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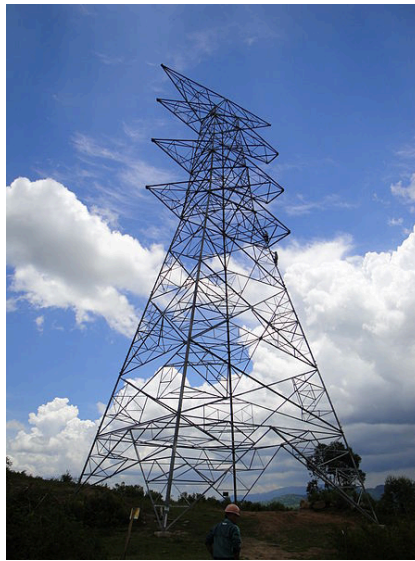
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# The Proposed Northern Pass Transmission Line: The Power of Public Opinion

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May 7, 2015



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## **Abstract**

The proposed Northern Pass Project is a 187-mile high voltage direct current (HVDC) transmission line that would carry up to 1,200 megawatts (MW) of electricity across the Canadian border through the state of New Hampshire (U.S. Department of Energy, n.d.). This energy will be generated from hydroelectric power from Hydro-Quebec. I focused this research on the public scoping period in the Department of Energy's Environmental Impact Statement development from November 11, 2010 to December 2013. There are over 8,000 total comments, and I collected a sample of 506 comments that I analyzed based on content and geography. This research found that the majority of comments were opposed to the project due to its aesthetics, environmental impacts, economic impacts, and the fair process through which it is approved or denied. The Northern Pass Project incorporates energy policy and public participation as it relates to the environmental decision-making process.

## **Keywords:**

Energy, policy, Environmental Impact Statement, National Environmental Policy Act, Hydro-Quebec, Northern Pass, hydroelectric power, hydropower, transmission line, New Hampshire, environmental justice, public participation, public opinion

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## Introduction

Transmission lines are large projects that cover hundreds of miles, and have environmental, social, and economic effects on the people and environments that inhabit the areas that they traverse. The Northern Pass Transmission LLC (Northern Pass) is a transmission line that will carry electricity generated from hydroelectric power in Quebec, Canada through the state of New Hampshire. This energy will be delivered to the New England energy grid.

In the wake of climate change, energy has become a crucial issue in New England. As a result, the region will face a changing energy supply. Hydroelectric power has become a substantial contributor to the New England energy supply, and Hydro-Quebec in Canada has become the major exporter of this type of energy to the United States (Grubert and Booth, 2014). Hydropower is debatably considered green or clean in comparison with dirtier fossil fuels such as coal, natural gas, and petroleum. However, hydroelectric power has more effects on the environment than people may realize, and than it is advertised by energy utilities. Transmission lines are required for the transportation of the energy created from hydroelectric sources, and both these and the land transformed to water reserves should certainly be considered in the clean energy debate.

The Northern Pass is currently awaiting an Environmental Impact Statement (EIS) as part of its application for a Presidential Permit. Northern Pass Transmission originally applied for the permit in October of 2010. A draft Environmental Impact Statement is expected in 2015 (Northern Pass Transmission, 2015). Although this document has not yet been released, significant debate has occurred over the proposed project through the scoping process that precedes the EIS. Much of the discourse around transmission lines has been voiced in the scoping period that began in 2010 and continued into 2015.

Because transmission lines and other energy projects directly affect the people that live near them, these people should play a crucial role in the decision-making process over whether or not to adopt and implement them. The scoping process, as well as the comment period of the Environmental Impact Statement, provides the opportunity for

community members, in this case the residents of New Hampshire and New England, to voice their opinions about proposed projects.

Although the Environmental Impact Statement has not yet been released, the online public comment library holds more than 8,000 comments filed online with the United States Department of Energy. Commenting began in October 2010 with the filing of a presidential permit. Although the scoping period officially ended in November 2013, the scoping period has been reopened, and comments continue to be filed with the Department of Energy into 2015.

This research investigates the core arguments displayed by different actors in the Northern Pass debate. I conducted a content analysis of the Department of Energy's public scoping comment library of the Environmental Impact Statement development from November 2010 through December 2013. This analysis of public opinion over the project should inform the decision-making process through which the Northern Pass is or is not adopted.

## **Background**

### **The Project**

The proposed Northern Pass Project is a 187-mile high voltage direct current (HVDC) transmission line that would carry up to 1,200 megawatts (MW) of electricity across the Canadian border through the state of New Hampshire (U.S. Department of Energy, n.d.). The line would begin at the Des Cantons Substation in Quebec, Canada, and continue for 45 miles to the American border (U.S. Department of Energy, n.d.). The American portion of the transmission project begins in Pittsburg, New Hampshire, on the Canadian Border, as direct current (DC). It then continues 140 miles to Franklin, New Hampshire, where the electricity would be converted from DC to alternating current (AC) at a proposed HVDC converter station (U.S. Department of Energy, n.d.). While the electricity in the transmission line is a direct current, it cannot be accessed for electricity. The proposed transmission line would then continue to Deerfield, New Hampshire where it would connect with the Deerfield Substation, which is operated by Public Service of New Hampshire (PSNH), a subsidiary utility of Northeast Utilities (U.S. Department of Energy, n.d.). Figure 1 shows the route of the Northern Pass Project in New Hampshire.

Figure 1 has been omitted from this online version. The full version is available in the University of Vermont Environmental Program office.

Figure 1. The Northern Pass Project Route (Evans-Brown, 2014).

The Northern Pass Transmission LLC is a jointly owned project by NU Transmission Ventures, Inc., which is owned by Northeast Utilities, a publically held utility, and NSTAR Transmission Ventures, Inc., which is owned by NSTAR. Northeast Utilities, now called Eversource Energy, owns both NSTAR and PSNH, who are subsidiary utilities that would be involved in the Northern Pass transmission line's energy functions once operational (U.S. Department of Energy, n.d.). Northeast Utilities is the largest utility in New England (Keir et al., 2014). The project will cost \$1.4 billion (Northern Pass Transmission, 2015).



The project is divided into three sections. The north section would require almost entirely new right-of-ways, and would pass through the towns of Pittsburg, Clarksville, Stewartstown, Dixville, Millsfield, Dummer, Stark, and Northumberland. The Northern Pass would then use existing right-of-ways through the towns of Northumberland, Lancaster, and Whitefield (Department of Energy, n.d.). This section is located in Coos County.

The central portion of the Northern Pass would use existing right-of-ways (ROW) through the towns of Sugar Hill, Easton, North Woodstock, and Thornton until the city of Franklin, which contains the DC-AC converter. The line crosses the Appalachian Trail and White Mountain National Forest in this section, but uses existing ROW (Department of Energy, n.d.). This portion is located in Grafton and Merrimack Counties.

The southern portion of the Northern Pass begins at the converter substation in Franklin, and would require new ROW for eight miles until the town of Pembroke. It would then use existing ROW until it terminates at the substation in Deerfield (Department of Energy, n.d.). This portion crosses Merrimack County and ends in Rockingham County.

The construction of transmission lines requires the approval of the Bureau of Land Management (BLM) to initiate ROW. The project will be constructed predominantly on existing right-of-ways. The Northern Pass will use 147 miles of existing ROW (Northern Pass Transmission, 2015). However, it will need 32.25 miles of new ROW. The project will contain two buried sections of 7.5 miles and 2,300 feet (Northern Pass Transmission, 2015).

Proponents of the Northern Pass cite many potential benefits of the plan, both to the environment and economy of New Hampshire. The project will create 1,200 temporary jobs during the construction period that will be filled primarily by residents of New Hampshire (Northern Pass Transmission, 2015). It will also provide energy from a renewable energy source, hydroelectric power, and offset the use of fossil fuel and natural gas energy sources in New England. Proponents also claim that the project will provide \$28 million per year of tax revenue to the state of New Hampshire, as well as \$20-\$35 million of energy savings for New Hampshire residents (Northern Pass Transmission, 2015).

## **NEPA, Environmental Impact Statement, The Permitting Process, & Scoping**

Because the Northern Pass crosses the international border between the United States and Canada, developers of the project require a presidential permit to move forward with the process warranted by the National Environmental Policy Act (NEPA). Northern Pass Transmission LLC applied to the United States Department of Energy for this presidential permit on October 14, 2010 (US DOE, 2014). The permit process focuses on whether the project is “consistent with the public interest” (CLF, 2014). This is evaluated mainly through the forthcoming Environmental Impact Statement, which calls for an evaluation of the environmental impacts of all development projects, the potential alternatives to the project, the short and long-term nature of the project, and the permanent commitment of resources that would be devoted to the project (CLF, 2014). The EIS addresses the purpose or need for the project as well as alternatives that would satisfy this purpose or need (Council on Environmental Quality, 2007).

The project also requires approval from the New Hampshire Site Evaluation Committee, a special use permit from the United States Forest Service for the project’s planned route through the White Mountain National Forest, a special use permit from the United States Fish and Wildlife Service for the project’s route through the Silvio O. Conte National Fish and Wildlife Refuge, and a permit from the Army Corps of Engineers for the project’s effect on wastewater runoff (CLF, 2014).

The public commenting periods are important parts of NEPA process, and are the most important component of public participation in the system. Two rounds of public meetings occurred during the scoping period. The first round consisted of seven meetings that took place in March of 2011. These meetings were held in Pembroke, Franklin, Lincoln, Whitefield, Plymouth, Colebrook, and Haverhill, New Hampshire (DOE, 2014). A second round of four public scoping meetings took place in September of 2011 in Concord, Plymouth, Whitefield, and Colebrook, New Hampshire (DOE, 2014).

Northern Pass Transmission LLC submitted the application for a presidential permit on October 14, 2010. In response, the Department of Energy released the *Notice of Intent to Prepare and Environmental Impact Statement and to Conduct Public Scoping Meetings and Notice of Floodplains and Wetlands Involvement* (NOI) on February 11, 2014. This commenced the Scoping Process of the Northern Pass Project, which

continued originally until April 12, 2011. The Department of Energy decided to continue the commenting period due to overwhelming public response. The scoping period was reopened on June 14, 2011, and closed in November of 2013 (U.S. Department of Energy, n.d.). However, comments have been accepted after this date into 2015.

