STATE OF VERMONT
PUBLIC SERVICE BOARD

Petition of Champlain VT, LLC d/b/a TDI New England for a Certificate of Public Good, pursuant to 30 V.S.A. §248, authorizing the installation and operation of a high voltage direct current (HVDC) underwater and underground electric transmission line with a capacity of 1,000 MW, a converter station, and other associated facilities, to be located in Lake Champlain and in the Counties of Grand Isle, Chittenden, Addison, Rutland, and Windsor, Vermont, and to be known as the New England Clean Power Link Project ("NECPL")	)	Docket No. _____

PREFILED DIRECT TESTIMONY OF THOMAS KAVET

ON BEHALF OF CHAMPLAIN VT, LLC

December 8, 2014

Summary:

Mr. Kavet's testimony concerns the economic impacts of the NECPL under 30 V.S.A. § 248(b)(4). Based upon his analysis, Mr. Kavet concludes that the NECPL will have significant and positive economic impacts on the State and its residents as a result of both the direct and secondary expenditures associated with the construction and ongoing operational expenditures associated with the NECPL and the beneficial effects from lower electricity prices in Vermont and New England it will offer upon completion.

List of Exhibits

Exhibit Number	Name of Exhibit
TDI-TK-1	Resumes of Thomas Kavet and Nicolas Rockler
TDI-TK-2	Charts and Figures Referenced in Testimony (KRA)

Q1. Please state your name and position relative to this Project.

A1. Response: My name is Thomas E. Kavet. I am President of the economic and public policy consulting firm, Kavet, Rockler & Associates, LLC (hereafter, KRA), located in Williamstown, Vermont.

Q2. Please describe your qualifications and expertise.

A2. Response: I have been a professional economist for the past 36 years. I worked for 11 years at McGraw-Hill/DRI (now IHS Global Insight), the largest economic consulting and forecasting firm in the nation, where I started the Construction and Real Estate Information Service and was later Vice President, Development and Product Operations. I have been an independent economic consultant based in Vermont for the past 26 years, during which time I have been the State Economist and Principal Economic Advisor to the Vermont State Legislature for the past 19 years. My partner, Dr. Nicolas Rockler, and I have extensive experience building and using regional economic models, specifying econometric and applied regression models, and performing economic impact analyses. We currently maintain and manage REMI, IMPLAN and REDYN economic models for the State of Vermont, on behalf of the Vermont Legislative Joint Fiscal Office. We have conducted hundreds of regional economic impact analyses, including analyses associated with energy projects in Vermont and other states. A copy of my resume (and that of my partner) is attached as *Exhibit (Exh.) TDI-TK-1.*

Q3. On whose behalf are you offering this testimony?

A3. Response: Champlain VT, LLC d/b/a TDI New England (hereafter TDI-NE).

Q4. What is the purpose of your testimony?

A4. Response: My testimony concerns the economic impacts of the proposed New England Clean Power Link Project ("NECPL" or "Project") in Vermont under 30 V.S.A. § 248(b)(4) (Economic Benefits to the State and its ratepayers). Based upon my analysis, I conclude that the Project will have significant and positive economic impacts on the State and its residents as a result of both the direct and secondary expenditures associated with the construction and ongoing operational expenditures associated with the Project in Vermont and the beneficial effects from lower electricity prices in Vermont and New England it will offer upon completion.

Highlights of the positive economic impacts that we found are as follows:

Significant job creation

- During the three year construction period, the Project will support an annual average of almost 500 new jobs (direct and secondary) in Vermont and over 700 throughout New England.
- During the first ten years of operations, the Project will support an annual average of over 200 new jobs (direct and secondary) in Vermont and over 2,100 new jobs throughout New England.

Increase in Gross State Product

- During construction, the Project will generate an annual average increase in Gross State Product in Vermont of over $38 million and $64 million throughout New England.

- During the first ten years of operations, the Project will generate an annual increase in Gross State Product in Vermont of over $31 million and $354 million throughout New England.

Q5. Have you previously testified before the Public Service Board or in other judicial or administrative proceedings?

A5. Response: Yes, I have testified before the Vermont Public Service Board on behalf of UPC/Sheffield Wind, GMP/Kingdom Community Wind, Deerfield Wind, and the Vermont Public Service Department in the Entergy Nuclear Vermont Yankee and Entergy Nuclear Operations, Inc. cases. I have testified before State legislative committees on hundreds of occasions and at Act 250 and numerous other public hearings and administrative proceedings such as the Vermont State Emergency Board.

