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Economic Impact Analysis and Review of the Proposed Northern Pass Transmission Project

Prepared for the
State of New Hampshire
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Counsel for the Public
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Supplemental Report
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Economic Impact Analysis and Review Of the Proposed Northern Pass Transmission Project

Prepared for the State of New Hampshire, Office of the Attorney General
Counsel for the Public, SEC Docket No. 2015-06, December 30, 2016

1) Overview and Executive Summary

The purpose of this analysis is to evaluate regional economic impacts associated with the proposed Northern Pass Transmission Project (the "Project" or "NPT"), per SEC Docket No. 2015-06. There are three primary areas of analysis within our purview: (i) a general economic impact analysis of the construction, development and operation of the Project, including integration of energy market price impacts, (ii) potential property valuation effects and (iii) potential tourism industry impacts.

This analysis is primarily focused on statewide New Hampshire impacts, however, there are some aspects of the analysis that require estimates of effects in other New England states and some that require sub-state analysis in order to accurately estimate statewide New Hampshire impacts.

Within our areas of purview, we have both evaluated the Applicants' submission for the Project and prepared independent analyses of these same issues. In performing our independent analyses, we have relied on The Brattle Group, also under contract with Counsel for the Public in this proceeding, for energy market assumptions and model inputs that are among the most important determinants of net economic impacts. While we summarize Brattle's assumptions in arriving at energy price and capacity market effects, details of their analysis is presented separately as a part of this Docket.[1]

In estimating economic impacts, we have also relied on detailed Project expenditure data from the Applicants and their parent company, Eversource Energy. All Project development and construction costs, estimated property tax payment tax base valuation, expenditures associated with the offered Forward New Hampshire Plan, were provided by the Applicants and are consistent with values used by the Applicants' consultants in preparing their analyses in late 2015. Although we expected additional Project detail might be available in the intervening year, the Applicants indicated that no significant changes in Project expenditures were made. Although we have checked all data for reasonableness against industry standards, the Project is unique in some respects and

[1] "Electricity Market Impacts of the Proposed Northern Pass Transmission Project" by The Brattle Group, available from Counsel for the Public, Office of the New Hampshire Attorney General, and related supplemental filings.

does not lend itself to formulaic comparison. Where we have modified economic model inputs, it has generally been associated with model specification corrections rather than source data overrides.

In general, the Applicants' economic impact analysis was well-performed, however, model specification errors resulted in an overstatement of employment impacts during the development and construction phase of approximately 20%. Ongoing operational impacts were very close to our estimates, but are relatively small.

The largest differences in net economic impacts stem from considerably less beneficial electricity market assumptions made by The Brattle Group and used in our simulations.[2] In some scenarios, there were no price benefits whatsoever or very minimal benefits. Even where benefits were more substantial, however, reduced or eliminated electric power generation in New England and/or New Hampshire that may be displaced by cheaper Canadian power transmitted by the Project, could result in net negative economic impacts in New Hampshire. This is especially true if plant shutdowns result and happen to be concentrated in New Hampshire. Even in the most "extreme case" scenario run by The Brattle Group, with the greatest benefits to New Hampshire from potential electricity price reductions, net economic impacts were about 30% lower than those presented by the Applicants.

For some Project components, our employment and other economic impacts were higher than those of the Applicants. For example, we included spending assumptions related to estimated property tax payments to state, county and town governments which resulted in hundreds of additional jobs beyond those estimated by the Applicants. We also included longer term impact periods in some analytic components than the 11 year period used by the Applicants, resulting in 40 year impacts from property tax payments and 20 year impacts from the Forward NH Fund.

We did not find the Applicants' stark conclusions regarding the complete absence of any potential negative property valuation or tourism impacts to be credible. While both areas of potential negative impacts are uncertain and difficult to estimate, they both could give rise to negative economic impacts that are substantial.

Some property valuation losses from viewshed impacts associated with the proposed transmission line are likely, and have been the source of vocal local opposition along the proposed route. While burying nearly one-third of the line avoids some of these impacts, it does not entirely eliminate them. Based on the percentage of acreage within the viewshed of the proposed transmission line and associated structures, as estimated by T.J. Boyle & Associates, also under contract with Counsel for the Public in this proceeding, there is potentially more than $1.1 billion in residential property that could be affected by the presence of the line. While some properties with high scenic view amenities could be severely affected and others will have minimal or no negative impacts, the loss in wealth to current property owners within this viewshed could be as much as $15 to $30 million. As these properties sell, they will also exert a negative impact on the future property tax base of the affected towns.

[2] Although the Brattle Group will be submitting updated estimates as supplemental testimony on April 17, 2017, they have stated that, "our updated analysis is not fundamentally different from our original," with respect to retail customer savings.

Similarly, some negative tourism impacts are likely as a result of the aesthetic degradation introduced by the presence of a highly visible industrial structure in areas whose primary tourism appeal is exactly the opposite: pristine natural beauty, unspoiled wilderness, and unparalleled scenic vistas from the tallest mountains in the Northeast. While this degradation is incremental and difficult to quantify, it is not, as the Applicants contend, of no economic consequence.

There are very few academic or other studies upon which to base potential tourism industry losses, because there are few places with high scenic tourism values, such as the tourism-dependent regions through which the Project is proposed to pass, that would even consider the development of a high voltage transmission line in their immediate vicinity. This does not mean, however, there will be none. Even a reduction of 15 one-hundredth of one percent (0.15%) in regional visitation in the affected tourism regions could result in reductions in direct spending losses of $8 million per year and the loss of nearly 200 jobs per year. This could be especially detrimental to North Country communities whose economies have been devastated by manufacturing job losses and where tourism remains an especially important economic lifeline. The net present value of such losses in tourism spending in areas affected by the proposed Project over the lifetime of the transmission line[3] could exceed $300 million.

Construction period losses can also occur from business disruption in sensitive downtown areas such as Plymouth, where the underground line is currently planned to run directly down the narrow Main Street on the Route 3 ROW. Plymouth has a complex network of underground utilities that could slow construction and a vibrant downtown that both caters to and depends upon tourists. Even a 10% decline in downtown business during a six month construction period could result in more than $1M in lost income, along with 50 jobs. A larger loss or more prolonged construction period could force some out of business and cause more lasting local negative impacts.

Second homes and the flow of expenditures they generate are not usually included in the tourism metrics commonly used in quantifying this important sector of the New Hampshire economy. However, New Hampshire has the third highest share of vacation homes in the nation, 50% of which are in towns within the viewshed of the proposed Project. Both sales and valuations for these properties are much more sensitive to view encumbrance than suburban and other single family homes, and could amplify both property valuation and tourism spending losses.

The Project will undoubtedly generate significant employment and positive net economic impacts during the three year construction and development phase, however, long-term net benefits are uncertain. If significant energy price savings do not materialize, as most of The Brattle Group scenarios suggest, and as property tax payments gradually decline and end over the 40 year expected depreciation schedule for the line, more lasting

[3] Although a 60 year "useful life" has been used for similar transmission lines in other studies, such as, "Impacts Associated with the Proposed Susquehanna to Roseland Transmission Line," National Park Service, 2012 , the relevant analytic period for this estimate is the likely duration of visual encumbrance, which may be longer than the useful life of the initial project. Prior experience in New Hampshire and elsewhere suggests that ROW landscape intrusions tend to grow over time as new lines and other systems are added or uprated. The proposed Project is an example of this, as is the Phase II line detailed in the Applicants' tourism impact study.

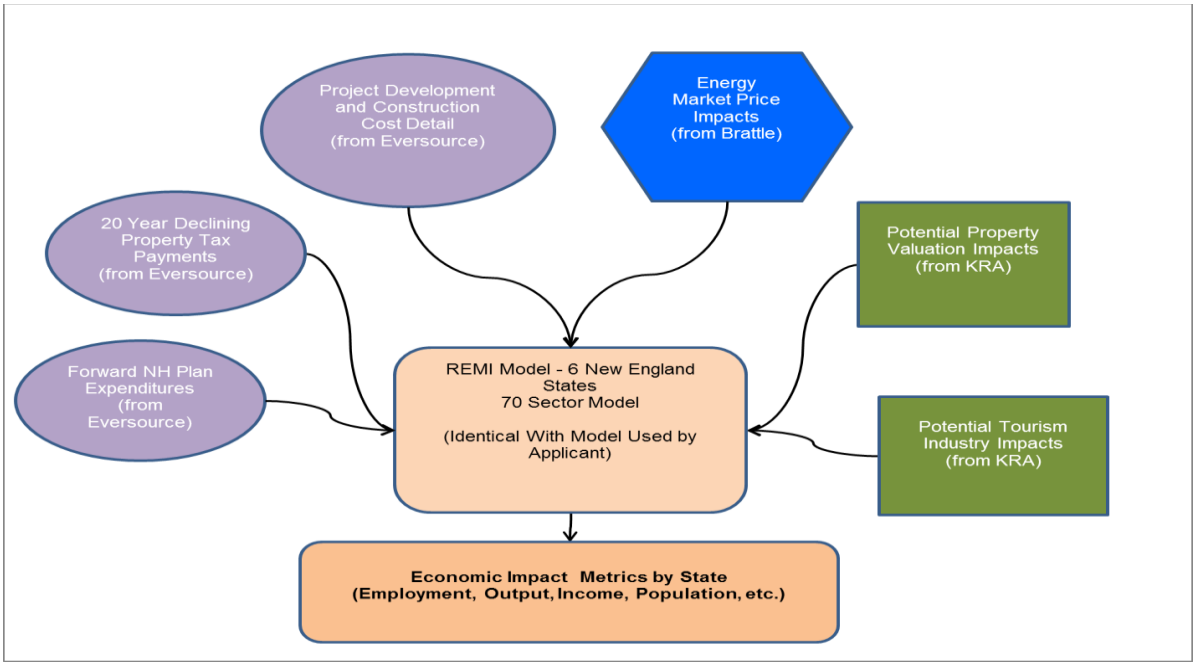
tourism and property valuation losses could easily exceed the small ongoing economic benefits of the 10 to 15 jobs and associated line maintenance and repair.

It is also important to note that economic measurement of loss is largely confined to spending flows and market valuations as expressions of human priorities and value. In the long run, public evaluation of the Project must extend far beyond the third digit of economic quantification, and reflect the considered tradeoff between our growing need for electricity and the preservation of a unique natural environment and its value and meaning to the state and its people, now and in the future.

2) Background and Scope of Work

The Project is a 192-mile 1,090 MW transmission line with related facilities proposed by Northern Pass Transmission, LLC and Public Service Company of New Hampshire d/b/a Eversource Energy, which filed an application for a Certificate of Site and Facility with the New Hampshire Site Evaluation Committee (SEC) in October 2015. Approximately 60 miles of the proposed line is to be buried, 100 miles is to be sited in an existing or widened ROW and approximately 32 miles of the proposed line will be on a newly cleared ROW.

We have evaluated the potential economic impacts associated with the Project with the use of a regional economic model developed by REMI (Regional Economic Models, Inc.) of Amherst, MA – the same model used by the Applicants in their SEC filings. The model consists of 70 industrial sectors and includes all six New England states. In this way, feedback effects from economic activity in both New Hampshire and nearby states can flow to and from New Hampshire.



The REMI model is one of the more comprehensive regional economic models for impact analysis, incorporating basic Input/Output functionality in a General Equilibrium model with advanced Economic Geography and other econometric time-series modeling capabilities. The model is well-documented, regularly updated, and has been widely used in analyses such as this. In addition to being used by the Applicants, it was used by the Department of Energy in its review of the Project.

The REMI model is based on inter-industry relationships defined by Input-Output (I/O) data regularly collected by the U.S. Bureau of Economic Analysis. In I/O-based models, the industry structure of a particular region is captured within the model, as well as transactions between industries. Changes that affect industry sectors that are highly interconnected to the rest of the economy will often have a greater economic impact than those for industries that are not closely linked to the regional economy.

General Equilibrium is reached when supply and demand are balanced. This tends to occur in the long run, as prices, production, consumption, imports, exports, and other changes occur to stabilize the economic system. For example, if real wages in a region rise relative to the U.S., this will tend to attract economic migrants to the region until relative real wage rates equalize. The general equilibrium properties are necessary to evaluate changes such as the electricity price changes evaluated herein that affect regional price differentials and relative business competitiveness.

The REMI model also utilizes advanced statistical and econometric techniques to quantify structural relationships and responses in the model. The speed of economic responses is also estimated, since different adjustment periods will result in different impact results. This is of particular importance in applications such as the Project, where there are discreet, time-sensitive events, such as the three year flow of construction activity followed by very different economic inputs in the subsequent ten or eleven year operational period over which many impact estimates are estimated and presented. Because the impacts are reported annually, and many expenditure flows are episodic, it is important to note that the time period chosen to display impacts and the units in which they are displayed can affect the interpretation of impacts.

The New Economic Geography capabilities in the REMI model represent the spatial dimensions of an economy. Transportation costs and accessibility are central economic determinants of interregional trade and the productivity benefits that occur due to industry clustering and labor market access. Firms benefit from access to a large, specialized labor pool and from having access to specialized intermediate inputs from supplying firms. The productivity and competitiveness benefits of labor and industry concentrations, called agglomeration economies, are modeled in the economic geography equations. These capabilities are important in estimating impacts associated with a project such as the Project, requiring highly skilled, specialized labor for some construction tasks in a relatively small labor market such as New Hampshire.

The REMI model estimates thousands of economic and demographic metrics, including employment, gross product, output, wages, occupational data, income, value added, trade-flows, population and other demographic impacts associated with user-defined economic events, such as the subject analysis. Although selected economic metrics are

displayed in various tables herein, additional detail consisting of thousands of variables is available.

The version of the REMI model we employed in this study divides the New England economy into 70 industries, including private and public sectors, by the six New England states. The industry definitions by which all private and public activities are classified are largely consistent with the North American Industry Classification System (NAICS) at a 3-digit level of detail.

The REMI model simulates the effects of changes in economic events, such the subject project, via so-called "policy variables." These variables represent the basic components of the regional economic system, and include measures such as wage payments going to on-site construction workers, off-site project administrators, purchases of goods and services used in construction such as building materials and supplies, land lease expenditures, tax payments and other direct expenditures.

We used an array of different policy variables to reflect the different types of expenditures that are required to construct and operate the proposed transmission line. The changes in level and composition of economic activity represented by the policy variables trigger a whole series of secondary responses that ultimately produce the full set of economic responses that are reflected in changes in employment levels, factor prices (labor and capital), consumer and producer prices for goods and services, and summary measures such as regional product and personal income. Secondary responses that involve satisfying demand for the output of goods and services needed by the Projects' direct suppliers are often termed "indirect" effects. Thus, when a supplier of ready-mix concrete requires additional sand, crushed stone, and Portland cement to produce concrete for the pylon pads or substation foundations, quarry and cement kiln operators are called on to produce more of their products. Similarly, when workers on the Project, as well as workers at supplier businesses, and workers even further back on the supply-chain spend income earned directly or indirectly on the Project, this increase in spending gives rise not only to consumer goods and services purchases, but to another iterative set of responses from the producers of those goods and services. Taken together, this impact is referred to as the "induced effect" of the Project.

In order not only to review technical data and relevant literature, but also assess local conditions and characteristics on the ground, we participated in six regional meetings designed to provide public input on potential aesthetic impacts and spoke with people in or travelled to most of the towns through which the transmission line is planned. In some sections, we walked on the existing transmission line ROW and viewed it from various public crossings. We also participated in two meetings with business leaders and received input from a third from Counsel for the Public. We met with local government officials and business leaders in Plymouth and Bristol, current and former state revenue and tourism officials in Concord, and other New Hampshire economic development and tourism industry experts.

3) Review of Applicants' Economic Impact Analysis

A) Introduction and Use of REMI Model

Regional economic impact analysis is often used to evaluate projects that involve both a sizeable construction component and resulting operations that are likely to have a significant effect on local and/or broader regional markets. The proposed Project has both of these characteristics. An impact analysis usually starts by accounting for the effects of labor and material usage during the construction phase, as well as for those tied to the ongoing operation of the new facilities. Although there are no formal standards as to the scope of such impact analyses, they almost always include the application of a regional economic model to measure a project's economic effect in a broad, comprehensive manner, not limited to the immediate labor markets and materials and services producers in the region that supplies the project. Unusually large construction projects or new facilities' operations can have a major effect on the wider regional economy, reaching individuals and institutions that appear to be unrelated to such a project at first glance. It is the role of the economic model to identify affected sectors in the economy that are not ones tied directly to the building process or operating activity.

Regional economic activity can be measured in a variety of ways, but is normally done in the context of an accounting framework that classifies the value of different types of economic activity into categories such a direct labor, material and services expenditures, intermediate goods and services transactions, and consumption effects. Oftentimes, economic models are used to estimate some of these transactions which can be numerous but individually too small to be seen among the administrative documents and cost estimates that offer the initial view of project expenditures (i.e., the so-called "direct impact.") In addition to the accounting for project expenditures, the combined effect can lead to significant changes in aggregate consumption, inflation, and even be the cause of sizeable demographic shifts when job market or price-level changes are sufficient attract or repel persons or businesses to or from a region.

In addition to the quantitative characteristics of a project and the measurable economic responses that flow from new levels of activity, it has become increasingly common to include identification and quantification, whenever possible, of projects' economic externalities. Externalities are project effects that appear to be "off-the-books" in terms of direct measurability, yet still affect the value of existing goods and resources, often public ones, when present. Simple examples of externalities are the aircraft noise that emanates from a newly completed airport, or the improvement in air quality that stems from mandated use of cleaner fuels or technologies in transportation and power generation. In the case of the former, residents experiencing new high noise levels may see the value of their property decline, while in the case of cleaner air, persons with respiratory problems may experience fewer days of discomfort or illness, allowing them to be more productive. While there is no observable price accorded to higher noise levels or cleaner air, many externality effects may ultimately be "capitalized" in the value of property and objects that have become more or less desirable. By identifying the scale and scope of these "spillover" effects, a regional impact analysis can provide a

valuable service in aiding public officials seeking to mitigate negative externalities, while promoting widespread recognition for positive ones.

In this section, we review and assess the regional economic impact analysis prepared for the Applicants by London Economics, Inc. (LEI). Counsel for the Public has requested that we assess both the completeness and accuracy of work submitted by LEI. In the absence of a formal standard for such impact assessments, our review of the LEI work is based on our professional judgement. Our primary goal throughout our evaluation is to inform the SEC as to whether the LEI analysis is sufficiently complete and accurate so as to permit fully informed decisions regarding the economic consequences of moving forward with the Project. In meeting this objective, we intend to enable a weighing of the apparent economic gains attributable to the Project's construction and operations against any economic losses that are also attributable to the Project's construction and operation. For both gains and losses, we look at both measurable ones that take the form of tangible effects, such as employment gains and losses, income gains and losses, and aggregate gains and losses in regional economic activity. Where the economic effects are less certain, as in the cases of externality gains and losses, we will provide a best estimate of potential gains and losses and how those affect the balance of net economic effects attributable to the Project.

Our evaluation of the regional economic impact estimates prepared by LEI will be presented in three parts. In the first part of our evaluation, we will look at the estimation and analysis of construction impacts on the New Hampshire economy. In the second part, we will look at the economic impact of operating the transmission line in terms of physical labor and material requirements. In the third part, we will review the expected changes in electricity prices in the New England region's six states on the New Hampshire (and broader regional) economy, in so much as New Hampshire is one of the six states that will see its electricity markets affected by the sizable supply capacity increase that the Project represents.

Following the review, we present our revised estimated impact. Our revisions involve either changes to the LEI inputs to the REMI model, or completely new entries used to estimate the impact of items LEI chose not to include. The latter consist of property tax payments and Forward New Hampshire Plan expenditures that are readily quantifiable. They also include estimates for changes in property values and tourism spending. LEI did not include property tax payments to towns through which the line passes and Forward New Hampshire Plan expenditures on the grounds that they were providing what LEI referred to as "conservative" estimates of the Project's overall impact. These omissions were conservative in the sense that any expenditure of these tax or grant funds would only serve to increase beneficial state level impacts that, absent these, already showed large positive values.

Nevertheless, such tax impacts and grant fundings should be included for the sake of completeness and full-disclosure of what we know about the Project. Other impacts, such as the economic effect of property value losses or reduced tourism spending, were not included with the justification being that consultants to the Applicants found that the Project would have no effect on property values or to tourism. We cannot agree with these contentions and have prepared estimated impacts incorporating a combination of the best available research combined with the informed opinion of various professionals.

These estimates are, by their very nature, "softer" than the fully modeled results, as we will discuss in some detail. They are not as firmly grounded as the construction and operating period estimates that have been developed by construction cost estimators and transmission line managers, but are offered to the SEC to aid in a full evaluation of how the Project affects New Hampshire residents' well-being in a more comprehensive sense, not just the arithmetic of construction and utility operations impacts.

B) LEI's Use of the REMI Economic Model

Based on information contained within LEI spreadsheets used to prepare data for input to the REMI model, we know the following information about the Project:

- Estimated labor expenditures by state and occupation during construction and operating periods.
- Estimated total material expenditures for the Project and the majority of those specific to New Hampshire during construction.
- Estimated expenditures for subcontracted administrative support and logging activity during construction.

There are several current estimates for total Project spending, depending on the source (and possibly the time period covered.) For the 2015-2019 period, the anticipated construction period for which LEI prepared its local economic impact analysis, the Project construction, including labor and material, was estimated at $1.1 billion in total nominal dollars. A different total expenditure figure is shown to be $1.3 billion according to LEI's working estimates. When additional allowances for contingencies, financing allowances (AFUDC),[4] and property taxes, the total rises to $1.63 billion. This is close to the figure submitted latest revision of the Applicants' submission to the SEC of $1.66 billion (see NPT_DIS 008427).

In this portion of the analysis, we are largely concerned with the estimated construction and operating costs, which we noted is the $1.1 billion figure LEI expected to be expended. The estimated major expenditures are shown in Table 1.

[4] Allowance for Funds Used During Construction

TABLE 1

2015-2019 NPT Construction and Operating Expenditures ($000s, nominal)

Expenditure	New Hampshire	Rest of New England	Outside New England	Total	Percent of Total
Labor	**$218,101**	**$242,039**	**$86,544**	**$546,684**	**49%**
Construction	*$155,662*	*$222,613*	*$66,952*	*$445,227*	
Professional/Technical *	*$10,551*	*$13,661*	*$19,592*	*$43,804*	
Logging/Site Work	*$51,888*	*$5,765*	*$0*	*$57,653*	
Project Support	**$34,457**	**$13,478**	**$0**	**$47,935**	**4%**
Logging/Site	*$6,898*	*$4,021*	*$0*	*$10,919*	
Professional/Technical	*$27,065*	*$8,904*	*$0*	*$35,969*	
Real Estate (Right-of-Way)	*$494*	*$553*	*$0*	*$1,047*	
Subcontracted Specialties (Administration)	**$13,439**	**$0**	**$0**	**$13,439**	**1%**
Materials	**$134,339**	**$0**	**$372,344**	**$506,683**	**45%**
TOTAL	**$400,336**	**$255,517**	**$458,888**	**$1,114,741**	**100%**

* Includes, engineering, legal, environmental, public relations

Source: LEI. "Breakdown 150.6M Proj Support" tab in LEI workbook, "Original Protected LEI Labor and Wage Data - NPT 2.xlsx", created July 21, 2016, and "NU Labor data" tab in LEI workbook, "Original Protected LEI Labor and Wage Data - NPT 2.xlsx", created July 21, 2016.

Based on the data shown in Table 1, the NPT, with 49% of project expenditures estimated to be for labor, is significantly more labor intensive than either the estimate that is derived from the JEDI (Jobs and Economic Development Impact) model for transmission line construction from the National Renewable Energy Laboratory (NREL) or that from a recently completed 150 mile high voltage power line constructed by Public Service Electric and Gas (PSE&G) in New Jersey for the Susquehanna-Roseland Transmission Network in New Jersey. Using the JEDI model, we estimated the labor and material cost shares for construction of a 132-mile aboveground line (a magnitude similar to the above-ground portion of the Project) and found labor costs represented 40% of the project total. In this case, the labor share is derived from construction, design, environmental, engineering, legal, and support activities. For the PSE&G project, a 150-mile high voltage aboveground line, it had a labor share of 38% of the project total for all labor. The higher relative labor intensity of the Project may stem from the plan to construct 60 miles of its192 miles total length underground, which involves drilling, trenching, and otherwise burying the cable.

C) Local Construction Impact 2015-2019

The REMI model is very flexible in allowing analysts to model the impact of Project expenditures either by using the total spending or by using estimates for its labor utilization. If it is thought that a project is likely to be very different than an "average" project, modeling by using the known parts (e.g., labor and detailed material expenditures) is preferable to having REMI estimate for these. Modeling the impact of

the known inputs entails determining quantities of labor and materials measured on the same basis as REMI does (i.e., in identical accounting units) with appropriate disaggregation for the model's geography. As they sought to develop the labor requirements, LEI's work is comprehensive, but in the course of estimating direct employment effects, several significant problems appear that have a measurable effect on results. We will explain the nature of these problems after describing what LEI did to make its direct labor requirement estimates.

