoeing, sledding, back-country XC skiing, and hiking.	2.1	Yes
Widow Gage Hiking Trails	There is a kiosk with trail maps at the parking area on Rhododendron Rd. Walking trails are easy to moderate, and wind past old cellar holes and beautiful ponds. Trails connect with the M+M Trail where it is possible to complete a loop over Little Monadnock, down the Rhododendron Park Trail and back along Rhododen-dron Rd to the parking area (about 5 miles).	4.7	No
Windblown Cross Country Skiing & Snowsho	New England have been returning each year to ski their favorite trails at Windblown. Here in what Thoreau called "The Front Range", on the beautiful high terrain at the gateway to the Monadnock Region, you will find 40 kilometers of trails with a variety to please every member of your family. We take special care to provide exceptional grooming, the highest quality rental skis and snowshoes, and a family-friendly handcrafted Base Lodge with healthy food and pleasant wood-heated spaces. We hope you take the short drive to discover our scenic trails that undulate and curve with rhythms and landscapes that	10	No
Windswept Mountains View Christmas Tree	Welcome to the Wind Swept Mountains View Christmas Tree Farm, located in Richmond, NH, where we welcome visitors from Keene to Swanzey, Winchester to Jaffrey, Winchendon to Northfield, and all around the Monadnock region.	7	No

Source: Town of Fitzwilliam website

6.5. Wildlife Watching, Fishing, and Hunting

Hunting, fishing, and wildlife watching are essential contributors to the NH economy. In 2011, these three activities contributed $550 million in direct spending to the NH economy[47]. Wildlife watching accounted for just over half of total direct expenditures at $282 million with 630,000 resident and non-resident participants spending $54 per trip. Fishing accounted for almost 40% of total direct expenditures at $209 million with 228,000 resident and non-resident anglers spending an average of $35 per trip. Hunting accounted for just over 10% of total direct expenditures at $61 million with 56,000 resident and non-resident hunters spending an average of $25 per trip.

Wildlife Watching

The search phrase "wildlife watching fitzwilliam nh" entered into the Google search engine on April 1, 2019 did not return any hits in the first page of results (9 distinct links) that linked wildlife watching recreation opportunities in Fitzwilliam. The tourism and recreation inventory did not indicate any wildlife watching opportunities in the Project footprint. While there may be some wildlife watching activity that does occur in the Project footprint, it is expected to be limited and therefore the Project would not be expected to disrupt any significant economic activity related to wildlife watching in the Project footprint. While it is possible that some of the local area hiking opportunities may result in a view of the Project, they are expected to be limited as the viewshed analysis indicates there will be very few view opportunities to view the Project within the region.

Fishing

There are no significant bodies of water in the Project footprint. Therefore there is not expected to be any change in economic activity due to changes from recreational fishing due to the Project.

Hunting

There is evidence that hunting is active in the Town of Fitzwilliam and the overall region. Between 2010 and 2018, there were an average of 600 adult (antlered) buck kills in Wilderness Management Unit H2 collectively. WMU H2 consists primarily of Cheshire County. Figure 18 provides a map of the WMUs in the southern portion of NH.

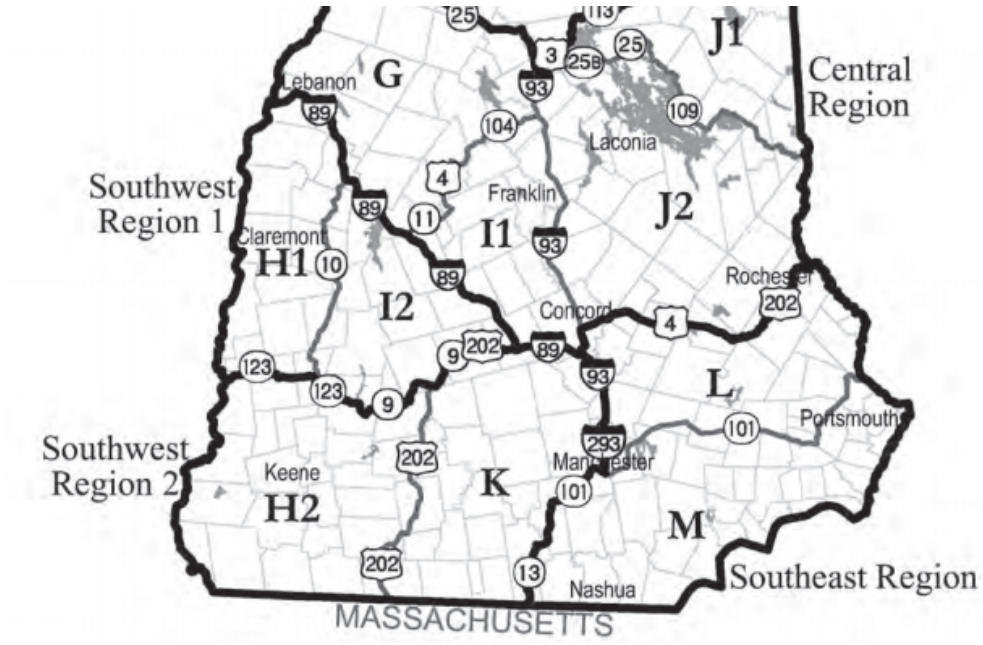
In 2018, there were 1,103 white-tail deer kills, 59 black bear, and 592 turkey kills in WMU H2. During the same time period, there were 72 white-tail deer kills (6% of WMU H2), 6 black bear kills (10% of WMU H2), and 33 turkey kills (6% of WMU H2) in the Town of Fitzwilliam. The total area in Fitzwilliam is 23,000 acres or approximately 5% of the total area in WMU H2 at 460,625 acres. This indicates that hunting activity is slightly elevated in Fitzwilliam relative to the overall region.

It is unknown the extent to which hunting activity takes place in the Project footprint. However, most land in NH is open to hunting unless posted against hunting and there are large undeveloped areas in or near the Project footprint that would be expected to be appropriate for hunting-related activity. In addition a category of current use that land owners can select requires the landowner to keep land open to public use, including hunting. Approximately 96 acres in the Project footprint, fall into this category of use.

The Associated Sportsmans Club Inc. located along Sportsman's Pond in Fitzwilliam (approximately 4 miles from the Project) appears to be active for members and their guests by providing hunting-related training, events, and social gatherings. As of 4/2/2019, there were 120 following a Facebook page maintained by the organization. A review of posts for 2018, did not yield any observations of specific geographic locations in Fitzwilliam for hunting-related

[47] 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: New Hampshire, U.S. Department of the Interior, U.S. Fish and Wildlife Service, U.S. Department of Commerce, U.S. Census Bureau. December 2013. Available on-line at https://wildlife.state.nh.us/funding/documents/usfws-economic-data-2011.pdf

Figure 18: Wilderness Management Units in southern New Hampshire.



Source: NH Fish & Game

activities.

The web search "where to hunt in fitzwilliam nh" on Google on 4/2/2019 did not return any relevant results within the first page (top 9 results). There does appear to be some local businesses that support hunting in the Town of Fitzwilliam and surrounding communities. A home-based federally-licensed firearm dealer was identified. The businesses website (retrieved on 4/2/2019) did not indicate any services specific to hunting other than firearm-related services. A convenience store in Fitzwilliam is one of five deer and turkey check stations in Cheshire County as of 10/31/2018.[48] This location is also a NH Fish and Game license agent. An unofficial Facebook page for the establishment did not have any posts listed as of 4/1/2019. This business is near at approximately 0.6 miles from the Project but not identified as in the Project footprint.

