CANADIAN ELECTRIC IMPORTS AND New England's Renewable Energy Transmission Dilemma: A Case Study of the Northern Pass's Origins and Defeat in New Hampshire

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ABSTRACT

In order to shift away from carbon-based electricity production, transmission infrastructures must be reconfigured. As the state of Massachusetts drives to access new low-carbon energy, a primary target is Québec hydropower. The complication is that in order for hydropower generation in Québec to reach export destinations in southern New England, transmission lines must be constructed through northern New England. This, in turn, requires permits from authorities along the transmission routes. The Northern Pass transmission project was a proposal to build a high-voltage power line from Québec to Massachusetts through New Hampshire. The line would be co-owned by Eversource, New England's largest investor-owned electric utility, and Hydro-Québec. New Hampshire organizations and stakeholders as well as opponents from across the region came together in New Hampshire within the Site Evaluation Committee to shut down the project. The result of public debate was a unanimous rejection in March 2018 by the Site Committee, reaffirmed by a unanimous New Hampshire Supreme Court decision in July 2019. Opposition to the Northern Pass is embedded in local historic relationships; people in northern New England have grievances towards southern New England history of exploiting and despoiling the North's lands and waters. New Hampshire's institutions gave power to the interests and voices within the state against the regional interests advocating for the Northern Pass. Investigating what led to Eversource's and Hydro-Québec's costly defeat, this paper shows that the fight over the Northern Pass is a critical instance of emerging conflicts in transmission planning.

Key words: Electricity Planning, Electricity Transmission, Energy Democracy, New Hampshire

Introduction

In an attempt to curb greenhouse gas emissions, many private and public institutions are investing in new technologies and alternative fuels to transition our energy systems away from carbon-polluting sources. Massachusetts' current renewable energy plans include an initiative to import Canadian hydropower (see paper by Silverstein and Autery, this issue). While this initiative could help Massachusetts reduce its state-wide greenhouse gas emissions, importing Canadian hydropower has the potential to cause significant negative environmental and social equity impacts. Delivering Canadian hydropower to Massachusetts requires energy development in peripheral areas of Northern Québec, in what have historically been ecologically pristine rivers in indigenous people's territory (see Desmeules and Guimond, this volume). Additionally, importing Canadian hydropower requires a transmission line to connect the Canadian and southern New England electric grids that must inevitably pass through northern New England, where the lines would impact the landscape, communities, economies, and people's sense of place. Several routes for the transmission line have been proposed and each has been contested (see papers by Kroot, this issue; McCourt, this issue; Frederic, this issue). As corporations and policymakers of Québec and Massachusetts work to fund and site a route for power lines, the communities in between play a key role in determining the outcome of potential large-scale infrastructure projects. This paper examines the Massachusetts and Québec drivers of one particular proposed transmission line, the Northern Pass, in New Hampshire, and highlights the way that people concerned for landscapes, places and communities in the in-between state of New Hampshire contested and successfully prevented the line.

The Northern Pass transmission project was a proposed high-voltage direct current (HVDC) line that would have interconnected the southern New England and Québec electrical grids[1]. Transmission projects are a large undertaking, as they are generally expensive and environmentally transformative. The anticipated cost of building the Northern Pass was upward of a billion dollars (Evans-Brown 2015). Northern Pass was proposed as a joint project between Eversource, New England's largest investor-owned electric distribution utility, and Hydro-Québec, Québec's provincial electrical utility. If the Northern Pass project had been designed to improve New England grid's reliability, regional electrical customers would have paid the cost (ISO-NE 2020; Vogel, this issue). However, it was intended to access a preferable resource mix— not a high enough priority for regional transmission planners. For this reason, costs to build the Northern Pass fell on the transmission owner. Corporations were hesitant to build the line due to concerns over uncertainties and changes to the dynamic electricity market.

Massachusetts, the planned destination for much of the power the Northern Pass line would transmit, guaranteed adequate revenue to pay for the line. The state set up a system in which the state's distribution utilities would sign long-term contracts with the transmission owners, promising to buy the power for 20 years. Massachusetts would then allow the utilities to put those costs onto their customers' bills (see Vogel, this issue). Eversource Energy, the parent corporation to several regulated Massachusetts distribution utilities involved in issuing those contracts, owned a separate Eversource subsidiary, Eversource Energy Transmission Ventures Inc., which proposed the Northern Pass. As Massachusetts customers of Eversource and other investor-owned utilities paid their bills over the next 20 years, they would thus boost the profits

of both arms of Eversource to bring in this low-carbon power.

Meanwhile, on the other end of the proposed transmission line, former Québec Premier Francois Legault made clear the province's vision to take on a leading role in developing a more sustainable energy system by stating his ambition to "help our neighbours [and] help the planet [by] becoming the green battery of North America" (Authier 2019). Québec's plans to raise $1 billion for provincial coffers by 2030 from electricity exports reflected the seriousness of this goal.

To understand why the Northern Pass became controversial— and was ultimately stopped— one must understand a basic geographical fact: between southern New England and Québec sit the states of Vermont, New Hampshire, and Maine (Figure 1). The transmission line would go through one of these. In the case of Northern Pass, citizens and a single regulatory agency in the independent jurisdiction of New Hampshire ultimately blocked the region-serving transmission project.

The conditions leading up to this project proposal and its rejection are compiled into a three-section narrative. The first section investigates Hydro-Québec's actions taken towards exporting electric power and the province's history of similar enterprises. The second section investigates the actions of Massachusetts legislators and Eversource Energy which orchestrated the proposal. The last section of this empirical analysis focuses on how New Hampshire's organizations and institutions came together to reject the Northern Pass. This case study is a unique display of the importance of deliberative bodies associated with land use permitting.