TABLE 2

LEI DIRECT EMPLOYMENT INDUSTRIES FOR NPT CONSTRUCTION

OCCUPATION	REMI INDUSTRY
1. Construction Labor	Construction
2. Logging	Logging
3. Legal & Expert Witnesses	Professional, Scientific, and Technical Services
4. Communications, Community and Legislative Outreach	Professional, Scientific, and Technical Services
5. Environmental	Professional, Scientific, and Technical Services
6. Right-of-Way/Real Estate	Real Estates
7. Engineering (Project management)	Professional, Scientific, and Technical Services
8. NU Labor	Construction
9. Other (Mitigation/Office Expenses/Insurance)	Administrative and Support Services

D) Labor Expenditures 2015-2019

LEI assembled a comprehensive estimate of annual labor required for the Project by occupation and state, measured with what was thought to be labor compensation expenditures. This data was presumably obtained directly from Eversource. The occupational labor expenditures were given for nine occupations, shown in Table 2. These nine had to be classified to an industry basis for use with REMI, also shown in Table 2. From the labor expenditure data, LEI estimated FTE employment by industry for each year of construction by dividing occupational labor expenditures by FTE annual compensation, the latter obtained by multiplying hourly compensation (again presumably from Eversource) by 2,080 to get a compensation per FTE. It is these FTEs that LEI entered into the REMI model.

REMI "takes" the user's employment estimate and derives its own estimate of the Project's detailed direct non-labor expenditures, i.e., the purchases of specific materials, as well as goods and service purchases that represent overhead expenditures. This derivation is performed by application of state-level input-output models that are internal to the REMI model. The input-output model uses the ratio of labor-to-intermediate goods/services expenditures to estimate both the total intermediate expenditures and their composition. Thus, estimating the amount of materials expenditures, the accuracy of REMI's ratio approach hinges on having accurate labor requirements.

Based on the way LEI used the model, there are three evident problems with the way they developed their inputs: The first is a minor error in that REMI is not set up to run FTE employment inputs. Rather, it uses the U.S. Bureau of Labor Statistics (BLS), preferred unit of reporting, namely "jobs." Jobs include full- and part-time workers, and as a general rule, jobs figures are almost always greater than FTEs, measured at the same time and place. The BLS publishes average weekly hours by industry, which would be a better means of estimating direct employment job-years from the labor

expenditures data than assuming that average weekly hours are 2,080 per year. By using FTEs instead of jobs, LEI underestimated direct labor very slightly.

The second problem is more serious. Eversource supplied what were supposed to be labor compensation rates to LEI. These appear to be extraordinarily high compared to the ones incorporated in REMI. We show a comparison of the Eversource and BLS hours wage rates in Table 3. For example, annual compensation for professionals and technology workers, a category that includes architects, engineers, and lawyers, is shown to be $113,530 per job per year, a U.S. average. Eversource's average annual of $634,500 for the lower wage New England states (i.e., New Hampshire, Maine, and Vermont) and $873,600 for states in the higher wage region (Connecticut, Massachusetts, and Rhode Island) are extraordinarily high, at 6 to 8 times the BLS figures.

Those factors are even larger when compared to the REMI industry-based compensation rates, at 8 to 10 times the $85,291 per job for Massachusetts professionals. We believe, (and engineering consultants to Counsel for the Public, Dewberry, have confirmed this possibility), that LEI was supplied with construction cost estimating guide hourly rates, which include not only hourly wages and benefits, but union dues and the apportioned overhead costs and profits that a contractor would include in preparing a bid. These latter two items are entirely inappropriate for use in the input-output modeling framework that is incorporated in REMI. They are already accounted for, and their inclusion creates distortions for all affected economic impact estimates.

By using the Eversource-based figures in the context of the REMI model, LEI has computed direct employment values that are excessively low (by the multiples shown above.) If the employment estimates were correct, workers on the Project would have to be many times more productive (again by the factors above) than their general labor market counterparts to build the Project with so few workers. If LEI's FTEs are not as super-productive as would seem from the LEI estimate, then the relationships between direct, indirect and induced employment will be skewed. Thus, the problem is not limited to direct employment. Because REMI automatically converts direct employment to intermediate goods purchases at a fixed ratio (using the BLS compensation rates, not the LEI ones), LEI has also drastically under-estimated the volume of material inputs and other inputs, unless the automatic estimation function in the model is turned-off, which LEI failed to do. This brings us to the third problem with LEI's application of REMI, inadvertent estimation of intermediate demand for goods and service. We will discuss the nature of this error in the next section under "Materials Expenditures"

There is one additional potential problem with the construction period estimates prepared by LEI involving their estimation of additional compensation to be paid to all direct employees working the Project. LEI correctly recognized that the employment estimates entered into the REMI model will result in estimated compensation at the implicit BLS compensation rate, approximately the same annual compensation figures shown in Table 3 for each occupation. In order for the employees to receive the correct compensation, additional compensation, i.e., the differential between the BLS and Eversource annual compensation, is required. Assuming the Eversource compensation figures are strictly hourly compensation, i.e., wages and noncash benefits such as

TABLE 3

Average Annual Employee Compensation for REMI Industries, Eversource NPT Project Occupations and BLS Occupations

($ nominal per employee per year)

REMI Industry Category	REMI Annual Compensation ($/Job) 2012		LEI Category	LEI Annual Compensation ($/FTE) 2014		BLS Occupational Category	BLS Annual Compensation U.S. 2012
	NH	MA		ME, NH, VT	CT, MA, RI		
Professional, Scientific, and Technical Services	$53,033	$85,291	Legal and Expert Witnesses	$634,400	$873,600	Lawyers	$113,530
						Legal Secretaries	$35,330
						Paralegals/Legal Assistants	$46,990
Professional, Scientific, and Technical Services	$53,033	$85,291	Communications, Community, and Legislative Outreach	$226,720	$416,000	Public Relations and Fundraising Managers	$95,450
						Public Relations Specialists	$54,170
Professional, Scientific, and Technical Services	$53,033	$85,291	Environmental	$307,840	$520,000	Conservation Specialists	$59,060
Real Estate and Rental and Leasing	$10,084	$18,977	Right-of-Way/Real Estate	$187,200	$228,800	Real Estate Brokers	$41,990
						Real Estate Sales Agents	$41,990
Professional, Scientific, and Technical Services	$53,033	$85,291	Engineering (Project Management)	$278,720	$374,400	Civil Engineers	$79,340
						Construction Managers	$82,790
						Electrical Engineers	$89,630
Construction	$31,110	$49,721	NU Labor-Project Support	$118,560	$270,400	Construction Laborers	$29,160
						Line Installers and Repairers	$58,210
Administrative and Waste Management Services	$36,545	$38,181	Other (Mitigation/Office Expenses/Insurance)-Project Support	$176,800	$270,400	Office Clerks	$27,470
						Receptionists and Information Clerks	$25,990
Construction	$31,110	$49,721	NU Union Agreement	$176,800	$139,360	Construction Laborers	$29,160
						Line Installers and Repairers	$58,210
Forestry, Fishing, and Related Activities	$15,140	$32,398	Logging/Site	$176,800	$270,400	Logging Equipment Operators	$33,630
						Logging Workers	$33,630

employer contributions to pension funds, to health insurance, and to social insurance, then LEI applied the correction properly. If Eversource's hourly compensation includes overhead or other indirect labor charges, then the compensation differential will be too great, causing over estimation of induced (i.e., consumer spending) effects.

E) Materials Expenditures, 2015-2019

LEI separately estimated both the total value of the materials required for the Project and the location where it would be produced. The total value of all materials is $507 million, as shown in Table 1. These materials include expenditures for cable, support towers, concrete structures for towers and underground cable installation, and converter/substation equipment. This is a 45% share of total Project cost and appears to be reasonable by comparison with both the JEDI transmission line model estimate of $53% of total costs and the PSE&G estimate for the Susquehanna-Roseland project of 63% of total cost.

Of the total material purchases, LEI shows estimated New Hampshire purchases of $134 million. However, because LEI allowed REMI to utilize its own default material purchases, a significant additional set of expenditures were included in the LEI analysis that are both erroneous and irrelevant to transmission line construction. These estimated materials are derived from the input requirements of the general construction category, an amalgam of all forms of construction because it includes all forms of nonresidential building (e.g. offices, warehouses, retail structures, public buildings, etc.), residential structures, and public works/nonbuilding types of construction including highways/streets, water and sewer systems, power plants, transmission lines, etc.) By allowing these materials purchases, (even inadvertently) through REMI's highly aggregated construction sector, purchases of plumbing products, glazing products, millwork and lumber products, roofing, insulation and the like are assumed to occur for the Project and appear as indirect impacts of the Project.

Using only direct employment as estimated by LEI, we entered these into the REMI model to show the mis-estimation of intermediate purchases (materials and other goods and services). These are significant in scale. As shown in Table 4, $336 million were incorrectly included in the impact estimates. Almost half of this is for manufactured goods of a type that, as we noted, would never be part of a transmission line project.

Since the expected materials required for the Project are known to be $507 million and LEI separately shows material purchases in New Hampshire of $134 million, we are nevertheless concerned that some omission has been made in the setting up the REMI estimates for locally purchased materials. LEI's REMI input files show only $35.7 million for nonmetallic mineral production (i.e., ready-mix concrete) manufacturing. We do not know what happened to the other $98 million of materials purchases that were to have occurred in New Hampshire, assuming the "Cost Data" table is correct. Once the correction is made for default material purchases, we may still need to correct for this missing amount.

TABLE 4

Erroneous Material Expenditures Included in LEI Impact Estimates

2015-2019, $000

Category	2015	2016	2017	2018	2019	Total
Forestry, Fishing, and Related Activities	0	9	547	482	109	**1,147**
Mining	4	110	6,952	5,906	1,336	**14,308**
Utilities	1	28	1,852	1,620	366	**3,867**
Construction	1	14	895	764	145	**1,818**
Manufacturing	48	1,184	77,184	66,496	14,176	**159,088**
Wholesale Trade	4	120	7,540	6,482	1,336	**15,482**
Retail Trade	1	17	1,027	882	193	**2,119**
Transportation and Warehousing	4	88	5,800	5,016	1,062	**11,970**
Information	8	96	6,268	5,372	1,052	**12,796**
Finance and Insurance	8	192	12,544	10,832	2,264	**25,840**
Real Estate and Rental and Leasing	4	128	8,684	7,616	1,752	**18,184**
Professional, Scientific, and Tech. Services	8	280	18,288	15,776	3,288	**37,640**
Management of Companies and Enterprises	4	36	2,274	1,916	310	**4,540**
Admin. and Waste Mgmt. Services	8	108	7,020	6,064	1,280	**14,480**
Educational Services	0	1	77	67	17	**162**
Health Care and Social Assistance	1	13	845	716	144	**1,719**
Arts, Entertainment, and Recreation	1	8	535	461	96	**1,099**
Accommodation and Food Services	1	27	1,771	1,532	325	**3,656**
Other Services, except Public Admin.	2	46	2,972	2,549	564	**6,133**
TOTAL	**108**	**2,504**	**163,073**	**140,548**	**29,814**	**336,048**

Source: Kavet, Rockler and Associates using the REMI PI+ model for New England.

F) Total Construction Period Expenditures, 2015-2019

The REMI model has a provision for adding construction spending such that the value of the region's capital stock increases by value of construction. This is important because the model relies on a capital stock adjustment to control future investment levels. Adding construction value to the capital stock is a manual operation. The total value of construction completed in New Hampshire should be entered into the REMI model via the "addition to capital stock" policy variable. By adding the construction value to the stock at the end of the construction period, later years may see a small decline in REMI's estimated nonresidential investment levels, as the state's actual capital stock rises toward the desired capital stock.[5] To the degree that the Project displaces investment which otherwise might otherwise occur in the absence of the Project, the net economic impact of the Project may be slightly smaller than presently estimated by LEI.

G) Local Operating Impact, 2019-2029

Once completed, LEI has estimated that the Project will require an average of 2.3 workers per year to operate and maintain the new portion of the regional power network.

[5] REMI's baseline forecast shows the region's nonresidential capital stock as being $109 billion in 2019, $61 billion below the optimal stock of $175 billion. Because the State will still be significantly below the optimal stock, we would not expect any sizeable decline in investment levels as a result of the Project. Because NPT will serve the electricity market needs of all six New England states, we added the Project's nominal dollar value ($1.1B) to the New England capital stock, distributed proportionally by state, based on estimated gross regional product in 2020.

This figure is derived from the estimated expenditure on operation and maintenance of around $2.13 million per year. There is no further documentation regarding this expenditure estimate in the LEI report or workbooks, so we have no basis upon which to review it. If it was made in a manner consistent with the construction period employment estimates, it will have mis-estimated direct employment by having too few employees and having estimated them as FTEs and not jobs. If the estimate is based on those same extraordinarily high compensation rates, the implied, unrealistically high, labor productivity will distort the resulting impact estimates. These figures, therefore, should be subject to further review, and modification as necessary.

As was done with the construction period labor expenditures, the operating period labor expenditures were supplemented by LEI with additional compensation to account for the apparent difference between the REMI/BLS wage estimates for Eversource's utility sector workers. In all, LEI added an average of $585,000 per year in additional compensation or a total of $6.4 million during the operating period. The extra $254,000 per worker appears to be excessive.

Just as direct employment during the construction phase gives rise to additional materials purchases for the construction category as a REMI default unless turned-off, direct employment during the operating phase gives rise to material and other goods/services purchases during the estimating period from 2019 to 2029. Although we contend that the additional materials purchases were inappropriately included during the construction phase, in the case of the operating impact they should be retained. Together, the operating employment and compensation generate an additional average of 14 jobs per year. Once again, this is an extraordinarily large indirect and induced impact, largely due to the very high compensation for the utility sector. Without the compensation adjustment, the additional employment from indirect and induced activity still totaled 12 additional jobs above the 2.3 jobs/year average.

H) LEI Regional Electricity Price Impact, 2019-2029

LEI modeled the impact of the additional supply of electricity carried over the Project and made available to the Independent System Operator for New England (ISONE). Over the entire New England region, the reduction in electricity purchased by residential, commercial, and industrial users amounted to $6.4 billion, combined over the eleven years from 2019-2029. For New Hampshire, the total reduction was $879 million over the 11 year period, about 14% of the regional total reduction. This reduction is disproportionately large relative to New Hampshire's demand for overall utility services (electricity, gas, and water) of around 8% of the regional total. Of the regional total reduction of $6.4 billion, nearly 44% of the reduction goes to commercial users, 40% to residential users, and 16% to industrial users. In New Hampshire, the corresponding figures are 41%, 41%, and 18% for residential, commercial, and industrial users, respectively. By way of comparison, The Brattle Group's Scenario 2 analysis, presented in Section 7 herein, assumes an identical composition of rate reductions among end-use sectors in New Hampshire.

Large electricity price reductions are highly stimulative to the New England economy, which is not surprising, given that energy prices are relatively high compared to the rest of the nation. Based on LEI's electricity price assumptions, without the Project, New

Hampshire's electricity prices are expected to be 57% higher than the nation as a whole, and with the Project, this figure declines by 4 percentage points to about 53% higher than the nation. With the $6.4 billion reduction in prices, LEI estimates that the New England economy will see a gain of $12.3 billion in gross regional product. Thus, for every $1 in electricity price reductions, LEI predicts that the region will see almost $2 in income from various sources. In terms of job gains, LEI predicts that the region will see an increase in average annual employment of 6,500 jobs, while New Hampshire will average an additional 940 per year over the 11 year period from 2019 to 2029.

For a thorough analysis of the LEI electricity market modeling approach and an evaluation of their results, we refer readers to The Brattle Group study that is filed with all of the submissions by experts selected by Counsel for the Public.

4) Review of Applicants' Property Valuation Impact Analysis

A) Overview – Potential Property Valuation Impacts

The analysis associated with potential property valuation impacts provided by the Applicants was prepared by Chalmers & Associates, LLC, and concluded that the proposed Project will result in "no consistent measurable effects…on the market value of residential real estate."[6] Although recognizing that there were credible statistical studies that found market value effects "in the range of 1-6%," there was no quantification of any negative impact along the proposed power line, nor was it included in the LEI or any other economic impact model used in the Applicants' analysis. Even a 1% reduction in residential property values within the viewshed of the proposed Project represents more than $11 million in potential wealth loss to current property owners, lower rental income and a reduction in the property tax base when these losses are ultimately realized in lower-priced property sales.

B) Existing Literature Review

Chalmers cites a variety of industry-sponsored and other literature that shows little, if any, loss in property valuations as a result of transmission line development. Although we generally concur with his assessment that the studies Chalmers cited show relatively low aggregate observable losses and find that losses diminish with distance from the transmission lines in the areas in which the studies were conducted, the body of international and U.S. literature on this subject over the past 50 years has produced mixed results on the measurement of likely impacts. They range from zero, or even positive effects, to valuation losses of more than 30%.

A recent text summarizing major U.S. studies on the subject concluded that the primary reason for diminution of value was visual disamenity and that proximity to high voltage transmission lines and pylons "may cause prices to decrease by up to 12% on average

[6] See Appendix 46 of the Applicant's submission, entitled, "High Voltage Transmission Lines and Real Estate Markets in New Hampshire: A Research Report."

over all the US studies reviewed."[7] It cautioned, however, against placing too much credence in the literature. This is due in part to the fact that a large percentage of these studies have been industry-financed, which may introduce bias,[8] that the rigor of both statistical analysis and even more importantly, the quality of the data underlying the analyses, has not always been adequate, and that, there may be unique local factors that are not included in the existing literature that can affect outcomes.

Virtually all of the studies in the current literature are in metropolitan, suburban or exurban areas – not areas with high scenic and recreational amenity values, characterized by tourism and a substantial share of second home ownership. Where rural agricultural areas have been included, they are almost all in working landscapes with low recreational and scenic values. In much of the subject area, however, amenities more characteristic of tourism demand, such as scenic views and natural aesthetic beauty, are of far greater importance in the mix of potentially affected properties than is the case in areas covered by the existing literature.

In the entire New Hampshire 10 mile viewshed area, the share of second home ownership exceeds the national average in 76% of all towns. It is more than three times the national average in more than 60% of all affected New Hampshire towns. In about 25% of all towns in the viewshed, second homes as a percentage of all residential housing are more than ten times the national average.[9]

The primary mechanism for property valuation diminution in such areas is via visual encumbrance effects. There are several reasons there is a paucity of relevant research in settings such as this: (1) Few large industrial developments such as high voltage transmission lines are ever considered in residential and vacation areas with high scenic and recreational values and are often actively resisted when proposed, (2) Sample sparseness and lack of homogeneity in residential properties in such areas makes both data collection and comparative analysis more difficult, and (3) Extensive on-site data collection work, time and expense is required to accurately catalog the necessary property attributes, including detailed view characteristics, for a sufficient number of properties to populate an analytic database. All of these factors are exacerbated when estimating impacts from a prospective future development, with unique topographical and vegetative characteristics, whose precise visual impacts are uncertain.

Because of a reliance on existing literature that is not comparable in critical respects to the subject area, we believe Chalmers entirely ignores the part of the market that may be most severely affected: land with high view amenity value, with and without structures. In areas with a high number of such properties, there are also related regional characteristics that affect real estate prices and may be impacted by surrounding visual contamination of public approach roads, nearby towns and local scenic vistas. As the

[7] "Towers, Turbines and Transmission Lines: Impacts on Property Value," Sandy Bond, Sally Sims and Peter Dent, Wiley – Blackwell, 2013; Health concerns and noise were also mentioned as disamenity factors.

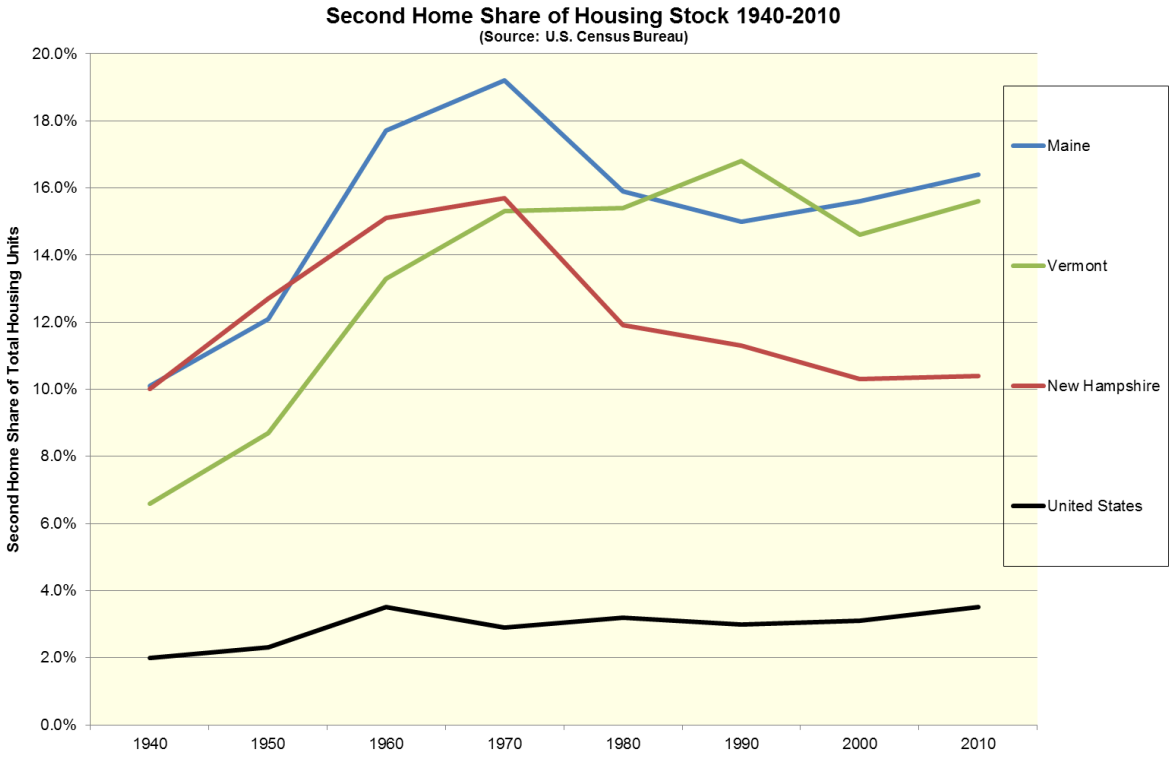
[8] In a broad review of studies through 1992 prepared for the Edison Electric Institute, entitled "The Effects of Overhead Transmission Lines on Property Values - A Review and Analysis of the Literature," Cynthia Kroll and Thomas Priestly identified 22 of 27 studies sponsored by power companies (more than 80%), whose vested interests must be considered in interpreting the results. In the U.S. Department of Energy review of the NPT, they excluded all property valuation studies sponsored by utilities or other interested parties in developing their estimates of likely property valuation losses.

[9] Based on 2010 U.S. Census Bureau data

Applicants' tourism consultant, Nichols, found in his prior New Hampshire survey analyses,[10] people visiting New Hampshire value "quaint towns and villages" and "scenic beauty." Many second home owners first come to an area as tourists and then make a larger investment and commitment to the location as a more permanent scenic, recreational and non-urban "get-away" or full-time retirement homestead. It is the contrast with their more urban home setting that is the prime motivation for locational decisions regarding both vacation visitation and second home ownership in New Hampshire.

People in urban and suburban settings do not necessarily expect to have great view, a bucolic setting or neighborhood devoid of any major commercial or industrial intrusion. In most of the places in New Hampshire in which people vacation and recreate, they do. This is one reason visual impacts are more important in settings such as the subject area than most of those studied in the literature.

It is not only visitors, however, who value the extraordinary scenic beauty of the region and believe their property values may be affected by the proposed Project. Many long-time residents (often for multiple generations) also derive value from the iconic scenery and natural wilderness around their homes and in the region. This was apparent in our participation in public meetings and voluminous local feedback the SEC has received during the permitting process.



[10] See NPT_DIS 058541.pdf and NPT_DIS 058599.pdf, in response to discovery questions. This study was performed by Nichols Gilstrap Group, entitled "New Hampshire's Image as a Tourist Destination"

Structural economic differences in the subject area and those dominating the literature were also evident in Chalmers' discussion of commercial and industrial property valuation impacts. None of the studies he cited mentions or considers commercial hotel, motel, campground or resort properties. These property types are the commercial analog to second homes in the residential market. Their presence indicates market characteristics that are different from those studied and, in this case, are consistent with the same tourism-defined values and property expectations.

With respect to vacant land, in the very small number of instances in the literature where lots were located in more "recreational" rural areas, larger price effects were observed. For example, in a statistical study in Montana performed by Chalmers,[11] there was a 15% price effect to a distance 1,000 feet from the HVTL centerline. This development, however, was hardly in a prime tourist location. In addition to being bisected by a HVTL, the development is also bisected by an interstate highway (I-15), and is located less than three miles from a large open pit mine, extracting lead, zinc, gold and silver. Despite being marketed since 1986, very few of the 156 lots have buildings on them today and access roads remain to be fully developed. The power lines were also a preexisting condition when the development was planned – not an encumbrance on existing views.