Hunting appears to be an important activity in the local community hosting the Project. The Town of Fitzwilliam has a sportsmen association, and at least two business establishments directly related to hunting activities. Hunting activity is higher per acre in the Town of Fitzwilliam than the overall region. The extent to which the Project marginally prevents access to previously accessible hunting areas may reduce economic activity related to hunting in the Town of Fitzwilliam. There is insufficient information to quantify the potential negative impact, but, if the Project were to limit previous levels of hunting activity, it would be expected to be a relatively small, negative impact most likely within the hundreds to thousands of dollars. Specifically, supporting this conclusion is that the approaches listed in this section did not reveal any marketing materials or informal references to specific hunting locations/paid activities in any location in Fitzwilliam, including the Project footprint. Any actions that Chinook Solar, LLC takes to manage any potential loss of previously accessible hunting areas would be expected to mitigate any potential negative economic impacts from the Project related to hunting activity.

[48] Deer and Turkey Check Stations in New Hampshire, New Hampshire Fish and Game. Available on-line at https://www.wildlife.state.nh.us/hunting/deer-check-stations.html

6.6. Traffic During the Construction Phase

A recent survey of visitors to New Hampshire found that 19% identified traffic delays as a critical or very important barrier to their destination (Nichols Tourism Group, 2015). This leads to the question do construction delays during the construction period of electrical infrastructure cause negative short-term or long-term economic impact to a region's tourism industry? A search of the academic literature did not uncover any studies analyzing the impact of general construction delays on tourism activity.

One area that may provide insight into any potential for traffic delays on tourism areas of cultural and recreational significance is visit activity at national parks in the United States. From 2013 to 2017, visitation to NPS sites in the United States has increased by 20.9% (Rice, Park, Pan, & Newman, 2019). Acadia National Park in Maine, an area of significant natural resources in New England, has grown from 2,504,208 in 2010 to 3,537,575 visits in 2018 (41% increase). During this same time period traffic counts have increased from 284,466 vehicles in 2010 to 370,522 vehicles in 2018 (30% increase). The National Park Service indicates that traffic and congestion are current challenges the Park is experiencing. [49] This is one example where a site with significant natural resources located in New England has not experienced a decline in visitation due to increased traffic levels and the associated congestion. Therefore the experience at Acadia National Park would not support statements that traffic delays always cause a decline in tourism-related activity.

Furthermore, there is evidence that traffic-related delays do and have historically existed in New Hampshire and New England.[50] [51] [52] [53] However, as was observed with Acadia National Park, other factors must exceed any negative impacts as the New England region continues to draw record-levels of tourism activity.

A survey of NH visitors and residents on the NH Rte. 1A/1B corridor (a route running along the NH coastline with tourist attractions including beaches) found that 25% of respondents stated they visit less due to traffic congestion (Wiersma & Robertson, 2003). In this same survey, only 3% indicated that they would not visit the corridor again due to traffic congestion. This same survey found that patterns of use were reported to change including visiting in the off-season, changing times of visitation, and changing days of the week of visitation.

As discussed in the section 6.1 a Traffic Management Plan was not available at the time of this study, however an analysis of AADT (between 4,700 and 5,200 along routes 119 and 12) and estimates of traffic volume by NEE did indicate relatively low overall changes to traffic volume as a result of the Project. NEE has estimated that traffic changes associated with the Project will be approximately 100 vehicles twice per day for workers arriving and leaving the site and 5-10 tractor trailers or flatbeds arriving daily for 3 to 4 months for equipment deliveries. Based on this estimate, traffic would increase by approximately 4 to 5% higher than otherwise would be expected to occur on routes 119 and 12.

NEE has indicated that they do not expect traffic delays from lane or road closures and direct access to the site will be from local roads. NEE also expected that road use would be addressed in a MOU with the town. Peak traffic would be expected through late spring through the fall.

[49] Don't Let Gridlock Spoil Your Acadia Experience, National Park Service. Available on-line at https://www.nps.gov/acad/traffic.htm

[50] Final Environmental Impact Statement. New Hampshire Route 16/US Route 302 Conway Project HDPPE-9117(1), 11339A. US Department of Transportation and NH Department of transportation. October 1995.

[51] Record traffic expected in Maine for Labor Day weekend. Buckle up., Press Herald. August 31, 2018. Available on-line at https://www.pressherald.com/2018/08/31/record-traffic-expected-for-labor-day-weekend/

[52] Maine highway agencies aim to ease traffic woes during Interstate 95 construction. Press Herald. May 15, 2019. Available on-line at https://www.pressherald.com/2019/05/15/maine-highway-officials-aim-to-ease-traffic-woes-during-i-95-construction/

[53] Here's what MassDOT's proposals for improving Cape Cod traffic look like, Boston.com. May 23, 2019. Available on-line at https://www.boston.com/cars/local-news/2019/05/23/cape-cod-traffic-plan-massdot

This analysis suggests that traffic delays do occur in New England and are not viewed favorably by 20 to 25% of the population in the context of visitation. Another finding is that traffic delays may cause lower visitation but that this is not always the case. Furthermore, a poor traffic experience does not necessarily result in long-term avoidance of an area. Based on AADT counts, change in traffic volumes overall during the construction period appear to be low on the major routes in Fitzwilliam. There were no significant tourism or recreation resources identified in the inventory developed that were accessible only through the local roads around the Project. Provided traffic patterns do not result in travel delays along the major routes through the Town of Fitzwilliam, it is unlikely there will be any short-term or long-term decrease in tourism-related visitation to the Town of Fitzwilliam. If there are consistent traffic delays on major routes during the construction period, it may impact visitation to the Town during construction, but is unlikely to cause any long-term changes in visitation. A traffic management plan that is part of a MOU may help to reduce the risk of traffic delays and any associated negative short-term economic impacts from traffic delays.

6.7. NHEC Solar Project

Several economic indicators were collected for the Town of Moultonborough, host of the 2 MW NHEC Solar Project, and Carroll County (the county that Moultonborough is part of). The goal was to identify indications of change in tourism and recreation economic activity as a result of the construction of the NHEC Project.

Meals and Rentals Receipts

Total meal and rentals receipts for the Carroll County region were $258 million in 2016, $279 million in 2017, and $282 million in 2018. The annual growth rate for each year was 4.5%, 5.7%, and 3.5% respectively. While the growth rate in 2018 was lower than the two previous years, there is no indication that this is outside a range that might otherwise be expected as recent years 2011, 2012 and 2015 also experienced growth rates under 4%.

While not a direct indicator of any tourism-related economic impact due to the NHEC Project, the economic activity related to meals and rentals activity for the overall region demonstrated continued growth both during and following the construction of the NHEC Project.