Geographies along the Northern Pass Route

Québec

The province of Québec spans from the 62nd northern parallel to the 45th, with its southern perimeter bordering the states of New York, Vermont, New Hampshire, and Maine. The majority of the province, from around 51 to 58 degrees North, has a subarctic climate. The subarctic of Québec has attracted recent waves of hydropower investments. Environmental conditions such as alpine snow pack that seasonally replenish the region's mighty rivers create an ideal environment for hydropower development. The geologic conditions of this area, a part of the Canadian Shield, allow for considerable mining and forestry; still the region is sparsely populated. The largest administrative districts by geographical area, Nord du Québec (Northern Québec) and Côte-Nord (named for the north coast of the St. Lawrence River), are predominantly First Nations territory. In contrast, the French-Canadian majority inhabits a much smaller geographical area within Southern Québec. Québec's largest cities, Montreal and Québec City, are hundreds of miles south of some of the province's largest dams, in warm-summer humid continental regions. Very few French-Canadian settlements are in the far north, and they are either mining or hydropower towns, such as Radisson, QC, a town adjacent to the Robert-Bourassa hydropower facility. While river flow in Northern Canada has immense potential to satisfy energy demands in Québec and the United States, extensive high-voltage north-south transmission lines are required to carry the hydropower from dams up north down to the southern grids.

Hydro-Québec TransEnergie oversees one of the largest electric transmission systems in the world with high voltage alternating current powerlines connecting remote hydro-electric projects at James Bay, the St. Lawrence region, or Churchill Falls, Labrador, to southern cities within Québec (Figure 1). A Hydro-Québec spokesman described the utility's electricity system as overbuilt for Québec, bottlenecked by the lack of transmission lines to southern New England markets. Hydro-Québec claims to be capable of producing 40 TWh of surplus power each year (Storrow 2019, 4). All of this surplus electric power encouraged Hydro-Québec to seek out business prospects to connect their remote dams to neighboring markets who would purchase their unstorable surplus.

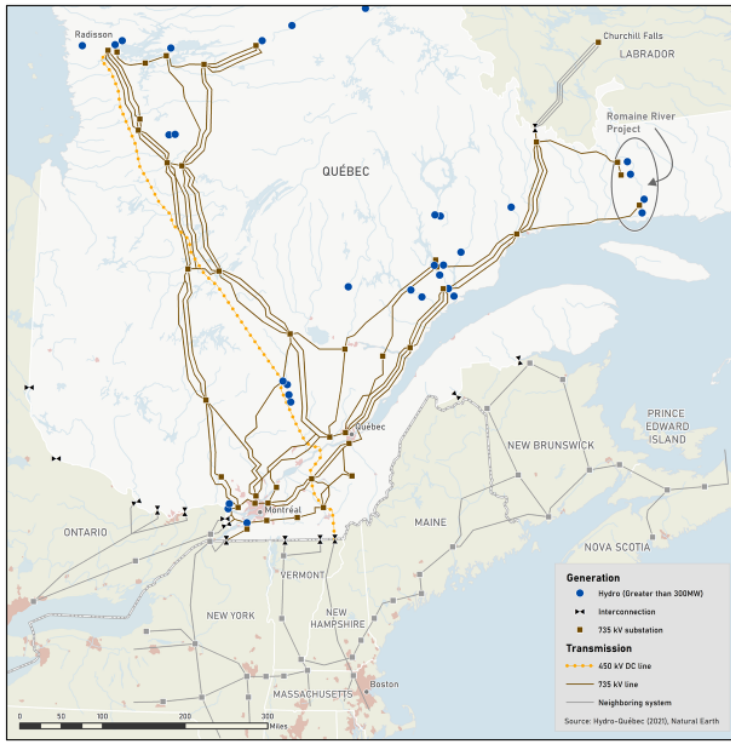

Figure 1. The Hydro-Quebec transmission system, showing the Romaine River Project and the distance required to bring that power to southern New England. In addition to the vast grid north of the US-Canada border, the transmission system south of the border must traverse either upstate New York or one of the northern New England states, Vermont, New Hampshire, or Maine (or the Atlantic Ocean), to reach Boston. Image adapted by Matthew McCourt from Hydro-Quebec, 2021 p. 123, Map 'Our Major Facilities.'

Southern New England

Massachusetts, Connecticut, and Rhode Island constitute the more urban half of the New England region. Cities like Boston, Hartford, and Providence are centers of economic activity and energy demand. Massachusetts has almost half the population of New England. Over two thirds of the electricity use in New England is in Massachusetts or Connecticut (NEPOOL 2018).

The New England states have some of the highest electric rates in the country. A key reason for this is the lack of traditional energy resources available in the region. The region has had to import coal, oil, natural gas, and uranium to generate electricity— making the region particularly vulnerable to market crises like the 1973 Oil Embargo. Massachusetts' last nuclear power plant reactor, Pilgrim Nuclear Generating Station in Plymouth, retired in 2019; there are only two left running in New England. The limitations of their current energy resource mix led Massachusetts to ratify An Act to Promote Energy Diversity in 2016 to plan for a more resilient electricity system. Renewable energy development has gained widespread political and social support across the region as the most popular alternative power source, due to a rising interest in reducing emissions coupled with concerns about future costs of fossil fuel, whether that be due to a carbon tax or a shift in demand, and public fears of nuclear power.

Proponents for the clean energy transition in southern New England believe the future of its success relies on local efforts to improve and expand upon renewable energy conservation, generation, and consumption. Southern New England states are national leaders in energy conservation, which means that each unit of electricity is more efficiently used than in most states. Southern New England has expanded solar and offshore wind capacity and begun exploring technologies to improve storage and demand response. Massachusetts has been a leader in solar energy development. But in terms of hydropower, New England hasn't developed new hydropower facilities in decades, and is instead actively removing dams in contentious projects aimed at river restoration (Magilligan, Sneddon and Fox 2017. Many clean energy advocates maintain that the region's quickest and most realistic path to affordable, carbon-free energy must include import of hydropower from Québec (see Silverstein and Autery, this issue). However, to satisfy Massachusetts clean energy demand using hydropower, contracts from Hydro-Québec would require extensive transmission interconnections that link southern New England to Québec.

