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The Northeastern Geographer is an annual publication that replaced the *Proceedings of the New England-St. Lawrence Valley Geographical Society*. The *Proceedings* were published from 1972 until 2006. *The Northeastern Geographer* publishes research articles, essays and book reviews on all geographical topics but the focus of the Journal is on the Northeast United States, the St. Lawrence Valley and the Canadian Maritime Provinces. All research articles submitted to the Journal undergo peer-review.

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Special Issue: Québec Hydropower for a Green Massachusetts? Connections, Contradictions and Contests of Electricity

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INTRODUCTION TO THE SPECIAL ISSUE:
Québec Hydropower for a Green Massachusetts? Connections, Contradictions, and Contests of Renewable Electricity

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This Special Issue illuminates the profound and complex relationship between a serious policy effort to increase renewable electricity as a way to reduce carbon emissions in a densely populated economic region, and the environmental and social changes and political conflicts in more remote rural regions where the necessary infrastructure must be built. As described in the Acknowledgments section at the end, this Special Issue has been a five-year effort in which New England-based undergraduate students who care about sustainability, justice, and critical analysis, undertook much of the research. Unlike some related studies, the case study that animates the articles is located in the global North, and the remote and peripheral regions are farther north (though not the Far North). The issue is being published in the *Northeastern Geographer* because the geographies of the case study are focused on New England and Québec, closely aligning with the journal's purview. However, the case study itself, and many of the individual authors' insights, are relevant to questions about the wider sustainability and justice of the push for renewable power. In this Introduction, I provide broader theoretical and practical context for the articles, and for the issue as a whole. I emphasize the spatial and material linkages, political economies and political ecologies, and divided political geographies, inherent in the use of large-scale renewable electricity from remote locations as a route to climate mitigation. I refer to these here as the *connections*, *contradictions*, and *contests* of electricity.

This issue Introduction proceeds in four parts. Section I provides a brief literature review and draws out the themes of connections, contradictions and contests of renewable electricity. Section II takes us to Québec, the origin of the electricity that is the focal point of this Special Issue, orienting the readers to Hydro-Québec's current major hydropower construction project on the Romaine River, in the territory of the Innu First Nation, a river they call the Unamen Shipu. The third section outlines the seven articles in the Special Issue, which follow geographically from electric policymaking in Massachusetts to transmission infrastructure proposals first in New Hampshire and then in Maine, to the Romaine Unamen Shipu River in Québec. Section IV provides an analysis of the collective contributions of the articles to the themes of connections, contradictions and contests of renewable electricity that I introduce in Section I. A conclusion suggests some lessons and next steps for scholars and advocates of energy sustainability and justice in this region and beyond, and an Epilogue provides a summer

2022 update on the transmission line through Maine, the current status of Massachusetts' stalled effort to import more Hydro-Québec power, and related issues raised by the articles.

I. Critical Geographies of Renewable Electricity: Connections, Contradictions, and Contests

As climate change brings more frequent fires, floods, droughts and other disasters, along with the promise of much worse future calamities (e.g. Struzik 2020; DeConto et al. 2021; Masson-Delmotte et al. 2021; IPCC 2022), it is imperative that carbon emissions are drastically lowered. Electricity is a key sector in which this needs to happen, as most electricity is generated by burning fossil fuels, and in many places electric generation constitutes about one-third of greenhouse gas emissions. Moreover, the best chance of reducing emissions in other energy-consuming sectors like transportation and heating and cooling of buildings in many cases depends on electrification, so reducing emissions across those sectors also entails emissions reductions in electric generation (Farnsworth et al. 2018; Cleary 2019; U.S. EIA 2021).

For these reasons, there is in many places across the world a push for an energy transition to low- to no-carbon electricity. Much of the hope rests on replacing the burning of fossil fuels with renewable energy that comes from biophysical systems and dynamics such as wind, sun, and moving water.

Many scholars, policymakers and advocates have waxed hopeful about the potential for non-fossil-fuel energy to be more sustainable, democratic and just (e.g. Becker and Naumann 2017; Burke and Stephens 2018; Knuth 2019; Prakash and Girgenti 2020; Vanegas Cantarero 2020; Thomas and Erickson 2021). There are enormous negative ecological and social impacts of climate change, and deep spatial and social inequalities of fossil fuel energy (Healy, Stephens, and Malin 2019; IPCC Working Group II 2022). Mitigating climate change and changing our energy systems are necessary goals for any overarching plan to address a wide array of unsustainabilities and injustices (Sultana 2022).