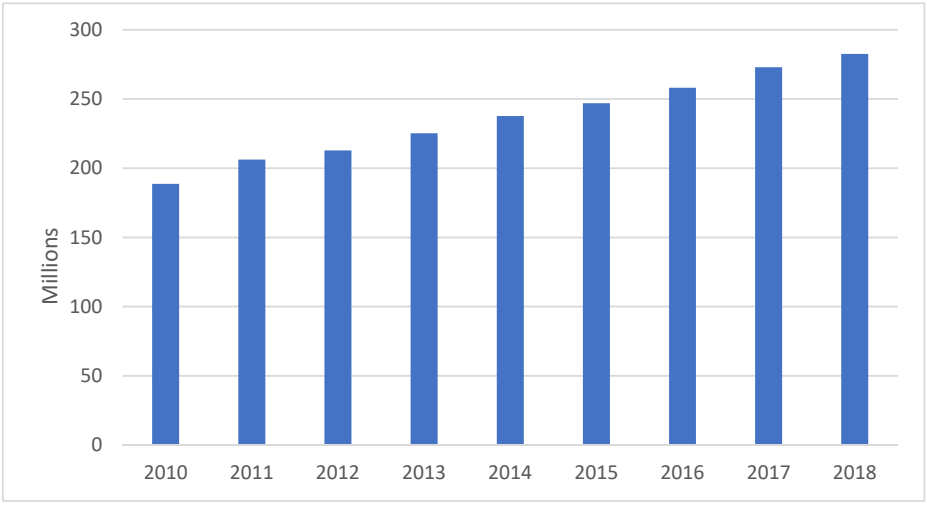
Motor Vehicle Traffic

The level of traffic in the area around the Project and the NHEC Project are similar. The two NHDOT data collection sites closest to the Project are located on Rte 12 and Rte 119.[54]. In 2018, at collector site # 82157059 (NH 12 over Scott Brook), the AADT was 5,230 vehicles and site # 82157054 (NH 119 East of NH 12), the AADT was 4,646 vehicles. This is a similar traffic volume, to the two NHDOT sites closes to the NHEC Project (both occur on the same road as the Project). At site #82313059 (Moultonboro Neck Rd East of Kona Farm Rd) the AADT was 3,379 vehicles and at site #82313051 (Moultonboro Neck Rd South of NH 25(SB-NB)) the AADT was 6,215 vehicles in 2018.

The two traffic sites nearest the NHEC Solar Project indicate a small, but positive increase in average annual daily traffic in the years of construction and post-construction. This does not indicate that construction of the facility caused any significant change to traffic patterns in the immediate or surrounding area as shown in Table 41. Based on the similar volume of traffic and the corresponding characteristics of low visibility of both the NHEC Project and the Project, it is believed that observations of traffic change around the NHEC Project could also be applied to expected traffic patterns around the Project if constructed. Based on the observed traffic patterns immediately

[54] Transportation Data Management System. NH Department of Transportation. Available on-line at https://nhdot.ms2soft.com/tcds/tsearch.asp?loc=Nhdot&mod=TCDS

Figure 19: Total meals and rentals receipts from 2010 to 2018 in Carroll County.



Source: NH Department of Revenue Adminstration

around the NHEC Project, it is not expected that there will be any significant change in traffic volume as a result of the Project during construction or post-construction.

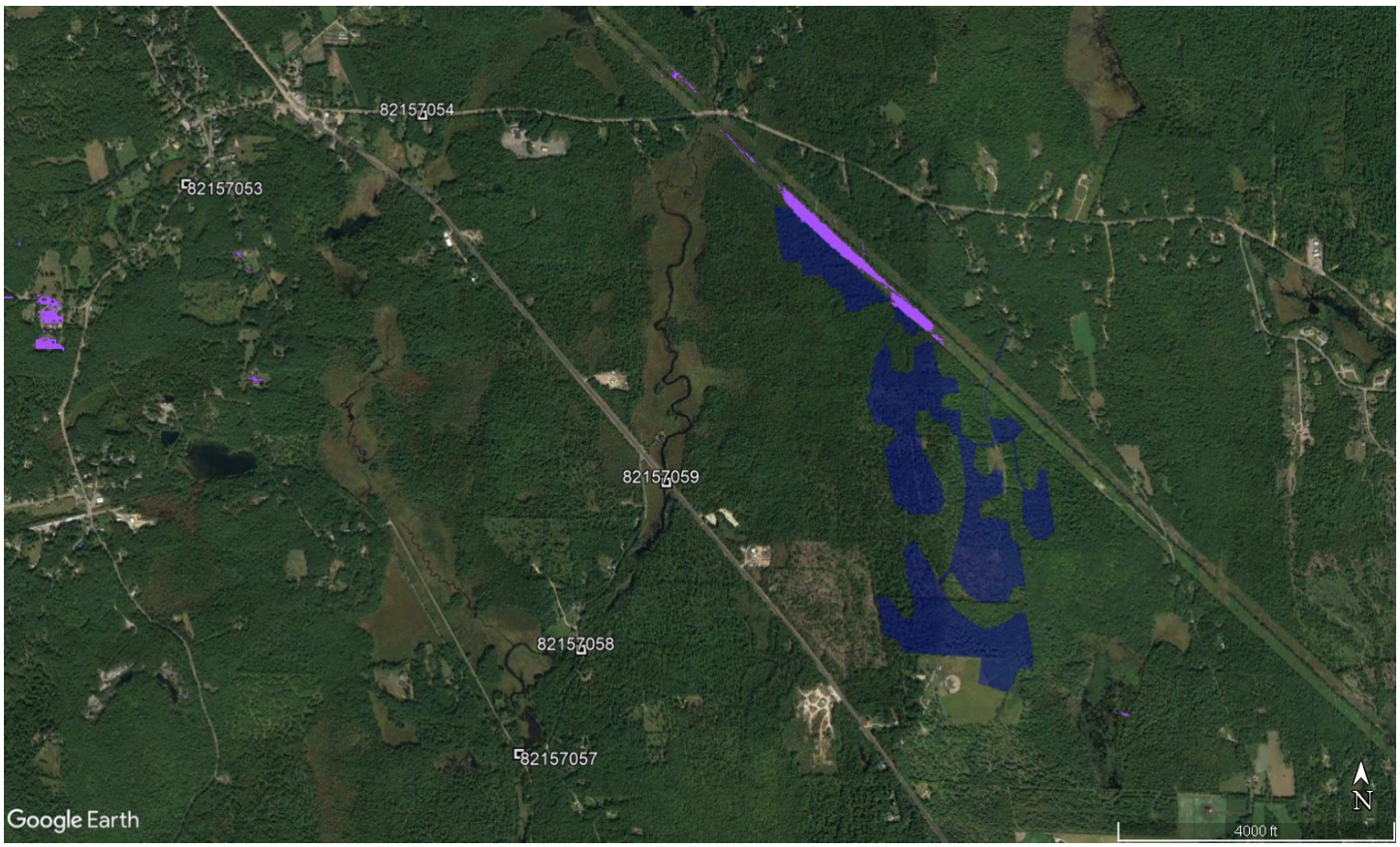
Hunting Activity

Hunting is an activity that occurs in Moultonborough. Hunting kills for deer, black bear and turkey were collected from 2016 to 2018. White-tail deer kills have increased from 70 in 2016 to 121 in 2018. Black bear kills were flat from 7 in 2016 to 7 in 2018 and turkey kills were slightly down from 18 in 2016 to 15 in 2018. None of these kill statistics demonstrate a significant downward drop and therefore it is unlikely that the NHEC Project had an impact on hunting activity during that time period. Therefore it is not expected that there were any economic impacts due to changes in hunting activity as a result of the construction of the NHEC Project.

Additional Supporting Information

The administration of the Town of Moultonborough appears to have been active in ensuring the NHEC Project integrated well into the community. A search for the word "solar" in the Town of Moultonborough's website retrieved 83 documents. Of those retrieved documents, each was reviewed, and a total of 22 documents were selected as having a non-trivial reference to the NHEC Project installation. None of those documents indicated any change in tourism or recreation activity due to the facility during or after construction.

Figure 20: NH DOT traffic monitoring sites in Fitzwilliam, NH.