New Hampshire

The required infrastructure to transport electricity to Massachusetts from Québec would amount to around 192 miles of power line crossing the state, including the White Mountain National Forest (Figure 2), a relatively small addition to the vast network of transmission and distribution in Québec, but a significant land area for the small state of New Hampshire. The various right-of-way routes considered for the Northern Pass meander from the northwest corner of New Hampshire southbound to the outskirts of the Greater Boston Area, terminating in Deerfield, New Hampshire (Figure 2).

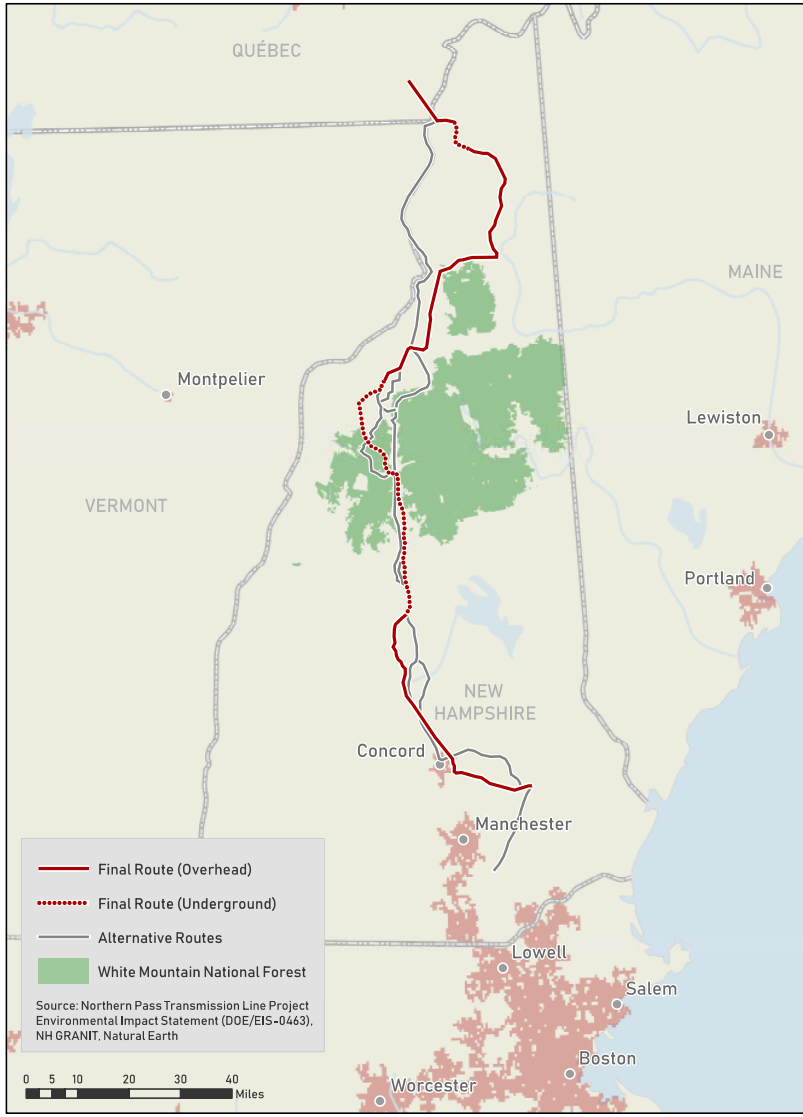

Figure 2. The Northern Pass Transmission Project, showing both the final and alternative routes considered by the U.S. Department of Energy in the project's Environmental Impact Statement. The proposed final route would have been buried through the White Mountain National Forest and in portions of Coos County. The roughly 192-mile power line would have terminated in Deerfield, MA. Image adapted by Matthew McCourt from U.S. DOE, 2017 p. 8, Map E-1.

As the states are more rural, people in New Hampshire and other northern New England states have often positioned themselves in opposition to Boston and other parts of southern New England, which have often been seen as extracting northern resources for their benefit. Northern New England has developed a conservation ethos that was adapted over the years to combat destructive land use development, especially natural resource extraction. The tension between rural and urban New England has complicated transmission planning, and resident populations are fully aware of their right to utilize one's democratic agency to leverage political control and gain a stake during state decision-making processes. New Hampshire, Vermont and Maine have strong local governments allowing political mobilization, community engagement, or special interests to influence the decision-making processes in each state.

The Northern Pass's Planning and Proceedings

Hydro-Québec's Provincial and Peripheral Hydroelectric Production as a Foundation of Québec's Economic Development

The economy of Québec is powered by natural resources and cheap electric power from its northern periphery. Many of the province's largest hydroelectric generation projects are sited in remote areas to power the extraction of mineral and forestry resources. Prior to hydroelectricity exports being championed as a solution to the climate crisis, Québec's dam building was subsidized and encouraged by both governments in response to other political crises in Canada and the United States during the 20th Century (Massell 2011). The Great Depression inspired the premier of Québec, Louis-Alexandre Taschereau, to attract capitalists from the United States who would establish private enterprises in the province's vast lands. These new enterprises offered job opportunities in extractive industries and dam construction that began to curb the economic outmigration of Québecois. Taschereau's justification for controversial tax breaks seeking foreign direct investment was that "[i]t is better to import American dollars than to export French-Canadians to the United States" (Massell 2011, 135).

During both World Wars, increased demand for aluminum for military aircraft drove a massive push for hydroelectricity development in Québec. Provincial and federal governments considered aluminum and electrical power to be a part of the war effort, and limited regulation and taxation of large corporations who sought to meet electricity demand with the hasty construction of new dams and reservoirs (Massell 2011; Morgan 1942). This period of intense hydropower expansion helped Québec establish aluminum as an export staple and gave its residents and enterprises some of the lowest electricity prices in the world.