## **Hydro-Quebec**

Hydro-Quebec is a Canadian electric utility that gains ninety-eight percent of the energy it generates from large-scale hydropower, which is generated when the flow of water passes through a turbine (Northern Pass Transmission, 2015). Most of this energy is shipped through transmission lines to customers and other utilities in Canada and the United States. Hydro-Quebec has extensive reservoir and dam reserves. In total it has 60 generating stations, 570 dams, and 26 reservoirs in the province of Quebec that contribute more than 40,000 megawatts (MW) to the electric grid (Northern Pass Transmission, 2015). Hydro-Quebec's reserves are greater than the land area of New Hampshire (Courchesne, 2011). Hydro-Quebec benefits from shipping its hydropower to the northeastern United States. For example, in 2012, exports constituted 15% of sales volume and 24% of sales revenue (Evans-Brown, 2014).

## **Environmental Impacts of Hydropower**

One of the major promotions made by the Northern Pass LLC is the benefit that hydropower will have on the environment. It claims that the Northern Pass will reduce carbon dioxide emissions by 5 million tons per year, which would offset the greenhouse gas emissions of 900,000 cars (Northern Pass Transmission, 2015). However, there is an array of environmental impacts associated with large-scale hydropower.

Dams disrupt the natural hydrological flows of rivers. This leads to the disruption of fish migration patterns, the trapping of sediment on one side of the dam, and the creation of an artificial reservoir where there was once a river (International Rivers, n.d.).

Hydropower, although frequently considered a clean and renewable energy source, is not devoid of greenhouse gas emissions. In order to fully determine the effects of hydropower, organizations such as the National Renewable Energy and Synapse

Energy Economics have started conducting Life Cycle Assessments (LCA) that incorporate the emissions related with an energy facility during its construction, operation, and dismantling (Steinhurst et al., 2012). These assessments include direct emissions, such as combustion of fuels, operational fuel use, and transformation of land use from operations (Steinhurst et al., 2012). They also include indirect emissions, such as the acquisition and transportation of the materials used to build a facility, the infrastructure and construction of the facility, and the waste disposal and decommissioning of a facility (Steinhurst et al., 2012). These assessments analyze the entire life cycle of an energy project when determining its total fossil fuel emissions.

Hydroelectric greenhouse gas emissions assessments have yielded varied results because there are wide-ranging types of hydroelectric facilities. Many emission scenarios depend on the specific climate of an area where a reservoir will be created, the type and amount of vegetation that will be lost as a result of flooding, and the size of the dam infrastructure (Evans et al., 2009). The major sources of hydropower emissions occur from the construction of dam facilities and decomposition from biomass inundation (Evans et al., 2009). When a hydropower facility is initially created, plant communities are flooded and subsequently decompose in an anaerobic condition. This anaerobic decomposition by bacteria results in the emission of methane, a greenhouse gas that exists in the atmosphere for approximately 12 years and has a global warming potential (GWP) of 25 (EPA, 2015). Newly flooded reservoirs result in the most greenhouse gas emissions of a hydropower facility's lifetime, and methane emissions from flooded areas decrease over time (Steinhurst et al., 2012). Steinhurst et al. gave four-year figures of greenhouse gas emissions of the 232.8 square mile Eastmain-1 reservoir in Quebec in their 2012 study. Year one resulted in 671 grams of carbon dioxide per kilowatt-hour (kWh), year two resulted in 436 grams of carbon dioxide per kWh, year three resulted in 308 grams of carbon dioxide per kWh, and year four resulted in 238 grams of carbon dioxide per kWh (Steinhurst et al., 2012). Researchers assumed the lifespan of the hydropower facility to be 100 years, and estimated that the average greenhouse gas emissions over this period are between 160 and 250 grams of carbon dioxide per kWh (Steinhurst et al., 2012). Initial emissions of hydropower facilities are high, and may exceed natural gas powered power plants. However, as Figure 2 indicates, the average

emissions of a hydropower over the lifespan of a facility are lower than other fossil fuel energy sources.

Energy Source	Greenhouse Gas Emissions (Grams of Carbon Dioxide per Kilowatt Hour)
Hydropower	160-250
Natural Gas	400-500
Oil	790-900
Coal	900-1200

Figure 2. Lifetime greenhouse gas emissions for energy sources (Steinhurst et al., 2012).

Hydropower emissions vary based on climate and quantities of inundated biomass. Hydropower sources that have lower emissions are in cooler climates, they flood areas of lower biomass, and consist of dams with high power densities, which is the ratio of the capacity of a dam to the area flooded (Evans et al. 2009)

Most of Hydro-Quebec's current and planned reservoirs do and will displace boreal forests (Courchesne, 2012). These flooded areas are high in biomass but are cool climate species. The Northern Pass Transmission Line is a part of Hydro-Quebec's Plan Nord, an \$80 billion reservoir expansion project that will take place over twenty-five years (Courchesne, 2011). This project, much like the Northern Pass Transmission Line, will require large amounts of construction and newly flooded reservoirs.

There are several advantages to hydropower in comparison to other energy sources. It is 90% efficient at using energy, it can provide for both base and peak electricity loads, and it is a flexible and reliable energy source (Evans et al., 2009). The reliability and efficiency of hydropower surpasses that of other renewable energy sources (Evans et al., 2009). However, hydropower contributes more greenhouse gas emissions than wind and solar renewable technologies (Courchesne, 2012).

## **Literature Review**

### **Public Participation**

Public participation has undergone significant transformation throughout the history of the United States. From the late 19<sup>th</sup> century through the middle of the 20<sup>th</sup> century, public decision-making followed an administrative approach, known as managerialism, in which government officials and agencies made decisions based upon what they determined was the public good (Beierle and Cayford, 2002). Gifford Pinchot and the United States Forest Service displayed this style of public representation by pursuing the utilitarian ideal of the greatest public good for the greatest number of people (Beierle and Cayford, 2002). This bureaucratic approach forces decision-making officials to successfully merge their management capabilities with their roles as public representatives (Beierle and Cayford, 2002). This falls under the form of representative democracy in which the citizens of the United States elect leaders who make decisions for them (Lauber and Knuth, 2000). Discrepancy arises in this form of democracy when leaders do not correctly identify the interest of the public they represent (Beierle and Cayford, 2002).

Pluralist public participation arose in the United States in the 1960s and 1970s. This form of government did not pursue a singular public good, but instead worked as a facilitator towards a wide range of public interests (Beierle and Cayford, 2002). The environmental legislation of the 1970s in the United States, such as the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Clean Air Act, and the Clean Water Act, as well as the Freedom of Information Act of 1966 embodied pluralist ideals (Beierle and Cayford, 2002).

From the 1980s to the present, the public has become even more involved in decision-making. Under a participatory democracy, citizens elect officials to represent them, and simultaneously participate in the formulation and adoption of policy (Lauber and Knuth, 2000). A greater level of public participation creates a decision-making process that combines competing interests towards the public good (Beierle and Cayford, 2002). However, the public good is often difficult to define, both for government

representatives and citizens themselves. The public good can vary based on values and perspectives of stakeholders and citizens.

Higher levels of public participation increase “government accountability” (Beierle and Cayford, 2002, p. 6). Public participation can help agencies and officials make decisions that are representative of the public, build a foundation of trust between the government officials, agencies, and the public, and initiate capacity building to address future problems (Beierle and Cayford, 2002). Citizen participation also can improve the quality of information available to representatives (Lauber and Knuth, 2000). It is intended to improve government action and representation, and increase the quality of decisions (Lauber and Knuth, 2000; Beierle and Cayford, 2002). Higher citizen involvement should keep the public more informed about government action (Beierle and Cayford, 2002).

The citizens of New Hampshire inhabit the region through which the Northern Pass transmission line will pass. Under a participatory democracy, the citizens of NH should be meaningfully involved in the decision-making process through which the project is approved or denied. However, level of citizen participation in the decision-making process exists on a spectrum of active control by citizens to nonparticipation by the public. Sherry Arnstein describes this spectrum as a ladder of citizen participation (1996).

The process of environmental impact assessment, a part the National Environmental Policy Act, falls under the “consultation” level of Arnstein’s ladder of citizen participation (1969, p. 219). In this rung, citizens are provided the opportunity for input. However, they have no effective power in the final decision. Public meetings and other public forms of communication, such as the Northern Pass scoping meetings that occurred in March 2011 and September 2013, allow the public to contribute opinions and information (1996). However, the ultimate decision to listen to and use these opinions and information lies out of the public’s control and in the control of the agency decision makers. The public relies on decision makers to represent the public good by making just and appropriate decisions that are equally distributed.

## **Environmental Justice**

The term environmental justice was conceived in 1982 in Warren County, North Carolina when citizens protested the dumping of hazardous waste in their community (Layzer, 2012). The concept gained widespread recognition in the political arena during the 1990s when a correlation was established between the placement of hazardous waste sites and minority communities (Layzer, 2012). Environmental justice is typically applied in a framework that focuses on environmental racism. It adheres to the premises that environmental harms and burdens are unequally placed upon those of minority races, or that environmental policies are disproportionately assigned to people of color (Newton, 1996). However, environmental justice also includes the concepts of environmental discrimination and environmental inequity, which widens the scope of the unequal distribution of environmental harms and burdens to those of lower economic and social classes (Newton, 1996). These terms imply intent in the disproportionate placement of environmental harms, and deliberate intent is difficult to prove. Environmental justice also applies to the process and placement of energy projects, such as transmission lines, pipelines, dams, solar panels, and wind turbines.

The concept of environmental justice falls into two categories: distributive justice and procedural justice. Distributive justice involves the outcomes of decision-making and includes many of the concepts described above. Distributive justice requires that the benefits of a project be proportionate to the costs sustained by the people who experience and interact most closely with a project (Keir et al., 2014). Smith and McDonough indicate that addressing equity, equality, and need are important qualities in achieving distributive justice (2001).