Source: NH Department of Transportation

6.8. Tourism & Recreation Conclusion

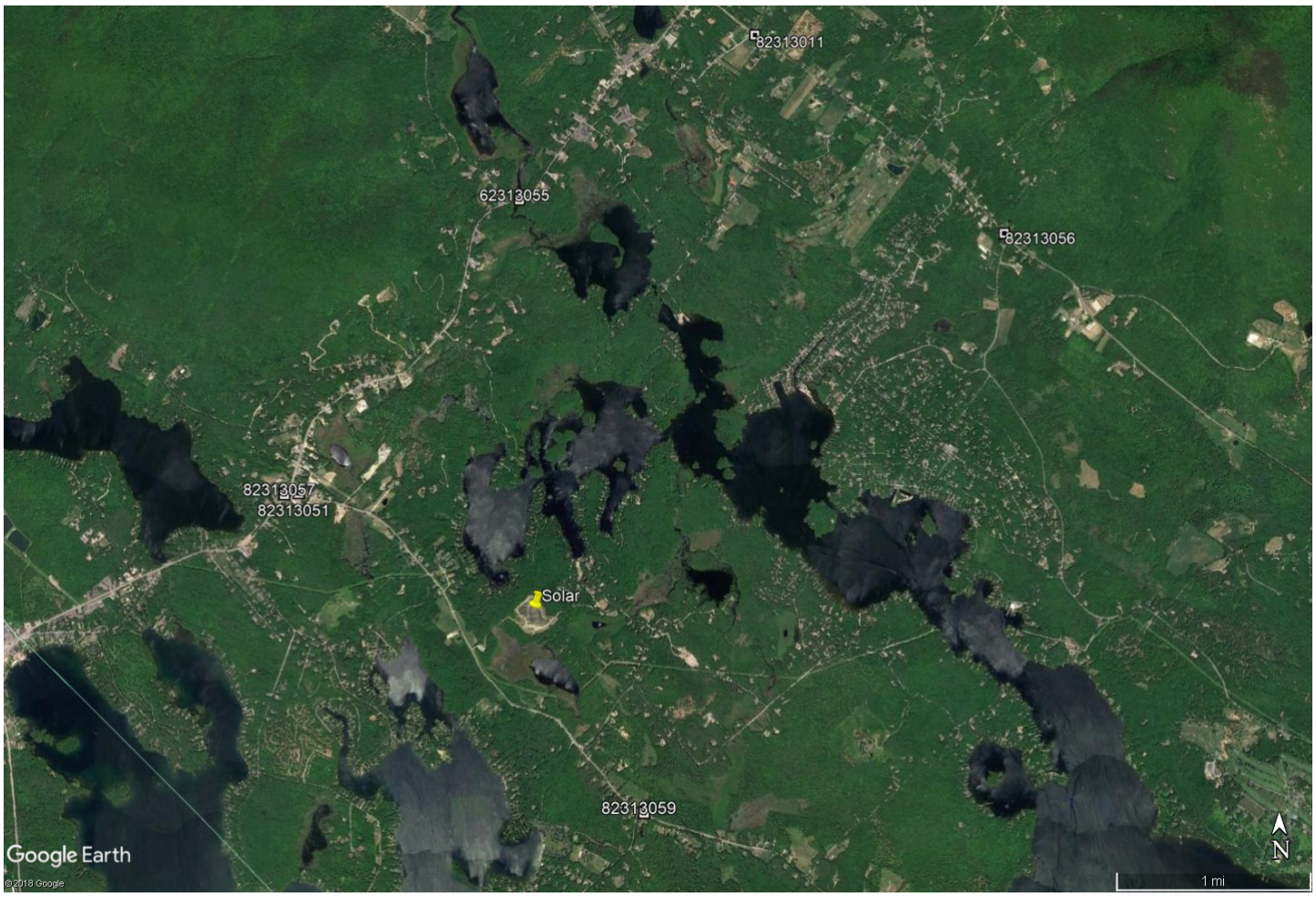
Tourism and recreation make up a significant portion of the New Hampshire economy and the sector shows continued strength and growth. A strength of New Hampshire is its ability to draw visitors to enjoy its rich and aesthetic outdoor resources. Therefore, it is important to ensure that any development that may potentially impact natural resources is evaluated.

Drawing on the research performed in relation to tourism and wind farms, there is no conclusive evidence to suggest that renewable energy infrastructure has a significant net impact (either positive or negative) on tourism and recreation. This finding coupled with the results of the intercept survey on Mount Monadnock are not indicative of the Project having an economic impact on tourism or recreation.

The Town of Fitzwilliam and the surrounding region provide many different recreational and tourism opportunities involving the outdoors. An analysis of business composition and measures of tourism-spending indicates that the region may be slightly more dependent than the overall state on tourism and recreation.

An inventory constructed from resources highlighted on the Town of Fitzwilliam website resulted in a total of 7 visitor attractions in Fitzwilliam and 10 visitor attractions outside of Fitzwilliam. No resource was identified as being in the Project footprint. Other than Mount Monadnock and Telemark Hill, none of the other tourism resources identified are believed to have a view of the Project. The low visibility of the Project would not be expected to negatively

Figure 21: NH DOT traffic monitoring sites in Moultonborough, NH.



Source: NH Department of Transportation

impact any of the attractions referenced.

The Town of Fitzwilliam does have a slightly above average rate of hunting activity. It is possible that if the Project limits access, it may reduce hunting activity that could have a small negative economic impact. The extent to which the Chinook Solar, LLC provides access to areas adjacent to the facility may mitigate or negate the negative impact.

An analysis of the 2 MW NHEC Project constructed in 2017, did not give any indication of changes in tourism related expenditures, or motor vehicle traffic. In addition, hunting activity in Moultonborough did not demonstrate any negative impacts.

While there is mixed evidence as to whether or not traffic congestion impacts visitation, a consistent connection between traffic congestion and visitation has not been established. It appears that the Project will result in a 4 to 5% increase in traffic volume during the construction period on the major routes in Fitzwilliam. NEE has stated that it does not anticipate any traffic delays during the construction period due to vehicles associated with the Project. Any short-term delays experienced during the construction period would not be expected to cause any long-term changes to visitation to the area. A well-developed traffic management plan may help mitigate any traffic delays in the area.

Based on a combination of information obtained from the literature search combined with actual observations of the

Table 41: Average annual daily traffic at sites in or near Moultonborough from 2015 to 2018.

ID	Year			
	2015	2016	2017	2018
82313011	4,673	5,687	5,795	5,882
82313051	5,399	6,009	6,123	6,215
82313056	3,900	4,013	4,089	3,986
82313059	2,248	2,313	3,329	3,379
82313060	980	1,008	1,027	1,072

Source: NH Department of Transportation

Table 42: Hunting kills in the Town of Moultonborough from 2016 to 2018.

Species	2016	2017	2018
White-Tail Deer	70	92	121
Black Bear	7	4	7
Turkeys	18	12	15

characteristics of the local area around the Project, and observations of activity around one of the largest utility-scale solar projects in NH, it is not expected that the region will experience a significant economic impact (positive or negative) in tourism and recreation as a result of the Project.

7. Community Services and Infrastructure

The potential impacts on community services and infrastructure from the Project were analyzed as part of this study. Given that the Project is completely located within the Town of Fitzwilliam and the low visual impact of the Project (as discussed in Section 5.5), the analysis of community services impact focuses solely on the host community of the Project, the Town of Fitzwilliam.

7.1. Approach

The following approach was taken towards developing an opinion of the potential impacts on community services and infrastructure in the Town of Fitzwilliam from the Project. Documents originating from several NH towns' websites were reviewed to identify stated impacts to community services and infrastructure related to utility-scale solar.