In this same study, other rural subdivisions in areas with higher recreational and tourism appeal also exhibited observable negative price effects due to the presence of HVTLs. In one Missoula area subdivision, price effects were measured between 20%-25% with extended marketing periods. One property in nearby Sanders County registered a 50% decline in value.

In another Missoula area subdivision with 34 lots, the price effect was estimated to be 25%-30%, with at least a doubling of the marketing time and some lots reported by the owner to be unsellable. He stated that the transmission line "corridor had been a major impediment to lot sales and that he had to "give away" several of the lots adjacent to the corridor," adding that, "he doubted that he would ever be able to sell lots 10, 11, 12, 13 and 15 which border the corridor to the south and remain the only unsold lots in the subdivision."

The only statistical study we found that explicitly mentioned potential impacts associated with second homes was a study that examined 936 land sales in Quebec between 1965 and 1981 and considered both proximity to the transmission line and view.[12] The study found strong negative price effects for second home lots, of up to 34%. This was the largest statistically significant negative finding reported in an Edison Electric Institute review of all relevant literature through 1992.[13]

[11] See "High Voltage Transmission Lines and Montana Real Estate Values" by Chalmers & Associates, prepared for NorthWestern Energy, January 2012. It should be noted that the evidence of price effects in this study was primarily anecdotal, due to both the lack of sufficient data and the fact that critical property transaction information, including sales price, is not publicly available in Montana. This information has to be collected on a transaction by transaction basis through contact with buyers, sellers and/or realtors, and as Chalmers notes, "there is frequently reluctance by the involved parties to share price information."

[12] Universite du Quebec a Montreal. 1982. Impact de l'implantation des lignes de transport d'energie hydro-electrique sur les va leurs foncieres des sites de Villegiature. Project Hydro-Quebec HA-596- 507. June.

[13] "The Effects of Overhead Transmission Lines on Property Values - A Review and Analysis of the Literature," Cynthia Kroll and Thomas Priestly, July 1992, for the Edison Electric Institute Siting and Environmental Planning Task Force.

Several studies also found impacts to be greater among higher priced homes[14] and in areas developed before the intrusion of the transmission lines, rather than after.[15]

Another major flaw in much of the existing literature as it pertains to the subject area is the substitution of "view intensity" as a primary independent variable, with "proximity" to transmission lines. Because these two property characteristics are often correlated and proximity is far easier to measure and specify, it often becomes the variable of choice. The measurement of view amenities in an analytic database requires on-site visits with property and building access, subjective interpretation of view elements from different places on a property, and data collection in different seasons in locations with deciduous vegetation that can screen viewshed intrusions (as is the case in much of the subject area). This process is too expensive and time consuming for most study applications.

The reliance on proximity over view in approaching potential property valuation effects and the weight given to studies in areas not comparable with the subject area resulted in minimal or no consideration of most properties beyond a relatively small area in the immediate vicinity of the existing power line in the Applicants' analysis. Of note, despite the enormous recent advances in technology and GIS systems, we found no use of GIS viewshed data in the existing literature to more precisely measure potential landscape and view quality changes in estimating property valuation impacts.

C) Comparability of Cited Literature and Affected New Hampshire Regions

Chalmers asserts that prior analyses he has performed for Eversource in Massachusetts and Connecticut[16] are directly comparable to the affected areas of New Hampshire in the subject analysis. He equates densely settled and highly commercial and industrialized areas of suburban Hartford and Boston to suburban neighborhoods in Concord and Deerfield, and equates three small study areas that are in, or are within 3 miles of the New York City Metropolitan Statistical Area just north of Danbury, CT, with "central New Hampshire between the White Mountain National Forest and Concord."

In addition to methodological concerns in the above study,[17] one of the three study subareas is mislabeled as being in Litchfield County when, in fact, more than 90% of the land area and virtually all of the residential housing in the study subarea is in Fairfield County, CT.[18] The other two study subareas that are purported to be similar to "central New Hampshire" are both less than three miles from Fairfield County, along a highly developed commercial and industrial highway (Routes 7 and 202). Fairfield County is a part of the New York Metropolitan Statistical Area, the largest urban center in the nation, with a population of more than 20 million. Despite the presence of Connecticut's largest lake (Candlewood Lake), which extends to within a mile of Interstate 84 in downtown

[14] For example, The Price Effects of HVTLs on Abutting Homes by Steven C. Bottemiller, MAI, and Marvin L. Wolverton, The Appraisal Journal, Winter 2013

[15] "Power Lines and Land Value," Peter Colwell, Journal of Real Estate Research, Spring 1990

[16] "High-Voltage Transmission Lines: Proximity, Visibility, and Encumbrance Effects" by James Chalmers and Frank Voorvart, The Appraisal Journal, Summer 2009

[17] On page 233 of the study, the authors eliminate 22 of the study observations "to improve the fit of the regression model." Discarding inconvenient data observations in order to "improve" regression fit without documenting their characteristics or effects on the study results is methodologically questionable and raises the issue of possible bias.

[18] See ibid., Map of Study Area 2: Subarea 2.3, page 244, with the Litchfield-Fairfield County line visible in the top left hand corner of the map.

Danbury, this highly developed study area is hardly comparable in terms of tourism intensity, industrial and commercial development and settlement density to central New Hampshire.

Chalmers refers to this area of Connecticut as the "western Connecticut Lakes Region," but there is no such designation on the Connecticut Office of Tourism's website or other publications.[19] On the State Tourism website, they refer to most of the western part of the state as the "Lichfield Hills Region," with no mention of lakes. Chalmers' so-called "western Connecticut Lakes Region" is neither a well-defined region, a tourism-based region, or a region with real estate markets that are comparable in any meaningful way to the impact area in New Hampshire. Unlike New Hampshire, Connecticut is one of only two states (the other is Washington, DC) in which no county has more than 10% of its housing stock in vacation homes. While Candlewood Lake provides recreational offerings to many, it is hardly the kind of tourism-dependent area characteristic of much of the central New Hampshire impact area.

No study area is mentioned as being comparable to New Hampshire's Great North Woods region, which may experience some of the more severe visual encumbrance effects from the proposed Project. In this region, more than 5% of the land area will be within the viewshed of the proposed Project.[20]

D) Local Market Review – "Near-Site" Assessments by Chalmers

As a part of his local market review, Chalmers embarked on a "near-site" tour of 89 property addresses with detached single family homes provided to him by Eversource that are within 100 feet of the existing ROW. He considered these to be the most "vulnerable" properties solely because of their proximity to the power line, regardless of the presence of visual stigma. No properties with multi-family structures, such as the 148 townhouses that are a part of McKenna's Purchase in Concord or commercial properties such as the Sherburne Woods senior living facility in Deerfield were visited or considered. Chalmers concluded that none of the properties he visited would be further impacted by the presence of the proposed transmission line.

Unfortunately, these visits did not include on-site access to the affected properties, and were largely confined to subjective assessments from viewing locations along public roads. Chalmers stated in SEC technical sessions that he did not have viewshed maps or tower simulations while visiting any of these potentially highly vulnerable locations. He performed this work during peak deciduous foliage cover in August, without any surveying equipment with which to measure potential new visual stigma from any location visited. Without this, it would be impossible to collect the information necessary to definitively reach his "no impact" conclusion with any reasonable level of certainty. Without full access to the properties, seasonal simulations from key property and building locations, including the removal of potentially screening vegetation in the ROW, such conclusions are unreliable. Of greater importance, his use of a 100 foot maximum

[19] In fact, a Google search of the term reveals more hits for the "Connecticut Lakes Region" of New Hampshire, which is in the North County, than anything so-named in Connecticut.
[20] Based on estimates provided to us by T.J. Boyle Associates, LLC.

impact zone ignored visual impacts that could extend well beyond this parameter and affect many more properties.

E) Local Market Review – Case Study Transactions by Chalmers

Chalmers also conducted a "case study" of 58 properties recently transacted, all of which abutted, and some of which were encumbered, by the existing power line. Sales data for each property was combined with an attempt to appraise each property as if there were no ROW stigma, by two appraisers in the employ of Eversource, Brian Underwood, who had performed prior analyses for Eversource which concluded that there would be no property valuation impacts from the proposed Project,[21] and Mark Correnti. Underwood and Correnti also conducted interviews with real estate brokers involved in the transactions to inquire as to whether or not they knew if the ROW was a factor in the sale.

Since most of these sales took place after the Project was announced, it is unclear if this was also discussed prior to the sale or included in the post-sale interviews. Based on the combination of the difference between the sales price and the appraised price (as estimated by Underwood and Correnti), and the ad hoc interviews by Underwood and Correnti, a subjective determination was made as to whether or not the sales price and/or number of days on the market for each of transaction was affected by the presence of the ROW. A loose "visibility" metric (clear, partial and none) was also noted for each transaction. The conclusion from this analysis, like all others Chalmers reached during this study, is that there were no generalized negative property valuation impacts from the presence of the transmission line that could be discerned. He also concludes that since none of the transactions within 106 feet (from building location to the ROW) was determined to have any negative impact, that no such impact was likely for any property beyond 106 feet – which he later "rounded" to 100 feet in conducting other analysis.

Aside from the well-documented drawbacks to "case-study" type analyses,[22] this analysis is flawed in many respects. The use of pairing speculative appraised values of properties without the ROW stigma with sales prices of properties adjacent to the power line is an "apples to oranges" comparison rife with potential mismeasurement. Appraisal valuations can vary significantly from one appraiser to the next. It would not be surprising if 10 appraisals produced 10 different valuations - and could easily vary from high to low by 10% or more – especially in areas with few comparables. In almost all of

[21] A preliminary study prepared for the Applicant by Underwood in May 2011, attempted to analyze the impact of existing HVTLs on property values in Littleton and Deerfield NH. Underwood initially reviewed more than 150 parcels located along the existing lines, and then narrowed the preliminary study down to a mere eight properties that had been sold or improved with a house or other upgrade within the last 10 years. Based on his analysis of these eight properties, four in each town, and his interviews of persons involved in these transactions, Underwood concluded: "… there is no market evidence in either Deerfield or Littleton that would indicate diminution of property value due to high voltage transmission lines. This conclusion is further supported by interviews conducted with individuals involved in the market transactions of properties abutting HVTL corridors."

[22] As noted by Steven C. Bottemiller and Marvin L. Wolverton in *The Appraisal Journal*, Winter 2013 issue, survey and case study "methods exhibit inherent difficulty controlling for all of the factors affecting market value; the opinions of market participant proxies (brokers, lenders and appraisers) may not accurately represent the opinions of buyers and sellers, and; case study evidence is mostly anecdotal in nature."

the transactions reviewed, a variance like this would exceed the measured difference between the appraised value and the sales price – rendering the study meaningless.

However, even if one accepts the accuracy and conformity of the appraisals, the conclusions drawn by Chalmers are not supported by the data. He mistakenly rejects some negative variances between the appraised and sales prices because in the interview, the broker indicated that the ROW was not raised as an issue. Aside from the possibility that it was an issue and never discussed, and aside from the potential bias introduced by a paid representative of a financially interested party as the interviewer and interpreter of the interview (especially one who had already concluded that there would be no price effect), there is no reason to assume that any negative price differential should not be fully attributable to the presence of the ROW.

Negative price effects can be derived both via lower prices that compensate people who consider the ROW to be a negative stigma, and depressing the price via lower demand as a result of the exclusion of people who would not even consider the property because of the stigma. Of importance, for the "excluded" potential buyers, there may be no verbal reference to the stigma during the transaction.

Thus, any and all negative price differentials should be attributed to the only difference in a perfectly appraised valuation – the presence of the transmission line and ROW. If this were the case, 28 of the 58 properties (48%) would show negative impacts, with 11 of these extending beyond 106 feet and 7 beyond 200 feet (including one at 781 feet). 22 of the 28 (about 80%) negatively affected properties have a visibility notation (however incomplete) of "partial" or "clear."

Lastly, by excluding all properties not abutting or encumbered by the ROW, this component of Chalmers' analysis does not attempt to measure the most likely property valuation impact, visibility. Although much more difficult to gather and measure, this is the only way to accurately estimate property valuation loss from diminishment of this amenity. Had Chalmers done this, he would have had to use competent viewshed data, identified affected parcels, generated before and after photo simulations and performed professional, unbiased, appraisals, subjective as they would necessarily be, given that there is no comparability data on towers of this height and visibility, on at least a sample of such properties.

F) Local Market Review – Subdivision Analysis by Chalmers

Chalmers' local "subdivision studies" attempted to pair sales prices of "comparable" lots with and without existing ROW encumbrance. As with all other local analyses he performed, Chalmers found no consistent measurable negative impacts from the ROW encumbrance.

These studies, apart from comparing unadjusted sales prices in some cases that are 18 years apart, suffer from some of the same drawbacks as the other local studies: There was no meaningful notation or test for visibility, which is the primary mechanism by which the stigma should theoretically occur. If a property has a ROW encumbrance, but no visibility issue, it would not be expected to underperform relative to an unencumbered property with a prominent visual stigma. By studying parcels that are all in close proximity to the transmission line, these effects could be frequently present, since

subdivision lots would be planned to minimize visual stigma - as well as the possibility of a general negative stigma that could exist for the entire subdivision.

Real estate marketing sign on a development in Dalton within the Project viewshed

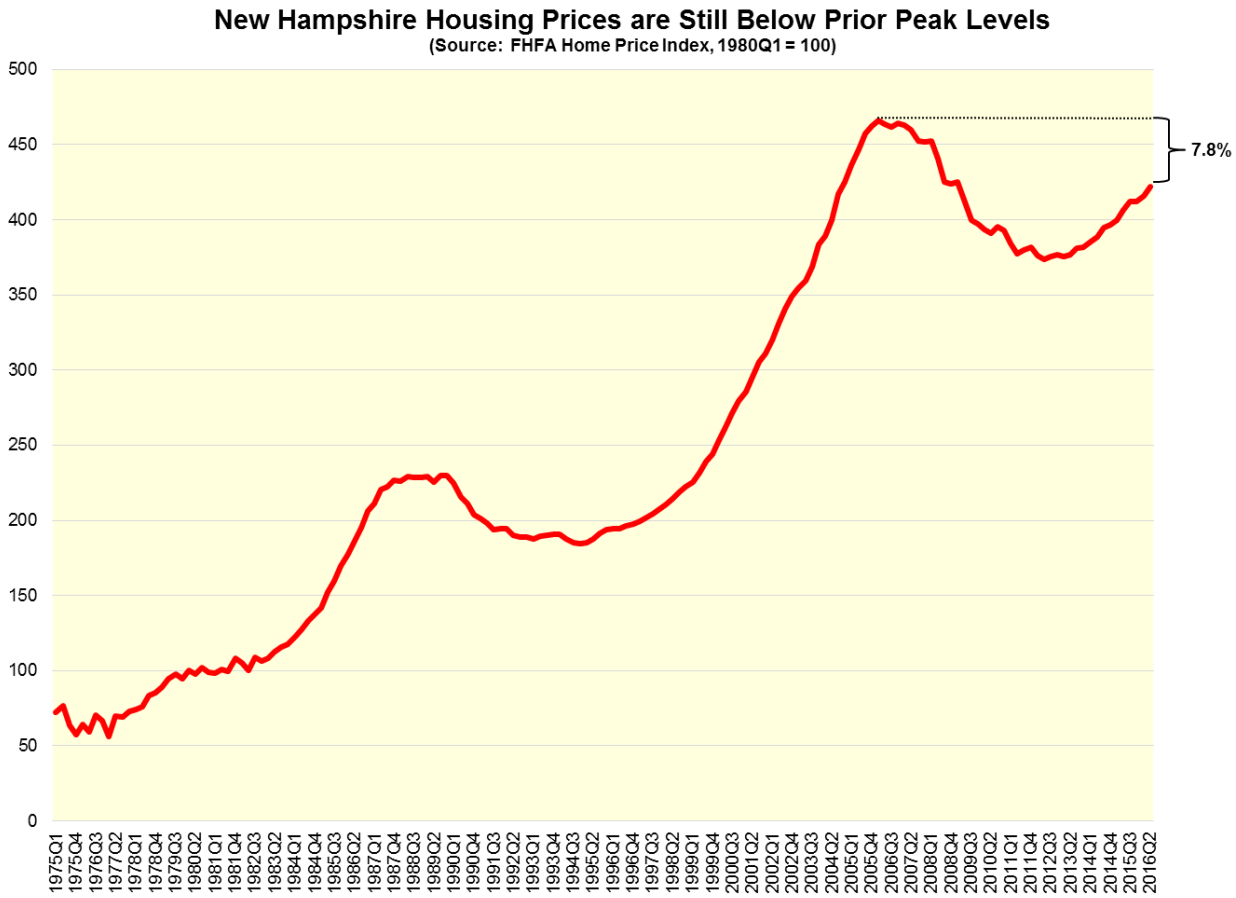
G) Local Market Review – Market Activity Research by Chalmers

In the last study component presented, "Real Estate Market Activity Research," Chalmers constructs two ratios – sales price to list price and days on market – averaged for three classes of properties: abutting/encumbered, 1 to 500 feet and 501 feet to one mile, for a period of eight quarters. Use of a longer time period was rejected "due to the recession's effect on prices,"[23] as was the stated reason for limiting the transaction data period in the above case study analysis as well.

The sample sizes relied upon for the comparative calculations in this study component were so small as to be meaningless. In many periods fewer than five transactions underlay the analysis and in several quarters, only two or three. Aside from the fact that the listed prices could be dramatically lower because of the threat of the announced Project, thereby "improving" both ratios, in order for these metrics to have any relevance

[23] As stated at the SEC technical information session in September 2016

or validity, additional variables would need to be considered, such as the Project announcement date, potential Project visibility, and the importance of the property's view amenity. Lastly, there is no reason in this analysis or the case studies to limit the relevant data to the time periods chosen. The real estate market in New Hampshire peaked in the fourth quarter of 2006, declined through the second quarter of 2012 and has yet to reach its pre-recession peak (of which it is currently about 8% below). Use of data in any period could be adjusted to market conditions and in any event, would have been consistently declining well beyond the study periods chosen.

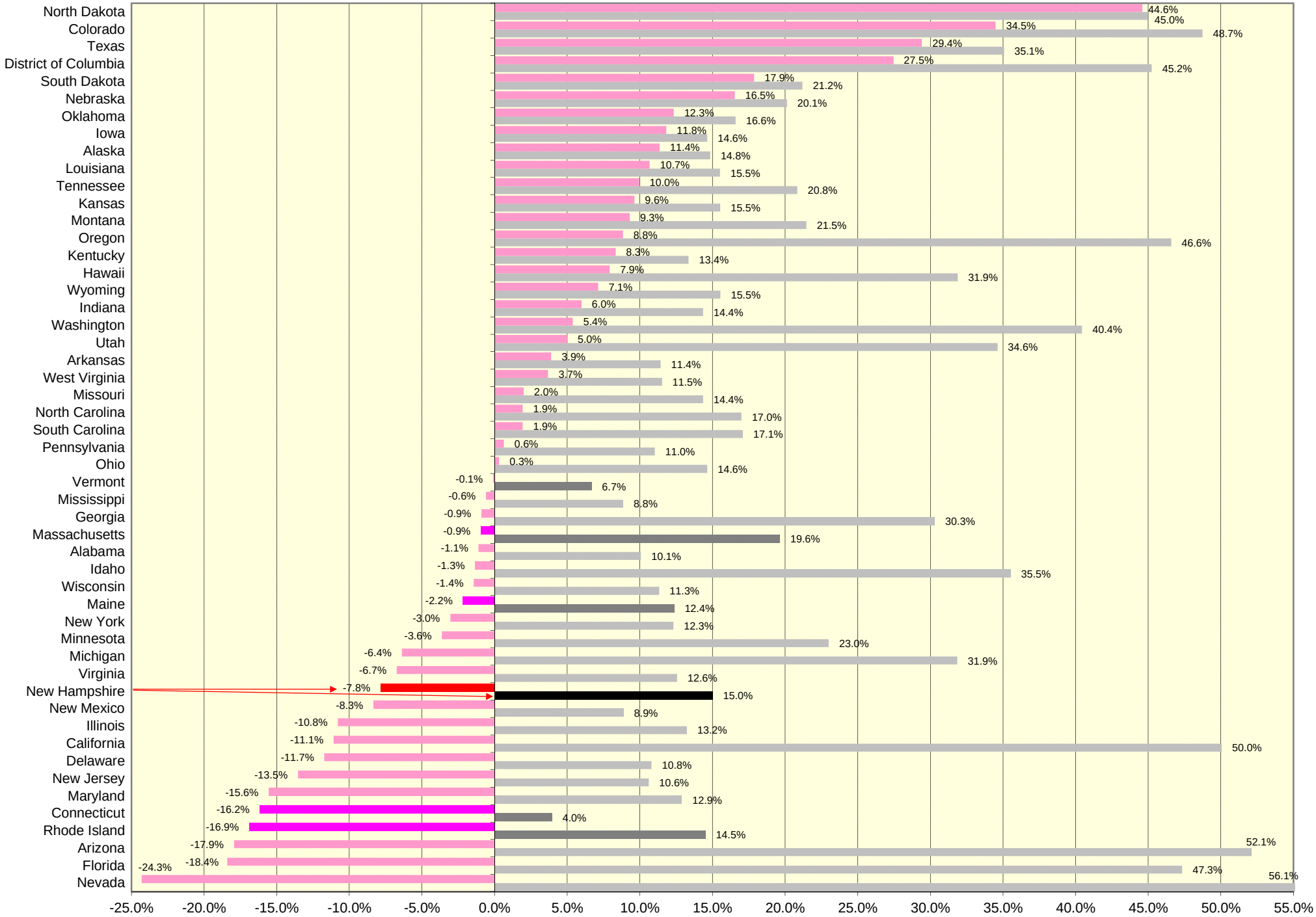


H) Summary of Applicants' Analysis

The Chalmers analyses, individually and in sum, fail to examine the most important conduit for potential property valuation diminution in an area of high recreational and scenic amenity values – visual property degradation. Property value loss is not a mere dark imagining of the many potentially affected parties to which this process has given voice. It is a real potential effect that should be studied and estimated, however, difficult to quantify.

Real Estate Markets: Housing Values Relative to Last Peak (pink) and Trough (grey)

Percent Change, 2016Q3 vs. Peak Price by State Reached Between 2005Q3 and 2009Q2 - Pink and 2016Q3 vs. Trough Price Reached Between 2009Q3 and 2016Q3 - Grey
Source: FHFA



In no event, however, could it reasonably be considered to be zero, even if the inapplicable extant literature were to be the exclusive basis of such a determination.[24] Perhaps because of possible preconceptions of outcome from performing such work repeatedly for transmission line developers, and the lack of relevant study areas in the reviewed literature, viewshed impacts beyond 100 feet were largely excluded from Chalmers' Project analysis and therefore did not even consider the extensive viewshed reach prepared by the Applicants' aesthetic consultant. The SEC review process specifies a potential 10 mile impact zone on each side of a transmission line. Visual impacts in mountainous terrain such as that through which the proposed Project passes can be significant throughout this range. To ignore this possibility is to ignore an important potential economic impact. Lastly, there was virtually no analysis or mention of the 32 mile newly cut portion of the transmission line ROW corridor and any differential impacts that could occur for this segment of the transmission line.

5) Review of Applicants' Tourism Impact Analysis

A) Overview – Potential Tourism Impacts

The Applicants' assessment of potential tourism impacts from the proposed Project is contained in a study and related testimony by Mitch Nichols of the Nichols Tourism Group.[25] Their analysis concluded that the "Project will not affect regional tourism demand and it will not have a measurable effect on New Hampshire's tourism industry." This conclusion was based on five "study elements," which we will review in sequence.

B) Study Element 1: The Incidence of Relevant Prior Research Requests

The first is based on Mr. Nichols' 20 years of industry experience assisting tourism destinations with marketing and promotional activities, during which time the absence of "any concern … raised about the presence of transmission lines and their possible effect on visitor demand," is equated by Mr. Nichols with an absence of any possible negative effect. This is underscored by the mention of specific prior work in areas with particular scenic beauty, including the "red rock region of Sedona, Arizona."

What is not considered in this logic, however, is that the absence of discussion regarding the development of high voltage transmission lines in areas of high scenic value is not because they would not impact tourism visitation, but because such areas would never consider allowing this type of development and thus, neither "concern" nor conversation would ensue.

For example, Jennifer Wesselhoff, the current President and CEO of the Sedona Chamber of Commerce & Tourism Bureau stated that:

[24] Such as that performed by the Department of Energy review of the Project, which used a 3.5% loss rate on all properties within 500 feet of the transmission line. "Socioeconomics Technical Report for the Draft Environmental Impact Statement" by Edgeworth Economics, Inc., for the U.S. Department of Energy, July 13, 2015

[25] See Appendix 45 of the Applicants' submission, entitled "Northern Pass Transmission and New Hampshire's Tourism Industry."