Q6. What work have you performed concerning the NECPL?

A6. Response: We have performed an economic impact analysis of the NECPL on the six affected New England states, including Vermont. As a part of this, we have estimated likely net economic and fiscal benefits to Vermont and its residents as a result of the NECPL Project.

Q7. Have you relied on the work of any other experts concerning the NECPL?

A7. Response: Yes, we used estimates of likely changes in ISO New England wholesale power prices as prepared by Seth Parker of Levitan & Associates, Inc. (hereafter, Levitan), as detailed in his prefiled testimony and exhibits that have also been submitted in this case.

Detailed project expenditure estimates and their expected timing were provided by TDI-NE. The data provided to us from both these sources was as of November 11, 2014. As is the case in many large projects such as this, refinements in future project cost estimates and other direct model inputs occur on an ongoing basis. We have reviewed input data through December 2, 2014 and determined that the refinements in the data input used in our analysis were either minor, resulting in no material change in our impact assessment, or would only serve to increase the beneficial economic and fiscal impacts presented herein.

Q8. Have you provided project information to other experts in support of their section 248 testimony and if so, what?

A8. Response: Yes. Selected economic impact metrics were provided to Todd Singer of TDI-NE.

30 V.S.A. § 248(b)(4) – Economic Benefit to the State

Q9. Please describe the economic model you used to estimate regional economic impacts associated with the NECPL.

A9. Response: To estimate economic impacts associated with this Project, we utilized a six state[1] New England regional economic model prepared by Regional Economic Models, Inc. (hereafter, REMI), of Amherst, MA. REMI offers one of the more sophisticated regional economic models for impact analysis, incorporating basic Input/Output functionality in a General Equilibrium model with advanced Economic Geography and other econometric

[1] The six New England states are: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

time-series modeling capabilities. The model is well-documented,[2] regularly updated, and has been widely used in Vermont and the nation, including extensive use by the Vermont Public Service Department and in prior analyses submitted to the Public Service Board.

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. Because of the unique nature of the construction processes involved in the NECPL, we developed customized I/O profiles for some inputs so as to most accurately simulate impacts.

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 NECPL, where there are

[2] See www.remi.com for additional methodological and background information on the REMI model.

discreet, time-sensitive events, such as the three year flow of construction activity followed by very different economic inputs in the subsequent ten year operational period over which impact estimates are estimated.

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 NECPL, requiring highly skilled, specialized labor in a relatively small labor market such as Vermont.

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. 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.[3]

[3] For a full description of the NAICS classification system, see: http://www.census.gov/eos/www/naics.

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 NECPL. 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 project's 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 project, 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 NECPL, 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.

Q10. Please describe the sources upon which you relied and inputs used in estimating economic and fiscal impacts associated with the NECPL.

A10. Response: All direct model inputs associated with this analysis were developed with detailed project data from TDI-NE and regional electricity price effects as estimated by Levitan. The model specification included all estimated construction, development, equipment purchases, building, leases, tax and anticipated operational expenditures. Using this expenditure detail, we allocated all direct project expenditures by year and state.

During the three year construction period, local Vermont expenditures are approximately $234 MM, and include labor costs of approximately $83MM, materials and overhead costs of approximately $110 MM, and taxes and fees of $41 MM. Following the three year construction period, direct operational expenditures in Vermont are estimated at approximately $20 million per year in constant 2014 dollars, including 22 FTE positions.

The electricity price effects were estimated by Levitan as nominal and real dollar wholesale electricity price savings by state and month. These effects do not include significant additional potential savings associated with capacity price benefits as described in the testimony of Seth Parker in this case.[4]

All model inputs were aggregated by year and state for specification in the REMI model.[5] Based on both direct project expenditures and electricity price effect inputs, the

[4] Capacity price benefits had not been estimated at the time of the economic impact analysis, but could represent substantial additional economic benefit to the State and region.