However, the process by which a decision is made greatly affects how citizens and other actors feel about a final outcome. Procedural justice provides a second key foundation of environmental justice and equitable decision-making. Thibaut and Walker introduced the concept in 1975, and stated that the perceived fairness of the decision-making process and participation mechanisms for public contributors affect participant approval more so than the final outcome (Keir et al., 2014; Smith and McDonough, 2001; Thibaut and Walker, 1975). Procedural justice and fair process are inseparable from distributive justice.



Qualities of fair process include the ability and ease of participants to express their views, the ability for citizens to influence outcomes, the elimination of bias and self-interest by policy makers and representatives, accurate and available information to participants, open participation to all stakeholders and actors, expedient and sufficient feedback to participants, consistent actions by decision-makers across the duration of the decision-making process, and the representation of all ideas and groups of people (Keir et al., 2014; Smith and McDonough, 2001; Leventhal et al. 1980).

Procedural justice and distributive justice are interconnected concepts that contribute to the decision-making process and environmental justice. If participants feel that a particular process is unfair, then they will also view the final decision in that process as unfair (Keir et al. 2014). If the decision-making process leads to a fair outcome, then participants will approve the result. This will subsequently generate more public support for the decision-making process and the representatives making these decisions.

Here I examine these issues, including environmental inequity, distributive justice, and procedural justice, through a case study of the Northern Pass project. The citizens of New Hampshire bear the burden of the transmission lines and their associated social and environmental effects, while they do not directly benefit from it. The energy generated from the hydropower transported through the Northern Pass will be sold on the wholesale energy market of New England. Therefore, it will most likely benefit higher population density areas of the region, such as Connecticut and Massachusetts. On top of this, the residents of the North Country of New Hampshire are largely lower income, so the placement of the Northern Pass transmission line is being positioned in an area of lower economic class.

Grafton and Coos counties are considered the North Country of New Hampshire, and have lower per capita incomes than other counties of the state. Grafton and Coos counties would contain 137.7 miles or 73% of the Northern Pass Transmission Line. Average per person income in Grafton county is \$29,699, and is \$24,059 in Coos County. These are lower than the New Hampshire average of \$32,758 per person (U.S. Census Bureau, n.d.). The Grafton median household income is \$53,386, and the Coos County median household income is \$41,774. These are also lower than the New Hampshire

household median of \$64,925 (U.S. Census Bureau, n.d.). The lower income levels of these counties indicate that the placement of the Northern Pass in these regions is an example of environmental inequity. Figure 3 shows the northern location of Grafton and Coos counties within the state of New Hampshire.

Figure 3 has been omitted from in this online version. The full version is available in the University of Vermont Environmental Program office.

Figure 3. New Hampshire Counties (gelogy.com).

### **Overview of Competing Arguments from Previous Literature**

Two studies have been conducted on competing arguments put forth over the proposed Northern Pass Transmission Line Project. The Department of Energy (DOE) released a study in March 2014 of 4,718 comments from the Environmental Impact Statement scoping process. DOE categorized four most frequent frames in these comments as alternatives to the Northern Pass, economic impacts, health and safety, and purpose and need. Other frames included tourism, the NEPA process, scenery, cumulative effects, national forest and conserved land, and vegetation. The Department of Energy restricted its analysis to only comments that fit a “substantive” criterion. Substantive comments were “within the scope of the proposed action, were specific to the proposed action, had a direct relationship to the proposed action, and included supporting reasons for the Responsible Author to consider” (DOE, 2014). This “substantive” criterion means that the DOE removed opinions and comments that they considered irrelevant from its analysis.

DOE found the most frequent frame in the EIS scoping process to be alternatives to the Northern Pass. The most popular alternative is to bury the transmission lines underground instead of housing them in 85-135 foot tall towers. There are currently two sections of the transmission lines that the developers plan to bury. These two sections are approximately 8 miles. However, Gary Long, the president of Public Service of New Hampshire (PSNH), estimated that this buried portion has increased the cost of the project by \$200 million (Daley, 2013). A crucial component of the Environmental Impact

Statement development is the consideration of alternatives to the project, as well as the benefits of not adopting the project at all.

Keir et al. (2014) completed the second study, which analyzed 299 comments that were expressed orally during seven public scoping meetings that took place in March 2011 in New Hampshire. Keir et al. created eight frames of comments. Seven of these frames were in opposition to the project, while one frame was in favor of the project. The frames opposed to the project include public accountability, environmental impacts, local economic impacts, aesthetics, alternatives, health concerns, and property values. The frame in favor of the project was progress (Keir et al. 2014). In their analysis, public accountability occurred most frequently. Many citizens who voiced this argument felt they were not being adequately represented and that their opinions were not being considered during the NEPA process. This frame includes considerations of whether people can adequately express their views in the process, whether citizens can influence the decision-making outcome, whether information is available to the public, whether there is significant feedback to citizens about the process, and whether participation in the commenting period is accessible to everyone (Keir et al., 2014).

## **Methods**

### **Purpose of Study**

I researched how the public who commented on the Department of Energy website described and interpreted the Northern Pass Transmission Line. Did the interpretations of the Northern Pass Project vary by geography as described by proximity to the transmission line?

I specifically approached these research questions by characterizing frames, arguments, and interpretations expressed in comments submitted through a descriptive assessment and frequency analysis. A secondary objective of my research was to compare interpretations of the project based upon New Hampshire County through a comparative analysis.

### **Methodological Context**

Qualitative social research draws from the body of theoretical knowledge on a subject, and uses this theory in application towards a contemporary problem (Patton, 2002). Erving Goffman first introduced the concept of frame analysis in 1974. It is a form of recognition in frequent patterns or themes in a series of texts (Patton, 2002). More specifically, a pattern is the general feeling a certain text has, while a theme is a more specific categorical topic (Patton, 2002).

Content analysis applies to qualitative research that takes a volume of data and “identifies core consistencies and meanings” (Patton, 2002, p 452). These core meanings are the themes and patterns that I described above (Patton, 2002). Content analysis as a form of qualitative research can take two forms: inductive analysis and deductive analysis. Inductive analysis consists of discovering patterns and themes in the midst of analyzing data (Patton, 2002). This is called emergent coding.

Deductive analysis consists of examining data and classifying it based on an existing framework (Patton, 2002). Professionals in the field have agreed upon these frames, patterns, and codes (Stemler, 2001). This researching strategy is called a priori coding. Much qualitative research begins as inductive analysis, and, once frames, patterns, and themes emerge, it develops into deductive analysis (Patton, 2002). Inductive

analysis must be employed to create a framework or codebook. Once that codebook has been created, it can be used for deductive analysis.

The major limitation of the content analysis method lays in the difficulty that occurs in separating the nature of the content of the chosen material from its author (Denscombe, 2010). Sometimes content can be misconstrued out of context. Often researchers of content analysis can become so immersed in the different frames they are analyzing that the bias of the researcher can influence content (Denscombe, 2010). Another limitation to content analysis is that it can become difficult to categorize vague content. Implied meanings make content analysis challenging (Denscombe, 2010).

### **Data Sampling**

I organized the data I researched using a content analysis of the online comments from November 2010 to December 2013 on the commenting section of Department of Energy's Environmental Impact Statement of the Northern Pass Project.

The Department of Energy's Northern Pass Environmental Impact Statement website consists of 80 pages of comments submitted regarding the project. There are 100 comments per page, consisting of about 8,000 total comments. I conducted a systematic random sample in which I analyzed every 10<sup>th</sup> comment in this dataset. I began my sampling with comments in December 2013 and continued sampling until I had reached my final of sample size of 506 comments. This ended in 2010. I limited my data collection and did not include 2014 in my analysis because 2014 comments continued to be submitted throughout the duration of my research.

I recorded and kept track of data entries in Microsoft Excel. I gave each comment a unique identification number, and I also collected the identification number given by the Department of Energy to each comment. I recorded the first and last name of each person who submitted the comment, and collected his or her geographic information, including address, city, state, and county.

I analyzed the written text of each comment to characterize the interpretation of the Northern Pass project made by its author, and to determine the appropriate frame of the comment. Often a comment mentioned more than one frame. In these scenarios, I

determined the comment's predominant frame. Lastly, I recorded whether the comment was opposed or in-favor of the Northern Pass project.

I disregarded sample cards administered by the Society for the Protection of New Hampshire Forests (SPNHF). These comments spanned from page 4 through page 26, contributing 2,175 comments. The comment text said "SPNHF Scoping Comment Card" and the content of these comments were therefore impossible to categorize.

I did not include comments that did not include any personal information, such as name or geographic information, such as state. Often times these comments were one-sentence comments such as "I oppose the northern pass" that did not adequately embody a frame. When I encountered a discarded comment such as this, I would choose the subsequent comment for analysis.

### **Qualitative Analysis**

My study was a form of applied qualitative research that is relevant to a specific project over a defined time period. My research was specific to humans and their relationship to society and the environment (Patton, 2002).

I analyzed specific recurring themes in the comments regarding the Northern Pass Project. My research was a combination of inductive and deductive analysis that built upon existing frameworks established by Keir et al. (2014) and the Department of Energy (2014), but also used emergent coding methodology (Patton, 2002). Keir et al. based their research upon a sample size of 299 comments (2014), and The Department of Energy's scoping analysis used a sample size of 4,718 comments.

I originally used the frames put forth by Keir et al. and the Department of Energy as a starting point for my own content analysis, employing the strategy of a priori content analysis. The most commonly expressed frames in Keir et al.'s analysis were public accountability, environmental impacts, local economic impacts, and aesthetics. The most commonly expressed frames in the Department of Energy's analysis were alternatives, economy, purpose and need, health and safety, and tourism.

I also discovered emergent frames during my research. For example, the Department of Energy had many different frames to address specific environmental impacts of the project, such as the effects wildlife, vegetation, wetlands, and air quality,

which I grouped into one category of environmental impacts. I also split the Department of Energy's frame of "economic impacts" into one frame of negative economic impacts and one frame of economic benefits. I divided Keir et al.'s "public accountability" frame into two frames addressing fair process and purpose and need for the project.