> *The presence of a large high voltage transmission line in Sedona could obviously have negative tourism impacts and any development causing degradation of the unique, natural scenic beauty that is our primary tourism draw would encounter considerable resistance. Because of this, I do not ever recall there being serious consideration of any such large power line development in or near Sedona … While I understand the tradeoffs involved in our need for electric power and the preservation of unique natural environments, there are places for each. Places of rare scenic beauty and high tourism visitation risk both economic and cultural loss when development is not sensitive to these values.*[26]

This same logic applies to the absence of academic literature on negative tourism impacts from high voltage transmission line development that is also cited by Nichols in support of his conclusion. From an absence of relevant studies, he illogically infers no potential tourism impact. We believe it is more likely that the relatively small number of academic studies on the subject is due to common sense avoidance of obvious negative effects in the siting of such projects in scenic tourism-sensitive areas.

C) Study Element 2: Descriptive Review of the New Hampshire Tourism Industry

The second study element in Nichols' report is a descriptive review of the characteristics and importance of the New Hampshire tourism sector that neither supports nor contradicts the author's conclusions. This data is largely sourced from Plymouth State University's Institute for New Hampshire Studies, however, there are basic math and labelling errors in tables presented in this and other sections of the report. For example, in Figure 3-1 of the report, the number labelled as "Direct/Indirect/Induced" Visitor Spending is actually only "Induced" spending. And, in the same table, although Nichols counts direct, indirect and induced totals for visitor spending, he omits induced employment (26,120 jobs) in the calculated total. This would change total employment from 90,825 to 116,945 and the calculation of the share of state employment that is tourist-related from 10.2% to 13.1%, as estimated using Plymouth State University (PSU) assumptions and data.[27] Of note, state tourism spending as a share of total economic output is about half the employment share, at 7.3%, in FY14. Though difficult to precisely measure all economic components of tourism,[28] we generally concur with the use of PSU data as a reasonable depiction of the importance of tourism to the state economy, regional tourism characteristics and its recent performance.

D) Study Element 3: Listening Tour Feedback

The third study element consisted of feedback from a four stop "listening tour" in December of 2013, arranged by the Applicants through the New Hampshire Travel Council, of which the Applicants are a member/sponsor. Some of these sessions had as few as four attendees. Despite mention in a "summary of key points" that "opinions

[26] Letter from Jennifer Wesselhoff, President/CEO of the Sedona Chamber of Commerce and Tourism Bureau, December 11, 2016, in response to inquiry regarding hypothetical HVTL development in Sedona, AZ

[27] PSU source data for FY14 are available at: https://www.plymouth.edu/institute-for-new-hampshire-studies/nh-tourism-data/travel-economic-reports/

[28] It should be noted that estimates that include indirect and induced spending are the most expansive measurements of total industry impacts and are derived through estimation, not direct measurement.

regarding the potential future impacts of the Project on tourism varied," with "some concerns … expressed in regards to New Hampshire losing its image as a beautiful state and tourism attraction power," these opinions were dismissed because "no one offered an empirical basis supporting those concerns." By definition, a "listening tour" is structured around "listening" to anecdotal perspectives and opinions - not empirical analysis. While such anecdotal information could lead to empirical research to test its validity, dismissal of selected perspectives because they were not offered with an "empirical basis" presents an easy opportunity for bias in the analysis. Without taped transcripts or other recordings of the meetings – and none were made - it is impossible to know what was selectively reported in this section and what was omitted. Based on a few hand-written notes from the various sessions, there were many negative comments about the proposed transmission line that were not reported or given voice in the conclusions reached by Nichols.[29]

Mention was also made during the listening sessions of enhanced recreational opportunities for "hunting, ATV, snowmobile and mountain biking communities," by virtue of expanded transmission line rights of way access. However, when we asked during the discovery process how many miles of the current rights of way are used for such trails or open to the public, we were told this was unknown. When we visited road crossings at several locations under the existing high voltage transmission line, most had no trespassing signs limiting public access. Since the landowner of a utility ROW maintains control of access rights to all but the utility, unless the utility owns the land outright, they cannot confer public access rights to others.

In conversations with snowmobilers and ATV riders at two informational sessions in Colebrook, New Hampshire, and in a related North Country Chamber of Commerce visitor and industry questionnaire, we were told that they did not wish to have extended trails under the transmission lines and sought locations where the trails offered the same wilderness experience and natural beauty hikers and other outdoor enthusiasts seek in visitation to New Hampshire. This was buttressed by comments Nichols received from snowmobilers at the listening sessions, including the following: "People won't check New Hampshire off their list of places to ride, but may find other trail[s] if there is infrastructure on the trail." And, "They may not want to ride the trails – only use as a pass through to the beautiful trails they want to ride." In light of these kinds of comments and the legal control of ROWs by landowners, it is unclear why ROW access for these purposes was considered a significant potential tourism benefit of the proposed Project.

[29] At the December 5 and 6 sessions for example, such comments included: "People…may never come back after seeing towers. Don't want to take photos with towers in them."; "Uphill battle – takes over beauty and that's what people want."; "Tourism industry doesn't care how green the power is – Beauty is what gets them here, not how green the power is."; "NH is not going to be as pretty as it was – may be an issue and a reality for visitors."; "Scenery – a vital part of the industry (i.e., skiing and hiking). The visual aspect keeps them coming."; "Not having too many [power] lines is a huge factor for tourists." ; "[Large infrastructure] takes away what people envision NH to be – the height of the towers matters – pipelines didn't see."; "If not getting the views they want, visitors will look elsewhere." Complete listening session notes are in the document, NPT_DIS 058291.

View from a public road crossing on the existing transmission line in Lancaster

From the sparse listening session notes, and the guided questions posed to participants, there is a sense that the listening sessions were as much about explaining and promoting the proposed Project as gaining unbiased feedback on potential tourism impacts.

E) Study Element 4: Prior Local Transmission Line Development Review

The fourth study element involved an attempt to examine "actual experience" with two "similar" transmission projects: the "so-called Phase II line" in New Hampshire, a 450kV line constructed through portions of Grafton, Merrimack and Hillsborough counties "in the late 1980s" and the "Maine Power Reliability Program," affecting five of the most populous counties in Maine, where construction commenced in 2010 and was expected to be completed in 2015.[30] Nichols attempts to assess tourism impacts from these projects by comparing before and after employment and establishment counts in selected tourism-related industries in the counties through which the projects pass, with counties in New Hampshire and Maine through which the projects did not pass.

[30] The project owner, Central Maine Power, still reports that it "expects to complete the project in 2015" on its website (http://www.cmpco.com/OurCompany/MPRP.html) as of this writing.

Although all source data was requested during the discovery process, along with numerous follow-up requests for missing data, only source data for the Phase II analysis has been provided as of this date.

In addition to the absence of source data access, both the study design and its execution render this component of the analysis virtually meaningless. There are several reasons for this: First, analysis at the county level does not properly capture potential impacts where they are most likely to occur: within the viewshed or close proximity to the line. Use of county-level employment metrics will include a great deal of economic activity that is completely unrelated to the transmission line. For example, Hanover and Lebanon represent more than 25% of the population of Grafton County, and Lebanon alone accounts for more than 20% of all Accommodation and Food Services employment. Neither would be expected to be impacted by the line and yet Grafton County is considered an affected county in the analysis.

Similarly, Manchester and Nashua represent about half of the population of Hillsborough County and nearly two-thirds of all Accommodation and Food Services employment, however, much of this is not tourism-related demand. In fact, the largest employment and establishment category used in this study component, "Eating and Drinking Places," is not always predominantly tourism-related. Nationally, only about 17% of all economic activity in this category is considered to be derived from tourism demand.[31] Within New Hampshire, it is estimated to range from a low of about 11% in Sullivan County to nearly 80% in Carroll and Grafton counties.[32] This kind of variation makes it impossible to rely on this metric as a consistent measure of tourism activity between counties.

The time period over which the Phase II line is examined also introduces potential error into this analysis. The economic recession in the early 1990s in New England was particularly severe and affected various counties differentially. Many other much larger factors such as this could affect employment and establishment counts in the various counties over the study period chosen. For example, much of the demand for Eating and Drinking Establishments and Hotel and Motel employment in Hanover, New Hampshire, which is included within a potentially "affected" Phase II line county (Grafton), is related to economic activity related to Dartmouth College and the large Dartmouth-Hitchcock Medical Center, not a distant new transmission line in an existing ROW.

The Phase II line used in this comparison is also different in important respects from the proposed NPT Project. Virtually all of the Phase II line was built on existing rights of way, and placed between two other power lines, with towers that are considerably lower than the proposed Project and screened in many places by the existing canopy. Aside from the 32 miles of new right-of-way that the proposed Project will add, the towers will be taller, more visible, and along much of the existing corridor, will have a wider cleared ROW area.

[31] Per the Survey of Current Business, U.S. Bureau of Economic Analysis, "U.S. Travel and Tourism Satellite Accounts for 2010–2013," June 2014

[32] Implied rates based on actual FY2014 Meals and Rooms tax receipts from the NH Department of Revenue Administration and FY14 Tourism Satellite Account estimates from PSU. The FY2014 statewide rate was about 50%

In addition to methodological study design flaws, the calculations upon which the conclusions were drawn were erroneous in several ways. First, they aggregated industry categories in counties in which there were suppressed data points due to nondisclosure limitations. These values were treated as "0" in the analysis, despite being positive integers of unknown size. Though usually relatively small, there are instances when there are a small number of firms with substantial employment in such cells. There are hundreds of such nondisclosed cells in the source data used that are likely to contain significant positive values. To treat these as zeros is methodologically indefensible. In the Phase II analysis, Nichols also added all data from unknown geographic locations (labelled FIPS code 33099) to the non-impact area. This data should have been excluded from the analysis entirely.

Finally, when presenting and analyzing this data, "average annual change" in both employment and establishment counts appear to have been calculated by averaging the percent change reported in each year (simple average), instead of the more common professional practice of calculating change over time using compound annual growth rates (CAGR). While these two rates will not differ much for smoothly growing or shrinking series over longer time periods, they can be significantly different for volatile series over shorter time periods, such as some of the data in this study element.

There was also some confusion regarding the starting and ending years for these calculations, which remain unresolved as of this writing. In Table 5-1 in the Applicants' report, the starting year is labelled as1985 for the number of establishments and 1986 for the number of employees. From a review of the source data, it appears that the starting date used was 1986 and not 1985, based on matching the simple averages displayed in the Applicants' report.

The source data spreadsheet, however, also reveals another serious calculation error: The formulas in the source spreadsheet that were used to derive the data used for "All Other Counties" excluded Rockingham County entirely. Thus, what is reported and used in the analysis as the comparative control region is both misspecified and mislabeled.

Table 5 on the following page, entitled "Source Data Review of Table 5-1," is based on the source data provided by the Applicants (which exclude Rockingham County), however, it includes variables not presented in the Applicants' report (wages), adds the more meaningful compound average annual growth calculations (CAGR) highlighted in green, and illustrates the likely starting date error by showing all calculations starting in both 1985 and 1986.

TABLE 5

SOURCE DATA REVIEW OF TABLE 5-1

PHASE II LINE COUNTIES	Establishments	Employees	Wages
1986 to 1990			
CAGR	5.1%	**0.3%**	5.9%
simple average	4.5%	1.3%	7.5%
Applicant report	**4.5%**	**NA**	**NA**
%CH	22.0%	1.4%	25.7%
1985 to 1990			
CAGR	4.5%	**1.2%**	7.3%
simple average	5.0%	2.0%	8.6%
Applicant report	**NA**	**1.3%**	**NA**
%CH	124.5%	105.9%	141.9%
1991 to 1995			
CAGR	2.5%	**4.5%**	6.9%
simple average	2.8%	2.3%	4.7%
Applicant report	**2.8%**	**2.3%**	**NA**
%CH	110.5%	119.3%	130.7%
1986 to 1995			
CAGR	3.8%	**1.4%**	5.2%
simple average	3.7%	1.8%	6.1%
Applicant report	**3.7%**	**NA**	**NA**
%CH	140.2%	113.1%	157.2%
1985 to 1995			
CAGR	3.6%	**1.7%**	5.9%
simple average	4.0%	2.2%	6.8%
Applicant report	**NA**	**1.8%**	**NA**
%CH	143.0%	118.2%	177.4%
1991 to 2012			
CAGR	1.9%	**1.7%**	4.8%
simple average	2.0%	1.3%	4.4%
Applicant report	**NA**	**NA**	**NA**
%CH	149%	142%	266%

ALL OTHER COUNTIES (EXCLUDING ROCKINGHAM)	Establishments	Employees	Wages
1986 to 1990			
CAGR	1.6%	**2.3%**	6.3%
simple average	1.5%	3.0%	7.9%
Applicant report	**1.5%**	**NA**	**NA**
%CH	6.7%	9.5%	27.8%
1985 to 1990			
CAGR	1.5%	**2.8%**	7.6%
simple average	3.0%	3.0%	8.7%
Applicant report	**NA**	**3.0%**	**NA**
%CH	107.5%	114.9%	144.2%
1991 to 1995			
CAGR	5.7%	**6.2%**	8.1%
simple average	2.7%	2.0%	4.6%
Applicant report	**2.7%**	**2.0%**	**NA**
%CH	124.7%	127.0%	136.4%
1986 to 1995			
CAGR	2.1%	**1.9%**	5.2%
simple average	2.1%	2.5%	6.2%
Applicant report	**2.1%**	**2.5%**	**NA**
%CH	120.3%	118.5%	157.8%
1985 to 1995			
CAGR	1.9%	**2.2%**	5.9%
simple average	2.8%	2.5%	6.9%
Applicant report	**NA**	**2.5%**	**NA**
%CH	121.3%	124.4%	178.1%
1991 to 2012			
CAGR	2.4%	**2.0%**	5.0%
simple average	2.0%	1.3%	4.4%
Applicant report	**NA**	**NA**	**NA**
%CH	164%	152%	279%

Based only on the source data we were provided, and ignoring the many methodological problems with this approach noted herein, there is almost nothing conclusive that can be drawn from the Phase II analysis source data. As shown in the table above, and based on the compound annual employment growth rate (highlighted in green in the table), which is the best overall metric of economic "health" included in the source data, the "Phase II line counties" had slower employment growth during every period measured, including both the construction period (whether measured from 1985 or 1986 to 1990)

and following its completion (1991 to 1995) than did New Hampshire counties considered outside the impact area (with the erroneous omission of Rockingham County). Although we do not regard this variation as meaningful due to the methodological flaws mentioned above, it contradicts the conclusions drawn in the Nichols report.

Because no source data were provided for the Maine Power Reliability Project (MPRP), it is not reviewed in detail here. It suffers, however, from the same methodological design flaws as the Phase II analysis and thus, cannot be the basis of any meaningful conclusions regarding potential tourism impacts. Without considering viewshed data, it is impossible to know whether the transmission line work performed as a part of the MPRP extends to the tourism-intensive coastal regions of supposedly impacted counties or adjacent coastal counties. The absence of any data following the scheduled completion of the MPRP line in 2015 also precludes its inclusion in support of Nichol's statement that "the actual experience from both projects in the two states indicates that both during and after construction of large power projects, tourism industry establishments and employees continued to grow and expand." There was no "after construction" data reviewed for the MPRP because it did not exist at the time of the study nor is it available now. Of note, the MPRP study purported to utilize the same Standard Industrial Classification (SIC) employment codes used in the Phase II study, and yet these codes did not exist at the time of the Maine study, having been replaced in 1997 by North American Industry Classification System (NAICS) codes.

F) Study Element 5: Custom Survey of Potential Visitors

The fifth study element reviewed "factors influencing visitor demand" in New Hampshire, based on a web-based survey of 456 paid respondents. Many of the broad findings in this survey are consistent with tourism research sponsored by the New Hampshire Division of Travel and Tourism Development, however, some of the findings call into question both the survey instrument and the interpretation of some results.

Specifically, there were notable counterintuitive responses to several questions, including a 6.2% response that found "possible traffic delays" to be an "essential or very important benefit" of a tourist destination, along with 9.3% who considered "visible power lines in areas" and 6.5% who responded that seeing "commercial or industrial from highway" to be similarly positive visitation attributes. When queried about this in telephone conversations and at the SEC-sponsored technical sessions, Mr. Nichols indicated that he honestly believed that these responses were valid and that these destination characteristics are considered to be important or essential benefits of a place to vacation.

Our sense is that it is more likely that the respondents either did not understand the question or interpreted it to mean the absence of the attribute was important. It defies belief that anyone would consciously seek out vacation locations with traffic delays, or travel to New Hampshire in order to see visible power lines or commercial and industrial buildings from its scenic highways, when such vistas are plentiful in the metropolitan locations from which most New Hampshire tourists originate.

The most glaring omission in this study element was that for an analysis whose primary purpose is to evaluate potential tourism impacts from a high voltage transmission line,

that there was not a single question in the survey that mentioned, provided a visual simulation, or described a high voltage transmission line. The only attribute description around which the survey posed questions even remotely relevant to this central issue was, "the destination has visible power lines in certain areas." This characterization pertains to almost every tourist destination to which one could drive, purchase food or stay in a hotel. By providing no information about the size, height, prominence, location or type of "power line," most would assume this refers to ubiquitous low voltage power lines on wooden telephone poles. To add the phrase, "in certain areas," further diffuses any potential strong reaction and obfuscates the attribute. What is a "certain area?" A small New England village with great restaurants? A small, barely visible low voltage power line behind a row of trees along a highway? Or a pristine wilderness area with iconic views interrupted by a 200 foot cleared right of way with multiple 100 foot steel towers rising above the forest canopy with connecting high voltage power lines? Any of these could qualify as a "power line" in a "certain area."

Even with the avoidance of the term "high voltage transmission line" and other descriptive minimization in the survey regarding power lines, there was evidence of strong negative feelings among some towards "visible power lines in certain areas." For nearly 5% of the respondents, this was a "critical" barrier" to consideration of visitation, and for more than 10% of all respondents, it was either a critical or "very important barrier." Nearly 30% found "visible power lines" to be "somewhat, very important or critical" as a barrier to visitation.

Almost 40% of the respondents had the same sentiments about seeing large commercial or industrial development from the highways, with more than 17% saying this was a very important or critical barrier in their decision to visit. In a related question, about 40% of the respondents also said that they made their travel destination decisions "almost all the time" (10.6%) or "quite often" (28.9%) based primarily on the following attribute: "The destination has little commercialization (that is, pure wilderness)." Clearly, there are a significant number of potential New Hampshire tourists who value "pure wilderness" areas devoid of commercial and industrial structures. For these visitors, the presence of the proposed Northern Pass Project could affect their visitation decisions.

TABLE 6

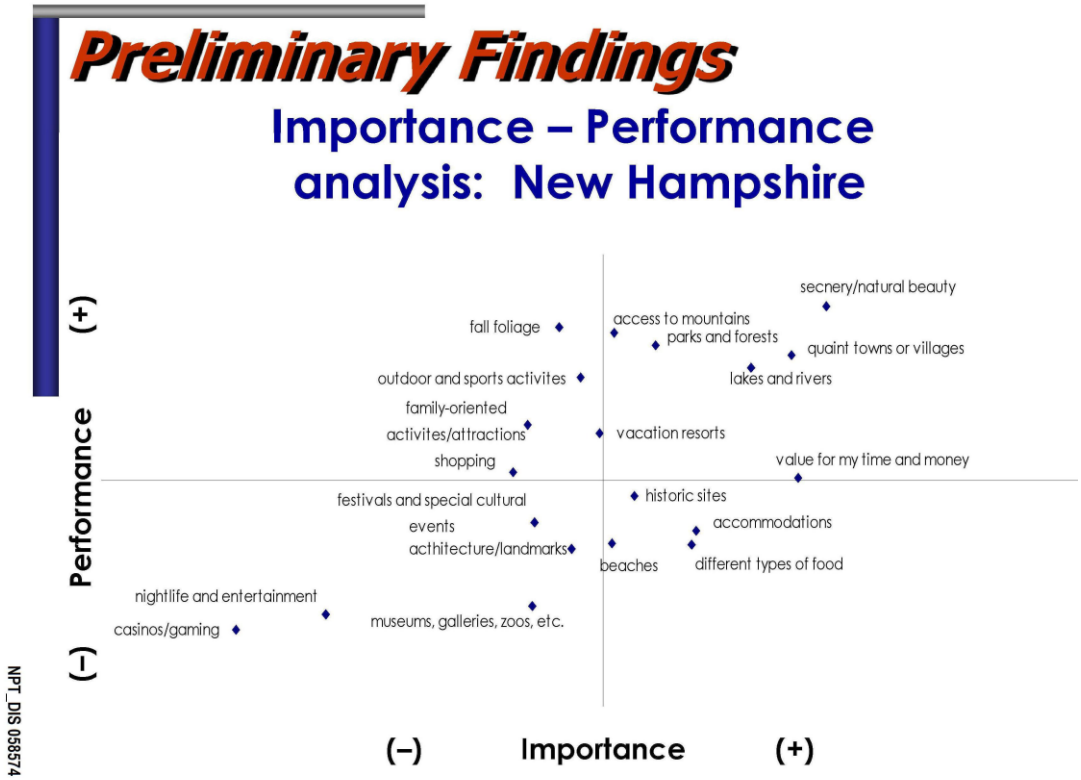
Percentage Responding With "New Hampshire" to the Question: Which State Would You Most Associate With the Following Feeling?		
1	Beautiful	24.3%
2	Friendly	23.9%
3	Relaxing	22.4%
4	Peaceful	19.1%
5	Charming	17.8%
6	Fun	17.6%
7	Quaint	17.1%
8	Romantic	13.2%
9	Surprising	11.5%
10	Boring	9.5%
11	Luxurious	6.8%
12	Diverse	5.2%
13	Hip	5.1%
14	Cultural	4.6%
15	Sophisticated	4.1%
Nichols NPT Survey, Among a choice of ME, NH, VT, MA, CT, RI and NY		

Nichols dismisses these sentiments by noting that other attributes are cited "more frequently than power lines." Frequency of response, however, is not the equivalent of intensity of feeling, especially when a sentiment is deemed "important" or, especially, "critical." It is, of course, possible to have more responses to a question and not disregard strong negative feelings dismissed by a smaller number of respondents.

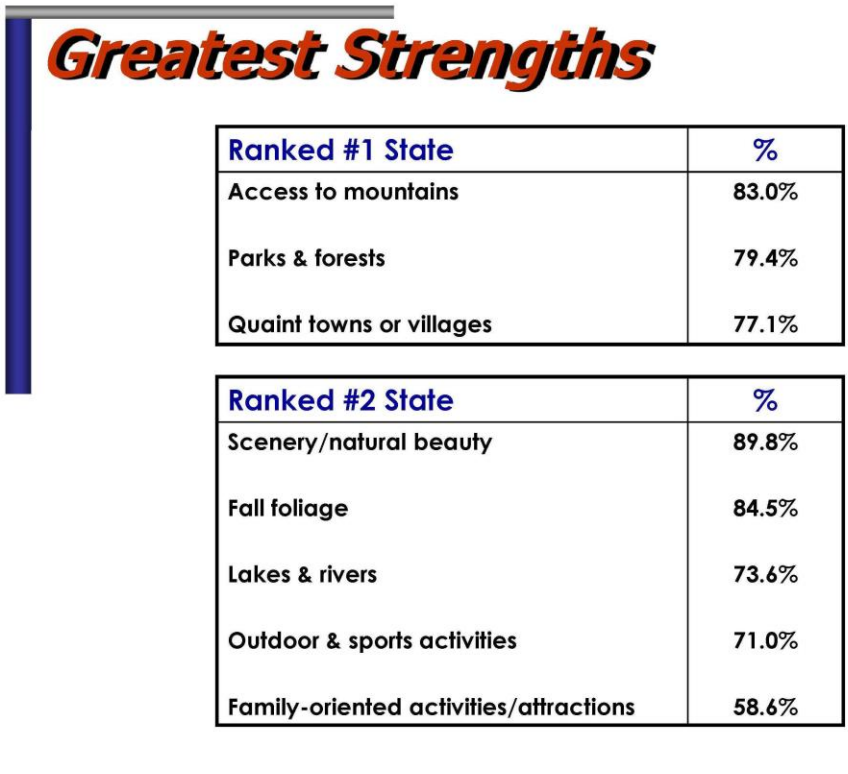
Nichols reports on "Feeling" associations from the survey in his Table 6-2, listing "destination feelings" in which New Hampshire's relative state ranking is highest. Based on this, "relaxing" and "friendly" are the top rated attributes. This, however, is different from the ordering of survey results based on the attributes with the highest percentage of responses for New Hampshire. Based on this, and as shown in the table on the preceding page, the highest percentage of respondents rated "beautiful" as the top attribute.

A Nichols' study done specifically for New Hampshire in 2002-2003,[33] also found "scenery/natural beauty" to be the top state tourism draw. Per the below chart, based on preliminary findings, this is both an important attribute to visitors and one in which the state performs well. This is also true of many of the attributes located in the top right quadrant of the chart, including quaint towns or villages, access to mountains, parks and forests, lakes and rivers and vacation resorts.