While efforts to nationalize aluminum never came to fruition, the province of Québec took public ownership over its hydroelectric system, establishing Hydro-Québec in the 1960s. The period of further hydropower expansion following the 1960s Quiet Revolution was seen as an effort for the economic self-determination of French Canadians, unlike earlier development owned by anglophone companies. In the effort to emerge with greater autonomy and relative

independence from anglophone Canada, Québec sometimes found it better to build economic relationships with its U.S. neighbors. Québec's neighbors in the United States also had higher electricity prices, motivating transmission lines across the national border. By the 1980s, electric exports regularly made Hydro-Québec over $500 million a year, and the province had emerged with a new-found sense of self-determination (Hydro-Québec 2001).

Since the 1960s, energy exports to southern New England have been a popular environmental and economic goal for many Québec premiers. Hydro-Québec executives wrote in 1997, as electricity restructuring was opening energy markets in the United States to the utility, that "Hydro-Québec is fully aware of the role it plays in the Québec economy, and of its social and environmental responsibilities as a 'business first' publicly owned company" (Menard and Caille 1997, 1). Restructured electric wholesale markets (see Vogel, this issue) in the United States enabled Hydro-Québec to sell over $4 billion of electricity into export markets over three years—over 20 percent of the total sales for the utility in 2000 (Hydro-Québec 2001).

For current Premier Frances Legault, a reduction of regional greenhouse gas emissions is an added benefit to Hydro-Québec's financial interest in binational electricity sales. In 2018, New England imported 24 TWh of energy in total; over half from Hydro-Québec, of which 10 TWh was transmitted over lines constructed in 1989 which run from Québec through Vermont and New Hampshire to Sandy Pond, MA alone (ISO-NE 2019, 111). The scale of Québec's hydroelectric developments keep their costs low, but they extensively disrupt rivers and adjacent land. Hydropower production transformed the rivers of Québec, including many rivers far removed from the urban populations. These dramatic environmental transformations disproportionately impact sovereign indigenous nations (Cree, Inuit, Naskapi, and Innu) and others who depended on the functioning of these river ecosystems for both sustenance and local economies (Wavnik, 2017; Wavnik and Caine 2017). The most recent Hydro-Québec large dam construction project is a four-dam project on the Romaine River (see Figure 1) along the north coast of the St. Lawrence River (see Desmeules and Guimond, this issue).

As Québec seeks to further its economic paradigm of development of its own periphery in order not to be a periphery to Anglo Canada, it has rebranded its cheap electricity as "clean" energy that can achieve Massachusetts' climate mitigation policy goals. Today, the province and its leading utility Hydro-Québec advance a vision of a New England-Québec regional renewable energy transition anchored by new high-voltage transmission lines between Québec dams and centers of energy demand in southern New England.

Massachusetts and Eversource Energy: A Demand for Cheap and Low-Carbon Electricity Joins With an Investor-Owned Electric Utility

Québec's interest in the Northern Pass transmission line is inseparable from the interests of the provincial utility Hydro-Québec. Massachusetts and Eversource have both supported the Northern Pass; however as an investor-owned utility, the company is ultimately responsible to its shareholders.

Eversource began to plan the Northern Pass line from Québec to Massachusetts after electric restructuring had shifted the corporation's role in electricity markets (see Vogel,

this issue, on electric restructuring and its legacies). Before the late 1990s, Eversource, then Northeast Utilities, was a parent holding company for several vertically-integrated utilities selling electricity generation, transmission, and distribution. As the U.S., followed by individual states, moved away from the old model of regulated utilities with restructuring legislation, Northeast Utilities and its subsidiaries were forced to sell off generation assets. The corporation divested from all of its generation in Massachusetts and Connecticut by 2006. The process was contested and delayed in New Hampshire, but Eversource sold its last generation assets in New Hampshire in 2018 (ISO-NE 2019).

Without the ability to generate and sell electricity, Northeast Utilities, later Eversource, needed other sources of revenue. While its utility business was reduced, corporate deregulation of electric utilities now allowed the company to own complex corporate conglomerations of different business types across unconnected geographical locations and to pursue a range of business activities. In 2003, Northeast Utilities "joined[ed] the New England ISO and the Federal Energy Regulatory Commission (FERC), as well as some of the state utility commissions, in advocating a more robust regional transmission system" (Northeast Utilities 2004, 6). And in 2005, the corporation made "the key strategic decision to exit all of our competitive businesses... and focus exclusively on our regulated companies," with special emphasis on "poles, wires and pipes" (Northeast Utilities 2006, 4). Transmission, the 2005 annual report emphasized, would be the company's growth engine[2]. Under restructuring, transmission was required to be open access, allowing any electricity generator or buyer to transmit electricity, and the regulator became the Federal Energy Regulatory Commission (FERC) rather than state utility commissions. However, FERC recognized that each transmission line still held a monopoly along its route, and that more transmission was needed for the competitive generation marketplaces to work (Joskow 2019). FERC thus regulated transmission tariffs to ensure a profitable return for the owner and worked to create incentives for companies to build across transmission bottlenecks. Although transmission lines were no longer part of utilities, a parent holding company could own both a utility and a transmission company (see Vogel, this issue).

These reforms occurred over the backdrop of growing sustainability initiatives and public demands for the widespread transition to renewable energy sources. Since the Global Warming Solutions Act (GWSA) in 2008, Massachusetts has committed to reduce its carbon emissions by 25 percent below 1990 levels by 2020 (see Autery and Silverstein, this issue). Following the GWSA and other Massachusetts and Connecticut carbon reduction legislation, Northeast Utilities announced, "a memorandum of understanding ... to build a new high-voltage, direct current, participant-funded transmission line from Québec to central or southern New Hampshire... [which] could allow New England to meet nearly one-third of its greenhouse gas reduction goals" (Northeast Utilities 2009, 9).

In 2011 federal regulations were issued to reform the process for regional and interregional transmission plans and to increase competition in transmission building (Joskow 2019). The Independent System Operator of New England (ISO New England, or ISO-NE) started implementing these regulations, FERC Order 1000, in 2015. The regulations were intended to make incumbent utilities, like the regulated utilities held by Eversource, face more competition

on interregional and regional transmission projects, while incentivizing new investment, thereby speeding the development of high voltage transmission and facilitating the switch to low-carbon resources (Vogel, this issue).