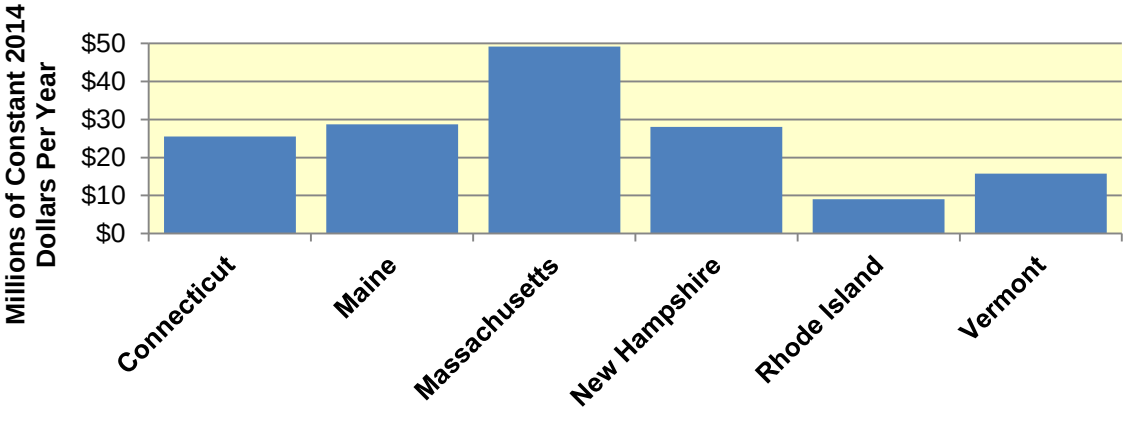
[5] To accommodate REMI model protocols, it was necessary to distribute the total change in electric bills to three different rate categories. REMI classifies these as residential ("consumers"), commercial, and industrial. We distributed the state totals to the different rate categories using data produced by the U.S. Department of Energy, Energy Information Administration (EIA), averaging these over the 2011-2013 period. Each category's usage was weighted by an index value of average price per kilowatt hour recorded by EIA in 2012 (the latest full year available) for the appropriate rate category in each state and then normalized to the Levitan state total. The ensuing cost estimates were then entered into the REMI model for the three cost categories in each state. Based on conversations with Seth Parker

REMI model was used to estimate total economic impacts (including secondary indirect and induced effects) from the NECPL for the region and State, as well as demographic impacts on an annual basis.

Q11. Why are electricity price effects important to this analysis?

A11. Response: The average annual savings in electricity expenditures during the initial 10 year operational period as a result of power supplied by the NECPL are significant, ranging from just under 2% of the total power bill in Massachusetts, Connecticut and Rhode Island to more than 5% in Maine, New Hampshire and Vermont. See Chart 1:

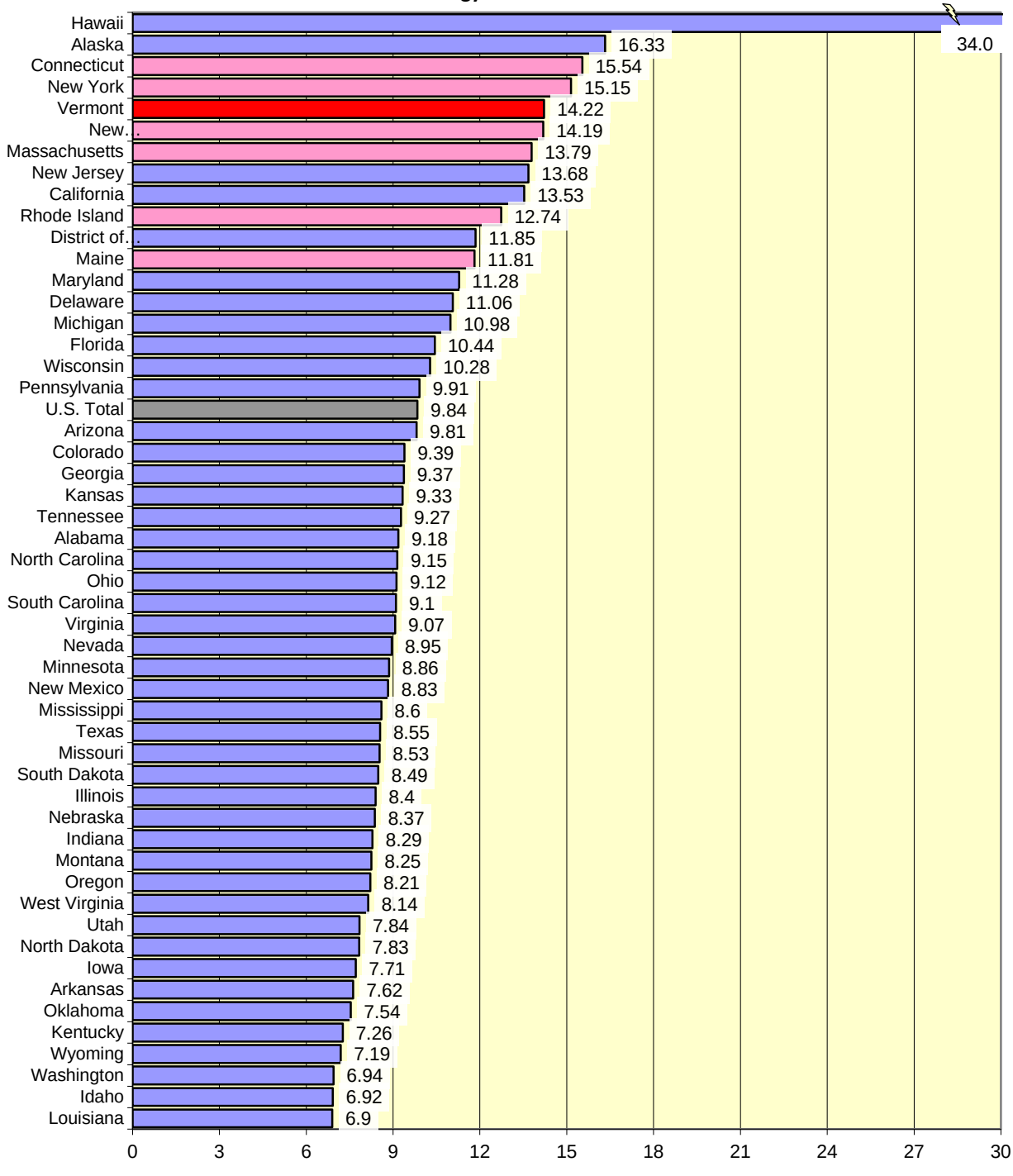
CHART 1: Average Annual 2019-2028 Savings in Electricity Costs Due to Power Delivered Via the New England Clean Power Link
(Millions of Constant 2014 Dollars, Source: Levitan & Associates, Inc., KRA)



Savings from lower electricity prices over the 2019-2028 period for the New England region will exceed $1.5 billion in 2014 constant dollars and $1.8 billion in current dollars. For Vermont ratepayers, the savings over this period will total more than $150 million in constant 2014 dollars and $190 million in current dollars (see Chart 1). These price effects are especially important to the State and region because of the relatively high price of power in New England.

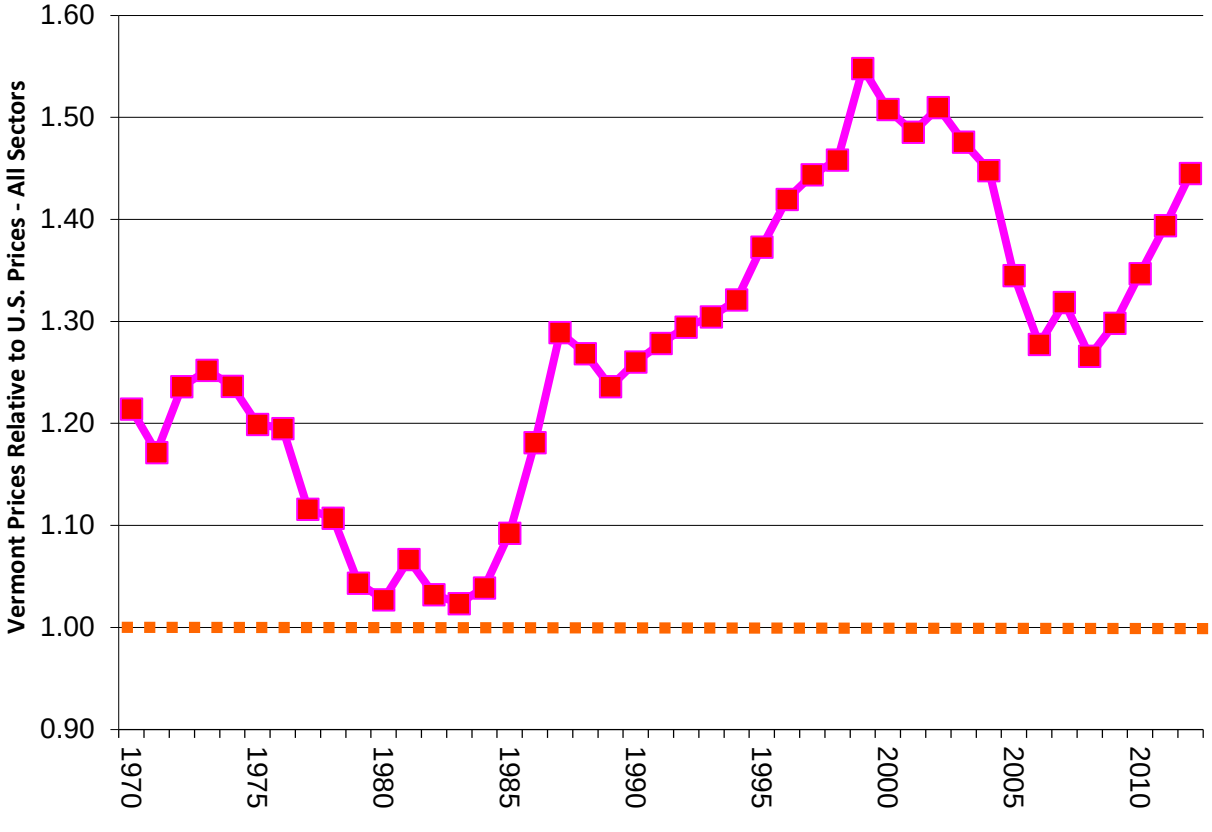
of Levitan, wholesale market price changes are assumed to flow through in their entirety to retail prices to the three end-market sectors.