My analysis consisted of twelve different frames: aesthetics, alternatives, economic benefits, economic impacts, environmental impacts, environmental justice, fair process, health and safety, purpose or need, recreation, reliability, and renewable energy. Once I had collected my sample, I conducted a frequency analysis of these frames to determine their importance to the comment-submitting public.

An important part of my data collection was the collection of geographic information such as city, state, and county. I observed overall geography of comments across the United States, and more specifically New England and New Hampshire. I used this geographical information to analyze responses by counties that would house the Northern Pass Transmission Line, and to determine whether proximity to the project was related the public's interpretations of the project.

## **Results and Discussion**

### **Overview of Competing Frames**

#### ***Predominately Opposed to the Northern Pass Transmission Line***

##### **Aesthetics**

Aesthetics was the most frequent frame exhibited over the sample, with a total of 115 different comments, or 22.7% of the total comments. This frame included comments that mentioned that the towers would affect their viewshed, those that mentioned that the towers would “destroy the scenery,” those that said the towers were ugly or “unsightly,” and those that cited the view of or from the White Mountain National Forest.

This frame included some particularly vivid language with statements such as, “the towers would be a visual travesty...and would scar ridge lines,” and that the project would be an “unthinkable desecration of a national treasure.” There were also many comments that voiced the need for the completion of a visual analysis.

##### **Environmental Impacts**

Environmental Impacts was the second most frequent overall frame that I encountered, consisting of 95 comments or 18.8% of the total comments. However, it was the most frequent frame that I encountered from comments submitted from New Hampshire.

Comments in this frame included concerns about the effects of transmission lines on wetlands, water quality, habitat fragmentation wildlife, vegetation, and soils. A comment from the Easton Conservation Commission highlighted the presence of Canada Lynx within three miles of a Northern Pass right-of-way.

This frame also included comments that were concerned with the environmental effects of large-scale hydropower projects, such as the flooding of boreal forests in Quebec, the disruption of river hydrology, and the release of greenhouse gasses from these large-scale constructions. One such comment mentioned skepticism towards the Northern Pass Transmission claim “that the power it will carry is both green and clean.” It further stated that “Hydro-Quebec’s large scale hydropower floods hundreds of thousands of acres of forest which leads to the release of toxins and GHGs, the



destruction of riverine ecology, and grave effects on wildlife, recreation, and indigenous people.”

### **Economic Impacts**

The economic impacts frame was the third most frequent frame exhibited by comments in the sample, and occurred in 66 times. Comments in this frame primarily regarded two separate economic impacts that people anticipated as a result of the construction of the transmission lines. The first was the impact that the transmission line would have on property values of residents living in close proximity to the proposed transmission line. These comments included current residents of the state who voiced the great economic importance the property value of their homes represented, as well as people who lived outside the state who had decided to buy or build vacation homes in New Hampshire.

The second economic concern was the impact that the transmission line would have on the tourism industry of New Hampshire, which is an important source of revenue to the state. One such comment stated, “With manufacturing and mills closed down, tourism is what we have here in the North Country. Northern Pass will threaten our abilities to make a living, combined with loss of property value...it will be devastating to an entire region of hardworking people.”

### **Fair Process**

This frame was close in frequency to economic impacts, and occurred in 64 comments. It included frames that were concerned with the National Environmental Policy Act process, the decision-making processes exhibited thus far for the project, and a lack of public accountability.

One comment stated, “It is unacceptable that the EIS process to date has been neither legitimate nor transparent. This includes choosing Northern Pass’s own contractor for the EIS (a decision which took considerable public and congressional intervention to reverse), failing to make available the data collected to date, and offering no acknowledgement of the Appalachian Mountain Club’s request to be a consulting party in

the on-going process reviewing impacts to historic resources such as the Appalachian Trail.”

## **Alternatives**

The alternatives frame occurred in 41 comments. It was the narrowest in scope, and applied almost exclusively to requests by comments to see either parts, or the entire transmission line buried underground. There are currently two planned underground sections. One is 2,300 feet in Piitsburg and Clarksville and another 7.5 segment in Clarksville and Stewartstown. Most comments that exhibited this frame wanted the entire transmission line to be buried, and most considered this the only permissible option.

Considering alternatives is a crucial part of the Environmental Impact Statement development. Decision makers must include an assessment of alternatives to the project including a no-action alternative, which must be included in every Environmental Impact Statement.

## **Recreation**

The recreation frame was exhibited 20 times throughout the sample, and included comments that mentioned hiking, exploring wilderness areas, and concern over the Appalachian Trail. Example comments include, “visitors to the White Mountain National Forest look to escape to a land with simpler objectives, to live with the calming effects that nature provides,” and “we have hiked numerous trails in the White Mountains and find it unmatched in the East Coast.”

The recreation frame had some overlap with the aesthetics frame. A lot of comments that opposed the project due to recreational purposes usually mentioned the views of the White Mountain National Forest. In scenarios where both aesthetics and recreation were mentioned, I chose the prominent theme that seemed to dominantly pervade the comment.

## **Health and Safety**

There were 11 comments that exhibited this frame, and were concerned for New Hampshire residents in close proximity to the transmission lines. Comments that put forth

this frame feared the hazardous health effect of electromagnetic fields (EMFs) on people, especially young children.

### **Environmental Justice**

There were 10 comments in this frame that, and it mostly addressed the idea that people in New Hampshire, especially the lower income North Country, would house the transmission line, but that the power generated from the project would serve the energy demands of larger population centers of Massachusetts and Connecticut. One such comment stated, “It should be kept in mind that New Hampshire has been brought into this project for the sole purpose of serving as the conduit for the corporate enterprise to go from Quebec to southern New England.”

Other comments in this frame mentioned the effects that this project will have on Native American peoples, including the Abenaki who inhabit northern New Hampshire and much of New England, as well as the Cree people who inhabited portions of Quebec that have been flooded from the hydroelectric reservoirs.

### **Reliability**

There were only 2 total comments that exhibited this frame. One comment stated that Quebec was a foreign and undependable source of energy. The other voiced concern that Northern Pass Transmission LLC “overstates the job and economic impacts.”

### **Purpose or Need**

This frame was predominantly in opposition to the Northern Pass Project. There were 39 out of 45 total comments in opposition to the project that exhibited this frame. Purpose and need are important components of the National Environmental Policy Act, and are crucial parts of the decision-making process that goes into deciding whether or not to approve a project.

The purpose of a project is the goals and objectives that the project intends to accomplish (NPS, 2015). The need of a project explains why the project is being proposed at this specific time (NPS, 2015). This includes problems that must be fixed,

policies that should be implemented, and existing conditions that require change (NPS, 2015).

39 out of 45 comments that expressed the purpose or need frame were opposed to the Northern Pass project. These comments expressed that “New Hampshire doesn’t need the power,” and “why not start making Northern Pass identify benefits of their project to me and others?”

However, there were some comments that voiced this frame and were in-favor of the project. Only 6 of 45 total comments displaying the purpose or need frame were in-favor of the project, and these comments expressed that New Hampshire and New England “need the power” delivered by the Northern Pass Transmission Line and generated by Hydro-Quebec.

### ***Predominantly In-Favor of the Northern Pass Line***

#### **Economic Benefits**

Economic benefits was the most frequent frame put forth in-favor of the Northern Pass Transmission Line. This was the only frame that was entirely in-favor of the Northern Pass project. 20 out of the 22 total comments that exhibited economic benefits as a frame were from the state of New Hampshire. These comments primarily addressed the jobs and the energy savings that would result from the project.

#### **Renewable Energy**

This frame was mostly in-favor of the Northern Pass Transmission Line. This was the second most frequent frame in-favor of the project, and 12 comments exhibited this frame. Comments that expressed this frame voiced the need for clean energy and an energy transition away from fossil fuels.

Three comments argued in opposition to the project because of renewable energy. These comments argued that the increase in energy from the Northern Pass would drive up the cost of other renewable energy sources, such as solar and wind in New England. One comment voiced the need for the “development of local green energy.”

## Overall Comment Geography

State	Responses
California	2
Connecticut	15
District of Columbia	3
Delaware	1
Florida	2
Georgia	1
Massachusetts	62
Maryland	2
Maine	7
North Carolina	2
New Hampshire	364
New Jersey	4
Newfoundland	1
New York	14
Ohio	1
Pennsylvania	6
Quebec	1
Rhode Island	7
Texas	1
Virginia	2
Vermont	5
Washington	1
Wisconsin	1
West Virginia	1
<b>Grand Total</b>	<b>506</b>

Figure 4. Number of responses by states and provinces.

Overall, I analyzed 506 submitted comments. 364 comments of these comments were submitted from the state of New Hampshire. Residents of Massachusetts submitted the second highest number of comments with 62. Residents of Connecticut submitted the third highest number of comments with 15, and was followed closely by New York with 14 submitted comments.