[33] See NPT_DIS 058541.pdf and NPT_DIS 058599.pdf, in response to discovery questions. This study was performed by Nichols Gilstrap Group, entitled "New Hampshire's Image as a Tourist Destination"



When these attributes are ranked by New England state, New Hampshire consistently scores well with attributes that are connected to natural visual elements. As shown in the chart on the following page, also from Nichols' 2002-2003 preliminary survey data, the same attributes, almost all of which are linked to natural scenic beauty, characterize New Hampshire's comparative tourism advantages. All of these attributes are consistent with more current analyses and marketing strategies pursued by the New Hampshire Division of Tourism and Travel as outlined in their FY2015 Strategic Marketing Plan. The importance of these elements, however, makes them vulnerable to visual disturbance, such as that accompanying the proposed Project.



By paying for the survey responses in the on-line survey used in this study element, there is a risk that there may be disproportionate participation by those attracted to the prospect of payment and low value time on their hands with which to respond. Since the respondents are otherwise anonymous, this could skew the results. The income distribution of those survey respondents who reported their incomes suggests this could be an issue, with more than 32% of the respondents (unweighted and about 28%, weighted) earning less than $40K per year in 2015 dollars. This is in contrast to a survey Nichols performed in his 2002-2003 study for New Hampshire, where only 7.6% of the respondents earned less than $40K in 2002 dollars. If adjusted for inflation, this comparison would be even more stark, with 40.3% earning under $38K in 2002 dollars in the current survey (unweighted and 35% weighted) versus 7.6% earning under $40K in 2002 dollars in the 2002-2003 survey. Nichols explained the importance having a higher income mix for tourism-related surveys in his 2003 report as follows: " … an emphasis was placed on soliciting survey responses from decision makers in households that have the financial ability to travel frequently and to spend impressively while traveling." Despite having considerably lower incomes, 77% of the respondents in the 2015 study element survey said they travel frequently in New England and 44% said they travel frequently throughout the U.S., versus only 75% and 36%, respectively, among the more affluent 2002-2003 survey sample. These kinds of discrepancies call into question the reliability and the appropriateness of the survey respondents relied upon for this study element.

G) Summary of Applicants' Analysis

In summary, we do not find the Applicants' analysis of tourism impacts to be a reasonable or credible assessment of the potential impact of the proposed Project. While aggregate monetized tourism impacts may not be an enormous share of total State tourism spending, they are unlikely to be nonexistent in the affected region.

6) Economic Impacts – Construction and Development

We have estimated the economic impacts of the planned $1.1 billion construction and development expenditures for the Project over the period from 2016 to 2020, one year later than the comparable LEI analytic period. In our earlier review of LEI's economic impact estimates (see Section 3), we identified two minor problems and two serious ones with the manner in which LEI implemented the REMI model with the available project expenditure information supplied by Eversource. The two minor problems are:

1. The use of full-time equivalent employees by LEI instead of a "jobs" based employment estimates will introduce slightly lower direct employment estimates than should have been the case.

2. LEI failed to include the value of the completed project as an addition to New Hampshire's nonresidential capital stock. In their report, they noted that the model could accommodate the change, but ignored the importance of doing so. Because the REMI model internally generates future investment spending and then uses this figure as the basis for future jobs, it is noteworthy that when investment is accelerated, the additional capital gives rise to later maintenance and repair expenditures. This causes an increase in future employment of a small magnitude. Although this is usually a minor concern, the Project's scale will result in an acceleration of such spending after the Project's completion. Very long run effects (2030 to 2060) will increase gross state product by an average of about $0.5 million per year ($2016) and add slightly to employment and other effects.

The two major problems are:

1. The use of extremely high compensation rates for various industries will generate extraordinarily low intermediate goods and services demand for sectors where they affect the REMI model's estimates for intermediate goods and services. Such sectors include legal services, real estate services, professional/technical/scientific services, and administration and support services. Offsetting these low estimates are very high figures for induced consumption that stem from added compensation to the direct employees. The compensation rates used appear to have been derived from cost estimating guides used in bid and cost estimation. They usually include allowances for overhead and profit, two figures that are already estimated in the REMI model, and inappropriately included here.

These distortions are likely to shift some of the estimated economic impact towards local markets, since personal consumption purchases tend to be local (at least initially). On the other hand, the low estimate of intermediate expenditures results in a reduction in purchases from nearby states' markets. Viewed together, however, the total size of the distortions could be relatively small. To correct for this problem, a different set of compensation rates are required.

2. The failure by LEI to nullify intermediate purchases generated by its direct employment entries into the REMI model led to a nearly $330 million overstatement of the New Hampshire and New England regional economic impact (as measured by GDP). In so much as LEI had already identified the intermediate purchases (i.e., electrical cable, structural towers, converter equipment, and substation equipment) as originating outside the New England region, the inclusion of the REMI model's estimation for these and many other materials, goods, and services (many inappropriate to transmission line construction) are unwarranted. We regard the failure to nullify these estimates as an oversight by LEI.

We show the estimated economic impact of the Project on New England and New Hampshire with corrections in place to use "jobs" based direct employment and with REMI's estimates for intermediate transactions nullified since LEI already estimated them outside the model. These estimates are shown in Table 7. As shown, we estimate the Project's impact on gross regional New England output to be $191 million ($2016), about 21% lower than LEI's estimate. For New Hampshire, our estimate of $85 million for gross state product is about 17% lower than LEI's estimate. In terms of job impact, we estimate New Hampshire will see an average of nearly 1,050 jobs during the construction period, more than 20% below LEI's estimate of about 1,400 jobs.

Even after all methodological corrections, it is clear that the construction of the Project will have a major beneficial economic effect on the New Hampshire economy during its four-year construction period, as would be expected with such a sizable investment.

TABLE 7

Construction Period Economic Impact : New England and New Hampshire, Average Annual

Economic Measure	Units	New England		New Hampshire	
		LEI (2015-2019)	KRA (2016-2020)	LEI (2015-2019)	KRA (2016-2020)
GSP	**$2016M**	$243.4	$190.6	$102.4	$84.6
Personal Income	**$2016M**	$254.7	$200.9	$112.6	$82.6
Disposable Income	**$2016M**	$211.9	$166.1	$97.2	$71.0
Employment	**Jobs**	2,915	2,213	1,367	1,050

Source: KRA, Inc. using the REMI Model

7) Economic Impacts – Potential Electricity Market Effects

The Brattle Group, in their analysis of the Project for Counsel for the Public,[34] generated four scenarios with varying electricity market impacts, including potential electricity price savings, for the six New England states. These potential benefits are an important input to the aggregate economic impact model and were calculated by end-use sector and state. They result in a substantial portion of the potential net economic benefits derived from the proposed Project once construction expenditures conclude.[35]

Benefits from lower electricity prices flow through the regional economic impact model in several ways: They boost disposable income for households and reallocate consumer expenditures away from electricity purchases and towards goods and services that generally have higher local content; They lower costs for businesses, adding to corporate income; and, If sustained over time, they encourage greater business growth by making regional businesses more competitive.

These benefits are included in our economic impact model in much the same way as LEI included them in their original analysis, with similar beneficial effects, however, we assume a supply response to the introduction of lower-priced power that will likely displace existing power generation. This supply response takes two forms: One, an assumed "mothballing" of regional generating supplies equal to the approximate amount of imported NPT energy (1000 MW), and the other, the closure of 500MW of regional power generation, allocated throughout the region based on existing power production, along with 500MW mothballed. The mothballing of generating capacity assumes

[34] "Electricity Market Impacts of the Proposed Northern Pass Transmission Project," by Sam Newell and Jurgen Weiss for the Brattle Group, December 30, 2016

[35] In the LEI analysis, these benefits represented virtually all of the net benefits in the post-construction period

retention of about 16% of affected plant employment,[36] whereas closure removes all affected employment.

A summary of the four Brattle scenarios is provided below, as described by The Brattle Group. A more complete description of the rationale behind these input estimates, further sensitivity analyses associated with some, and how they compare with those used by LEI, are contained in The Brattle Group's report to Counsel for the Public.

• Scenario 1: NPT expands the supply of clean energy into New England without displacing other similar projects, and it provides 1,000 MW of capacity. This scenario most closely corresponds to LEI's project case. However, this scenario takes into account changes in capacity market design and changes in market information revealed since the submission of the LEI Report. It also assumes, unlike LEI, that the addition of NPT capacity would cause some more expensive capacity resources not to clear the market that would have cleared in the absence of NPT. As a result, the net increase in capacity is substantially less than NPT's 1,000 MW, and the capacity price impact is partially mitigated. Unlike Scenario 2 below, we assume that while this "displaced" capacity does not clear the market in the initial years following NPT entry, it does not permanently retire and can thus provide capacity in the future. This scenario generates New Hampshire customer electric bill savings of about $28 million per year over the period 2020 to 2030 versus LEI estimates of about $75 million per year over the same period (in 2020 dollars).[37]

• Scenario 2: Similar to Scenario 1, but NPT induces 500 MW of existing generation capacity to retire. In this scenario, we assume 500 MW of existing capacity that would have cleared absent NPT instead permanently retires when NPT enters due to the prospect of several years of reduced prices. On net, this scenario is the same as if we had analyzed Scenario 1 with only 500 MW of NPT capacity added (which could happen if only that much capacity qualified or cleared the auction as discussed above). This scenario generates New Hampshire customer electric bill savings of about $19 million per year over the period 2020 to 2030 versus LEI estimates of about $75 million per year over the same period (in 2020 dollars).

• Scenario 3: NPT expands the supply of clean energy into New England without displacing other similar projects, but it does not provide any capacity. This scenario reflects the possibility that Hydro-Québec imports via NPT may not qualify as a reliable capacity resource and/or may not clear the capacity market for the reasons noted above. Scenario 3 assumes the extreme case where zero NPT capacity qualifies and clears, recognizing that intermediate cases with partial qualification and clearing are also possible. This scenario generates New Hampshire customer electric bill savings of about $5 million per year over the period 2020 to 2030 versus LEI estimates of about $75 million per year over the same period (in 2020 dollars).

• Scenario 4: NPT displaces competing clean energy projects, thus providing no more clean energy than if NPT were not constructed. LEI and our Scenarios 1–3 assume

[36] This figure is derived from production versus total employment in the electricity generation sector derived from U.S. Bureau of Labor Statistics, *Current Employment Statistics* series. See https://data.bls.gov/cgi-bin/dsrv?ce.
[37] See Table ES-1 in the Brattle report.

NPT would expand the amount of clean energy in New England, reflecting the fact that NPT will access hydro resources in Québec that are not available now. In Scenario 4, we consider the possibility that NPT does not expand the amount of clean energy in New England, but rather that in the absence of NPT other similar clean energy resources would come online. Since several New England states are determined (and have laws on the books) to procure clean energy, NPT can be seen as one of several options to meet existing obligations. Absent NPT, one or several alternative options, such as the New England Clean Power Link through Vermont (which already has its siting permits), or incremental wind and photovoltaic resources in New England, might be developed instead. Scenario 4 therefore compares a world with NPT to a world in which a similar competing project is built instead. This scenario allows us to consider the possibility that granting NPT a permit may only shift the delivery of future clean energy from some combination of regional renewable generation and hydro imports delivered over another line to the same amount of clean energy being delivered over this line through New Hampshire, and to ask what the relative electricity market-related benefits to New Hampshire would be in such a case. This scenario generates no New Hampshire customer electric bill savings whatsoever over the period 2020 to 2030 versus LEI estimates of about $75 million per year over the same period (in 2020 dollars).

In addition to these four scenarios, sensitivity analyses were also performed for some scenarios by The Brattle Group, illustrating further variants of possible electricity market outcomes. In none of the scenarios or sensitivity analyses performed were electricity price savings for New Hampshire businesses and residential consumers as large as those assumed by LEI. As noted above, in Brattle Scenario 4, there are no electricity price savings whatsoever. The most extreme beneficial variation run by The Brattle Group, in one of the sensitivity analyses run as a part of Scenario 1, maximum New Hampshire electricity price savings average $62 million per year between 2020 and 2030 (in 2020 dollars[38]) versus about $75 million per year during an equivalent time period and comparable constant dollar amount in the LEI study. In both the Brattle and LEI analyses, price savings as a result of the Project become insignificant after about a 10 year impact period, "as the market recalibrates to a balanced supply-demand condition."[39]

[38] We report these same savings in 2016 dollars, at about $57 million per year, with the LEI equivalent of about $70 million per year in Table 8

[39] LEI report, page 37; Brattle report, page viii

TABLE 8

Electricity Market Effects - Economic Impacts of Alternative Scenarios for New Hampshire Annual Averages During Selected Periods							
Economic Measure	**Units**	**LEI (2019-2029)**	**Brattle #1 (2020-2030)**	**Brattle #2 (2020-2030)**	**Brattle #3 (2020-2030)**	**Brattle #4 (2020-2030)**	**Brattle #1 Extreme High Sensitivity Variant (2020-2030)**
Price Reductions	**$2016M**	-$70.2	-$26.0	-$17.6	-$4.8	$0.00	-$57.10
	% of NE	*13.7*	*9.1*	*10.3*	*10.0*	*0.0*	*10.2*
GSP	**$2016M**	$123.6	$27.7	$10.3	-$10.7	$0.0	$85.8
	% of NE	*12.9*	*7.3*	*5.0*	*NM*	*0.0*	*8.7*
Personal Income	**$2016M**	$105.9	$25.4	$12.6	-$4.1	$0.0	$69.3
	% of NE	*17.0*	*9.8*	*8.6*	*NM*	*0.0*	*10.5*
Disposable Income	**$2016M**	$91.4	$21.9	$11.0	-$3.3	$0.0	$59.3
	% of NE	*17.9*	*10.6*	*9.4*	*NM*	*0.0*	*11.3*
Employment	**Jobs**	1,016	269	131	-45	0	745
	% of NE	*15.1*	*9.9*	*8.4*	*NM*	*0.0*	*10.8*

Source: KRA using the REMI Model, with data inputs from LEI and The Brattle Group

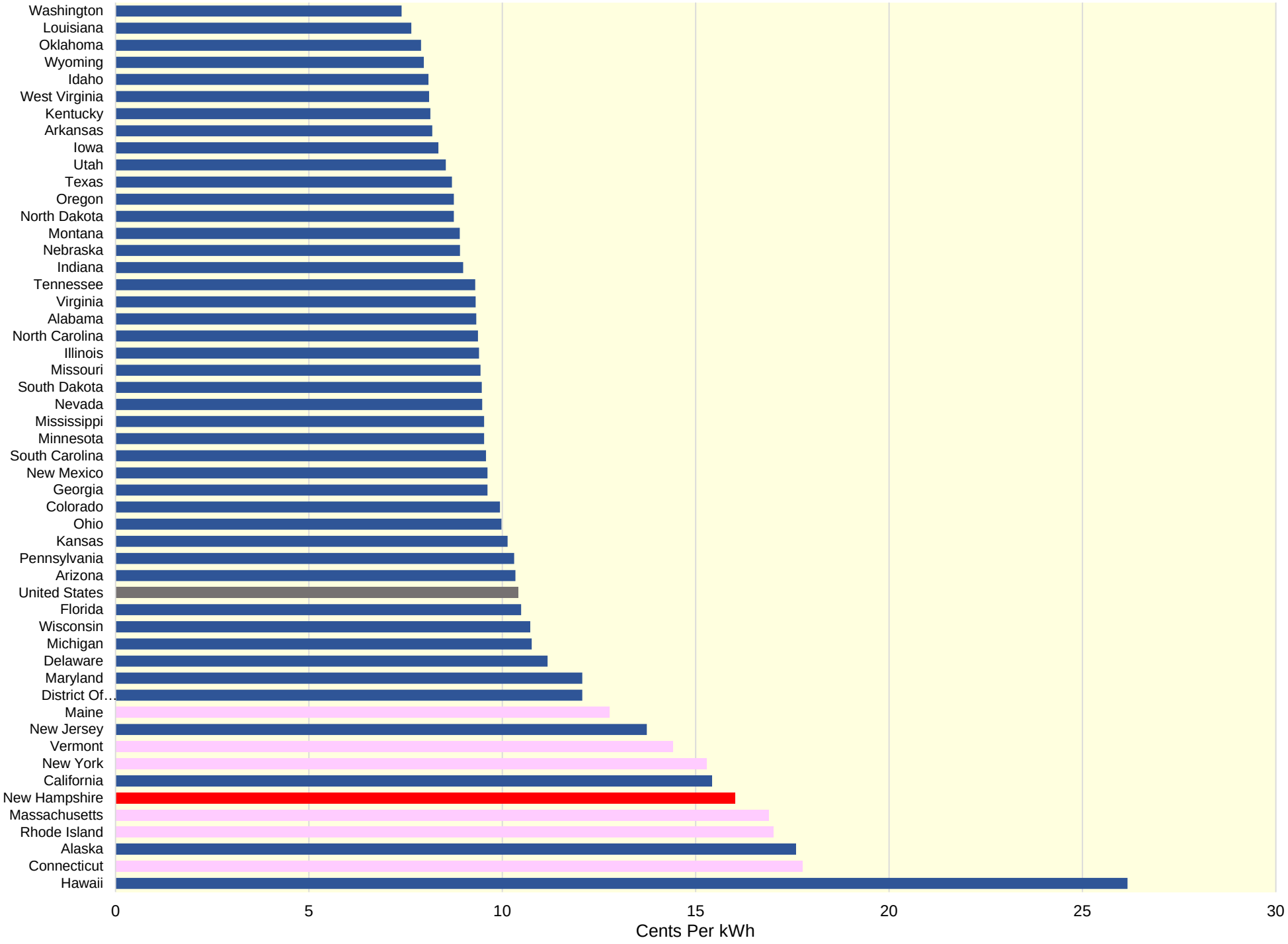
In Table 8, we summarize economic impacts solely from these electricity market effects, expressed in 2016 dollars, showing employment, gross state product (GSP) and other aggregate income metrics associated with the LEI analysis and four Brattle scenarios, plus the "extreme high" Brattle sensitivity analysis from Scenario 1. As expected, these effects are closely tied to expected electricity price savings, however, negative generation supply response impacts exceed the small price gains in Scenario 3, leaving Scenarios 1, 2 and the "extreme high" variant with the only net positive economic impacts to the state.

As shown in the chart below and on the following page, over the past 15 years electricity prices have been consistently higher in New England than the rest of the U.S. by about 50%. They have also been more volatile, with noticeable seasonal swings in price. This long-term price differential has affected the mix of industries in the region and limited business growth in many sectors. Of note, as shown in the lower part of the chart New Hampshire prices are very close to New England prices, but are not always identical. As might be expected, the largest dollar benefits from lower regional energy prices flow to the largest electricity users: Massachusetts and Connecticut.

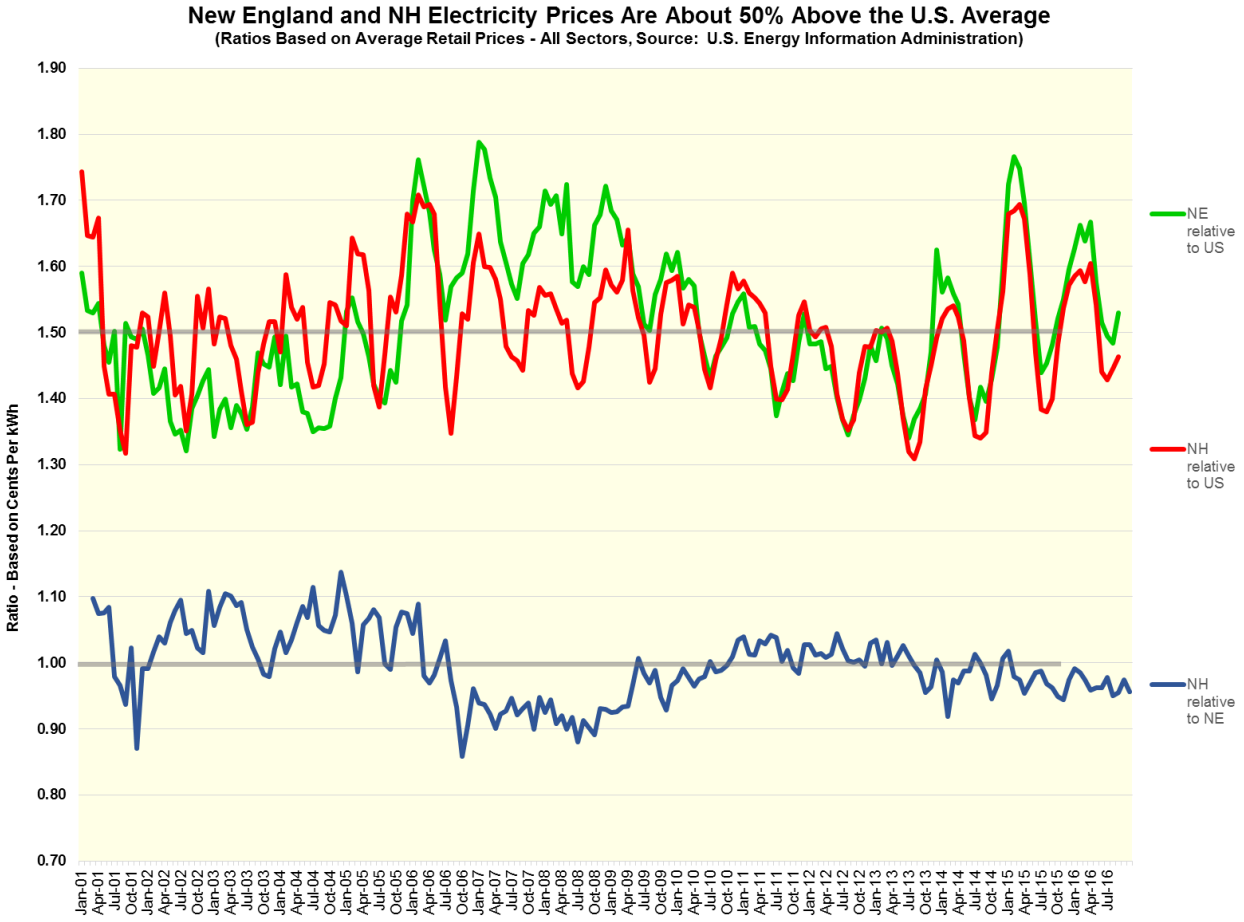
During our public outreach process, many business owners were emphatic about the need for lower, more predictable and less volatile electricity prices. Indeed, these are two of the prime benefits claimed by the Applicants for the Project. Based on the above scenarios from Brattle, however, little relief may be in sight as a result of the Project.

Average Retail Electricity Prices, All Sectors - 2015

(Source: U.S. Energy Information Administration)



Even in the most extreme case, Brattle estimates that overall New Hampshire electricity prices will not drop by more than 0.5 cents per kWh, about 2.8% of Brattle's baseline retail rate of 18 cents per kWh. For the average New Hampshire household, Brattle estimates "annual bill savings could be as little as zero or as great as $38." While any price reduction will generate some additional income to business and residential customers, even the potential price reductions in the LEI analysis prepared for the Applicants would not be sufficient to meaningfully change the enormous regional disadvantage in electricity costs confronting New England. Accordingly, the presence of the NPT, even in the best-case scenario, is unlikely to have a measurable effect on business relocation or regional industry mix, and to the extent that many New Hampshire businesses compete with other New England-based firms, will result in no additional competitive advantage, since relative rate changes will flow relatively evenly throughout the region.



As shown in Table 9, about 70% of the electricity price savings and related economic benefits accrue to these two states, with Massachusetts receiving about half of all benefits. New Hampshire's share of price benefits is approximately 10%. Employment gains and other economic effects are similarly distributed.

TABLE 9

State Shares of Electricity Bill Reduction Benefits by State, 2020-2030 (Millions of 2020 Dollars)				
Brattle Group - Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4**	
Massachusetts	48.0%	47.8%	47.0%	NM
Connecticut	23.8%	23.7%	22.8%	NM
New Hampshire	10.3%	10.3%	9.9%	NM
Maine	8.8%	9.2%	11.8%	NM
Rhode Island	7.0%	6.8%	5.4%	NM
Vermont	2.1%	2.3%	3.1%	NM
Total - New England	100.0%	100.0%	100.0%	NM

Data provided to KRA by The Brattle Group

In addition to these specific scenarios, consideration was also given to individual electric generation plant closings that could result from the displacement of power supplied from the proposed Project. The Brattle Group supplied us with a list of potentially vulnerable plants in Table 11, 17% of which are in New Hampshire.

If the four listed coal-fired power generation plants in New Hampshire totaling 531MW of output are discontinued in New Hampshire as a result of being displaced by Canadian power delivered by the NPT, there will be net negative economic impacts in both Scenarios 2 and 3 in New Hampshire, despite electricity price savings. Instead of the Scenario 2 employment gain of about 130 jobs outlined in Table 8, there would be a loss of nearly 160 jobs,[40] with a drop in New Hampshire GSP of about $42 million.