CHART 2: Average State Retail Electricity Prices, 2012
(Total Electric Industry Average Price, Cents Per Kilowatthour)
Source: U.S. Energy Information Administration



Per Chart 2 above, Vermont and other New England state electricity prices are among the highest in the nation. Despite a shift to lower priced natural gas as a fuel source for power generation, transmission constraints have kept electricity prices in New England well above national averages. As illustrated in Chart 3, below, the retail price of electricity in Vermont relative to the U.S. has been higher than the U.S. average for more than 40 years. In 2012, at 45% above the U.S. average, this price differential was among the highest on record. Preliminary monthly data through September of 2014 show that Vermont prices have remained at about 40% above the U.S. price during the two most recent years.

CHART 3: Average Retail Electricity Prices: Vermont Relative to U.S.
(Source: U.S. Energy Information Administration, U.S. Department of Energy)



This persistent electricity price differential represents a significant impediment to State and regional economic growth. Businesses that consume large amounts of power face

a pronounced competitive disadvantage when compared to regions with lower power costs. Higher regional power prices act like a tax on consumers, leaving less disposable income for other needs. The absence of local fuel supply production exacerbates negative economic impacts from elevated power expenditures, since a high percentage of these expenditures leave the region, with few beneficial secondary impacts.

Q12. Please describe the economic impacts of the Project to the State economy and Vermont ratepayers.

A12. Response: We aggregated economic impacts associated with the Project into two relevant time periods: a construction phase between 2016 and 2018, and an initial 10 year operational period between 2019 and 2028.[6] Although not presented in this analysis, economic impacts beyond 2028 are more uncertain, but likely to continue to be positive and of comparable magnitude, for an indefinite period of time.

The analysis herein shows the construction and operation of the Project will bring significant economic benefits to the State of Vermont, resulting in the creation of nearly 500 jobs (direct and secondary) per year during the construction phase from 2016 to 2018 and about 200 permanent new jobs per year in the 10 year initial operational period from 2019 to 2028. This Project is likely to generate more than $12 million per year[7] in State Source

[6] The actual construction period is expected to begin on 4/1/2016 and end on 3/31/2019, with operations commencing on 4/1/2019. No expenditures prior to 2016 were used in this analysis, despite the fact that significant 2013 to 2015 development expenditures will occur (including legal and other professional services work, such as this proceeding and its related analyses). Thus, the aggregated "construction" and "operations" period will understate Vermont impacts associated with the construction period and slightly overstate them in the subsequent period. We do not consider these variances over the time periods chosen for impact reporting to be material.

[7] Due in part to an extraordinary sales tax liability associated with primary cable and other component materials used in the Project.