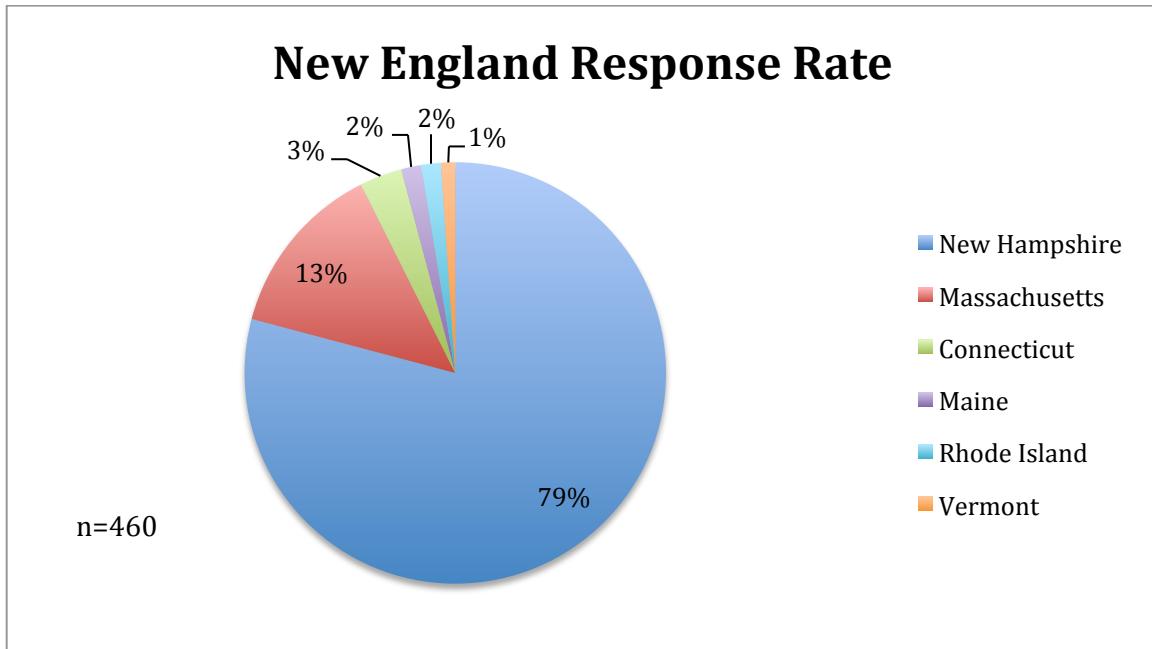


Figure 5. The response rate of states in the New England region.

New England formed the majority of states that submitted comments to the Department of Energy's website. New England consists of the six states of New Hampshire, Massachusetts, Connecticut, Maine, Rhode Island, and Vermont. New England states contributed 460 total comments, or 90.9% of the entire sample. Of the states in New England, comments were mostly submitted from New Hampshire. The second highest number of comments came from Massachusetts.

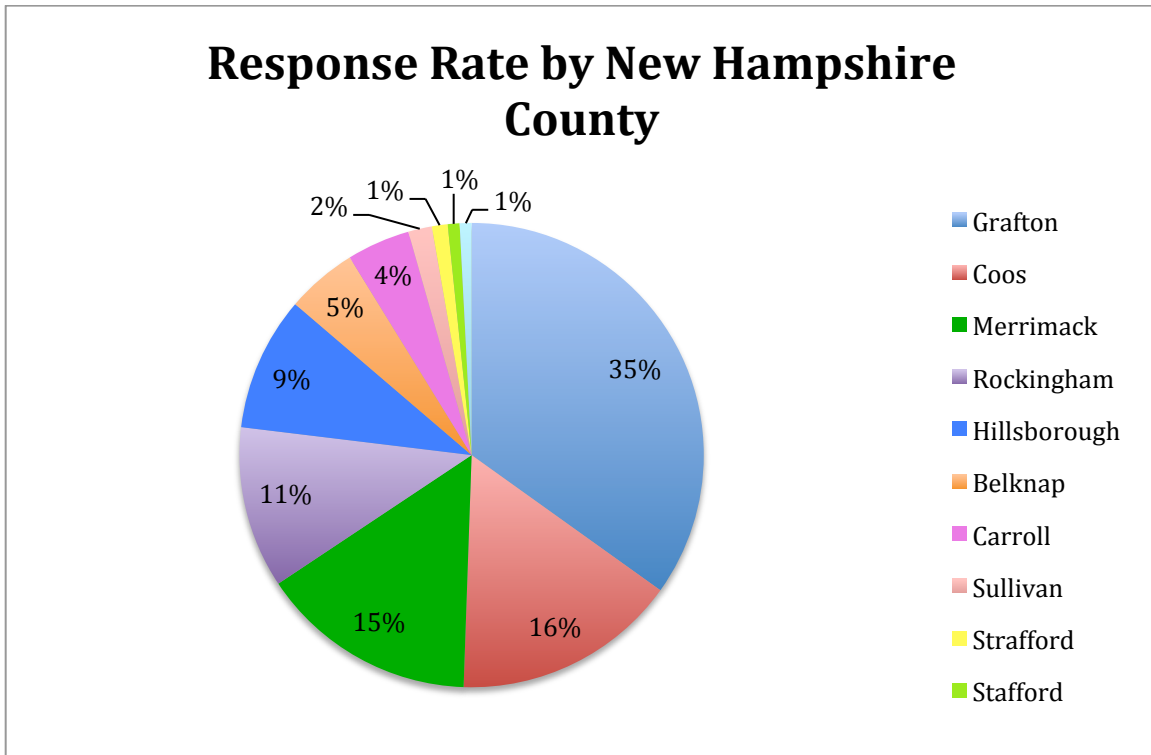


Figure 6. Response rate by New Hampshire County.

Altogether, there were 364 total responses from the state of New Hampshire. The county with the highest response rate was Grafton County with 127 comments, or 35% of the total comments submitted from the state of New Hampshire. The second and third largest sampled counties were Coos and Merrimack counties with 57 and 55 respective comments submitted. Rockingham County contained 11% of the total comments submitted in New Hampshire. The Northern Pass, if its construction were approved, would traverse Coos, Grafton, Belknap, Merrimack, and Rockingham Counties, and Figure 7 shows the percentage of miles each county would contain of the project.

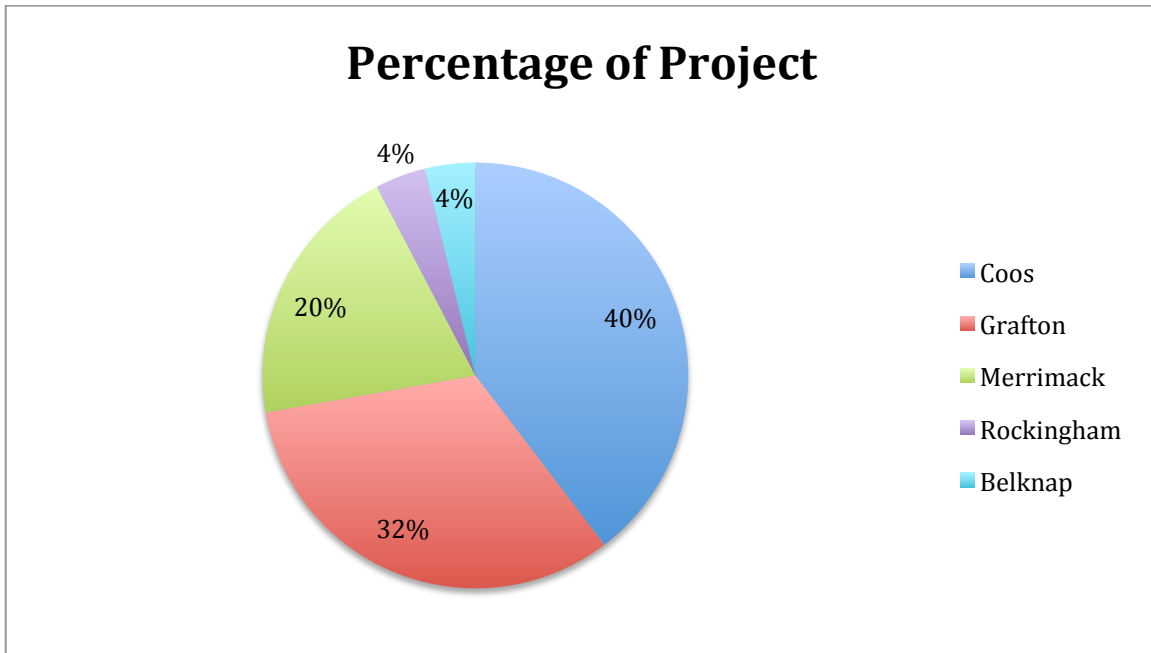


Figure 7. New Hampshire Counties that the Northern Pass would pass through and the percentage of miles each county would contain

Coos County would contain the majority of the project, followed by Grafton and Merrimack counties. The Northern Pass would pass through 31 different towns and cities, including Calrksville, Dalton, Dixville, Dummer, Lancaster, Millsield, Northumberland, Pittsburg, Stark, Stewartstown, Whitefield, Thornton, Ashland, Bethlehem, Holderness, Bridgewater, Bristol, Campton, Lincoln, Easton, Sugar Hill, Woodstock, New Hampton, Deerfield, Allenstown, Canterbury, Concord, Hill, Northfield, Pembroke, and Franklin.

The counties that would contain the Northern Pass Project contributed 298 comments out of a total of 364 submitted by people in the state of New Hampshire. This accounts to 81.9% of comments sampled from New Hampshire, and 58.9% of the total sample of comments collected. These results indicate that residents of the counties most directly involved with the Northern Pass Project have voiced their opinions through the Department of Energy's Environmental Impact Statement website.



## General Frame Analysis

Frame	Approval	Opposition	Total	Percentage of Total (%)
<b>Predominantly Opposed to the Project</b>				
Aesthetics		115	115	22.73
Environmental Impacts		95	95	18.77
Economic Impacts		66	66	13.04
Fair Process		64	64	12.65
Purpose or Need	6	39	45	8.89
Alternatives		41	41	8.10
Recreation		20	20	3.95
Health and Safety		11	11	2.17
Environmental Justice		10	10	1.98
Reliability		2	2	0.40
<b>Predominantly In-Favor of the Project</b>				
Economic Benefits	22		22	4.35
Renewable Energy	12	3	15	2.96
Grand Total	40	466	506	100

Figure 8. Predominant frames of approval and opposition to the Northern Pass Project.

The most frequent overall frames put forth in comments that I analyzed were those in opposition to the project based on the aesthetics of the transmission line and those in opposition based on the environmental impacts of the transmission line. These frames were followed in frequency by comments concerned with the economic impacts of the transmission line and comments concerned with the fair process of the environmental impact statement process. Frequent frames also included the need for alternatives, such as burying the transmission line, and those that questioned the purpose or need for the transmission line.