In August 2016, as a part of its carbon reduction effort, the Massachusetts legislature passed the Act to Promote Energy Diversity (H.4568) and issued the Section 83D Clean Energy Request For Proposals (RFP) offering an above-market price for 9.45 TWh annually of 'clean energy' by a 2020 operational deadline.

The RFP was a neoliberal strategy that Massachusetts employed to contract competitive bids, and laid the bulk of the projects' risks and rewards onto bidders rather than the state. Typically, government involvement in either reconfiguring property relations or financing is necessary for a large infrastructure project (Ekers and Prudham 2018; Bridge 2014). By offering long-term contracts, the RFP allowed Massachusetts to financially support large infrastructure developments with less risk incurred to the State.

The RFP sought "clean energy generation," defined as "either: (i) firm service hydroelectric generation from hydroelectric generation alone; (ii) new Class I RPS eligible resources that are firmed up with firm service hydroelectric generation; or (iii) new Class I renewable portfolio standard eligible resources" (Mass DOER 2017, A). The state needed firm low-carbon power to balance with other changes to their grid and acknowledged that the likely result of the RFP would be merchant transmission of hydropower from Canada.

Canadian imports to southern New England could reduce the amount of carbon emitted from Massachusetts' electric power system considerably. New England has not constructed new nuclear generation facilities in decades; replacing the baseload power from retired nuclear, which has supplied nearly 30 percent of the region's electricity for decades, without increasing carbon emissions, will be difficult without hydropower imports (Gellerman 2019). From 2006 to 2016, New England's transition from predominantly coal- and oil-based power to natural gas electricity generation reduced carbon emissions more than all of the alternative generation sources combined according to ISO-NE (2017). Wind and solar capacity only make up single digit shares of electricity generation in the region, though there is promising growth in offshore wind projects being proposed (ISO-NE 2019). Once built, 1.200 MW of Canadian imported hydropower would have reduced Massachussetts' overall carbon emissions by an estimated 5.4 percent, or 5.1 million metric tons (Breslow 2010, 45; Silverstein and Autery, this issue)).

The Massachusetts RFP was dependent on Hydro-Québec having enough low-carbon power in time and large landowners like Eversource being in a position to site transmission projects. While the competitive bidding process from Massachusetts invited the proposals of other Class 1 eligible renewable resources and competitive transmission proposals, Eversource had the best position to construct transmission in time. Still, Eversource was under pressure to propose the Northern Pass earlier than several similar transmission plans looking to fulfill Massachusetts' 20-year contracts

In 2017, Eversource and Hydro-Québec submitted two bids to the Massachusetts Clean Energy RFP for the Northern Pass. One was for a combination of Hydro-Québec hydropower and Gaz Metro wind, and the other was for 100 percent Hydro-Québec hydropower. By this time, the Northern Pass had already downsized to a 1,090 MW capacity (Evans-Brown 2015).

In January 2018, the Baker-Polito administration selected the exclusively hydropower Northern Pass bid to meet their call for proposals. The Northern Pass was likely selected because of the proposal's cost and the expected speed of getting the powerline in-service.

Critics of the RFP had been against these contracts before proposals were submitted. The New England Power Generators Association (NEPGA), whose members are predominantly natural gas companies, had argued against Massachusetts contracting with Hydro-Québec claiming that HQ was unfair competition for domestic producers (NEPGA 2013; Breslow 2010, 45-46; Dolan 2016). Both ISO-NE and NEPGA had warned that state-issued contracts could drive market generators across New England into retirement (ISO-NE 2015, NEPGA 2013). When Northern Pass won the contract, the President of NEPGA issued a press release in which he criticized Eversource and Hydro-Québec of undoing the goals of electric restructuring and competitive generation by using predetermined government contracts to return to the days of regulated utilities (Dolan 2018).

Private ownership of large stretches of land allowed Eversource to plan and develop interregional transmission interconnections, without the backlash that generally comes about from planned development on public lands. Eversource Energy owned three major utilities and electricity restructuring allowed a series of further consolidations, including the one that created Eversource, and Eversource is now the largest electricity distributor in New England. In 2018, Eversource owned 4,352 miles of transmission and 57,970 miles of distribution to serve over three million customers across New Hampshire, Massachusetts, and Connecticut (NEPOOL 2018, 16); for comparison, Avangrid owned 3,050 miles, and 27,045 miles for their million customers across Maine (for more on Avangrid, see Frederic, this issue). The route of the Northern Pass would largely be on real estate acquired from the merger with Public Service Company of New Hampshire in 1992.

The Northern Pass and New Hampshire: An Infrastructure and Jurisdiction In Between

On the northern end of the proposed Northern Pass, the province of Québec and the provincial utility giant Hydro-Québec worked together to advance hydropower exports. Indigenous nations within the political-geographic borders of Québec could do no more than negotiate for better compensation. On the southern end of the proposed Northern Pass route, the state of Massachusetts and investor-owned Eversource Corporation developed a mutually beneficial plan to increase hydropower imports to meet carbon emissions reduction goals, while ensuring profit to two arms of Eversource. In between these two jurisdictions, however, lay New Hampshire, an independent jurisdiction with no self-interest in being a conduit for electricity to run from Québec to Massachusetts, and no leading state-based corporation to advance the cause as crucial to New Hampshire's development or "green" future. The crucial questions in New Hampshire were whether the deals offered to compensate for the local impacts of the Northern Pass should successfully win state support, and whether the forums for decision making would allow opponents the traction to stop the project, despite its promised benefits to the state's northern and southern neighbors.