General Fund and Transportation Fund tax revenues[8] during the construction phase, with ongoing revenues in these State funds totaling about $2 million per year during the operations phase. State and local property tax and other government payments during the operational phase of the Project are expected to average about $17 million per year, in addition to more than $4 million per year in other operational expenditures in Vermont over the lifetime of the Project.[9]

Based on the detailed regional electricity market analysis[10] performed by Levitan, the Project will also serve to lower wholesale electricity prices in New England by nearly $2 billion in aggregate nominal dollars over the first 10 years of its operation, with aggregate nominal dollar savings to Vermont ratepayers exceeding $190 million during this same period. These ratepayer savings, along with ongoing operational project expenditures in Vermont, will result in average annual nominal GSP growth in Vermont of more than $30 million and the creation of more than 200 direct and indirect net new jobs per year during the initial 10 year operational period (see below Table 1).

[8] "Source" State revenues are expressed prior to internal fund transfers. For FY2014 Source revenues, see Tables 1A and 2A at: http://www.leg.state.vt.us/jfo/state_forecasts/2014-07%20July%20Forecast.pdf.

[9] The tax figures included in this section incorporate not just tax revenues as described in the prefiled testimony of Todd Singer, but also tax revenues resulting from the macroeconomic modeling performed by KRA.

[10] See Prefiled Direct Testimony of Seth Parker in this case.

TABLE 1
Selected Economic Impact Metrics, Relative to Baseline,
for New England Clean Power Link Project
(Average Annual Impacts – Construction and Operational Periods)[11]

Concept	*Region*	*Construction Period 2016-2018*	*Initial 10 Year Operational Period 2019 to 2028*
Total Employment	**Vermont**	**493**	**205**
(number of jobs)	New Hampshire	56	417
	Maine	23	305
	Massachusetts	105	802
	Connecticut	29	307
	Rhode Island	10	122
	New England	716	2,158
Gross State Product	**Vermont**	**$38.8**	**$31.6**
(millions of current dollars)	New Hampshire	$5.5	$58.9
	Maine	$2.0	$38.6
	Massachusetts	$13.2	$157.5
	Connecticut	$3.6	$50.4
	Rhode Island	$1.1	$17.4
	Total New England	$64.3	$354.3
Electricity Cost Savings	**Vermont**	-	**$19.2**
(millions of current dollars)	New Hampshire	-	$34.2
	Maine	-	$35.0
	Massachusetts	-	$58.8
	Connecticut	-	$30.5
	Rhode Island	-	$10.8
	Total New England	-	$188.6
State and Local Tax and Other Government Revenues[12]			
(millions of constant 2014 dollars)	Vermont	$12.6	$17.2

As outlined in the preceding Table 1, the net economic impacts associated with this Project in New England are large and positive. As also indicated in Chart 4 below, total regional employment growth during the construction phase will exceed 700 jobs per year (direct and secondary), and during the operational phase of the Project, will exceed 2,100

[11] Based on project information provided by TDI-NE to KRA as of November 11, 2014.

[12] Fiscal impacts include specific tax estimates made by TDI-NE as well as tax impacts derived from the REMI model.

direct and secondary jobs per year. As indicated in Chart 5 below, average annual regional gross state product will increase by more than $60 million per year (in current dollars) during the construction phase, and escalate to more than $350 million per year during the operations phase. While the bulk of the ongoing economic benefits from the NECPL will accrue to the states with the largest populations and economic output, Vermont, New Hampshire and Maine will all disproportionately benefit from the Project, with higher per capita beneficial impacts during the initial 13 year impact period than the region as a whole. The following three charts depict annual New England state impacts for selected economic metrics.

CHART 4: Total Employment Impacts Associated with New England Clean Power Link
(Total Direct and Secondary Employment Impacts Relative to Baseline,
Sources: REMI, Kavet, Rockler & Associates, LLC)