My results differed from the previous literature that has been completed on public opinion towards the Northern Pass Transmission Line. Keir et al. found that the most popular frame in opposition to the project was concerned with public accountability. This was similar to the fair process and purpose or need frames that I discovered, which were

the fourth and fifth most frequent frames found in my research. Keir et al.'s public accountability frame included the themes of unfair process, lack of public benefit, use of eminent domain, and lack of influence by local residents on the decision-making process (Keir et al., 2014). I separated themes incorporated by Keir et al.'s public accountability frame into two frames concerned with fair process and purpose or need for the project. My fair process frame included comments concerned with the NEPA process and the lack of public accountability in that process. This frame directly incorporates the concept of procedural justice that should be crucial in the decision-making process. My purpose or need frame included comments concerned with public interest and public benefit.

Despite the difference between the treatment of public accountability, fair process, and purpose or need, the research of Keir et al. found similar results as my study. Figure 9 displays that environmental impacts, local economic impact, and esthetics were the three next most frequent frames following public accountability in Keir et al.'s research. Keir et al. found similar percentages of comments voicing concern over environmental impacts and economic impacts to my research with 18% and 13% respectively. Keir et al. conducted their study regarding orally spoken comments of residents of New Hampshire that were expressed during public scoping meetings in the state, while my research incorporated written comments that had been submitted to a portion of the Department of Energy's website pertaining to the Northern Pass. Despite the differences in medium for public opinion and the different procedural processes by which people were able to voice their views, the frames found between the two studies were similar.

Frames found by Storace	Percent (%)	Frames found by Keir et al.	Percent (%)
<b>Frames Predominantly Opposed to the Northern Pass</b>			
Aesthetics	22.73	Public Accountability	32
Environmental Impacts	18.77	Environmental Impacts	18
Economic Impacts	13.04	Local Economic Impacts	13
Fair Process	12.65	Esthetics	11
Purpose or Need	8.89	Alternatives	9
Alternatives	8.1	Health Concerns	8
Recreation	3.95	Property Values	5
Health and Safety	2.17		
Environmental Justice	1.98		
Reliability	0.4		
<b>Frames Predominately In-Favor to the Northern Pass</b>			
Economic Benefits	4.35	Progress	5
Renewable Energy	2.96		

Figure 9. Comparison of frames found by Storace and Keir et al.

My results differed from the Department of Energy's scoping report, which found that the most frequent frames exhibited by comments were alternatives, economic impacts, purpose or need, and health and safety. Figure 10 displays the differences between the two findings.

Frames found by Storace	Percentage	Frames found by DOE	Percentage
<b>Frames Predominantly Opposed to the Northern Pass</b>			
Aesthetics	22.73	Alternatives	17.1
Environmental Impacts	18.77	Economy	10.4
Economic Impacts	13.04	Purpose and Need	7.8
Fair Process	12.65	Health and Safety	7.7
Purpose or Need	8.89	Tourism	6.6
Alternatives	8.1	Private Property/Land Use	6.5
Recreation	3.95	NEPA Process	6
Health and Safety	2.17	Viewshed/Scenery	5.8
Environmental Justice	1.98	Cumulative Effects	5.1
Reliability	0.4	Wildlife	4.8
<b>Frames Predominately In-Favor to the Northern Pass</b>			
Economic Benefits	4.35		
Renewable Energy	2.96		

Figure 10. Comparison of frames found by Storace and the DOE.

The biggest similarity between the two findings is the similar percentage of comments that displayed the frame of economic impacts. This frame was the third most frequent frame found by my research, and I witnessed it in 13% of all comments I analyzed. This was the second most frequent frame found by the DOE, who witnessed it in 10.4% of all comments.

The DOE's scoping report separated the environmental impacts of the project into several different frames including wildlife, national forest and conserved land, vegetation, water/wetlands, air quality, and soils. Conversely, I chose to maintain one frame that encompassed all environmental impacts. The most glaring difference between my research and the DOE's scoping report is the frequency of the aesthetics frame. This was my most frequent frame, while the DOE only found the "viewshed/scenery" frame in 5.8% of all comments. Figure 10 shows 10 out of 25 frames found by the DOE's research, which accounts for 77.8% of the total comments analyzed.

### **Approval and Opposition to the Project**

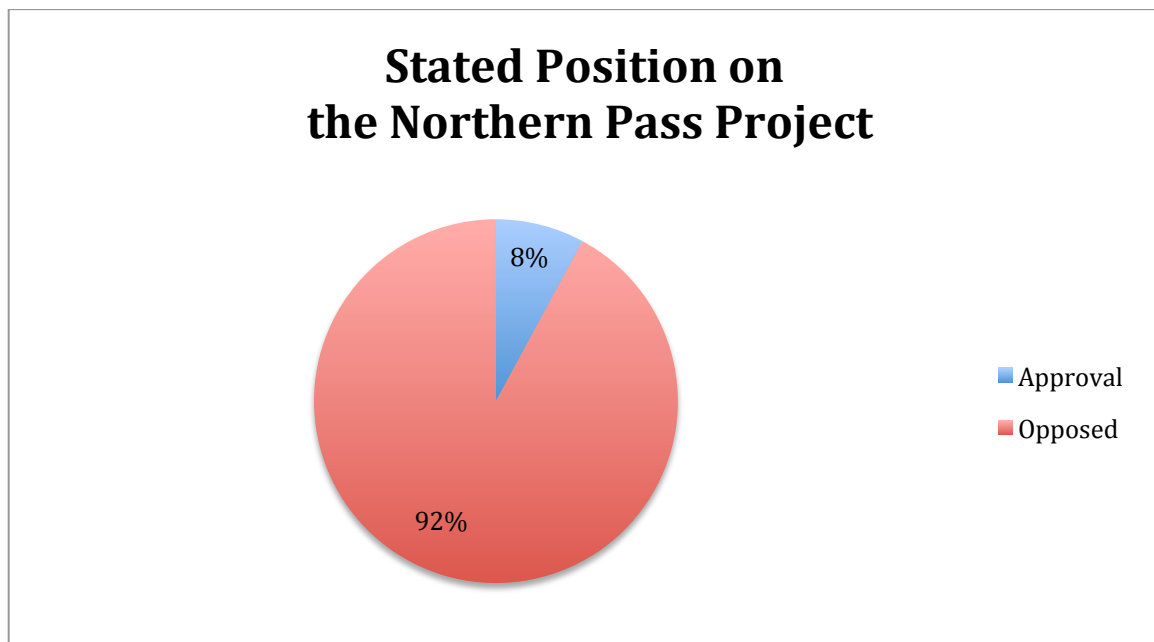


Figure 11. Stated position of comments to the Northern Pass Project

Overall, the overwhelming majority of comments that I sampled were opposed to the Northern Pass Transmission Line. Out of 506 comments, 466 were opposed to the project.

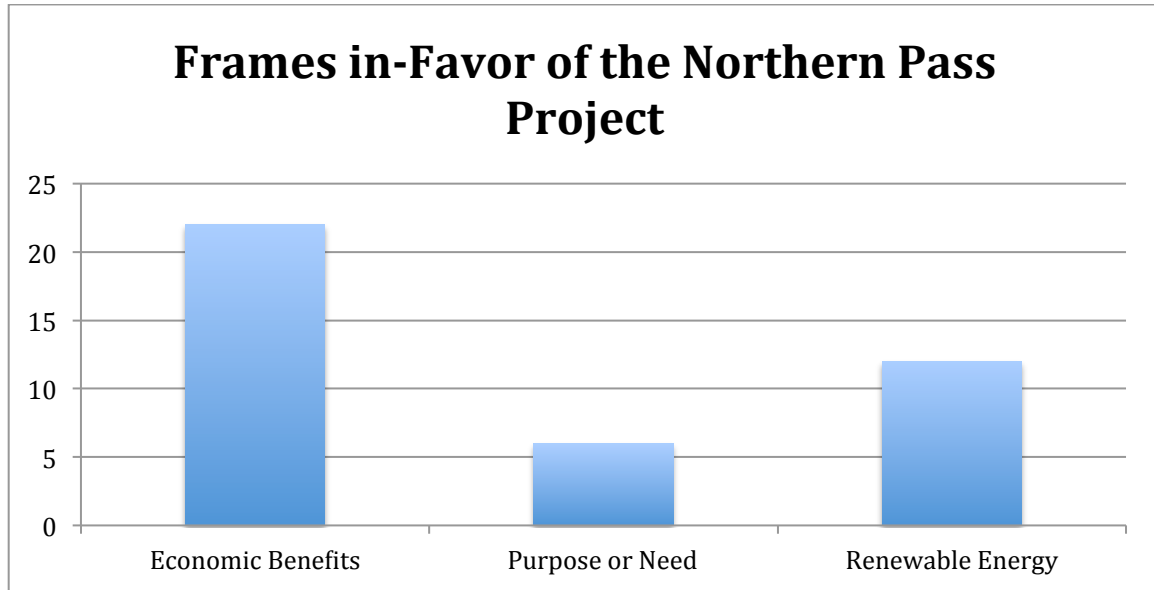


Figure 12. Frames in-favor of the Northern Pass Project

There were only 40 comments that stated that they were in-favor of the Northern Pass. Figure 13 indicates that the most frequent frame in-favor of the project was economic benefits, with 22 comments that exhibited the frame. The second most frequent frames regarded the renewable energy of the project with 12 instances. The third most frequent frame was the purpose or need for the project with 6 occurrences.