TABLE 10

Electricity Market Effects - Economic Impacts of Alternative Scenarios for New Hampshire Annual Averages During Selected Periods				
Economic Measure	**Units**	**LEI (2019-2029)**	**Brattle #2 NE 500MW Shutdown (2020-2030)**	**Brattle #2 NH 531MW Shutdown (2020-2030)**
Price Reductions	**$2016M**	-$70.2	-$17.6	-$17.6
GSP	**$2016M**	$123.6	$10.3	-$41.7
Personal Income	**$2016M**	$105.9	$12.6	-$12.9
Disposable Income	**$2016M**	$91.4	$11.0	-$10.8
Employment	**Jobs**	1,016	131	-157

Source: KRA using the REMI Model, with data inputs from LEI and The Brattle Group

[40] We used plant-specific employment figures when known. For the Schiller plant, we estimated employment using the ratio of utility employment, as derived from U.S. Bureau of Labor Statistics CES data, to electric generating capacity, as derived from the U.S. Energy Information Administration form 923 database, for New Hampshire in 2015.

Given the disproportionate share of "vulnerable plants" in New Hampshire and the fact that four of the five New Hampshire plants are coal-based facilities, this is a plausible downside risk. Of the recent and planned plant closures in New England, more than 70% are oil or coal burning facilities.[41]

Of note, the Seabrook Station Nuclear Power Plant is not on the below list. If it were to close due to downward price pressure from imported Canadian energy, the economic impacts from such an event would be considerably more significant.

TABLE 11

Northern Pass Economic Analysis

At-Risk New England Units

(Source: Brattle Group, December 2016)

Unit	State	Technology	Summer Capacity (MW)	Percent of Total	ISO-NE At-Risk	Analysis Group	Concentric Net CONE
NEWINGTON 1	NH	Gas/Oil Steam	400.2	7.2%	x		
MERRIMACK 2	NH	Coal Steam	328.1	5.9%	x		
MERRIMACK 1	NH	Coal Steam	108.0	1.9%	x		
SCHILLER 4	NH	Coal Steam	47.5	0.9%	x	x	
SCHILLER 6	NH	Coal Steam	47.2	0.8%	x	x	
SO. MEADOW 11	CT	Oil CT	35.8	0.6%		x	
SO. MEADOW 14	CT	Oil CT	36.7	0.7%		x	
SO. MEADOW 12	CT	Oil CT	37.6	0.7%		x	
SO. MEADOW 13	CT	Oil CT	38.3	0.7%		x	
MONTVILLE 5	CT	Gas/Oil Steam	81.0	1.5%	x	x	
MIDDLETOWN 2	CT	Gas/Oil Steam	117.0	2.1%	x		
MIDDLETOWN 3	CT	Gas/Oil Steam	226.8	4.1%	x	x	
MONTVILLE 6	CT	Oil Steam	386.0	6.9%	x		
MIDDLETOWN 4	CT	Oil Steam	399.9	7.2%	x		
NEW HAVEN HARBOR	CT	Gas/Oil Steam	447.1	8.0%	x		
CLEARY 8	MA	Oil Steam	24.8	0.4%		x	
WEST MEDWAY JET 2	MA	Oil CT	39.8	0.7%		x	
WEST MEDWAY JET 1	MA	Oil CT	42.0	0.8%		x	
M STREET JET	MA	Oil CT	47.0	0.8%		x	
WEST SPRINGFIELD 3	MA	Gas/Oil Steam	94.3	1.7%	x		
CANAL 2	MA	Gas/Oil Steam	558.5	10.0%	x		x
CANAL 1	MA	Oil Steam	562.2	10.1%	x		x
MYSTIC 7	MA	Gas/Oil Steam	575.5	10.3%	x		x
YARMOUTH 2	ME	Oil Steam	47.9	0.9%	x		x
YARMOUTH 1	ME	Oil Steam	50.1	0.9%	x		x
YARMOUTH 3	ME	Oil Steam	110.9	2.0%	x		x
YARMOUTH 4	ME	Oil Steam	602.1	10.8%	x		x
WEST MEDWAY JET 3	RI	Oil CT	42.0	0.8%		x	
BERLIN 1 GT	VT	Oil CT	40.3	0.7%		x	
TOTAL			5574.6				

Sources:

Summer Capacity: ISO-NE, 2016 CELT Report, 2.1 Generator List, https://www.iso-ne.com/static-assets/documents/2016/05/2016_celt_report.xls

ISO-NE At-Risk: ISO-NE, Resource Mix, https://www.iso-ne.com/about/key-stats/resource-mix

Analysis Group: Hibbard and Aubuchon, Power System Reliability in New England, November 2015, http://www.mass.gov/ago/docs/energy-utilities/reros-study-final.pdf

Concentric Net CONE: Concentric Energy Advisors, ISO-NE CONE and ORTP Analysis, December 2, 2016 (Draft), https://iso-ne.com/static-assets/documents/2016/11/a4_cea_cone_ortp_report_redline.docx

[41] Brattle report, page 26

Although there are a wide range of possible market price benefits as outlined by Brattle in their four primary scenarios, all are lower than LEI estimates. Without presuming any probability of occurrence, we assume the higher (more beneficial to the Applicants) of the two midpoint scenarios provided by Brattle, Scenario 2 (per Table 8, above), as a reasonable intermediate impact estimate for purposes of aggregate economic impact model presentation.

8) Economic Impacts – Operations and Property Taxes

A) Operational Impacts

Economic impacts from ongoing operational expenditures associated with the Project are positive, but relatively small, consisting of about $2 million per year (in constant 2014 dollars) in direct line maintenance expenditures, which give rise to about 14 New Hampshire jobs per year during the 11 year post-construction operational period, and beyond. We have no basis for contesting this expected expenditure flow and thus, have assumed identical operational period model inputs and resultant economic impacts. These impacts are summarized in Table 12.

TABLE 12

Operating Period Economic Impact: New England and New Hampshire
LEI (2019-2029) and KRA (2020-2030) Annual Averages

Economic Measure	Units	New England	New Hampshire
GSP	$2016, Millions	$3.0	$2.4
Personal Income	$2016, Millions	$1.7	$1.3
Disposable Income	$2016, Millions	$1.4	$1.1
Employment	Jobs	19	14

Source: KRA using the REMI Model

B) Property Tax Impacts

Once the Project is complete, economic benefits from property tax payments will be much more substantial than operational expenditures, though they will decline each year and disappear entirely when the Project's taxable base is fully depreciated over an expected 40 year period.

TABLE 13

Assumed State, County and Town Property Tax Revenues From the Northern Pass Transmission Line		
Taxable Basis, Year 1	**$1,525.9**	**Million**
Assumed Year		**Tax Payments $Millions**
2020	**Year 1**	**$33.5**
2024	**Year 5**	**$30.2**
2029	**Year 10**	**$26.0**
2034	**Year 15**	**$21.8**
2039	**Year 20**	**$17.6**
2044	**Year 25**	**$13.4**
2049	**Year 30**	**$9.2**
2054	**Year 35**	**$5.0**
2059	**Year 40**	**$0.8**

The Applicants' property tax estimation provided ranges of possible tax revenues assuming various tax rates, future rate growth, taxable project value, and depreciation schedules. Although depreciation issues are currently being litigated by some of the affected municipalities, we have largely used the Applicants' estimates for all but the expected future tax rate growth.

Although the effective property tax rate has risen over the past 10 years, this period has been notable for exceptionally low property tax base additions to stock. This was caused by the fact that real estate was at the epicenter of the last recession and severely depressed new construction activity during much of this period. As additions to stock grow again at more "normal" rates in the coming years, there will be less upward pressure on effective tax rates. Over the 15 year period since 2000, effective property tax rates have been relatively flat, declining through about 2006 and then rising since then, but to levels still below effective 2000 rates. Based on these longer term effective growth rates, we have not assumed annual effective tax rate increases over the forecast period.

The potential property tax revenue flows estimated by the Applicants were not included in LEI's economic impact analysis because they assumed that all new revenues would be used to retire debt and that measurable benefits from this would be insignificant. While this is possible, we believe this assumption may be excessively conservative and that although some of the new property tax revenue generated by the proposed Project may be used for debt relief, it is likely that at least some, and maybe most, will be used to increase state and local government spending. Especially in light of the pressure on state and local government spending during the recent recessionary period, the assumption that new revenues may be used to cover deferred expenses or the restoration of programs or services cut during the recession is tenable.

Accordingly, we have modeled state, county and town property tax revenues derived from the Project with 50% of the revenues used for increased government spending and

50% for debt retirement.[42] Based on these assumptions, the flow of new revenues from property tax payments will generate significant economic benefits not included in the Applicants' economic impact analysis. The below tables summarize the resultant impacts in New Hampshire and the region. Although these impacts are stated in terms of average annual impacts during the period 2020 to 2030, when average annual tax revenues will average nearly $30 million per year, as indicated in Table 13 above, they will steadily decline during the 40 year assumed taxable life of the Project and disappear entirely after 40 years.

TABLE 14

Property Tax Economic Impact : New Hampshire, Average Annual

Economic Measure	Units	LEI (2019-2029)	KRA (2020-2030)
GSP	**$2016, Millions**	$0.0	$19.2
Personal Income	**$2016, Millions**	$0.0	$16.1
Disposable Income	**$2016, Millions**	$0.0	$13.8
Employment	**Jobs**	0	249

Source: KRA using the REMI Model

TABLE 15

Property Tax Economic Impact : New England, Average Annual

Economic Measure	Units	LEI (2019-2029)	KRA (2020-2030)
GSP	**$2016, Millions**	$0.0	$26.1
Personal Income	**$2016, Millions**	$0.0	$21.6
Disposable Income	**$2016, Millions**	$0.0	$18.1
Employment	**Jobs**	0	305

Source: KRA using the REMI Model

9) Economic Impacts – Forward New Hampshire Plan

The Forward New Hampshire Plan is a combination of $210.5 million in "good-will" expenditures over a 20 year period unrelated to the direct development and construction of the proposed Project that have been offered by the Applicants in order to provide "economic, infrastructure, and tax benefits for New Hampshire." It includes funding of

[42] Debt retirement reduces public interest payments. Based on the 2012 Census of Governments, New Hampshire's combined state, county and local governments paid interest on outstanding debt at an average annualized rate of 4.89%.

$7.5 million to launch the North Country Job Creation Fund,[43] aimed "at increasing employment in the state's North Country," $3 million to the National Fish and Wildlife Foundation to establish the Partners for New Hampshire's Fish and Wildlife grant program, "dedicated to restoring and sustaining healthy forests and rivers in New Hampshire," and $200 million over a 20 year period to establish the Forward New Hampshire Fund, "to support clean energy innovations, economic development, community investment, and tourism."

The economic benefits from these expenditures were not fully included in the LEI economic model run as a part of the Applicants' SEC submission.[44] To the extent they are likely, these expenditures should be considered in full as a benefit of the Project. How the expenditure flows from this large contingent commitment will be made and by whom,[45] however, will have a bearing on the economic benefits this initiative can deliver. If independently administered by professionals in the fields in which the funds are designed to benefit, there could be substantial positive economic impacts.

The Partners for New Hampshire's Fish and Wildlife Fund is an example of optimal program administration, with grants reviewed by a committee of government and academic experts, and funding decisions based on the ability of the applicant to implement strategies that achieve the program priorities and result in measurable conservation outcomes. Eversource expenditures for this program to date have been leveraged with other public and private funds, augmenting the beneficial impacts of this Fund.

The North Country Job Creation Fund (NCJCF), which is being administered by the newly created Coos County Job Creation Fund (CCJCF), is not off to the same start. Grants have been seen by some as merely designed[46] to curry local favor and facilitate the permit approval process.[47] In addition, the small number of grants made thus far seem haphazard and poorly targeted for achievement of meaningful economic development outcomes.

Although there is little specific information regarding the exact expenditures planned for the Forward New Hampshire Fund or how the Fund will be managed and administered, Eversource has stated that it will be "dedicated to support important initiatives in tourism, economic development, community investment, and clean energy innovation, with an emphasis on North Country opportunities." The only more specific expenditure item mentioned, however, was that "the fund will be used to enable power grid upgrades that will improve the North Country electric system capacity by up to 100 MW, removing constraints to existing small scale renewable energy (e.g., wind, hydro, and biomass)."

[43] Which in turn has created the Coos County Job Creation Association (CCJCA) to administer grants from this Fund.

[44] The LEI analysis modelled 11 years of expenditures totaling $115.3M, $95.2M less than the announced $210.5M program. Although the LEI report does not separately report the economic impacts associated with this program, it was categorized in the REMI model as "Local Government Spending," which would significantly overstate the likely beneficial impact in the years for which values were entered.

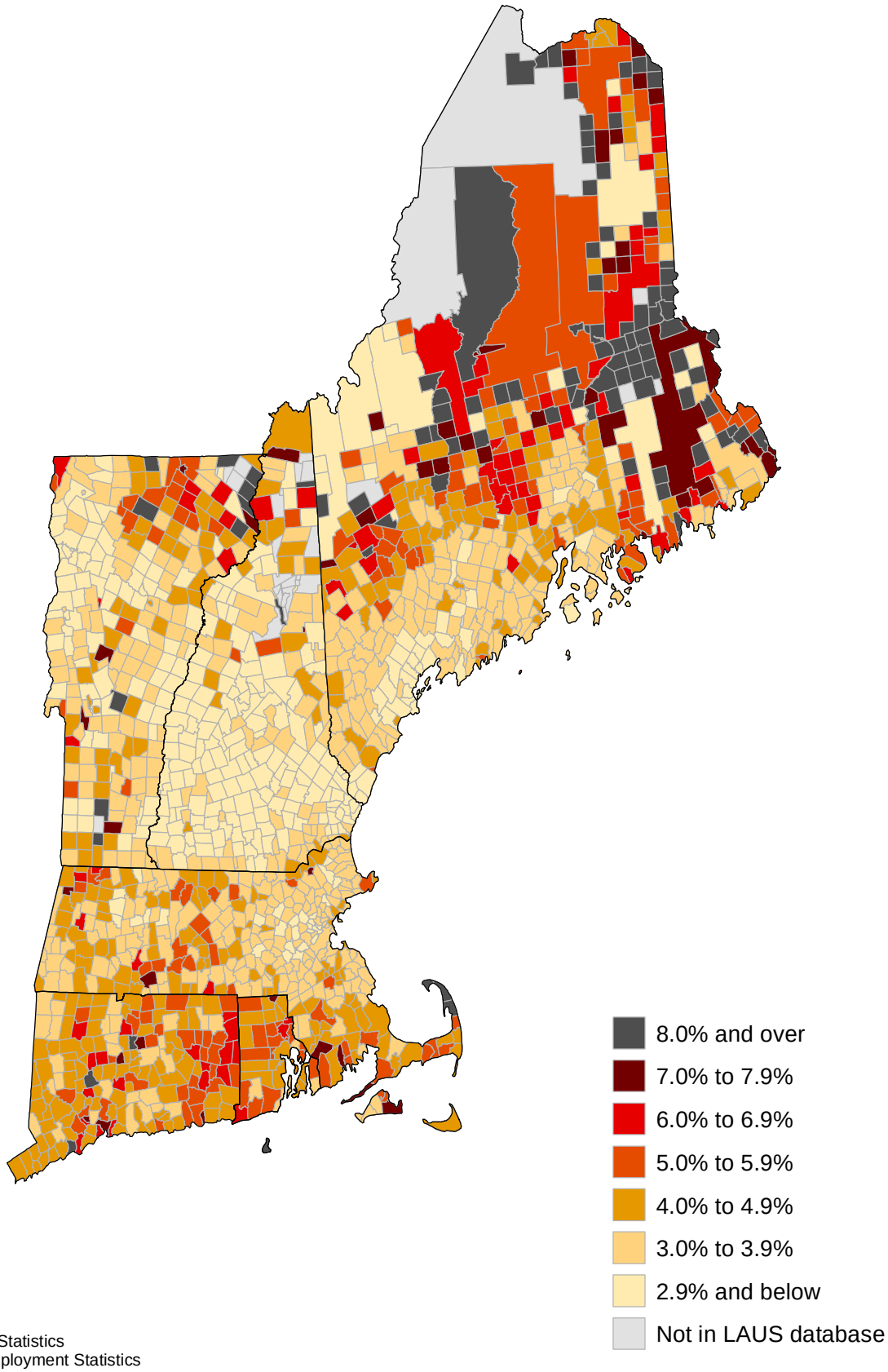
[45] Most, but not all funds, are contingent upon permitting approval for construction of the proposed Project. Approximately $550K in initial grants have been disbursed from the CCJCF and the PNHFW grant programs to date.

[46] See, for example, http://www.newhampshirelakesandmountains.com/Articles-Coos-County-Democrat-c-2015-09-30-160968.113119-Ride-the-Wilds-returns-Cos-County-Job-Creation-grant.html

[47] For this reason, two grant recipients, the New Hampshire Off Highway Vehicle Association (NHOHVA) and the North Country Community Recreation Association (NCCRA), even returned grants awarded to them.

Unemployment rates in New England by Minor Civil Division, November 2015 – October 2016 averages

(U.S. rate = 4.9 percent)



SOURCE: Bureau of Labor Statistics
Local Area Unemployment Statistics

It should be noted that to the extent any of these grid upgrades or similar systems expenditures would have happened in the absence of the Fund or in the "normal" course of the Applicants' business, they are not appropriately modeled as incremental additional Project benefits. This would also be the case if grid upgrades can be funded through ratepayer adjustments, or would otherwise benefit the Applicants. Given the uncertainty of such expenditures, and until more information on expenditure detail is available, we have modeled this in two ways: One that assumes all expenditures to be incremental and the other, where utility industry expenditures (one-third of all assumed Fund expenditures) are not.

If utility-related expenditures are not incremental, the average annual employment impact during the 20 year peak operational period would be about 130 jobs in New Hampshire and about 150 jobs in the region. Total economic output, at about $10 million per year, would be about a third lower than if these expenditures were considered incremental.

If the NCJCF and the Forward New Hampshire Fund are ultimately managed and administered by independent economic development professionals, it would be possible to achieve benefits resulting in at least 150 New Hampshire jobs per year on average (with another 30 in other New England states) over the 20 year program life and result in about $15 million per year in additional annual net economic output while operational. Despite its performance to date, we are assuming such management in the baseline aggregate economic impact model. If the NCJCF and the New Hampshire Forward Fund are not managed and administered by independent economic development professionals, beneficial economic impacts would be diminished.

It is also worth noting that the focus on economic development in the North Country, as expressed by the NCJCF and Forward New Hampshire Plan, could be of particular benefit to the state. As shown in the town level map on the preceding page, there is a persistent unemployment rate differential in the northern regions of New Hampshire, Maine and Vermont that reflects the chronic economic stress these regions have experienced.

10) Economic Impacts – Potential Property Valuation Impacts

A) Overview – Potential Property Valuation Impacts

In our review of the Applicants' assessment of potential property value impacts, we noted the conflict between conclusions drawn by some of the existing literature and local perceptions expressed to us directly in interviews and written presentations. The visual survey and parcel studies conducted by the Applicants' valuation expert, James Chalmers, concluded that the Project would not have any measurable negative effect on properties in its vicinity. Relying exclusively on the Chalmers finding, LEI had no basis for estimating any value change impacts on the state economy. We note that Chalmers' study conclusion applies exclusively to residential properties, since he did not consider potential effects on any commercial properties, such as hotels, motels, resorts,

campgrounds, multi-unit condominium properties, nursing homes, recreational locations, restaurants, etc. – some of which conceivably rely on a property's view amenity to create value or enhance the visitation quality perceived by customers. Further, we note that despite Chalmers' findings, local residents and real estate professionals have repeatedly told us they believe that the Project is already affecting property markets with longer marketing times, reduced size of the buyer pool, and lower bids - some dramatically lower. The two positions are difficult to reconcile.

Some would argue that to draw conclusions from the few unbiased statistically based studies that are available would be inappropriate because none took place in regions comparable to the New Hampshire subject area. In much of the affected area, New Hampshire has a preponderance of individually developed properties, many of which are vacation homes, that reflect the tastes of owners who value view lots in a scenic rural environment. Most of the academic and industry-sponsored studies to date focus on more homogeneous urban or suburban developments with tract homes where views are likely to be of less concern, and of less availability, than other property attributes.

Because of the paucity of relevant studies comparable to the subject area in the academic literature, and the consensus of opinion in the affected towns lacks the certitude that a proper market-based transaction study would provide, it is difficult to estimate property valuation change effects on the state economy with precision or certainty. A definitive study of the affected parts of the state would be well beyond both the time frame and the budget of our assignment.

To perform statistically based research properly, the time period for potentially observable effects would date to the first announcement of the proposed Project and its route, around 2010. It would have all real estate transactions in the region included in survey-based data collection (or a very large sample of transactions) that would involve on-site evaluation of existing view characteristics and projected line and tower visibility under summer and winter conditions. These data points would be used with the same hedonic statistical technique regularly used to evaluate the characteristics of real estate properties, but would include provision to isolate the effect of power line and tower visibility on property price, if any, where properties would include not only residential ones but potentially sensitive commercial properties, as well. It would likely require more than a year to perform, well beyond the permitting process presently underway.

Alternatively, a more subjective approach would involve individual appraisals of every potentially affected property, using viewshed simulations of the proposed transmission line. This would be equally time consuming and expensive.

In the absence of a comprehensive study of either approach, we contend that it is worth framing this discussion by estimating how much property will have a view of a line (or lines) and/or structure(s). With that, we can estimate hypothetical loss (or gain) using fixed percentage changes that can be scaled to a particular value. By using values from the existing literature that is most relevant to the study area, we can frame potential impact ranges.

The issue before the SEC as regards property valuation effects is not a simple one. It is not possible for both the Applicants' expert nor the apparent public consensus of sizable value losses to be 100% correct. Further, the lack of conclusiveness neither favors a

binary case nor even necessarily an intermediate conclusion. Our approach allows the SEC to see how much loss is at risk, and what that represents to the state economy, using standard impact estimation techniques.

B) Estimating Income Effects of Changing Property Values

Any changes in perceived value of residential properties that might result from NPT's effect on views from properties where the line/towers will be visible represent an external economic effect of the Project. Although there is no market for views, per se, the effect may, nevertheless, impact the value of residential properties and some commercial ones, as well. In this section, we estimate the effects of residential property value change on the state economy. We estimate how a one percentage point change in property value alters total personal income in the state, both directly and through consumer spending. We begin by computing the assessed value of residential property at the town level according to the different distance/view characteristics from geographic information system (GIS) data, assembled by T.J. Boyle Associates.[48]

Visibility is defined by six classifications of prominence for the lines and/or towers as seen from the property. Using the acreage that falls within each viewablity gradation in each town, we compute the total 2015 assessed value according to the six view characteristic categories and property valuation data from the New Hampshire Department of Revenue Administration. Unfortunately, there are no consistent or full-coverage GIS maps with parcel locations and values with which to overlay with Project viewshed maps. Thus, we applied viewshed shares of total acreage to the Department of Revenue data by property type as a best approximation of potentially affected property values. The resultant estimated share of state residential property with a view of the line/towers is 2.8% of total state acreage. This property is valued at a total of $1.2 billion. This represents slightly less than one percent of total state assessed residential property of $122 billion.[49] The share of property with an "immediate" or "foreground" view is $126 million, approximately 0.3% of the total assessed residential property, while the four more distant categories combined represent approximately $1 billion, or 2.5% of total assessed value.

To estimate what a one-percentage point change in the value of properties with a view of the line/towers, we first calculate 1% of assessed value for 2015. This is shown in Table 16. This represents a loss in wealth to affected property owners of almost $12 million for each one percent of impact. While most wealth effects are generally not realized until sale of a property occurs, they can be measured as a flow of income expressed as imputed rent.

[48] For reference, the visibility Boyle used accounts for the screening effect of land cover. Two different data sets are used in the same analysis. Within 1.5 miles of the NPT centerline, the original data have a resolution of 5 meters for land elevation (DTM for digital terrain model), and also for the top surface of land cover (DSM for digital surface model). Between 1.5 and 10 miles of the NPT centerline the data are the national elevation data (NED), which has 10 meter resolution, and the national land cover data (NLCD) which has 30 meter resolution. Boyle assigns a height of 40 feet to forest land cover, but no height to other land covers, because they are too variable and a very large percentage of their area is at ground level. The visibility analysis is the same—a line of sight over a surface that is the landform elevation plus the height of the land cover—obviously the data are much more accurate within 1.5 miles of the centerline. There is more to the analysis, but essentially that is it. There is a more detailed description in the DEIS:
http://media.northernpasseis.us/media/Visual_Impact_Assessment_COMBINED_reduced.pdf

[49] We include residential buildings, residential land, and manufactured housing in our residential property calculations.

We transform the value of a one percent change in assessed value into a flow of income by using the historical ratio of imputed rent from housing ownership to the assessed value of housing. The imputed rent figure for New Hampshire is the U.S. Bureau of Economic Analysis estimate of the contribution of actual and estimated rent to national income (the latter being a key measure of economic activity that goes into the estimation of total personal income). Actual rent payment information (obtained in the course of preparing the consumer price index) is used from data on the housing stock and occupancy characteristics given in the decennial census. Essentially, the purpose of the imputed rent estimate is to approximate the annual value of housing services created by rented and owner-occupied housing.