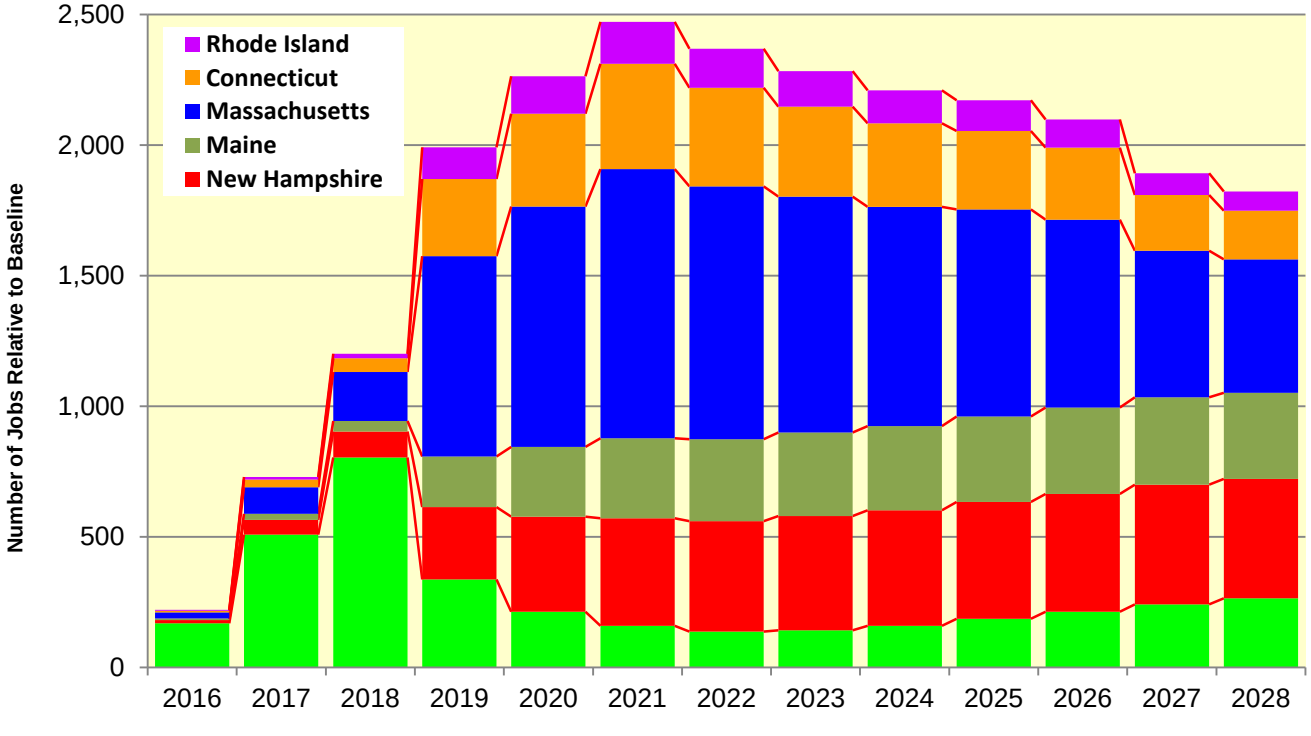
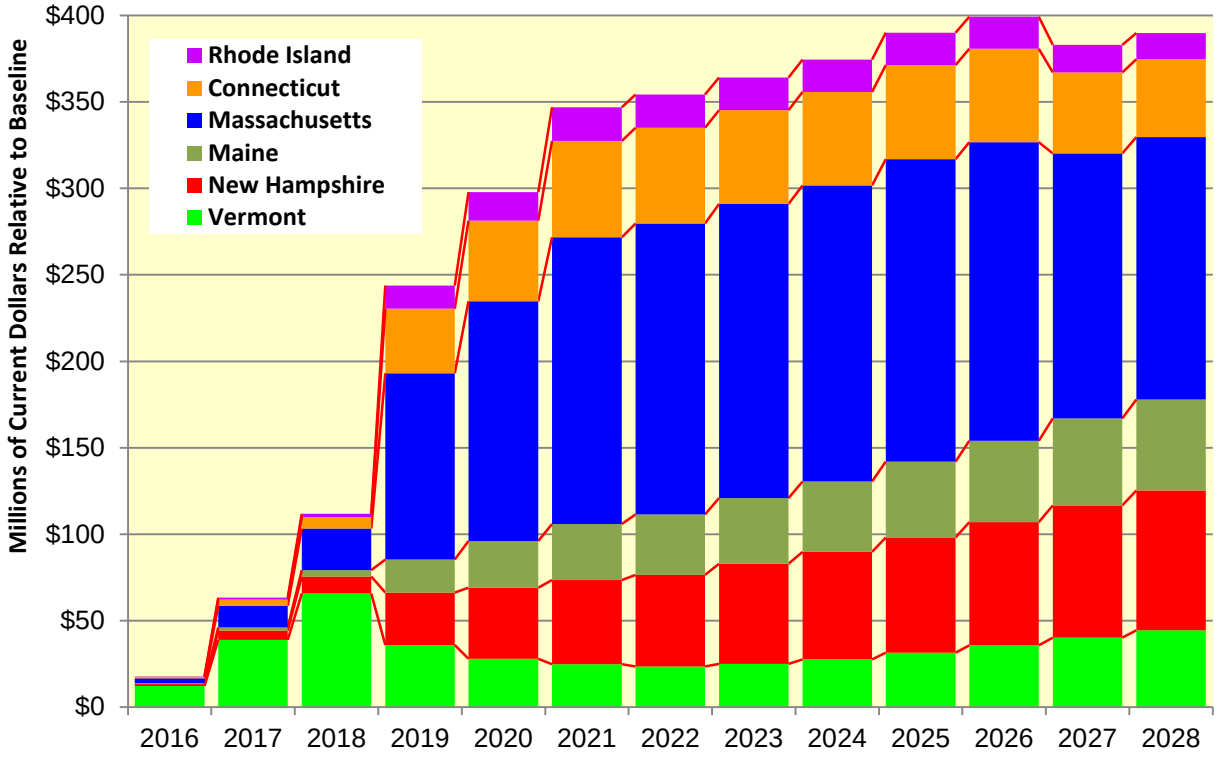