The plan to develop the Northern Pass was organized after the Global Warming Solutions Act in Massachusetts pledged a new wave of investment in low-carbon electricity. *Northern Pass Transmission, LLC* was incorporated in 2008 as a subsidiary of Eversource's *Eversource Energy Transmission Ventures, Inc* to build a high voltage transmission line from Canada to Massachusetts in partnership with Hydro-Québec. The original application for the Northern Pass would run a high voltage direct current line from the international border to Franklin, New Hampshire, approximately 140 miles, on towers ranging from 90 to 135 feet, with some sections buried. From there the power is sent to Deerfield, New Hampshire, on a high voltage alternating current line running an additional 40 miles. The right-of-way clearings for this project - that is, the width of trees that would be cut to allow the line to travel through - were expected to range from 400 to 1,500 feet (U.S. DOE 2010).

In addition to New Hampshire permits, there were also US federal permits required for the project. The original application for a 1,200 MW transmission line required a Presidential Permit for the project to cross the Canadian border. The Presidential Permit states that without hydropower transmission, New England would have to build up and expand natural gas infrastructure to meet the region's energy demand. That is because natural gas electricity generation depends on gas imports to New England, and during times of peak winter heating demand, natural gas supplies are insufficient to meet electric generation demand. Each winter, during severe cold spells, electric generation plants in New England must turn to carbon-polluting oil and coal for a number of days or weeks.

Northern Pass Transmission, LLC submitted its initial application to the U.S. Department of Energy (U.S. DOE) in October of 2010 (U.S. DOE 2010). The environmental impact of the Northern Pass was assessed by several federal agencies[3] as well as the New Hampshire Office of Energy and Planning. Despite the siting impacts of the Northern Pass, the project received the Presidential Permit, as officials from both federal agencies and the New Hampshire Office of Energy and Planning regarded these environmental effects as necessary to achieve improvements to New England's energy grid including resource mix diversification, a reduced carbon footprint, and non-intermittent power supply (U.S. DOE 2017.)

Anticipating a battle over siting the binational power line, New Hampshire passed bills in the House and Senate to increase the scrutiny facing the transmission projects (New Hampshire General Court 2012, 2014). For example, House Bill 648, passed in 2012, limited the State's use of eminent domain for transmission projects. Only transmission projects which were eligible for Regional Cost Allocation from ISO-NE could still use the power of eminent domain, making land acquisition for merchant transmission lines like the Northern Pass more difficult. Another law, Senate Bill 245, changed the role and makeup of the state's Site Evaluation Committee. Changing the role and makeup of the New Hampshire Site Evaluation Committee was a critical step, because this committee is the main hurdle for siting energy facilities in New Hampshire. Approval from the state Site Evaluation Committee is a permitting step applied only to large projects[4].

In December 2015 changes to the Site Evaluation committee from Senate Bill 245 went into effect, reforming the public participation process, reducing the size of the Committee,

providing additional funding and staffing, and requiring that energy projects "serve the public interest" (Kroot 2019, 127- 128). These modifications to the SEC would prove effective in facilitating a robust public oversight process and empowering opposition against the project. When the Senate Bill reforms went into effect the Site Evaluation Committee was tasked with considering how large project proposals are likely to affect land use, employment, and the regional economy, as well as how proposals are viewed by municipal and regional planning commissions. These criteria allow the Committee to determine if infrastructure development in New Hampshire can be deemed 'orderly development', which enabled the Committee to intensely scrutinize any potentially negative impacts of the Northern Pass.

New Hampshire's Site Evaluation Committee received Eversource's application in October 2015. A broad coalition of regional interests involved themselves in New Hampshire's Site Evaluation Committee deliberations. Defending their various and often divergent interests, New Hampshire-based generating companies, tourism and real estate businesses, impacted homeowners, First Nations representatives[5] and environmental organizations (Conservation Law Foundation, New Hampshire Sierra Club, Appalachian Trail Conservancy, Friends of the White Mountains, and the Society for the Protection of New Hampshire Forests) joined in alliance against the Northern Pass (Evans-Brown et al. 2017; Casey 2017; Nerestant 2016; Forcier 2016; for more see Kroot, this issue). There were 154 witnesses, 2,176 exhibits, and over 70 days of testimony (Rayno 2018).

A lengthy debate within the Site Evaluation Committee fortified opposition within New Hampshire. While the Site Evaluation Committee deliberated, negative media attention towards the Northern Pass increased. A growing chorus of voices from across the state opposed towers and transmission lines running through remote and rural areas in New Hampshire. The New England Power Generators Association, which included a number of New Hampshire-based generators, argued that New Hampshire's own electric exports provided crucial employment, and could be threatened by the Northern Pass project. New Hampshire has exported electricity since the Seabrook nuclear generator came online in 1990 (U. S. EIA 2019), and many generators could not compete with imports from Canada (ISO-NE 2015). The power generators group warned the Site Evaluation Committee that the Northern Pass Transmission Project "would require existing resources in New Hampshire and Maine to permanently retire" (NEPGA 2018, 29).

As negative media attention towards the Northern Pass increased, it became a prop for various politicians in the state. The project was planned under two governors, Maggie Hassan (2013 -2017) and Chris Sununu (2017 - present). When Governor Hassan (D) ran to unseat Senator Kelly Ayotte (R), Ayotte attacked Hassan in a campaign commercial for taking illegal donations from labor unions that supported the Northern Pass, which caused her to flip-flop politically on the project. Ayotte, known for breaking with her party nationally to support environmental protections, advocated for burying the entire power line, an alternative that would have made the line uneconomical.

On February 1, 2018, less than a week after Massachusetts selected the project, the New Hampshire Site Evaluation Committee denied *Northern Pass Transmission LLC* with a

unanimous vote that the project would interfere with orderly regional development. At the time, the decision was criticized by Governor Chris Sununu as predetermined and politicized. Although Eversource appealed, New Hampshire opposition remained firm as the decision was unanimously upheld by the New Hampshire Supreme Court in 2019. Respecting the court's decision, Sununu issued a statement that other clean energy projects in New Hampshire had potential to lower regional electricity rates. Meanwhile, Eversource lost hundreds of millions of dollars from the defeat of their transmission siting (Casey 2019). Despite initial approval from the federal government and encouragement from provincial officials in Québec and State officials in Massachusetts, after a long and grueling deliberation process, the New Hampshire Site Evaluation Committee (SEC) was able to reject Eversource's binational electric transmission project.