Two NH towns identified as having publicly available documents involving large solar projects in their communities were Moultonborough and Hinsdale. The 2 MW NHEC Solar Project was constructed in 2017 in the Town of Moultonborough. Municipal documents were reviewed including the Town of Moultonborough's Annual Reports to identify if any community services were impacted by the NHEC Project. While the Town of Hinsdale has yet to have a utility-scale solar project constructed within it, at least two large solar projects have been proposed in Hinsdale. Documents were reviewed to identify any mention of community services impacts and associated costs anticipated from proposed large solar projects. Public records from the Town of Fitzwilliam's website were also reviewed to identify any expectations of the community of impacts on services and infrastructure related to the Project.

Supplemental resources were consulted for any potential areas of impact identified to attempt to determine the likelihood of occurrence and the potential costs or benefits associated with the impact. The final step in the community services analysis was to draw upon what was learned from the analysis of these resources to form an opinion of potential changes to community services and infrastructure resulting from the Project.

7.2. Town Document Review

Town of Moultonborough

Documents from the Town of Moultonborough's website were reviewed to ascertain if the 2MW NHEC Project, currently one of the largest solar installations in NH, had resulted in any stated impact to community services or infrastructure. The Town Annual reports for 2016, 2017, and 2018 were reviewed for any mention of the NHEC Project. This review of the Town Annual Reports included but was not limited to examining the following sections:

1. the Board of Selectmen Chairman's report,
2. the Town Administrator's report,
3. Town warrant articles,
4. the Independent Auditor's report
5. the Town Assessor report

6. the Fire/Rescue Department & Emergency Services Department report

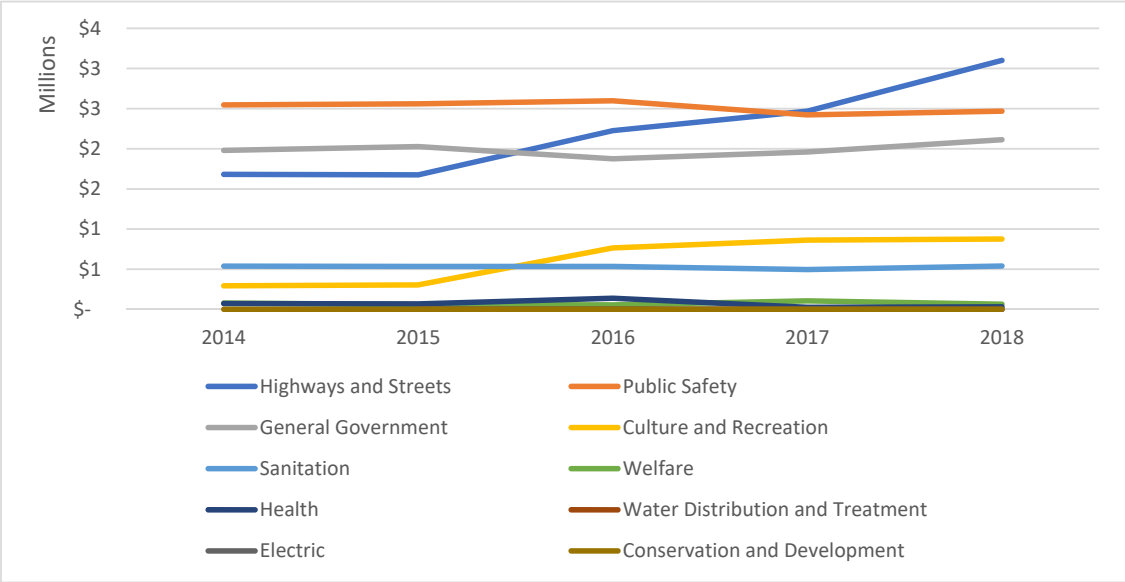
In reviewing the Town Annual Reports for 2016, 2017, and 2018, there did not appear to be any direct references to the NHEC Project impacting town services, or of costs to the Town associated with the NHEC Project. Actual expenditures for years 2014 through 2018 were collected from the Town's MS-636 form submission to the NH Department of Revenue in the appropriation categories of: highways and streets, public safety, general government, culture and recreation, sanitation, welfare, health, water distribution and treatment, electric, and conservation and development. Out of these categories, the three largest categories of expenditures of appropriations in 2018—highways and streets at $3.1 million, public safety at $2.5 million, and general government at $2.1 million—all experienced increases from 2017 (the year the NHEC Solar Project was completed). Only highways and streets appears to be growing outside the range in expenditures observed since 2014. The relevant sections of the town annual report for the corresponding year were reviewed. None of the narratives associated with these appropriation areas contained information that would lead one to conclude that the NHEC Project was a factor for any of the increase in cost.

Table 43: Actual expenditures by appropriation category by year in Moultonborough.

Appropriation	2014	2015	2016	2017	2018
Highways and Streets	$ 1,681,279	$ 1,675,328	$ 2,225,219	$ 2,469,102	$ 3,100,629
Public Safety	$ 2,546,635	$ 2,559,832	$ 2,597,347	$ 2,422,529	$ 2,468,229
General Government	$ 1,979,239	$ 2,027,132	$ 1,874,622	$ 1,960,312	$ 2,113,026
Culture and Recreation	$ 292,830	$ 305,042	$ 765,264	$ 862,138	$ 875,273
Sanitation	$ 537,532	$ 533,024	$ 534,502	$ 495,214	$ 539,634
Welfare	$ 78,450	$ 57,847	$ 55,460	$ 105,789	$ 63,418
Health	$ 71,410	$ 67,309	$ 138,665	$ 25,000	$ 30,300
Water Distribution and Treatment		$ -	$ -	$ -	$ -
Electric		$ -	$ -	$ -	$ -
Conservation and Development	$ -	$ -	$ -	$ -	$ -

Source: Town of Moultonborough, Seacoast Economics

Figure 22: Actual expenditures by appropriation category by year in Moultonborough.



Source: Town of Moultonborough, Seacoast Economics

A separate search for the case-insensitive term "solar" in the Town of Moultonborough's website retrieved 83 documents. Of those retrieved documents, each was reviewed, and a total of 22 documents were identified as having a non-trivial reference to the NHEC solar project installation. The administration of the Town of Moultonborough appears to have been active in ensuring the NHEC Project integrated well into the community. In general, there were no direct costs listed and planning activities involved the Town Administrator, Planning Board, Town Planner, and Town Engineer. However, the Planning Board did request up to $4,000 in funds to have the Town Engineer, KV Partners, monitor, on the Town's behalf, the construction activity at the NHEC Project.[55]

Town of Hinsdale

The Town of Hinsdale, with a population of 4,046 as of the 2010 U.S. Census, is located in Cheshire County, NH along the Connecticut River. Public documents including meeting minutes from the Town of Hinsdale website were searched for the case-insensitive term "solar". Out of a total of 584 documents, 72 contained a case-insensitive match for solar. Review of the documents revealed two commercially driven proposed solar projects that were discussed in meeting minutes on more than one occasion.

One project proposed by NH Solar Gardens was requesting a variance for a 1 MW project covering 0.5 acres on 10.15 acres of private land on November 13, 2014.[56] In the Zoning Board's finding of facts on this project, there were no direct costs or impacts on community services mentioned. The variance was approved unanimously by the board. Following the variance approval, through 2015 and 2016, there were additional meetings advancing the project involving the Planning Board, Town Assessor, Town Engineer and Board of Selectmen. The only cost mentioned was an escrow fee (amount not disclosed) related to the Town's Engineer review of the proposed Site Plan which apparently was paid by NH Solar Garden.[57]

The second commercial project identified in retrieved documents was the Chariot Solar project. This town was selected for further review because the company Ranger Solar introduced a 65 MW solar project Chariot Solar, LLC which the Board of Selectmen voted to support in January, 2017.[58] The project has since been acquired by NEE, and is currently being developed as a 50 MW project. The Chariot project is in early development and has not yet applied for permits. As was the case for the NH Solar Garden project, Town administration appeared to be involved in managing aspects of community development. The documents reviewed indicated a specific focus on the terms of a payment in lieu of tax (PILOT) agreement. For both projects, there were no retrieved documents reviewed that referenced direct or indirect costs or impacts to community services anticipated by the Town.