TABLE 16

Imputed Rental Income Value of a One Percent Change in Residential Property Value

View Category	1% of 2015 Assessed Property Value ($ nominal)	Annual Imputed 2015 Rental Income ($ nominal)
Immediate	$ 80,305	$ 1,400
Foreground	$ 1,188,440	$ 20,714
Near-Midground	$ 2,999,157	$ 52,273
Far-Midground	$ 2,533,833	$ 44,163
Near-Distant	$ 2,488,358	$ 43,370
Far-Distant	$ 2,338,061	$ 40,751
TOTAL	$ 11,628,154	$ 202,671

Source: KRA

The imputed rent value of a one percentage point change in the value of residential property is shown in Table 16. This figure, in total, is estimated for 2015 at $202,671.

To quantify impacts if only more proximate properties to the line/towers (those in the "immediate" and "foreground" view group)[50] experience value losses of, for example, five percent, this would amount to approximately $6.3 million in current dollar terms with annual imputed value losses of about $110,000 per year. However, if the value change were to affect these same properties in the viewshed at a 15 percent rate, the effects would be tripled, with wealth losses to current property owners of nearly $19 million and about $330,000 in annual New Hampshire imputed rental income lost.

The exact percentage loss that may be experienced in a region with high recreational and scenic amenity values, such as the subject area, is difficult to estimate. In the few studies that are applicable, nearby property impacts have ranged from 15% to as much as 34%, and more for individual properties, with diminishment as distance from the line increases. So-called “view lots,” with or without buildings, however, may experience even more significant losses, even if not proximate to the transmission line.

[50] The six view categories are defined in terms of distance as: Immediate, 0.00 to 0.01 miles; Foreground, 0.01 to 0.25 miles; Near-Midground, 0.25 to 1.50 miles; Far-Midground, 1.50 to 3.00 miles; Near-Distant, 3.00 to 5.00 miles, and; Far-Distant, 5.00 to 10.00 miles.

In one of the few prospective professional appraisals performed in connection with the Project, a loss of 63% was estimated for one such property in Dalton. Although this appraisal was contested by Eversource, and even led to legal action to discredit it, the professional appraiser who conducted it stands by his opinion and several local real estate professionals with whom we discussed this believe it to be a reasonable estimate of potential property valuation loss.

In an interview with New Hampshire Public Radio (NHPR), the Applicants' property valuation consultant, James Chalmers, concurred in the possibility of such a loss, stating that:

> *If it is basically a view-lot and your view is down the valley and you string transmission lines across that valley right in the middle of the viewshed and that becomes kind of the dominant feature of the view, I can easily imagine your $200,000 second home might only be a $75,000 second home or a $100,000 second home – something like that.*[51]

The $125,000 loss in property value posited in the above statement by Chalmers on a $200,000 property represents a 63% decline. The Dalton home which was appraised is not a second home, but has been the retirement home and primary residence of its owners for a number of years. There are likely many other such residences and potentially affected land parcels in the viewshed of the proposed Project. Without a parcel by parcel evaluation of this, it is impossible to know how many affected parcels there may be or how far from the transmission line they may be located and still be negatively impacted. In areas where view is the primary amenity affected, this is likely to extend to distances much farther than urban or suburban impact studies would estimate and show larger percentage losses.

Since virtually all studies show some diminution of impact with distance from a transmission line, we estimated a functional form from data on value-loss as a function of distance to transmission lines and towers given by Callanan (2014)[52], which presented some of her earlier findings from her 1995 study concerning the effect of overhead power lines on property values in Wellington, New Zealand. In the 2014 study, Callanan enriches her initial findings by examining the effect of removing overhead high voltage transmission lines on property values. She found significant prices increases from properties once the lines and towers were removed.

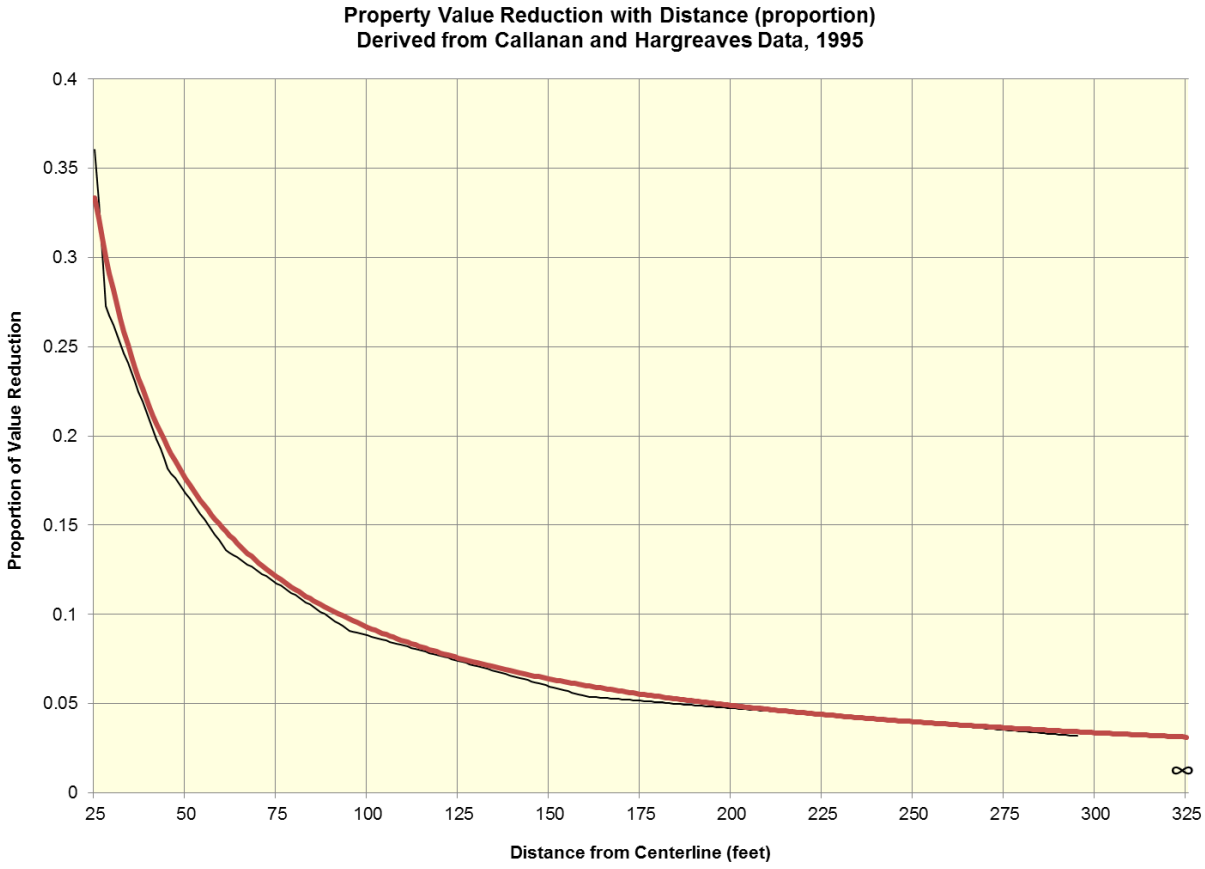
For the 1995 study, property values as a function of distance from lines and structures were included in a hedonic model incorporating actual sales price data and numerous property characteristics.[53] Her goal was to carefully isolate those characteristics that have a significant effect in determining property values. In this case, a history of 444 property transactions formed the basis of Callanan's conclusion that property values declined significantly at distances from transmission lines and towers as far as 1000 feet

[51] See http://nhpr.org/post/appraisal-triggers-latest-dispute-over-northern-pass#stream/0

[52] Callanan, Judith M. 2014. "Assessing the Property Market Impact of Stigma Removal: High Voltage Overhead Transmission Lines Removal in Wellington, NZ." Ph.D. Dissertation, School of Civil Engineering and Built Environment Science and Engineering Faculty Queensland University of Technology.

[53] Hedonic modeling is a statistical technique using multiple regression estimates to identify important relationships between the characteristics of subjects, in this case, residential property characteristics, and their value in the market place, so that the analyst can examine each characteristic of a property in isolation from others as regards value.

from the centerline. She provided value-loss percentages by six distance-cohorts from which we derived a functional form, shown in the below chart. We used this function to approximate value-loss relative to NPT lines and towers based on viewshed distance-cohort data developed by T.J. Boyle Associates for New Hampshire towns.



In a manner similar to that applied in the above discussion of what a hypothetical uniform one percentage point decline in property value would represent in terms of lost income to property owners, we used the Callanan estimates to approximate losses bases on an empirically derived value-distance relationship. Of note, we are limited to value and distance here, and not the more appropriate relationship of value and view quality with respect to the transmission lines and towers.

Based on these values, we show the estimated property values losses and imputed rental income changes in Table 17 to be slightly higher than the one-percent figure in Table 16. This analysis implies a potential loss of nearly $15 million, which translates into imputed rental income losses of more than $150,000 per year, as shown in Table 17.

TABLE 17

Imputed Rental Income Value of Callanan Variable Percent Change in Residential Property Value by View Category		
View Category	**2015 Assessed Property Value Loss ($ nominal)**	**2015 Annual Imputed Rental Income ($ nominal)**
Immediate	$2,537,636	$26,138
Foreground	$10,247,042	$105,545
Near-Midground	$1,530,929	$15,769
Far-Midground	$317,430	$3,270
Near-Distant	$174,823	$1,801
Far-Distant	$96,412	$993
TOTAL	$14,904,272	$153,514

Source: KRA, 2016

Callanan, by virtue of the sound application of the hedonic technique, offers clear evidence of a systematic decline in property values that are in proximity to transmission lines, with the effect decreasing with distance. Although the shape of this curve may be substantially different and higher in areas of high scenic amenity values, we believe this is a useful construct with which to consider potential residential property valuation losses in the context of the Project. If the curve were to be shifted upwards and/or become flatter, it could easily increase impacts by a factor of two.

In addition to her empirical finding with regard to value and distance, Callanan also reported that property views, on their own, are worth approximately 3% of the average property in the suburban study area. In the case of the affected areas of New Hampshire, where views are known to be an important attribute of many properties, we expect that this figure could be substantially higher.

Of note, if only 120 properties within the Project viewshed experienced a loss in value of $125,000 each, as speculated in Chalmers' statement about potential view-lot property value diminution, there would be a $15 million impact, approximately the same as estimated in Table 17.

C) Potential Commercial Property Valuation Loss

Potential valuation impacts on commercial properties are even more challenging to predict than residential properties. The existing literature provides virtually no guidance on this issue for the same reason it provides little guidance in evaluating residential properties: In areas with high scenic and recreational amenity values, there are rarely large transmission lines considered, built or studied. The theoretical potential loss in commercial sector property valuation would be concentrated in properties such as hotels, motels and restaurants whose income and therefore capitalized property value would be diminished by the visual intrusion of the proposed transmission line. Many hotels, for example, particularly in scenic areas, place a premium on "rooms with a view" and charge accordingly.

In terms of the economic impacts from such valuation losses, commercial properties have income flows directly related to property values, including view amenities. To the extent these properties are serving tourists, these impacts would be captured in tourism expenditure impacts, covered in Section 11 of this analysis. This would include virtually all hotels and motels, but not all restaurants or other recreational businesses. To the extent these other businesses also affect non-tourist demand, this would result in additional negative impacts above and beyond those estimated in Section 11.

Based on PSU tourism expenditure estimates and New Hampshire Meals & Rooms tax revenue data, we estimate approximately $1.24 billion in taxable restaurant expenditures were made by non-tourists in New Hampshire in 2015, about 44% of all restaurant expenditures. Based on county-level viewshed data for the Project provided by T.J. Boyle Associates, about 0.8% of these expenditures, or $10.4 million, could be allocated to the viewshed area. Of this, some percentage decline in sales, based on view encumbrance, would represent the loss in gross income to restaurant proprietors. Although the loss rates from tourists posited in section 11 (3% to 15%) could be applied, it is possible that local demand may be less affected by visual encumbrance than tourist demand. As a rough measure of potential impact, using a 5% loss rate would generate an additional loss of about $500K per year in restaurant sales.

D) Summary Potential Property Valuation Loss

It is clearly difficult to estimate potential property valuation losses with a high degree of precision. This is especially true with commercial properties. Given the absence of relevant source data, this analysis cannot be considered determinative. The order of magnitude estimations herein suggest, however, that residential property wealth effects could exceed $10 million and possibly be as high as $30 million. Because these losses are unrealized until sales of the affected properties occur, the economic impacts as measured by the REMI model are diffuse and relatively small over the near-term impact period of 2020 to 2030. Because of this, we have not included these effects as an explicit model component in this analysis, however, we recognize the reality, magnitude and potential financial loss to all affected property owners within the viewshed.

These potential wealth losses to current property owners can be especially impactful because the largest single asset held by most households is their home. A reduction in the value of this asset by 5% or 55% can be devastating. We met with one residential property owner, who also ran a pick-your-own blueberry operation on his property, who was relying on the sale of his home to finance his retirement. He believed the sale price he received, as confirmed by his realtor, represented at least a 20% loss due to the projected presence of the new transmission line and its much taller towers. This, in turn, will affect his income and living standard for the remainder of his life.

11) Economic Impacts – Potential Tourism Impacts

A) Overview: Potential Tourism Impacts

Although it is difficult to quantify potential negative tourism impacts from the proposed Project, they are unlikely to be nonexistent, as represented by the Applicants. There is ample evidence that scenic beauty and a pristine wilderness experience is a primary destination attribute affecting tourist visitation to New Hampshire. "Scenic beauty" expressed in various survey terms repeatedly arises as a critical visitation draw in surveys of New Hampshire tourism and is a prominent part of the New Hampshire "brand." The New Hampshire Division of Travel and Tourism has spent tens of millions of dollars in public funds over the past decade in promoting and maintaining this brand, along with many multiples of this spent by private tourism-dependent businesses to do the same.[54]

From the Official State Visitor's Guide, view from North Sugarloaf Mountain, a location in the Project viewshed

Promotional advertising by the State Division of Travel and Tourism prominently displays New Hampshire's unique scenic landscapes in stunning photographs and scores of advertisements. In not one of these landscapes is a power line visible. The reason for

[54] Data from the Plymouth State University Institute for New Hampshire Studies estimates State tourism spending in the last 5 years alone to be more than $30 million. Annual advertising and promotional expenditures by private sector New Hampshire tourist-related businesses are estimated to be more than 15 times this amount, based on the Census Bureau Survey of Business Expenditures and PSU New Hampshire tourism spending data.

this is that there is an obvious negative dissonance between the image of a pristine landscape and the visual impact of a large industrial intrusion on this landscape. Of note, the above photograph, featured in the 2016-2017 Official State Visitor's Guide, was taken from a location that will be within the viewshed of the proposed Project.[55] The proposed Project will not destroy the tourism industry in New Hampshire, but it does represent an incremental degradation of the landscape that is an important source of tourism visitation to the State and could affect New Hampshire's position in a highly competitive market.

B) Relevant Literature Review and Potential Impact Ranges

There is extensive literature documenting the negative visual stigma power lines can represent.[56] But it does not take an academic study to understand why an aboveground high voltage transmission line, as proposed in the Project, could be detrimental to the scenic beauty upon which New Hampshire tourism is dependent. It will not affect all tourists in the same way, and many will be entirely unaffected, but for some component of the tourist population it will be critical to their decision to visit and regularly return.

Because so few power lines of this size and scope are either considered or built through areas with high scenic amenity values, there are few prior studies upon which to base ranges of possible impacts on the New Hampshire tourism industry. Accordingly, the estimates herein are presented separately from other potential economic impacts and represent a range of possible impacts that should be considered among other potential economic impacts.

In reviewing the few external studies relevant to this issue, several have ventured specific estimates of visitation or spending losses. A 2009 study in Scotland estimated annual potential tourism visitation losses from a proposed high voltage transmission line could range from 3.2% to 14.6%.[57] A recent study on the economic impact of a high voltage transmission line in the Anza-Borrigo State Park in California, estimated negative tourism visitation effects of between 5% to 15% due to the presence of a proposed high voltage power line.[58] An analysis of a proposed high voltage transmission line affecting the Delaware Water Gap National Recreation Area in Pennsylvania and New Jersey calculated reductions in tourism visitation and spending to be 5%.[59] The survey performed by the Applicants, while deficient in asking any questions about the presence of high voltage transmission lines, found that even the presence of "visible power lines in certain areas," could have a very important or critical influence in deterring 10.3% of all respondents from a tourist destination. For 4.7% of the respondents, this attribute was considered a "critical barrier" in any visitation decision. More than two-thirds of those participating in the survey said they planned to visit New Hampshire within the next three years.

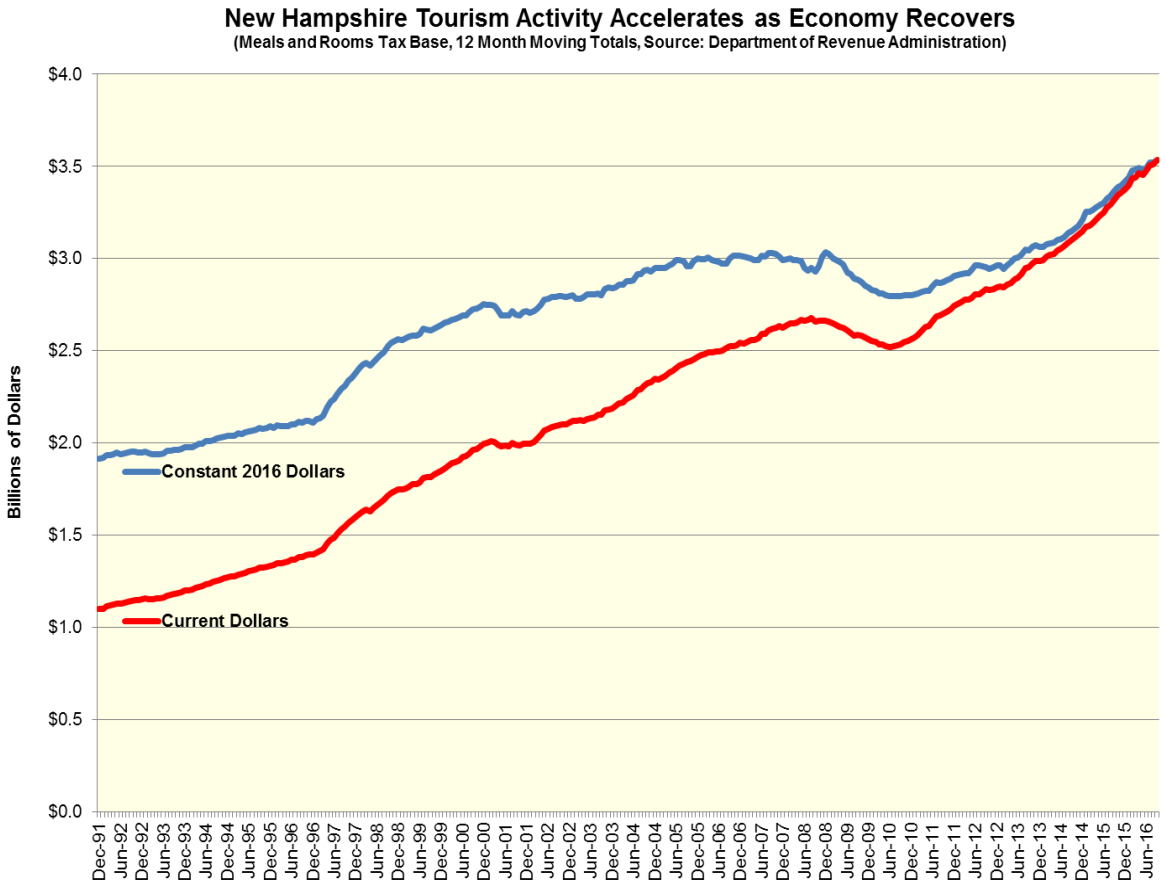
[55] According to viewshed analyses prepared by T.J. Boyle Associates in connection with this proceeding. By turning about 90 degrees to the right of the orientation of the above photo, the NPT will be visible in the far distance, about 10 miles to the west.

[56] See, among many such studies The Impact of Transmission Lines on Property Values: Coming to Terms with Stigma, by Peter Elliott and David Wadley, Property Management (2002) 20(2) and Impacts Associated with the Proposed Susquehanna to Roseland Transmission Line, National Park Service, 2012

[57] See: Beauly-Denny Report Volume 1: Chapter 16 – Tourism, Recreation & Economic Impact, Brian, et. al., 2009

[58] Economic Impact of Power-line Siting in Anza-Borrego Desert State Park, Haefele, 2015

[59] Impacts Associated with the Proposed Susquehanna to Roseland Transmission Line, National Park Service, 2012

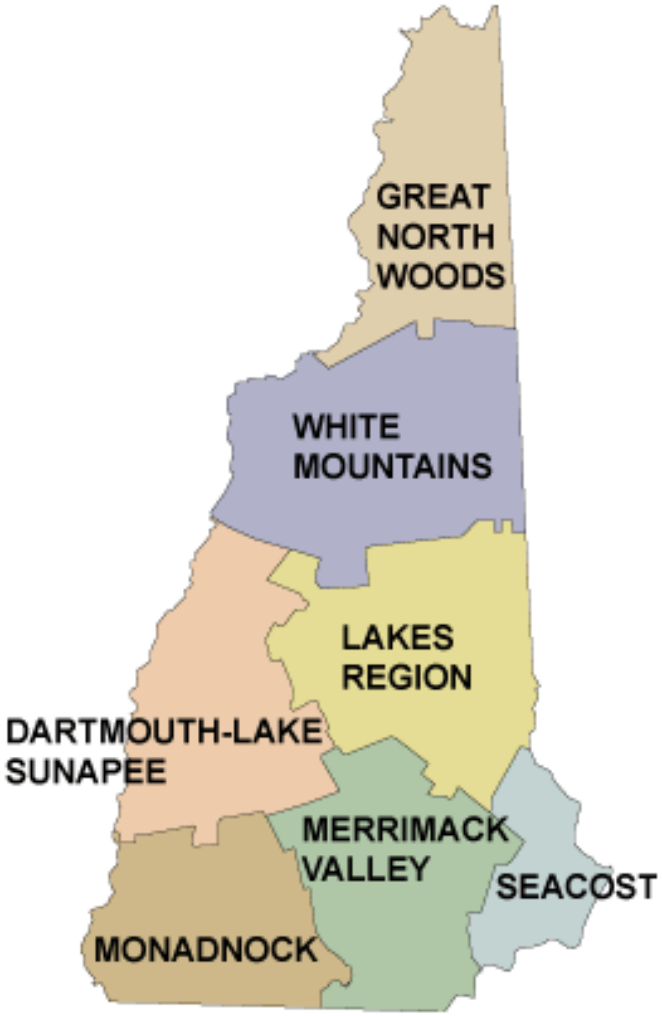


Based on conversations with New Hampshire tourism experts,[60] the presence of the proposed Project could have measurable negative tourism impacts in New Hampshire, especially in the Great North Woods region. This region's scenic beauty and pristine natural landscapes are its central tourism draw and the Project is predominantly aboveground through this region. While it is difficult to measure the incremental scenic degradation caused by one project, these experts estimated that tourism visitation and spending could ultimately be reduced by at least 3% to 10%, and possibly as much as 15%, due to the presence of the proposed transmission line in its current form and location. They emphasized the marketing importance of repeat tourist visitation and retention, believing that tourism losses could mount over time.

Based on these analyses and expert local opinion, we have constructed several alternative possible impact ranges, based on estimates of current direct tourism spending and the degree to which transmission line visibility may affect each region.

[60] These conversations included former State Director of Travel and Tourism, Alice DeSouza, and Mark Okrant, Professor Emeritus and Program Coordinator for Graduate Studies in Hospitality and Tourism Management at Plymouth State University, and former Director of the Institute for New Hampshire Studies, the source of most NH tourism statistics since 1990.

The estimates of tourism spending are based on Plymouth State University Tourism Satellite Accounts, which utilize a range of economic and tax data to estimate direct tourism expenditures by eight town-defined tourism regions (see map below) that are commonly used by both PSU and the New Hampshire Division of Travel and Tourism. Calendar year 2015 spending by region was based on the growth in meals and rooms tax receipt data from the New Hampshire Department of Revenue Administration between calendar year 2015 and fiscal year 2014. Calculations were then made by town on the share of the total town land acreage that would have visibility of the proposed transmission line and aggregated to the tourism region level, based on the viewshed analysis prepared by T.J. Boyle Associates. Losses of 3%, 5%, 10% and 15% were then calculated on the share of spending in each tourism region for calendar year 2015.



Tourism losses could be much greater than this viewshed-limited approach if visitors encounter the transmission line multiple times as they travel throughout the region or if there are particularly prominent views on high volume traffic arteries such as I-93 and Route 3 or at other critical locations at which tourists congregate. All of the above-cited percentage losses correspond to total tourism visitation in a region, not just viewshed

areas. However, there are no reliable statistics that allow us to estimate tourism expenditures by town within New Hampshire. Thus, while in aggregate we consider this to be a conservative estimate of potential tourism loss, it is highly uncertain and is not meant to represent losses in any given town or region.