Broader Lessons: Spaces and Forums for Opposition to Neoliberal and Expansive Energy Development

Québec and Massachusetts, Hydro-Québec and Eversource, supported the Northern Pass. It was a single committee in the small but independent jurisdiction in-between, New Hampshire, that stopped the transmission line project. We believe this was an important, if not uncomplicated, democratic victory. New Hampshire's institutions gave power to legitimate and marginalized interests and voices within and outside the state against the dominant regional corporate and government interests advocating for the Northern Pass.

What does this history tell us about the ways that environmental and energy policy and projects should interface with potential political opposition? One set of lessons arises from the intersection of political-geographic organization and the materiality of infrastructure: climate change may be global, but the infrastructure to deliver energy, whether fossil fuel or renewable energy, goes through particular jurisdictions. New Hampshire provided a tangible and legal political-geographic space that had the authority to stop a major region-serving transmission project.

A second set of lessons arises from the kind of forum that New Hampshire offered. In the world of energy transition literature and policy, much of the effort focuses on competitive markets, price-based incentives, or competitive bidding processes. In contrast, New Hampshire's Site Evaluation Committee was a more traditional permitting and regulating forum. Both of these highlight important spaces and forums in which non-dominant interests can influence energy transitions. Scholars have recognized that high voltage energy transmission doesn't offer the local benefits of generations and so often pits local engagement against large projects which frustrates local activists who do not see their opinions procedurally listened to (Knudsen et al. 2015).

Transmission Spaces: In-Between Material Infrastructure and Jurisdictions as Critical Sites for Political Opposition

Geographers and historians who study energy development agree that the spatial flows of energy resources are inherently political, and the prospect of new energy flows connect

geographically and socially dispersed groups in conversation (Calvert 2016; Jones, 2016). Power lines crossing borders are tangible manifestations of capital and energy flows. Whereas money and electricity can seem intangible and hard to influence in the decision-making centers of Montreal, Boston, New York or London or Frankfurt, the materiality of the transmission lines through remote and rural areas make them susceptible to public scrutiny and political opportunism against peripheral development. Because transmission lines through a rural or remote area so obviously go to *somewhere else*, they are easily seen and portrayed as incursive, extractive development, controlled by and for the benefit of powerful outsiders. The Northern Pass conflict was not the first or last over a transmission project connecting to southern New England. Hydro-Québec power lines crossing the national border were bombed on the Québec side by eco-terrorists in 2004 shortly before US President George W. Bush visited the province— with the accusation surfacing from those who were supposedly responsible that the United States is exploiting the natural bounties of Québec (Canadian Broadcasting Corporation/Radio Canada 2004).

Political and legal opposition to the sites of flows of energy or the sites of prospective flows, such as the opposition to the Northern Pass, reveal the dominant narratives for various participants and their interests in the future of the energy system. Participants in transmission siting have particular sway over the development of the region as a whole. The power of opponents who live and work in between the sites of energy production and consumption along transmission lines is particularly enhanced if they live in a separate political jurisdiction that control infrastructure siting, as was the case of New Hampshire in the Northern Pass deliberations.

The difficulty of siting energy transmission across jurisdictions and administrative territories with multiple independent sources of legal authority might be argued to go too far; state jurisdiction over transmission siting, and protectionism on behalf of those state governments, has been cited as a chief cause of underinvestment in the grid (Vaheesan 2012). Indeed, some argue that FERC and other regulators do not provide adequate incentive for investors to take on interregional transmission projects (Joskow 2019). Transmission improvements have the potential to push inefficient generators out of the market and dramatically reduce carbon emissions (Fairley 2020). Underinvestment in high voltage transmission leaves North America behind other regions in the transition to low-carbon energy (Fairley 2019; Farahmand et al. 2015). Conversations about where energy should be produced, how far it should be sent around, and which boundaries it should cross complicate and delay the transition to low-carbon energy.

However, the discretion of local political authorities over interjurisdictional transmission can protect the interests of their constituencies and democratize the energy system. The independence of a geographically in-between jurisdiction can provide a forum not only for internal opponents concerned about place, landscape, environment or other local concerns, but also for opponents from the end-point jurisdictions— in this case, from Québec and Massachusetts— who do not have the political sway to affect decision making in their own capitals. The Site Evaluation Committee deliberations gave power to a broad coalition of opponents from Québec, New Hampshire and Massachusetts, who gathered in New Hampshire.

In a Time and Place of Neoliberal Electricity and Peripheral Development, Traditional Regulatory Decision Making Provides Unique Opportunities for Democracy

As nations, states and provinces set emission reduction goals and integrate climate change projections into electricity planning, the policy and market frameworks shape the form in which changes can be implemented, negotiated, and contested. In the past several decades, electric power planning and regulation in New England and Québec, as elsewhere in the world, have undergone considerable restructuring. For the most part this restructuring has trended in neoliberal directions, whereby: (1) the production and allocation of generation resources are driven increasingly by market forces and competition, through price mechanisms, rather than direct utility planning or government oversight; (2) investors are able to organize electric utilities and other companies in the locations and groupings of investments they choose; and (3) corporations have the potential to either generate an unlimited profit, or they risk bankruptcy (see Vogel, this issue).

The Request for Proposals from Massachusetts seeking "clean" energy was a hybrid of state and utility planning, and neoliberal design. On the one hand, it was designed to meet particular state objectives of acquiring low-carbon power, and it required Massachusetts utilities to absorb that cost, while also ensuring their business survival and profitability by allowing them to put that cost onto their customers' rates. On the other hand, the RFP was set up as a competitive bid process that allowed an array of proposals and approaches to meet an abstract performance target of 1,200 MW of clean power. This opened a competitive market for corporations to find their own route for high voltage transmission and to take the risks involved. Massachusetts also held other bidding processes for solar and off-shore wind power development but directed the largest request for the cost-savings from Canadian imports. The competitive bid process further allows the state's citizens and distribution utilities to take very little direct risk when selecting a bid.