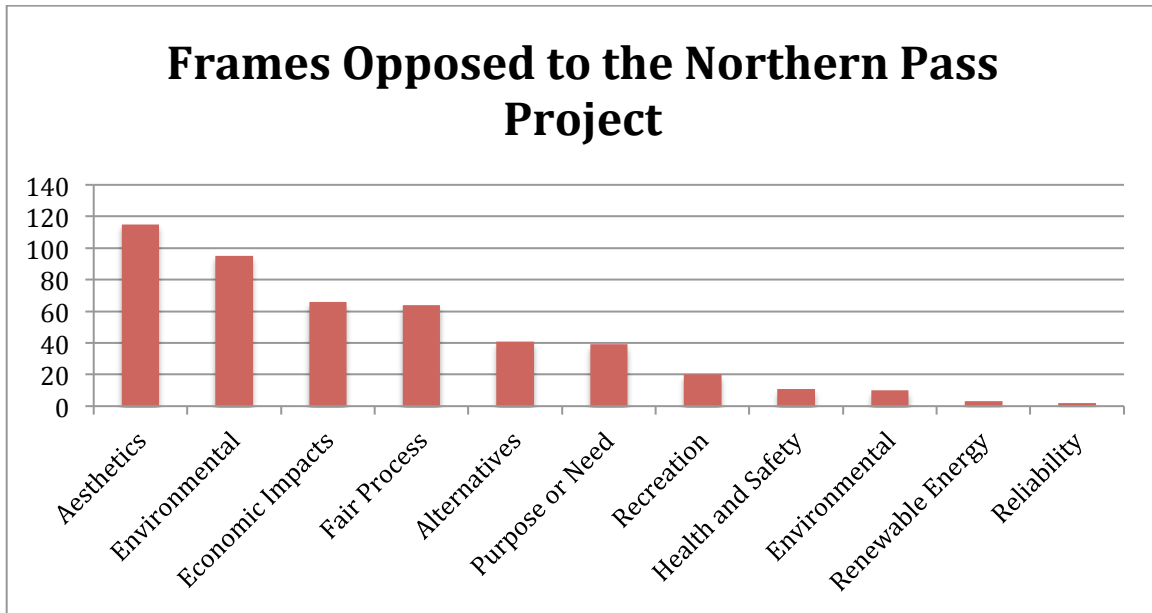


Figure 13. Frames opposed to the Northern Pass Project

Overall, there were 466 comments that voiced opposition to the Northern Pass Transmission Lines. The most frequent argument in opposition to the Northern Pass Transmission line was based on the aesthetics of the project with 115 occurrences. This was followed closely by arguments that opposed the project based on its environmental impacts with 95 occurrences.

## New Hampshire Results

Frame	Approval	Opposition	Total	Percentage of Total
<b>Predominantly Opposed to the Project</b>				
Environmental Impacts		64	64	17.58
Aesthetics		62	62	17.03
Economic Impacts		56	57	15.66
Fair Process		56	56	15.38
Purpose or Need	6	34	40	10.99
Alternatives		28	28	7.69
Renewable Energy	12	2	13	3.57
Environmental Justice		10	10	2.75
Health and Safety		8	8	2.20
Recreation		5	5	1.37
<b>Predominantly In-Favor of the Project</b>				
Economic Benefits	20		20	5.49
Reliability		1	1	0.27
Grand Total	38	326	364	100

Figure 14. Predominant frames of approval and opposition for the Northern Pass in New Hampshire

The state of New Hampshire's most frequent frames were slightly different than the sample as a whole. Figure 14 shows that the predominant frame for New Hampshire was environmental impacts, which differed from the entire sample whose most frequent frame was aesthetics. Despite this difference, the top four most frequent frames were the same as the sample as a whole, consisting of environmental impacts, aesthetics, economic impacts, and fair process. Also, 38 out of 40 total comments in-favor of the Northern Pass Project were submitted from New Hampshire.

## Proximity to the Project

Coos County would contain 75.6 miles, which is 40% of the total proposed Northern Pass transmission line, the most of any county. However, the response rate of this county was 57 submissions, which was similar to Merrimack County with 55 comments and Rockingham County with 41 comments. Northern Pass Transmission plans to invest \$398.8 million in Coos County, as well as \$6,355,912 in property tax

payments (Northern Pass Transmission, 2015). The towns of Clarksville, Dalton, Dixville, Dummer, Lancaster, Millsfield, Northumberland, Pittsburg, Stark, Stewartstown, Whitefield would all contain portions of the project. Figure 15 indicates that residents of this Coos County care about the economic impacts, environmental impacts, and the fair process associated with the Northern Pass project.

Coos County	Opposed	Approval	Total
Economic Impacts	13		13
Environmental Impacts	10		10
Fair Process	10		10
Aesthetics	8		8
Alternatives	8		8
Purpose or Need	4		4
Health and Safety	2		2
Economic Benefits		2	2
TOTAL	55	2	57

Figure 15. Predominant frames for and against the Northern Pass in Coos County.

Grafton County would contain 62.1 miles, which is 32% of the total Northern Pass transmission line. There were 127 total comments submitted from Grafton, which was the highest response rate of any county in New Hampshire. All of these 127 comments submitted from Grafton County opposed the project. Northern Pass Transmission plans to invest \$207.4 million in Grafton County, as well as \$3,320,976 in property tax payments (Northern Pass Transmission, 2015). The towns of Thornton, Ashland, Bethlehem, Holderness, Bridgewater, Bristol, Campton, Lincoln, Eason, Sugar Hill, and Woodstock would all contain the project. Figure 16 displays the predominant frames in Grafton County, which show similarities to frames displayed across New Hampshire.



<b>Grafton County</b>	<b>Opposed</b>	<b>Approval</b>	<b>Total</b>
Environmental Impacts	26		26
Economic Impacts	24		24
Aesthetics	23		23
Fair Process	21		21
Purpose or Need	14		14
Alternatives	9		9
Environmental Justice	3		3
Recreation	3		3
Health and Safety	2		2
Reliability	1		1
Renewable Energy	1		1
<b>TOTAL</b>	<b>127</b>	<b>0</b>	<b>127</b>

Figure 16. Predominant frames for and against the Northern Pass in Grafton County.

Merrimack County would contain 38.4 miles of the project, which is 20% of the total transmission line. It also would receive the most investment from the Northern Pass Transmission, with a \$493.4 million investment and \$9,985,277 in property tax payments (Northern Pass Transmission, 2015). The town of Franklin, however, will receive 79% of this investment and 73% of the property tax payments. The project would pass through the cities and towns of Allenstown, Canterbury, Concord, Hill, Northfield, Pembroke, and Franklin. Figure 17 indicates that there were 10 comments in-favor of the project from Merrimack County due to economic benefits of and purpose or need for the project. Figure 17 also shows that residents of Merrimack County are concerned with the fair process associated with the Northern Pass transmission line.

<b>Merrimack County</b>	<b>Opposed</b>	<b>Approval</b>	<b>Total</b>
Fair Process	10		10
Purpose or Need	6	4	10
Environmental Impacts	9		9
Alternatives	8		8
Economic Impacts	5		5
Aesthetics	4		4
Economic Benefits		4	4
Environmental Justice	2		2
Renewable Energy		2	2
Health and Safety	1		1
<b>TOTAL</b>	<b>45</b>	<b>10</b>	<b>55</b>

Figure 17. Predominant Frames for and against the Northern Pass in Grafton County

Rockingham County would contain 7.3 miles of the project. This would only traverse the town of Deerfield, where the Northern Pass would terminate in a preexisting substation (U.S. Department of Energy, n.d.). Northern Pass Transmission plans to invest \$56.9 million in direct investment in Rockingham, and the county would receive \$1,243,040 in property tax payments. Figure 18 displays the predominant frames for Rockingham, which include aesthetics, economic impacts, and the fair process associated with the Northern Pass.

<b>Rockingham County</b>	<b>Opposed</b>	<b>Approval</b>	<b>Total</b>
Aesthetics	9		9
Economic Impacts	7		7
Fair Process	7		7
Environmental Impacts	4		4
Renewable Energy		4	4
Economic Benefits		5	5
Environmental Impacts	4		4
Renewable Energy		4	4
Purpose or Need	2		2
Recreation	1		1
Environmental Justice	1		1
<b>TOTAL</b>	<b>32</b>	<b>9</b>	<b>41</b>

Figure 18. Predominant Frames for and against the Northern Pass in Rockingham County.

Belknap County would only contain 7.3 miles of the project, which would pass through the town of New Hampton. Belknap would receive \$26.5 million in investment, as well as \$416,208 in property tax payments (Northern Pass Transmission, 2015). Figure 19 indicates that residents of the Belknap County predominantly opposed the project due to economic impacts, environmental impacts, and aesthetics. There were two comments in Belknap that approved the project due to its economic impacts.

<b>Belknap County</b>	<b>Opposed</b>	<b>Approval</b>	<b>Total</b>
Economic Impacts	5		5
Environmental Impacts	2		2
Aesthetics	2		2
Economic Benefits		2	2
Renewable Energy	1	1	2
Environmental Justice	1		1
Fair Process	1		1
Health and Safety	1		1
Purpose or Need	1		1
Alternatives	1		1
<b>TOTAL</b>	<b>15</b>	<b>3</b>	<b>18</b>

Figure 19. Predominant frames in-favor of and opposed to the Northern Pass in Belknap County

### **Economic Benefits**

Proponents of the Northern Pass cite the array of economic benefits that the project will have for the New England region and for the residents of New Hampshire. Northern Pass Transmission claims that the project will result in 1,200 new jobs for residents of New Hampshire, \$20-35 million annual energy savings for the state, and \$28 million annual town, county, and state tax revenues for New Hampshire (Northern Pass Transmission, LLC, 2015).

Overall, there were 22 comments in-favor of the project due to economic benefits the project, out of 40 total comments in-favor of the project. This was the highest frame of comment in-favor of the project. Of those 22 people, 20 were from the state of New Hampshire.

The city of Franklin will receive the most money of any single New Hampshire town from the Northern Pass Transmission project, with a \$390.1 million investment and

\$7,368,832 in property tax payments (Northern Pass Transmission, 2015). This is predominantly because the Northern Pass will be constructing a HDVC converter terminal in Franklin that would convert direct current (DC) to alternating current (AC). There were 3 out of 4 total comments from Franklin that voiced approval due to economic benefits the Northern Pass would provide. Franklin will receive the most economic benefits from the project, and the small number of comments submitted from the town voiced approval for the project due to these economic benefits. Figure 17 indicates that there was only one other comment submitted from Merrimack County that approved of the project due to its economic benefits.

The town of Stewartstown stands to gain the second most economic benefits from Northern Pass Transmission, which plans to invest \$134.4 million and pay \$2,519,851 in property tax payments to the town (Northern Pass Transmission, 2015). This is because the 6.1-mile underground portion of the project will be in Stewartstown. There were only three comments submitted from Stewartstown, and all were opposed to the project. Stewartstown would receive 33.7% of total direct investment for Coos County and 39.6% of annual tax benefits for the county. Figure 15 indicates that 2 people from Coos County approved the Northern Pass due to economic benefits.