However, geographers and critical scholars from other disciplines have also raised a number of important considerations about the wider sustainability and justice implications of the push for renewable electricity as it transforms social and natural landscapes. Their work has contributed to the rapidly growing literatures on energy geographies (e.g. Bridge et al. 2013; Huber 2015; Calvert 2016; Harrison and Popke 2017; Baka and Vaishnava 2020), sustainable energy (e.g. Mulvaney 2020; Vanegas Cantarero 2020), just energy transitions (e.g. Heffron and McCauley 2018; Jenkins et al. 2021; Sovacool 2021), and geographies of energy infrastructure (e.g. Bridge, Özkaynak, and Turhan 2018; Furlong 2020, 2021). This Special Issue taps and builds on their work to contribute to the effort to think critically and integratively about the challenges to achieving a just and sustainable transition to renewable electricity.

I draw out three themes from this critical literature that I believe can guide consideration of the wider sustainability and justice of shifts toward renewable electricity: spatial and material linkages (connections); political economies and ecologies (contradictions); and divided political geographies (contests). Section IV in this Introduction returns to these themes, highlighting the collective contributions of the issue's authors to these three critical themes.

Connections Of Renewable Electricity: Spatial And Material Linkages.

Both theoretically and empirically, geographers and other critical scholars have shown that energy transitions in general, and renewable energy development, production, and infrastructure more specifically, entail diverse and profound material and spatial changes. These changes are driven by, and alter, social, cultural, political, economic and environmental processes, practices, and relationships. For example, Huber and McCarthy (2017) argue that many renewable energies are placed in rural and remote locations, often in the global South, and often in the lands of indigenous peoples or other marginalized populations, harming access to traditional lands and resources, while benefits accrue mainly to urban and economic centers and the economies of the global North. Renewable energy development is often linked to a variety of land and resource dispossessions (e.g. Kramarz, Park, and Johnson 2021; Sovacool 2021). Riofrancos (e.g. 2019) among others has shown that renewable electricity often depends on a host of materials that come from mines and other extractive industries with severe local environmental impacts, far removed from the consumers celebrating their new green energy. Construction of renewable electricity may require movement of culturally distinct workers into remote areas, the constriction of movement of local or immigrant groups, or the development of socially and culturally unequal labor conditions that reinforce colonialism (Desbiens 2013; Mitchell 2013; Guimond and Desmeules 2018). Renewable electricity production may require long-distance transmission and transportation infrastructure, with their own significant footprints (Jones 2013, 2016); it may also produce significant waste (O'Sullivan, Golubchikov, and Mehmood 2020). A switch to renewable electricity may reshape energy use and consumption in unexpected ways that in some cases can exacerbate environmental and social impacts or inequalities (Harden 1996; Nye 1998; Smil 2010; Jones 2016; Boucher and Mérida 2022). More broadly, renewable energy transitions can have impacts on wider regional and global political economies and the people, places and ecosystems that depend on them (Newell and Mulvaney 2013). A critical analysis of the wider justice and sustainability of renewable electricity development must include tracing these connections of material and spatial linkages (cf. Healy, Stephens, and Malin 2019 for a model of similar tracing for a fossil fuel transition).

Contradictions of Renewable Electricity: Political Economies and Political Ecologies

Geographers and others have also shown that renewable energy is inherently entwined with (and constitutes and is constituted by) political-economic structures and systems and political-ecological relationships. I draw on this literature to highlight three kinds of what I call contradictions, political-economic and political-ecological entwinements of renewable electricity development with capitalist economic development that can lead to negative impacts on wider sustainability and justice[1]. These three contradictions are: renewable electricity as a socioecological fix; funding and finance of renewable electricity; and government institutions and policies that promote renewable electricity.

One key contradiction illuminated by critical geographers is the role of renewable electricity development as a *socioecological fix*. A central insight is that the deployment and operation of renewable energy infrastructure is driven and shaped not only by a desire for greenhouse gas

reduction for climate mitigation but also, like most other kinds of infrastructural and economic development, by investors' need to secure new targets of reliable profit for ever-increasing capital accumulation. Continued capital accumulation often relies on new rounds of built infrastructure in new or remade physical spaces (a "fix" for capital), producing uneven socioecological impacts—on livelihoods, lands, ecosystems, people, and cultures (McCarthy 2015; Ekers and Prudham 2017, 2018). Renewable electricity development in these new spaces is often promoted in the name of local or regional economic development, indeed is commonly lauded as sustainable development precisely because the energy is renewable, and also as just, because it brings electricity and development to new spaces and peoples (e.g. IEA 2021b). Yet capital's requirement of ever-expanding biophysical materials and spaces belies goals of ecological sustainability. As well, deploying and operating renewable electricity in remote, relatively un-developed lands and waters can negatively affect livelihoods and cultures dependent on productivity of and access to ecological systems, and, like peripheral development the world over, often has a host of negative and uneven social, cultural, and environmental effects. For these reasons renewable electricity development may run counter to social justice as well as sustainability (e.g. Labban 2012; McCarthy 2015; Harrison and Popke 2017).