Traditional regulatory bodies that deal with infrastructure siting fill a role which bidding processes or market incentives leave unattended, by examining the project's secondary impacts. The Northern Pass was chosen by the standards of Massachusetts' competitive bid process; however, the challenge of actually permitting the project and evaluating its impacts became the responsibility of the New Hampshire Site Evaluation Committee. And it was only in that traditional regulatory forum, uninfluenced by neoliberal reforms, that a host of interests would be listened to and affect the trajectory of New England electric planning.

Forums for public participation and expert decision making to oversee electric power development are necessary to protect the interests and values of particular groups, environments and localities within a larger regional electric grid. Bidding processes can help the transition to low-carbon energy happen efficiently, but traditional decision-making bodies are necessary to ensure that development is deliberated and inclusive.

Conclusion

New Hampshire's denial of the Northern Pass prevented southern New England from bringing in Canadian imports of electric power. New Hampshire's dissent from Massachusetts' energy plans could dramatically shift the investments and plans that Massachusetts can implement to reach its carbon reduction commitments— likely pushing transmission to other locations, perhaps Maine, and possibly pushing more effort into sectors other than electric power. New Hampshire's intervention also, at least for now, jeopardizes the export profits desired by Québec.

This project would likely have avoided major controversy if Québec and Massachusetts were geographically contiguous. Even if the social and environmental impacts of large hydropower (cf. Desmeules and Guimond, this issue) and other sources of low-carbon electricity like large nuclear plants are politically palatable, the transmission infrastructure between locations of production and demand may not be— especially if transmission must be placed in a different, independent jurisdiction entirely. Electricity generation and an available market are not preventing the success of such projects. The Northern Pass Project has reiterated that transmission routing and land use deliberation may be the greatest challenges during low-carbon energy proliferation. But importantly, this should not be seen only as a problem— it is also an opportunity for energy development to take the concerns of people who live in transmission spaces into account.

Studying the successes and failures of energy policies and projects necessitates a thoughtful review of history and socio-cultural considerations through case study research (Hirsch and Jones 2014; Burns 2017). The defeat of the Northern Pass is a valuable case study for future multijurisdictional and binational infrastructures, geographic expansions of electric power grids, and other interconnections between peripheral development and demand centers.

The Northern Pass's procedural history shows the importance of independent jurisdictions and public deliberations in the implementation of infrastructure projects necessary for the low-carbon energy transition. Low-carbon energy development and high voltage transmission infrastructure will cause an increasing number of conflicts among stakeholders looking to reconfigure energy systems. In future attempts to import Canadian hydroelectricity to southern New England, transmission projects are likely contingent on the support they find from communities along the routes of transmission. Mechanisms to negotiate these conflicts quickly and fairly will ease the transition to low-carbon energy.

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Acknowledgements

We would like to thank our research team led by Dr. Eve Vogel, including then fellow undergraduate students Emily Chang, Steve Hayes, Ahmad Bakrin, Molly Autery, and Clara Silverstein, as well as Dr. Regine Spector and other faculty and undergraduate students from the Electricity, Sustainability, and Flexibility research project, which was funded by a UMass Institute for Social Science Research Sustainability Seed grant in 2017-18, and began our engagement in this project. We also thank a U.S. Geological Survey for a Grant/ Cooperative Agreement for funding a workshop in Burlington, VT in May 2019 that launched this special issue. We thank Dave Massell and Sam Evans-Brown for their time, mentorship and knowledge they shared generously at that workshop. Josh thanks Dr. Mark Hamin for allowing him to earn graduate credit while continuing this research project. We appreciate the other organizations that hosted our research graciously: the American Association of Geographers, the North East Graduate Student Water Symposium, the National Council for Geographic Education, and the Canadian Association of Geographers. We thank three external reviewers reviewers and editors Eve Vogel, Matt McCourt, and Steve Silvern for greatly improving this work, and also thank countless indirect contributions from journalists, engaged citizens, experts across the energy sector, and peers in the geography field.

Endnotes

[1] From the dawn of electrification in the 1880s, North America underwent sprawling transmission development to form giant interconnected grids in the eastern and western sides of the continent, called the Eastern and Western Interconnections. These two systems tied 47 of the lower 48 states together with five bordering Canadian provinces. Independent-minded Québec and Texas politicians and technocrats kept interconnections with their neighbors to a minimum in order to maintain sovereignty over their electrical power systems (Cohn 2018).

[2] These transmission markets are critical business for Eversource, who forecast a 9.8 percent compound annual growth rate for their transmission rate base from 2016 to 2020 with the success of Northern Pass Transmission (Eversource Energy 2017).

[3] The U.S. DOE's Office of Electricity Delivery and Energy Reliability received input from the White Mountain National Forest, the US EPA (Region 1), the U.S. Army Corps of Engineers, and the New Hampshire Office of Energy and Planning (U.S. DOE 20170.

[4] For transmission projects this was determined as longer than ten miles or in excess of 200kV with few exceptions (New Hampshire General Court 1991).

[5] Innu Nation activists had joined environment and forestry representatives to defend against deforestation within Québec from the Québec-New Hampshire Interconnection at Québec's Bureau d'audiences publiques sur l'environnement (BAPE) hearings in the Fall of 2016 (Nerestant, 2016; Forcier 2016) before traveling to speak at the Site Evaluation Committee. The Pessamit band of the Innu Nation filed to intervene in the Northern Pass proceeding in November of last year, but its request was denied by New Hampshire's energy siting board, which determined the band failed to show that a new powerline connecting to New England would impact their rights and interests. The Pessamit community activists continued their efforts to tell their story to New England electricity consumers though and partnered with the Sierra Club to fund a tour through Massachusetts and New Hampshire to meet with legislators and other state officials (Casey 2017).

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