Town of Fitzwilliam

Meeting notes that had a non-trivial reference to the case-insensitive search term "solar" were reviewed on the Town's website. The minutes do not appear to discuss any long-term direct costs or anticipated community service changes required due to the Chinook Project. However, a review of the minutes did indicate that there may be short-term direct costs such as acquiring professional services, including an attorney, to assist the Town in its deliberations on the Project and material costs for information dissemination to the community.

Specific documents reviewed as part of this study include:

[55] Selectmen's Work Session, Town of Moultonborough, NH, Feb. 23, 2017. Available on-line at https://www.moultonboroughnh.gov/sites/moultonboroughnh/files/minutes/bosminutes02232017_0.pdf

[56] Zoning Board of Adjustment, Town of Hinsdale, Nov. 13, 2014. Available on-line at https://www.town.hinsdale.nh.us/vertical/sites/%7B8C942171-06B1-40C3-B454-A57F3BF70DA5%7D/uploads/11-13-14_ZBA_Minutes.pdf

[57] Planning Board Meeting, Town of Hinsdale, May 19, 2015. Available on-line at https://www.town.hinsdale.nh.us/vertical/sites/%7B8C942171-06B1-40C3-B454-A57F3BF70DA5%7D/uploads/5-19-15_minutes(1).pdf

[58] Selectmen's PUBLIC HEARING Minutes. Town of Hinsdale, Jan. 30, 2017. Avaliable on-line at https://www.town.hinsdale.nh.us/vertical/sites/%7B8C942171-06B1-40C3-B454.-A57F3BF70DA5%7D/uploads/Minutes-PUBLIC_HEARING-20170130(1).pdf

- Minutes approved as amended February 5, 2019, Town of Fitzwilliam Planning Board Meeting Minutes January 15, 2019 [59]
- Chinook Solar Project Meeting with Fitzwilliam Planning Board, Select Board, and Conservation Commission January 15, 2019 Meeting Notes by Chinook Solar, LLC [60]
- Board Meeting Minutes February 19 ,2019 9:00 A.M., Board of Selectmen [61]
- Board Meeting Minutes May 30, 2019 9:00 A.M., Board of Selectmen [62]
- Board Meeting Minutes June 4, 2019 1:00 P.M., Board of Selectmen[63]

The Town Annual Reports for 2016, 2017, and 2018 were reviewed. There did not appear to be any explicit mention of community service impacts or expected new costs directly attributed to the Project.

It was noted that the Town of Fitzwilliam appears to have limited resources for emergency services. In the 2018 Town Annual Report, the Fitzwilliam Fire Department indicated that personnel limitations combined with escalating call volumes presented a challenge, as evidenced by the following reported statistics: "(i)n 2008 we had 30 members and 269 calls, in [sic] 2018 we have 21 members and had 407 calls." It was noted that the Town of Fitzwilliam is a member of the Southwestern District Fire Mutual Aid System (which lists 76 communities on the Agencies page for the mutual aid system web site) and due to understaffing relies on mutual aid to meet its call volume. Additionally the 2018 Town Annual Report states: "(t)he Board of Selectmen have worked with the Board of Firewards in efforts to strengthen the ambulance and emergency care programs as calls continue to increase. The Selectmen are recommending adding a new position for a part-time Fire Chief and per diem personnel during the week to ensure we have coverage for the Towns people."[64] The Fitzwilliam Fire Department is a paid on-call department.

7.3. Community Impact Areas

7.3.1 Administration, Conservation Committees, Town Clerk, and Planning/Zoning

With any significant infrastructure project, including utility-scale solar, that may impact a community, it is reasonable to expect that town administrators and other general administration positions would have some level of involvement in the project, specifically during the review/proposal phase and the construction phase. For example, in the Town of Moultonborough, the general administration of the Town appears to have had an active role in communicating with the NHEC. In general, the administration's involvement would be expected to diminish as the solar project is completed and is successfully integrated into the host community.

Other areas of town management and administration that could become involved during a solar project are conservation committees if environmental, cultural, or historical resources may be impacted or planning and zoning boards

[59] https://fitzwilliam-nh.gov/vertical/sites/%7B5152AF08-0D8E-4832-8682-9F3DC8413E4B%7D/uploads/PB_Minutes_011519(1).pdf.

[60] https://fitzwilliam-nh.gov/vertical/sites/%7B5152AF08-0D8E-4832-8682-9F3DC8413E4B%7D/uploads/Chinook_Solar_Project_-_January_Meeting_Summary_Notes.pdf

[61] https://fitzwilliam-nh.gov/vertical/sites/%7B5152AF08-0D8E-4832-8682-9F3DC8413E4B%7D/uploads/BOS021919(1).pdf

[62] https://fitzwilliam-nh.gov/vertical/sites/%7B5152AF08-0D8E-4832-8682-9F3DC8413E4B%7D/uploads/BOS053019.pdf

[63] https://fitzwilliam-nh.gov/vertical/sites/%7B5152AF08-0D8E-4832-8682-9F3DC8413E4B%7D/uploads/BOS060419.pdf

[64] Annual Reports of Fitzwilliam N.H. 2018, Town of Fitzwilliam. Available on-line at https://fitzwilliam-nh.gov/vertical/sites/%7B5152AF08-0D8E-4832-8682-9F3DC8413E4B%7D/uploads/2018_Annual_Report_-_Merge_-_FINAL(1).pdf

to review any zoning impacts associated with the infrastructure project. The expectation is that individuals in these positions, either paid or volunteer, are available to be involved in any development project experienced by the community. One potential impact is that any demands on the time of individuals serving on these boards caused by such projects could prevent the timely review and interaction with other community projects. In addition, if the size or complexity of a project exceeds the ability or expertise of the existing community to review and provide appropriate oversight, additional resources, including consultants may be required.

It is possible that during the planning and construction phase of the Chinook Project that town officials are cognizant that general administration resources in the Town of Fitzwilliam may be challenged by the scope and expertise required for the Project. This observation is based on review of the minutes and notes of meetings where members of the general administration in the Town expressed unfamiliarity with operational and financial aspects of the Project including a PILOT agreement. Consultants to support the development of the PILOT agreement and an MOU may benefit the Town in achieving the best outcome. This would come with a short-term additional cost in professional services for the Town.

The time commitment for general administration is expected to be minimal during the operational phase of the Chinook Project. Supporting this statement is the minimal discussion in minutes in the Town of Moultonborough, during the operation phase of the NHEC Project.

7.3.2 Assessment Services

There are two areas where utility-scale solar projects have the potential to put demands on assessment services within a community: 1) abatement requests by property owners who perceive that they have been negatively impacted by a project, and 2) electrical infrastructure valuation. Abatement requests by property owners may occur during the construction phase or soon after the end of the project phase but are unlikely to be on-going over time. While it is possible that some abatement requests may be made, they are not expected to be of significant volume and not expected to have an impact on community-wide valuation given the limited visual characteristics associated with the Chinook Project. Magnusson (2012) reported that two abatement requests were filed after the construction of the Lempster Wind Project. So there is the potential for a renewable energy project to generate abatement requests.