CHART 5: Total Additional Gross State Product as a Result of the New England Clean Power Link (Total Direct and Secondary Economic Impacts Relative to Baseline, Sources: REMI, Kavet, Rockler & Associates, LLC)



Vermont impacts are more pronounced during the construction phase of the Project, with longer term regional operational benefits mostly accruing from electricity price reductions. Vermont benefits from both electricity price reductions and direct operational and property tax expenditures during the initial 10 year operational period.

Vermont fiscal benefits from this Project are also significant and positive.[13] In addition to substantial anticipated tax and fee payments during the construction phase of the Project, estimated at more than $40 million, when the Project is completed, there will be a steady flow of State and local property tax payments during the initial ten year operations phase estimated to total about $100 million in constant 2014 dollars. In addition to this, the

[13] See also, testimony of Todd Singer regarding expected expenditures for selected taxes, leases and public good benefits.

economic activity generated by lower electricity prices and secondary impacts associated with the direct operational expenditures will result in additional State tax revenues totaling about $20 million during the initial ten year operations phase.

Vermont property tax payments and significant expected corporate income and local operational expenditures will persist over the useful life of the Project, generating benefits to the State well beyond the initial 10 year operating period analyzed herein.

Q13. Did you consider any negative economic externalities that could arise as a result of this Project?

A13. Response: Yes. The placement of the NECPL transmission line underwater and underground for its entire length eliminates the aesthetic negative externalities associated with most high voltage transmission lines. Given the importance of tourism to the Vermont economy and to the host communities along the route of the transmission line, the Project's minimal visual footprint represents an extraordinary project attribute. While the value of this attribute may be hard to monetize, the social and economic costs of visually prominent electric generation and transmission infrastructure is evident in recent public opposition to above-ground transmission lines in the region.

The primary negative externalities considered in this economic analysis were possible traffic delays and potential negative impacts on local businesses that could be affected by traffic issues during underground construction work. These were not considered large enough to include as model inputs, based on TDI-NE's other testimony in this case indicating that such negative externalities would be minimal and temporary, with local

business access maintained during construction periods and minor detours planned where necessary to keep traffic flowing.[14]

Q14. What is your overall conclusion from this analysis?

A14. Response: We find that the New England Clean Power Link Project will generate significant economic and fiscal benefits to the State of Vermont and local host municipalities through which it passes.

The provision of electricity to power Vermont's homes, industry and commercial businesses always involves trade-offs to some degree in costs, environmental impacts, economic benefits and reliability. The New England Clean Power Link, offers a rare opportunity to generate Vermont jobs through major local construction and ongoing operational activities, lower the price of electricity in Vermont and New England, add 1,000 MW of low CO2, renewable energy capacity to the New England power grid, minimize the risk of storm-related power outages by siting transmission lines underground, and accomplish all this without significant environmental impacts, or diminution of the natural landscape which is so important to the Vermont economy.

Q15. Does this conclude your testimony at this time?

A15. Response: Yes.

[14] For example, in one instance, in the Town of Shrewsbury, the transmission line route was moved off Route 103 to a nearby railroad ROW in order to minimize traffic and business disruption to local businesses. See also the prefiled testimony of Jessome/Martin/Bagnato, Alan Wironen, and Sean Murphy.