Losses could be lower than estimated if few of the viewing encounters are in scenically-sensitive locations or in areas with high tourism visitation. This would be impossible to estimate without tracking tourist travel within the region and logging expected versus actual view experiences.

For longer term impact estimates, we phased in maximum assumed impacts, recognizing that first year impacts would be negligible (excluding construction period impacts), but would mount over time as return visits and visitor recommendations, such as are routinely reported in social media such as TripAdvisor, are affected by actual experience. We assume 2.0% real annual growth in tourism spending, which is slightly below the long term state growth rate over the past 20 years for meals and rooms receipts (see chart on page 65). Thus, in a 10% loss scenario, losses start at 0% in year one, rising 2% per year to 10% in year six, and then hold constant at 10% for the balance of the Project life.

TABLE 18

Potential Tourism Impacts - Direct Spending

($Millions)	Visibility as a % of Total Land Acreage	2015 Direct Tourism Spending	2015 Spending Adjusted for Visibility	2015 Reduction 3%	5%	10%	15%
Tourism Region							
Dartmouth Sunapee	0.05%	$ 243.5	$ 0.117	$ 0.004	$ 0.006	$ 0.012	$ 0.018
Great North Woods	5.07%	$ 89.7	$ 4.550	$ 0.136	$ 0.227	$ 0.455	$ 0.682
Lakes	1.56%	$ 654.6	$ 10.228	$ 0.307	$ 0.511	$ 1.023	$ 1.534
Merrimack Valley	2.20%	$ 1,608.7	$ 35.453	$ 1.064	$ 1.773	$ 3.545	$ 5.318
Monadnock	0.00%	$ 300.1	$ -	$ -	$ -	$ -	$ -
Seacoast	0.01%	$ 1,175.7	$ 0.151	$ 0.005	$ 0.008	$ 0.015	$ 0.023
White Mountains	2.08%	$ 1,396.0	$ 28.999	$ 0.870	$ 1.450	$ 2.900	$ 4.350
TOTAL NH		**$ 5,468.2**	**$ 79.498**	**$ 2.385**	**$ 3.975**	**$ 7.950**	**$ 11.925**

In the above table, total 2015 tourism spending is estimated to be approximately $5.5 billion. About $79 million of that total occurs within the potential impact area (about 1.5% of the state total). Potential annual losses at 3% would be about $2.4M, with losses at 15% of about $12M. Although impacts should not be viewed as specific to any single region, since visitors often travel between regions and visit multiple regions, they are a reasonable basis for aggregate state estimates. Based on an assumed 60 year useful

life,[61] and a 3% discount rate,[62] the net present value of these annual losses are shown in the below Table 19.

TABLE 19

Net Present Value of Potential Tourism Industry Losses Phased in Impact Over 60 Year Project Life				
Maximum Annual Loss %	**3%**	**5%**	**10%**	**15%**
Net Present Value ($millions)	$ 105	$ 173	$ 336	$ 490

Of note, the net present value of the direct constant dollar tourism losses at a 3.5% phased in rate (at about $120M) are close to the net present value of the promised constant dollar expenditure flow associated with the Forward New Hampshire Plan. From an aggregate economic impact perspective, this would represent an approximate net offset. The net present value of a 7% tourism loss (about $240M) is close to the cost differential in the Project cost resulting from the decision to bury 52 miles of the line through the White Mountain National Forest.[63] This Project change, which the Applicants noted "eliminates potential visual impacts in the treasured White Mountain National Forest, Franconia Notch area, and along the Appalachian Trail," is one measure of the viewshed disamenity value of that segment of the transmission line.

Using a mid-point between 3% and 15%, a phased in direct tourism spending reduction of 9% scaled to the area within the Project viewshed will result in direct spending losses of about $10 million per year (in current dollars) and total economic impacts, including all secondary effects, that could approach average annual losses of more than $9 million in GSP (in constant 2016 dollars) and the loss of nearly 190 jobs per year during the 11 year period from 2020 to 2030, and beyond.

[61] Although a 60 year "useful life" is used in other studies, such as the above-cited National Park Service Susquehana analysis, the relevant analytic period for this estimate is the likely duration of visual encumbrance, which may be longer than the useful life of the initial project. Prior experience in NH and elsewhere suggests that ROW landscape intrusions tend to grow over time as new lines and other systems are added. The proposed Project is an example of this, as is the Phase II line in the Nichols study.

[62] Various discount rates could be used to estimate the public value of this lost revenue stream. The 3% discount rate used herein is based on the current mandated rate of 2.9% used by the U.S. Army Corps of Engineers for non-watershed work, which, in turn, is based on a formula that calculates the average interest on U.S. Treasury securities with a maturity of 15 years or longer, as estimated by the U.S. Treasury. This rate is consistent with that suggested for use by the California Energy Commission to evaluate transmission projects. See Lawrence Berkley Laboratories, "Transmission Benefit Quantification, Cost Allocation and Cost Recovery," CEC Report Number CEC-500-2013-12, June, 2008.

[63] At the SEC Joint Agency Hearing on March 10, 2016, in Merrimack County, the Applicants indicated that the total Project cost increased from $1.4 billion to $1.6 billion with the addition of 52 miles of buried Transmission Line.

TABLE 20

Travel and Tourism Economic Impact : New Hampshire and Region, Average Annual

Economic Measure	Units	LEI	New England (2020-2030)	New Hampshire (2020-2030)
GSP	**$2016M**	NA	$18.8	-$13.5
Personal Income	**$2016M**	NA	-$13.4	-$9.2
Disposable Income	**$2016M**	NA	-$11.2	-$7.8
Employment	**Jobs**	NA	-231	-189

Source: KRA using the REMI Model

As noted above, the application of loss rates by viewshed share result in what is probably a conservative estimate of potential loss. While we do not deem it appropriate to apply the loss rates to total tourism spending in every affected tourist region, the Great North Woods area is likely to experience the most widespread loss and could arguably be severely impacted. Travel to and from the region is concentrated on fewer major traffic arteries and many of these will bring visitors in contact with the transmission line, often for longer periods of time and with greater frequency. Examples of such places include Route 302 in Bethlehem, Routes 3 and 116 in and near Whitefield, U.S. Highways 2 and 3 in and around Lancaster, Route 110 in Stark, and along I-93 transiting from the Concord area north. Viewshed impacts in the Great North Woods region are also much more extensive, both at close and longer range distances. The reliance on tourism in the economy is also more pronounced, with second home ownership shares above 17% (more than four times the national average) in 11 of the 14 towns within the Project viewshed. As shown in the below table, if the loss percentages applied above were applied to total tourism spending in the Great North Woods region alone, direct spending reductions would be close to the aggregate totals estimated via the viewshed reduction approach outlined in Table 18.

TABLE 21

Potential Tourism Impacts, Regional Loss Basis
Great North Woods
(Millions of 2015 Dollars)

Percent Loss	3%	5%	10%	15%
Direct Spending Change	-$2.7	-$4.5	-$9.0	-$13.5

In considering longer-term impacts, it should be noted that canopy cover is unlikely to ever grow tall enough to screen the larger towers planned for the route.[64] It should also

[64] Based on conversations with Dr. Kenneth Kimball, Director of Research at the Appalachian Mountain Club. See also, "Assigning a Fixed Height to Land Cover Screen for Use in Visibility Analysis," by James F. Palmer, T. J. Boyle Associates, Journal of Digital Landscape Architecture, 1-2016; "New Hampshire's Forests 2007," U.S. Forest Service Bulletin 53, at http://www.nrs.fs.fed.us/pubs/rb/rb_nrs53.pdf and; "Ice Storm Effects on the Canopy Structure of a Northern Hardwood Forest After 8 Years," by Brian C. Weeks, Steven P. Hamburg, and Matthew A. Vadeboncoeur, University of New Hampshire Scholars' Repository

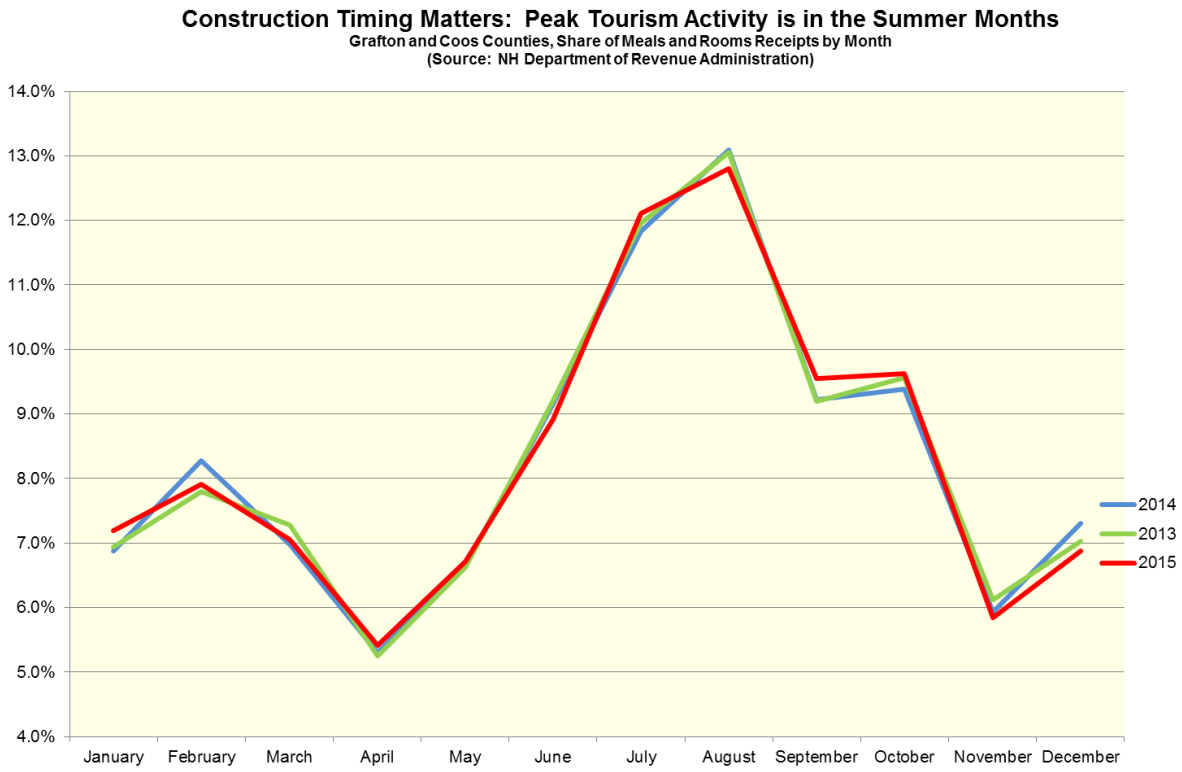
be noted that existing HVTL corridors are often expanded over time (such as the subject ROW) for both related and other uses, and are rarely discontinued. Thus, future impacts are not likely to diminish to the extent they might in cases with lower tower heights.

C) Potential Construction Period Disruptive Impacts

During the construction phase, both aboveground and underground construction activities could have significant disruptive impacts on tourism. Instead of the visual impacts that affect long-term tourism visitation, these effects would be localized traffic-related issues that are shorter-lived. They include traffic delays from road and trail closures or detours, and traffic and business disruptions from underground construction on highway rights of way that pass through or affect downtown areas.

While these effects could impact many locations and individual businesses and residents, the Town of Plymouth is particularly vulnerable to potential disruption and economic loss. This is because the proposed underground transmission line will be located under the narrow Main Street in downtown Plymouth along the Route 3 highway right of way. Other existing underground systems and a previously installed underground reinforced concrete subsurface could make construction particularly slow and complex. Parking and traffic detour options are limited and could result in considerable disruption to existing downtown businesses, of which there are many. In addition to traffic and parking issues, vibration, noise and dust are also significant concerns.

This construction could extend into the summer months when tourism visitation is at its peak, even if started as soon as spring temperatures permit in April. As shown in the below chart, meals and rooms receipts in Grafton and Coos Counties (the counties in which all underground work will occur) in the three month period from June to August are larger than sales in the five month period from January to May. Despite the fact that retail and restaurant sales in Plymouth have somewhat less pronounced seasonality due to the presence of the University, which counterbalances the high summer tourist demand with lower student populations during these same months, traffic counts in Plymouth suggest that the summer months still represent the highest period of overall demand, and would be the most vulnerable to traffic-based access issues.



While we do not have a list of every potentially affected business and their sales, payroll and employment counts, many of the businesses in the below sectors are located on or near Main Street in Plymouth. We estimate approximately 75% of the total Town business sectors included in Table 22[65] are located in or near the downtown area and could be affected by the planned underground construction activity.[66] Based on the most detailed plans available to us as of this date, and in consultation with other experts retained by Counsel for the Public, we are assuming an April start date, with construction expected to last from 70 to 130 days and involve complete street segment closures at times. The total street closures will shorten the construction period, but heighten the business disruptions, by eliminating on-street parking and vehicular access at times. If construction is delayed or extended by complications with other underground systems, impacts could be heightened.

Even with a "best case" expected construction period of about 70 days and a reduction in business of 30% during this period could lead to direct income reductions of more than $1.2 million and the loss of about 60 jobs. If the construction period extends to 130 days and business activity drops by 50%, economic losses could exceed $3.8 million in personal income and more than 175 jobs. Secondary effects would amplify these losses, ultimately causing total one-year local job losses of between about 80 to 250 jobs

[65] All data in Table 22 are from the Quarterly Census of Employment and Wages, New Hampshire Economic and Labor Market Information Bureau

[66] Based on a list of active Meals and Rooms taxpayers provided by the NH Department of Revenue Administration and conversations with tourism experts at Plymouth State University's Institute for New Hampshire Studies

and income losses of between $3.1 to $9.6 million.[67] The possible closure of some downtown businesses could tarnish what is now a thriving downtown tourist destination with shuttered storefronts, and affect future tourism visitation.

TABLE 22

Plymouth, NH Sector	2014 Annual Wage Bill	2014 Employment
Retail Trade	$ 12,398,518	$ 492
Real Estate and Rental and Leasing	$ 718,838	$ 17
Arts, Entertainment, and Recreation	$ 334,029	$ 16
Accommodation and Food Services	$ 8,057,281	$ 461
POTENTIALLY AFFECTED AREA	**$ 21,508,666**	**986**
TOTAL TOWN	**$ 167,567,353**	**4319**

While these jobs would eventually return, the economic hardship on the affected business owners could be more lasting. Profit margins are notoriously low in the retail and food service businesses and even a temporary decline in sales of this magnitude could drive some out of business.

Excessive traffic delays and temporary road and trail closures at other aboveground and underground construction locations could also have measurable negative tourism effects. Though short-lived, they will accentuate the presence of the new transmission line to visitors and could disrupt sales at businesses in areas affected by long traffic delays or detours. Nearly 20% of all respondents in the Nichol's tourism survey said that "traffic delays en route to their destination" would represent an important (11.9%) or critical (7.4%) barrier to visitation. With rapid communication of traffic conditions on social media and other electronic platforms, such as Waze, news of significant traffic delays can travel quickly and cause tourists to change plans. While they might visit a different New Hampshire location, they may also opt to go to a different New England state or outside of the region. As shown above, even a small percentage loss in tourism visitation in the affected regions can cost millions of dollars and many local jobs. Because of this, careful planning and thorough consideration of traffic flows on the main arteries to and from business locations should be studied so as to minimize negative impacts.

D) Incremental Degradation and Development Decisions

The linkage between visible industrial and commercial development and tourism character can be seen in comparing tourism survey data in Nichols' 2002-2003 study, which included both New Hampshire and New Jersey. New Jersey was once renowned for its beautiful beaches and peaceful natural scenery, attracting so many presidential guests that 150 years ago, it was referred to as the "summer capital." Today it still has some beautiful beaches and peaceful natural scenery, but is better known for the relentless commercial and industrial development that has made it the polar opposite of New Hampshire in terms of tourism image.

[67] Based on REMI model output, in 2016 dollars

This did not happen because of one project or one development, but an accumulation of development decisions that left the state with a brand reputation for anything but "pristine natural beauty." As shown in the below tables, only 15% of the respondents in Nichols' 2002 survey rated NJ as "very scenic," versus 93% for New Hampshire. Only 9% rated the lakes and rivers of New Jersey to be "attractive," whereas 88% found them to be so in New Hampshire.

TABLE 23

Tourism Importance - Performance Comparisons of Selected States				
Feature	**NH**	**NJ**	**ME**	**VT**
Very scenic/natural beauty	92.9%	15.1%	90.6%	87.5%
Good value tor time and money	71.4%	9.5%	73.4%	57.1%
Attractive lakes and rivers	87.8%	8.7%	81.8%	71.2%
Quaint towns and villages	84.9%	10.0%	82.7%	78.0%
Good/different types of tood	32.7%	37.7%	23.9%	30.2%
Attractive beaches	35.2%	44.4%	71.9%	10.6%
Good parks and forests	84.0%	16.3%	76.9%	70.0%
High quality accommodations	68.9%	29.4%	66.4%	59.6%
Great tor outdoor and sport activities	79.7%	17.8%	78.2%	65.3%
Access to mountains	88.3%	2.5%	65.1%	79.3%
Interesting historic sites	43.8%	14.2%	40.0%	32.8%
Good vacation resorts	65.3%	16.9%	60.0%	55.1%
Family-oriented activities & attractions	67.7%	26.8%	56.4%	47.4%
Excellent fall foliage	95.0%	13.2%	83.2%	88.4%
Interesting architecture/landmarks	35.0%	10.6%	32.4%	27.6%
Good festivals and special events	45.8%	13.8%	41.6%	33.0%
Excellent museums, galleries, zoos	18.2%	14.2%	20.6%	13.5%
Good shopping	50.8%	34.3%	53.8%	28.9%
Good nightlife and entertainment	16.0%	25.1%	11.0%	9.6%

Source: "New Hampshire's Image as a Travel Destination," Nichols Gilstrap, 2003, NPT_DIS 058600

A state has a limited number of options for tourism development, based on its natural, climatic, cultural, political and human characteristics. New Hampshire's natural and climatic comparative advantages are clearly based on its scenic natural beauty, not its gambling or nightlife opportunities. But, as shown in the above table, there are other nearby states that compete on the same terms. Tourism officials have stressed that the competition for tourism dollars is stiff. Changes that damage New Hampshire's image could readily divert business in this market segment towards neighboring competitors.

E) Summary

As noted in the Executive Summary, it is difficult to quantify the value of a public asset such as New Hampshire's scenic landscape. With few relevant studies that attempt to monetize such assets, we have offered a conservative assessment of one aspect of scenic value, tourism spending. Given the serious source data limitations, however, these estimates cannot be considered conclusive. Although potential negative tourism impacts could be many times greater than this assessment, there are other

unmeasurable aspects of this public asset that should also be considered as a part of this permitting review process. The primary reason this issue has not been extensively studied in the past – that communities with high scenic amenities rarely even consider such intrusions - should also inform the permitting decision.

In their analysis of the Project, T.J. Boyle Associates has cataloged 224 scenic byways, 183 designated rivers, 1,338 conservation/public lands, 218 great ponds, 1,311 public rivers, 12,313 scenic drives/public roads, 1,158 recreational trails, 83 access sites to public waters, 242 other recreational sites, 85 listed historic resource locations, 1,290 potential historic resources and 488 other community resources that will have visibility of the proposed transmission line.[68] While there may be uncertainty with respect to the exact magnitude of negative tourism impacts from the Project's aesthetic impacts, it is unlikely, as the Applicants now contend, that there will be none.

12) Aggregate Economic Impacts Over Time

We have presented ranges of impacts throughout this analysis in recognition of the uncertainty of possible outcomes and the absence of relevant data and historical experience with which to evaluate some potential impacts. While some impacts are more certain and have a narrower range of possible outcomes, such as the employment impacts associated with construction of the proposed Project, other impacts are less certain. In some areas of potential benefit or cost, such as expected electricity price reductions or tourism impacts, the potential ranges are exceptionally large – differing by a factor of ten or more. While this can provide some "order of magnitude" guidance, it can also be confusing as a policy guide. While we expect those weighing the merits of the Project will assess these risks and assign their own judgements of likelihood, we have also aggregated the areas of analysis within our purview into one such aggregate economic impact estimate for illustrative purposes. Although we do not endorse this as the most likely or only possible combination of assumed effects, we believe it to be a reasonable possible outcome that shows how these various components may combine in an aggregate Project economic impact estimate.

In the below table, we outline net economic impacts in terms of the primary Project components reviewed herein. As detailed in the above sections, this includes: KRA Project construction and development expenditure estimates; KRA property tax payments that are expended equally for the purpose of retiring debt and increasing state and local government purchases; The Brattle Group's "Scenario 2" energy market assumptions, with 500MW of terminated generation capacity and 500MW of mothballed capacity distributed throughout the New England region; KRA "conservative" viewshed-limited tourism loss assumptions; Forward New Hampshire Fund expenditures that assume independent management and administration of the various funds; and a traffic disruption scenario based on a "best-case" downtown Plymouth construction impact

[68] Per Appendix D, page G-9, of T.J. Boyle Associates report to Counsel for the Public on the Project.

and/or other possible areas of traffic delay.[69] Property valuation impacts, for the reasons described in Section 10, are not explicitly modeled, due to both data constraints and relatively small aggregate impacts. These negative effects, however, are probably about equal to potential additional longer term positive effects from assumed public debt retirement via property tax revenues from the Project and likely increases in line maintenance required in the later years of the modeling horizon.

While impacts may be better or worse than those outlined above, we believe this to be a reasonable framework for understanding and assessing some of the risks associated with both expected benefits and costs to the Project.

The below table illustrates the enormous beneficial employment impacts of the initial Project construction expenditures, followed by Forward New Hampshire Plan spending and sizable property tax payments. Many of these beneficial expenditure flows, however, decline and expire over time. The construction expenditures end by 2020. Electricity market benefits diminish and end at about 2031. Forward New Hampshire Plan expenditures end in 2037. Property tax revenues steadily decline every year from 2020 onward, and end completely when the Project is fully depreciated in 2059.

Meanwhile, tourism losses continue as long as the transmission line is visible, and grow slightly, with the expected expansion of the tourism sector as a share of the New Hampshire economy. The displaced regional electric generation supply response also persists indefinitely. In the 11 year period between 2030 and 2040, net employment impacts from the Project could go negative and persist in subsequent periods. The relatively small post-2020 effects in the "Construction and Development" impact element are the result of capital stock adjustments in the REMI model.

The below illustration is not meant to be a forecast of likely impacts, but shows how the interaction of various elements in the economy that may be affected by the Project could respond over various time horizons. Such tables could be generated for any number of economic metrics and assumptions. Another commonly used aggregate economic measure, Gross State Product (GSP), is outlined in Table 25.

[69] Although we conservatively use the "best-case" downtown Plymouth impact scenario in this hypothetical, we recognize that not all Plymouth losses will be statewide New Hampshire losses, as some tourists avoiding Plymouth will visit and spend in other New Hampshire towns. At the same time, however, we believe there will be negative impacts in other areas of episodic construction disruption and temporary tourism spending losses that will result in statewide impacts of comparable or greater magnitude.

TABLE 24[70]

Aggregate Model Impacts: Selected Project Components for New Hampshire (Annual Averages - Number of Jobs)

Employment

	---------- Project Phase and Selected Years ----------				
	Initial	Near-Term	Mid-Term	Late-Term	Long-Term
Impact Element	*Primarily Construction* **2016-2020**	*Operational Period* **2020-2030**	*Operational Period* **2030-2040**	*Operational Period* **2040-2050**	*Operational Period* **2050-2060**
Construction & Development	1,050	-53	-2	13	14
Electricity Market Effects	40	131	-192	-183	-198
Operations & Maintenance	2	13	8	6	4
Property Tax Effects	66	249	122	64	27
Forward NH Plan	147	170	87	0	0
Tourism Effects	-80	-189	-214	-260	-320
Construction Disruptions	-17	0	0	0	0
TOTAL	**1,208**	**321**	**-191**	**-360**	**-473**

TABLE 25

Aggregate Model Impacts: Selected Project Components for New Hampshire (Annual Averages - Millions of 2016 Dollars)

Gross State Product

	---------- Project Phase and Selected Years ----------				
	Initial	Near-Term	Mid-Term	Late-Term	Long-Term
Impact Element	*Primarily Construction* **2016-2020**	*Operational Period* **2020-2030**	*Operational Period* **2030-2040**	*Operational Period* **2040-2050**	*Operational Period* **2050-2060**
Construction & Development	$85	-$5	$0	$2	$2
Electricity Market Effects	$4	$10	-$30	-$40	-$54
Operations & Maintenance	$0	$2	$2	$2	$2
Property Tax Effects	$5	$19	$10	$6	$3
Forward NH Plan	$8	$10	$5	$0	$0
Tourism Effects	-$5	-$14	-$18	-$24	-$33
Construction Disruptions	-$1	$0	$0	$0	$0
TOTAL	**$96**	**$22**	**-$31**	**-$54**	**-$80**

[70] Table totals are summations of columns and may vary slightly with aggregate model runs. Project Phase impacts are expressed as annual averages for selected periods that intentionally include overlapping years.