The town of Deerfield in Rockingham County contains an existing substation that would serve as the endpoint for the Northern Pass Transmission Line (U.S. Department of Energy, n.d.). Northern Pass Transmission plans to invest \$56.9 million in Deerfield, as well as pay \$1,243,040 in annual property tax payments to the town (Northern Pass Transmission, 2015). The town of Deerfield will receive the third highest economic benefits of any town that houses the project. However, only 1 out of 12 total comments submitted from Deerfield voiced approval of the project based on its economic benefits. Figure 18 indicates that there were 4 other comments submitted from Rockingham County that voiced approval of the project due to its economic benefits.

The towns of Franklin, Deerfield, and Stewartstown contained four comments that approved the Northern Pass Transmission Line due to economic impacts, while the counties of Coos, Merrimack, and Rockingham, where these towns are located, contained 11 of the 22 total comments that approved of the project based on its economic benefits. This consisted of 27.5%, or 11 out of 40 total comments in-favor of the project.

## Conclusion

It is clear from the results of my research that there is overwhelming opposition to the Northern Pass Project. This is true of the sample as a whole, as well as comments submitted from New Hampshire, the state that would house the Northern Pass if it were approved. However, of those comments that were in-favor of the project, the majority came from New Hampshire.

The people with the motivation to submit comments on the DOE's website, especially those from New Hampshire, are opposed to the Northern Pass project because they fear the aesthetics of 85-135 foot towers and the change they will cause to the landscape. They fear that the transmission line and its associated maintenance will damage the habitat, vegetation, and wildlife of New Hampshire. They oppose it because they fear the economic damage the line may have on their lives, livelihoods, and property.

The majority of comments that stated approval of the project due to its economic benefits came from New Hampshire. The towns of Franklin, Stewartstown, and Deerfield would receive the most economic benefits from the project. Although, the towns of Stewartstown and Deerfield did not voice approval of the project based on its economic benefits, the majority of comments submitted from the town of Franklin did. These three towns are located in the Coos, Merrimack, and Rockingham counties, and these counties contained 50% of submitted comments in-favor of the project due to its perceived economic benefits. Property tax benefits from Northern Pass Transmission would extend to both towns and counties.

Overall, the majority of comments submitted were by counties in New Hampshire that would house the Northern Pass Transmission Line, mainly Grafton, Merrimack, Coos, Rockingham, and Belknap Counties. These are the people that would live with the transmission lines in their state and in their backyards. They would be the people directly affected by the project, and they are also the people who would see the direct benefits and impacts of the project.

I anticipated the concept of environmental justice to be more prevalent during my research because 137.7 miles, or 72%, of the Northern Pass will be located in the

predominantly lower income areas of Grafton and Coos County. However, the people who submitted comments to the DOE's website more concerned with the NEPA decision-making process than they were with the placement of the transmission line.

The people who will deal with the Northern Pass Transmission Line, as well as other large-scale transmission lines, should be meaningfully involved in the decision-making process by which that project is approved or denied. The people of New Hampshire, especially those in Grafton, Merrimack, Coos, Belknap, and Rockingham counties have chosen to voice their opinions on the Northern Pass Transmission Line because, overall, they oppose its construction. The process by which this transmission line is approved or denied is just as important as the final decision of where the project is placed. Procedural justice, or fair process, influences the public's opinion of both a project and the institution that makes the final decision. My research shows that the decision-making process surrounding the Northern Pass is important to the people who submitted comments through the Department of Energy's website.

The National Environmental Policy Act (NEPA) and the associated development of the Environmental Impact Statement (EIS) document allow for public input and commenting. The comments I analyzed are part of the scoping period associated with the development of the draft Environmental Impact Statement. They constitute an important portion of the development of the project that includes the draft Environmental Impact Statement, an associated commenting period, a final Environmental Impact Statement, and a final Record of Decision (ROD) (Council on Environmental Policy, 2007). The NEPA process allows for specific periods of public commenting. At this point in the development of the Northern Pass Transmission Line, it is clear that the public oppose the project. However, it is unclear to what extent decision-makers consider public opinion as it is generated through these public commenting platforms. Does the commenting process mandated by NEPA contain real significance or does it only exist as ineffective procedure with little role in the final decision?

Decision-makers should have the public good in mind when they make final decisions about the distribution and placement of large-scale projects, such as transmission lines that span entire states. However, they must organize and prioritize the array of public goods that they represent and the range of effects from energy projects

such as this. The public good as determined by agency decision-makers can differ from the comments submitted by the motivated people who took the effort to submit their concerns to the DOE's website.

On one hand, the Province of Quebec has vast hydroelectric reserves that could contribute a cleaner source of energy to a New England energy mix that is dominated by natural gas generated power (ISO New England, 2014). On the other hand, the people that would house the transmission line oppose the infrastructure that would transport this energy through New Hampshire.

The scoping process in the development of the Northern Pass Transmission Line was largely populated by comments submitted by residents of New Hampshire who were concerned with issues within the state of New Hampshire, such as aesthetics, environmental impacts, and environmental impacts. At times, responses by residents of New Hampshire reflected not in my backyard (NIMBY) mentalities, when decision-making public officials may determine the public good as it applies on a regional, national, and international scale. In the case of the Northern Pass, the comments associated with the EIS scoping period and the public participation within the NEPA process were localized and narrow in scope. They failed to address larger impacts of the project or energy on a regional or national scale.

The draft EIS for the Northern Pass Transmission Project will be released in 2015. This draft will address the purpose and need for the project, and will also analyze whether there are alternatives to the project that would address the project's purpose and need (Council on Environmental Quality, 2007). The draft EIS should also examine the effect of the line on property values. Future research could investigate whether property tax payments apply to houses that lose value due to proximity to the line.

As part of this draft EIS process, another commenting period will be opened. Another wave of public commenting allows the opportunity for future research in public opinion towards this project. Future research could analyze whether public opinion has significantly changed from the scoping process to the publication of the draft and final Environmental Impact Statements for the Northern Pass Transmission Line Project

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## Appendix 1: Predominant Frames for and against the Northern Pass in New Hampshire Counties.

Carroll	Opposed	Approval	Total
Aesthetics	2		2
Economic Benefits		2	2
Economic Impacts	2		2
Environmental Impacts	3		3
Environmental Justice	1		1
Fair Process	2		2
Purpose or Need	2		2
Renewable Energy		2	2
<b>TOTAL</b>	<b>12</b>	<b>4</b>	<b>16</b>

Figure 20. Predominant frames in-favor of and opposed to the Northern Pass in Carroll County.

Hillsborough	Opposed	Approval	Total
Aesthetics	9		9
Alternatives	1		1
Economic Benefits		3	3
Environmental Impacts	9		9
Environmental Justice	2		2
Fair Process	5		5
Health and Safety	1		1
Purpose or Need	2	2	4
<b>TOTAL</b>	<b>29</b>	<b>5</b>	<b>34</b>

Figure 21. Predominant frames in-favor of and opposed to the Northern Pass in Hillsborough County.

<b>Strafford</b>	<b>Approval</b>	<b>Opposed</b>	<b>Total</b>
Aesthetics		2	2
Alternatives		1	1
Economic Benefits	1		1
Environmental Impacts		1	1
Recreation		1	1
Renewable Energy	1		1
<b>Total</b>	<b>2</b>	<b>5</b>	<b>7</b>

Figure 22. Predominant frames in-favor of and opposed to the Northern Pass in Strafford County.

<b>Sullivan</b>	<b>Approval</b>	<b>Opposed</b>	<b>Total</b>
Aesthetics		3	3
Economic Benefits	1		1
Purpose or Need		2	2
<b>Total</b>	<b>1</b>	<b>5</b>	<b>6</b>

Figure 23. Predominant frames in-favor of and opposed to the Northern Pass in Sullivan County.

<b>Cheshire</b>	<b>Approval</b>	<b>Opposed</b>	<b>Total</b>
Purpose or Need		1	1
Renewable Energy	2		2
<b>Total</b>	<b>2</b>	<b>1</b>	<b>3</b>

Figure 24. Predominant frames in-favor of and opposed to the Northern Pass in Cheshire County

## Appendix 2. Predominant Frames of New England States

Frame	Approval	Opposition	Total	Percentage of Total
<b>Predominantly Opposed to the Project</b>				
Aesthetics		26	26	41.94
Environmental Impacts		16	16	25.81
Alternatives		6	6	9.68
Fair Process		3	3	4.84
Economic Impacts		3	3	4.84
Purpose or Need		2	2	3.23
Recreation		2	2	3.23
Reliability		1	1	1.61
Health and Safety		1	1	1.61
<b>Predominantly In-Favor of the Project</b>				
Economic Benefits	2		2	3.23
<b>Grand Total</b>	<b>2</b>	<b>60</b>	<b>62</b>	<b>100</b>

Figure 25. Predominant Frames In-Favor of and against the Northern Pass in Massachusetts.

Predominant Frame	CT	MA	ME	NH	RI	VT	Grand Total
Aesthetics	5	26	1	62	2	3	99
Alternatives	1	6	1	28			36
Economic Benefits		2		19			21
Economic Impacts		3	1	57	3		64
Environmental Impacts	4	16	2	65	1	1	89
Environmental Justice				10			10
Fair Process	1	3		56			60
Health and Safety		1		8		1	10
Purpose or Need	1	2	1	40	1		45
Recreation	3	2		6			11
Reliability		1		1			2
Renewable Energy			1	13			14
<b>Grand Total</b>	<b>15</b>	<b>62</b>	<b>7</b>	<b>364</b>	<b>7</b>	<b>5</b>	<b>460</b>

Figure 26. Predominant frames of New England states

### **Appendix 3. Variables Collected in Microsoft Excel During Sampling**

Specific Identification Number reported on DOE website

Identification number in fro my research

First and Last Name

Date of Submission

Organization (if stated)

Address

City

State

County

Predominant Frame

Stated Position