There may be a marginal cost to the Town of Fitzwilliam if abatement requests carry an additional cost for their assessment service provider. The expenses related to abatement requests by property owners are expected to be minimal, especially given the limited visual characteristics of the Project. However, utility valuation may be an additional expense that could have an additional cost for assessment, legal, consulting, or other professional services. This expense may or may not occur, as it depends on how the Town and Chinook Solar, LLC coordinate on valuation, including the development of a PILOT.

7.3.3 Economic Development

Economic development is an area of interest for the Town of Fitzwilliam as indicated by the presence of a standing Economic Committee page on the Town website. The stated mission of the committee is as follows: "(i)t is the mission of the Fitzwilliam Economic Committee to enhance the vitality of the local economy by attracting new businesses, supporting existing businesses and attracting complementary commerce. We seek to build community by strengthening relationships while preserving the rural character of the town."[65]

[65] Mission Statement, Town of Fitzwilliam. Available on-line at https://fitzwilliam-nh.gov/?SEC=FE18EC4D-0932-49DF-AA55-1E42AF7FD6C5

Table 44: 2018 actual expenditures in the Town of Fitzwilliam excluding capital reserves, debt service, operating transfers out, and payments to other governments.

General Government	$559,407
Public Safety	$472,490
Highways, Streets, Bridges	$405,637
Sanitation	$127,979
Health	$16,829
Welfare	$3,761
Culture & Recreation	$172,513
Total	$1,758,616

The characteristics of the Project do not appear to be at odds with the stated economic development goals. Given that a significant portion of the property in the Project footprint is in current use and undeveloped, it does not appear that the site is a high economic development zone that could displace other economic development projects. Therefore, it is not expected that the Chinook Project will negatively impact future economic development in the Town of Fitzwilliam. In fact, the Project may serve to support the economic development as highlighted in the Economic Committee's mission statement.

7.3.4 Tax Revenue

A PILOT agreement is being developed by Chinook Solar with the Town of Fitzwilliam, and the increased funding that would result from anticipated PILOT payments from the Project would be expected to positively impact the economic health of the Town. The funds would provide additional financial flexibility to the Town of Fitzwilliam which could be applied in different combinations in the areas of property tax reduction and/or increased services for the Town.

The PILOT payment amount assumed in this analysis was $300,000. In 2018, the town expended $1,758,616 for the town operations excluding capital reserves, debt service, operating transfers out, and payments to other goverments.[66] The categories included are listed in Table 44 and were selected to indicate on-going expenses related to town provided services. A PILOT payment of this magnitude is equivalent to approximately 17% of those 2018 expenditures.

7.3.5 Emergency Responder Services

There may be impacts on emergency responder services during the construction phase.[67] Emergency responder services consist of EMT, firefighter, and police services all who will need continued access to properties within the construction area is an area of importance to emergency responders. It is likely that any potential negative impact to emergency responder access can be mitigated through developing communication channels prior to construction and having construction management maintain good communication during the entire project phase. Emergency responders may need construction crews to make some accommodations including vehicle placement and construction structures such as steel plating to ensure access. Failure to implement these steps increases the risk that emergency

[66] Annual Reports of Fitzwilliam N.H. 2018, Town of Fitzwilliam. Available on-line at https://fitzwilliam-nh.gov/vertical/sites/%7B5152AF08-0D8E-4832-8682-9F3DC8413E4B%7D/uploads/2018_Annual_Report_-_Merge_-_FINAL(2).pdf

[67] Emergency Response Planning for Construction Projects, Provincial Labour-Management Health and Safety Committee, 2003. Available on-line at https://www.ihsa.ca/PDFs/Products/Id/B030.pdf

responders would be unable to respond to emergencies in a timely manner. This is a risk that most likely can be mitigated with appropriate project management practices.

Another area that may place demands on police services during the construction phase are traffic management for any changes in traffic flow caused by construction activity and monitoring of construction sites for non-authorized use, vandalism, and theft.[68] It is anticipated that as part of the construction plan these issues would be addressed with the Fitzwilliam Police Department to ensure that they are appropriately managed. If they are not appropriately addressed then there is an increased risk of additional labor resource pressure on police forces and/or traffic disruptions which would negatively impact the overall community reliant on properly flowing traffic in the vicinity of the construction area.

In addition, the Fire Department of the Town of Fitzwilliam and/or the State Fire Marshal may need to review the construction plans to ensure that they meet fire safety requirements for the community. While this could be an additional labor requirement for the Department or the Fire Marshal, it is not anticipated that it would generate any extra cost to the community.

Wildfire Risk

Upon the completion of the construction phase of the Chinook Project, the potential short-term demands on emergency responders would be expected to end. However, certain risk characteristics of the Project may require longer term planning and training by emergency responder services. One risk area that involves any electrical infrastructure in undeveloped areas are wildfires. In 2017, the National Fire and Aviation Management Web Applications (FAMWEB) data warehouse listed 69 wildfires in NH.[69] Of the 69, two were recorded as being caused by power lines, impacting a total of 0.3 acres. Between 2009 and 2017, there have been a total of 24 wildfires in NH attributed to power lines, impacting a total of 18 acres, or 0.7 acres on average.[70]. These statistics do not provide a count of wildfires caused by electrical generation facilities with power lines as the only clearly identified cause related to electrical infrastructure.

A review of news articles found that there have been some instances of structural fires started by solar panels in Massachusetts and New Hampshire.[71] [72] A study of roof-top solar in Italy also identified that there is a potential fire hazard, however, these appeared to be caused by improperly wired panels (Fiorentini, Marmo, Danzi, Rossini, & Puccia, 2016). A factor limiting the fire potential of solar panels is the low presence of flammable materials in the panels.[73] A report developed by the Fire Protection Research Foundation concluded that "the benefits of harnessing solar energy often outweigh the barriers, yet solar power systems are introducing new and unexpected hazards to firefighters and other emergency responders."[74] The Solar Energy Industries Association states that it is rare for solar equipment to start a fire but is possible if there are improper connections or other electrical or fire

[68] Meeting the Customer's Needs for Mobility and Safety During Construction and Maintenance Operations: Model Work Zone Traffic Management Program and Self Evaluation Guide, U.S. Department of Transporation, 1998. Available on-line at https://www.fhwa.dot.gov/reports/evalgd.pdf

[69] National Fire and Aviation Management Web Applications. Available on-line at https://fam.nwcg.gov/fam-web/

[70] Total Acres Burned by State by Year by Cause of Fire, Public Access Reports, Fire Reports, NASF, National Fire and Aviation Management Web Applications

[71] Solar-panel fires concern local officials: Electricity-generating devices can make fighting blazes more difficult, Lowell Sun, Jun 27, 2016. Available on-line at http://www.lowellsun.com/todaysheadlines/ci_30061421/solar-panel-fires-concern-local-officials

[72] Popularity of rooftop solar arrays posing challenges for firefighters, Keene Sentinel. Oct 9, 2017. Available on-line at https://www.sentinelsource.com/news/environment/popularity-of-rooftop-solar-arrays-posing-challenges-for-firefighters/article_4cd30b84-284f-55cb-a0c6-ffc5ac3596ec.html

[73] Health and Safety Impacts of Solar Photovoltaics, NC Clean Energy Technology Center, May 2017. Available on-line at http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2017/10/Health-and-Safety-Impacts-of-Solar-Photovoltaics-2017_white-paper-1.pdf

[74] Grant, C. C., and United States. (2013). Fire Fighter Safety and Emergency Response for Solar Power Systems. Quincy, MA: The Fire Protection Research Foundation. Available on-line at https://www.solsmart.org/media/FPRF_FireFitherSafety.pdf

hazards present.[75] There also is the risk that a pre-existing fire that impacts a solar installation may introduce risk to emergency responders including potentially charged PV infrastructure.

Considering the experience in Moultonborough for emergency responders, after the completion of the 2 MW NHEC Project in 2017, the Moultonborough Fire & Emergency Services Department conducted a walkthrough of the facility with NHEC staff. As of August 2019, a specific emergency response plan exclusive to the NHEC Project has not been developed and if there were an on-site fire-based incident the stated strategy would be to use emergency resources to contain the spread of the fire. There was no direct cost for training or plan development for the Town of Moultonborough as a result of the construction of the NHEC Project. To-date, there has not been a fire incident at the NHEC Project.[76]

A potential impact to emergency services may be that the Town of Fitzwilliam reviews any current emergency management plans for managing fires caused by electrical infrastructure including the Chinook Project. This may involve the development of an emergency response plan for the facility with associated training provided to the Southwestern District Mutual Aid System. There may be costs associated with this type of planning.

7.3.6 Consulting, Legal Services, and other Professional Services

In general, consulting, legal, and professional services is an area that municipalities have expended funds on related to general electrical infrastructure. Two areas of expenditures for legal expenses have included: 1) professional services during planning/development of the project, and 2) electrical asset valuations for assessment purposes. There is evidence that utility valuations can be an added cost and add uncertainty to community finances.[77] [78] [79].

A PILOT agreement and/or MOU between the Town and Chinook Solar, LLC are under negotiation which would be expected to reduce the likelihood of these type of expenses for the Town.

7.3.7 Parks & Recreation

In conducting the resource inventory there is no indication that formal community recreation takes place in the Project footprint. There are no short-term or long-term impacts anticipated to community recreation in the Town of Fitzwilliam due to the Project.

7.3.8 Waste

In the Annual Reports reviewed for the Town of Moultonborough there is no indication that waste services were required or impacted by the NHEC Project. There are no community waste resources located in the Project footprint and the expectation is that any on-site waste generated by the Project would be disposed of properly at its own

[75] Fire Safety & Solar, Solar Energy Industries Association. Available on-line at https://www.seia.org/initiatives/fire-safety-solar

[76] Telephone conversation with Moultonborough Fire Chief/Forest Fire Warden David Bengtson on August 30, 2019.

[77] N.H. Supreme Court Accepts Big Utilities Tax Appeals, Society for the Protection of New Hampshire Forests. Available on-line at https://forestsociety.org/news-article/nh-supreme-court-accepts-big-utilities-tax-appeals

[78] Town Reaches Settlement on Excess Taxes for Power Plant: A New Hampshire town has reached a settlement with the state's largest utility to repay millions in excess taxes on a local power plant. U.S. News. Available on-line at https://www.usnews.com/news/best-states/new-hampshire/articles/2019-07-03/town-reaches-settlement-on-excess-taxes-for-power-plant

[79] Legislative Bulletin, Bulletin 10, 2018 Session, Feb. 23, 2018. Available on-line at https://www.nhmunicipal.org/Resources/LegislativeBulletin/155

expense and therefore not impact community services related to waste. There are therefore no short-term or long-term impacts anticipated to waste services in the Town of Fitzwilliam due to the Chinook Project.

7.3.9 Water or Sewage

The Town of Fitzwilliam does not provide public water or sewer services. NEE has indicated that the characteristics of the Project will not generate any additional significant demands on the community for water or sewage services.

7.4. Community Services Conclusion

This analysis identified some areas of potential community impact with tangible costs. The first is near-term consulting assistance for the Town to ensure that it is able to develop a PILOT and MOU with Chinook Solar, LLC that provides the best terms possible for the Town, while also allowing Chinook Solar to economically pursue the Project. The areas related to planning and oversight identified where professional consulting services are expected to be most important include assessment, legal, and engineering. A well-developed PILOT and MOU under development may help to mitigate potential current and longer term costs in legal and other professional services. NEE also has indicated that it has provided funding to cover legal and consulting services during project development and NH SEC application review.

Another area of potential future impact identified is long-term emergency management planning. Review of the Town Annual Reports indicates that members of the Town of Fitzwilliam Fire Department would likely be under resourced in the event of a significant wildfire event, and that the Town participates in a mutual aid program to support the Town's emergency service needs. Additional financial resources may be required for an emergency plan to be developed that identifies any resource gaps in the Town of Fitzwilliam's emergency services and that coordinates the resources of the departments in the mutual aid program.

The increased funding that would result from anticipated PILOT payments would be a positive economic factor for the Town. The funds would provide additional financial flexibility to the Town which could be applied in different combinations in the areas of property tax reduction and/or increased resources/services for the Town of Fitzwilliam.

8. Economic Impact Study Conclusions

In conclusion, the Chinook Project is expected to bring a net positive economic impact to the Town of Fitzwilliam, and the overall state. The construction period is expected to have the greatest benefits by supporting approximately 95 FTE jobs (of which 60 jobs are expected to be in construction) and over $8 million in economic value to the overall state economy. The development phase of the Project (prior to construction) is also significant, supporting almost 11 jobs and $1.1 million in economic value added in NH. After the construction period, there is a net positive impact where the Project is expected to support 5.7 to 7.1 FTE jobs supporting an an additional $0.6 to $0.7 million in economic value to the NH economy annually. A PILOT payment would provide a direct economic benefit to the Town of Fitzwilliam. These funds would provide flexibility to the town and could be allocated to increase community services or to help offset property taxes.

There is evidence that a local skilled workforce is present to participate in the Project. Businesses in the local region could reasonably be expected to be competitive to work on the Project. To the extent that Cheshire County contractors are employed on the Project, the greater the extent the economic benefits concentrate in the local region.

Areas of potential concern relative to the Chinook Project include: 1) negative impacts on property values due to visual impacts, 2) reduced tourism and recreation activity caused by avoidance of views of the Project, and 3) increased costs for community services and infrastructure due to the construction and operation of the Project.

As discussed in the report:

- There is no evidence based on observable economic data to indicate a wide-spread, consistent change in residential and commercial property values due to the Project.
- There is no evidence based on observable economic data to suggest that the Project would cause a change (positive or negative) in tourism and recreation activity.
- There is evidence that the management of the Project by the Town of Fitzwilliam (host community) may require additional professional services up through the construction period of the Project. Chinook Solar has provided funds to the Town of Fitzwilliam to mitigate these costs.
- Given the limited resources of emergency management in the Town of Fitzwilliam, additional resources and training may be required for emergency management so that the Town is well-prepared to respond in the event of an incident at the Project.
- The potential additional costs to the town for short and long-term community services were not quantified in this study, but could potentially be at least in the tens of thousands of dollars.

The Project has a low-visibility profile and will be built on land almost all of which will be owned by the developer. This would be expected to mitigate any potential impacts to housing or tourism/recreation even if negative impacts were known to be associated with utility-scale solar. However, as discussed in this study, there is no evidence based on observed economic data to indicate that any utility-scale solar facility, including the Chinook Project, would result in wide-spread, negative impact to real estate or tourism and recreation related resources. While it is possible that the Chinook Project could have an isolated impact on a property or tourism-related resource, it is not believed to be likely. More concretely, given the information reviewed in this study, it is believed that the Chinook Project will bring positive economic impact to the local and state economy. Based on the study findings, the Project will not unduly interfere with the orderly development of the region.

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