Another contradiction of renewable electricity emphasized by geographers and other critical scholars has to do with *funding and finance*. A transition to renewable electricity requires that the infrastructure, land, resources, labor, etc. that are needed to build and operate renewable electricity are paid for. The amount of funding needed for a full energy transition from fossil fuels to renewable energy is enormous; as just one example, the International Energy Agency (IEA 2021c) estimates $4 trillion must be invested in low-carbon energy by 2030 in order to limit global warming to 1.5° C. Many critical scholars of political economy have noted that thanks to the legacies of neoliberalization and financialization over the last several decades, investments in renewable energy infrastructure today often rest on financialized debt (Baker 2021). This means that the flows of money and capital that enable and are produced by renewable electricity construction, operation and sales are increasingly opaque, potentially financially volatile, and hard to regulate. Furlong (2020) argues that there are also considerable continuities with postwar development, which also was often financed by debt. And, certainly, renewable energy is not unique among energy development projects in resting on financialized debt; rather, the point is that a renewable fuel does not mean a more just financing system. Despite the promises that overbuilding might be reduced with electric restructuring (see Vogel, this issue), renewable electricity development under neoliberalism and financialization today may risk instead an accelerated and exaggerated manifestation of what we have long seen: over-building of energy infrastructure in places where extractive profits are especially remunerative (with profits no longer limited by utility regulation), under-maintenance of that same infrastructure (with profits no longer guaranteed by regulation), and the potential for even more accelerated future debt crises for local, subnational, and national governments when development busts follow energy booms.

A third contradiction where renewable electricity development may conflict with sustainability and justice arises because renewable electricity placement, operation and funding must be regulatorily approved, facilitated, protected, and often incentivized by g*overnment institutions and policies*. This means that renewable electricity is also entwined in contradictory ways with politics

and government at multiple scales, levels, and locations. For example, if renewable electricity infrastructure is directly built, financed or subsidized by governments, it is often tied politically to ensuring that powerful or desired industries, companies or regions have access to cheap energy or investment opportunities (Hirt 2012; Vogel 2012; Klagge 2020). If governments instead must secure private-sector funding for electricity infrastructure, their electricity-promoting policies must ensure that investors are able to extract profit from public resources, their customers, or both (e.g. Baker 2021). These contradictory dynamics of course are not unique to renewable electricity; these are also important considerations for thinking about the sustainability and justice of electricity generated by fossil fuels and nuclear power, and of a host of other development resources (Mawdsley 2018). But recent changes in government and governance may make it even more difficult than in the past to oppose or mitigate impacts and contradictions. In the last 25 years or so, many regulatory frameworks and electric grids have undergone neoliberal restructuring, with rollbacks of direct government oversight and management, and re-regulation to support markets and competition. Reduced government regulations and new markets may be used to incentivize an energy transition, but the increasing control of governments and policy by financial institutions and interests may also undermine democratic participation, social welfare, and environmental protections (Beder 2003; e.g. Lambert 2006; Isser 2015; Newell and Phillips 2016).

These three contradictions provide highly useful analytical frames and questions that can illuminate issues of power, political economy, and political ecology, showing where to consider aspects of renewable electricity development that may lead to unjust and unsustainable outcomes.

Contests of Renewable Electricity: Divided Political Geographies

A third sustainability and justice consideration related to renewable electricity development that has been raised by geographers and other critical scholars is that the decision-making processes and forums of renewable electricity often inhibit full political participation. Poor, minority, and remote peoples, and non-capitalist concerns such as subsistence and cultural practices, for example, are likely to be underrepresented. Broader inclusion may better address the uneven impacts of renewable electricity.

The marginalization or exclusion of underrepresented people and interests has been a central concern addressed by the energy justice and just transitions literature. Scholars have written about a range of kinds of justice including distribution, recognition, procedural, spatial, restorative, cosmopolitan, and multispecies justice (e.g. McCauley et al. 2019; Celermajer et al. 2021; Jenkins et al. 2021). The focuses for many of these authors writing about energy justice are the inequitable access to energy, inequitable influence over energy siting decisions, and inequitable impacts of externalities from energy infrastructure, such as pollution.

In thinking through the implications on these kinds of issues of an energy transition, geographers have been especially interested to consider the extensive spatialities of renewable energy such as solar power, as this may cause landscape change, environmental impacts, and land dispossessions (e.g. Calvert and Mabee 2015; Baka 2017; Huber and McCarthy 2017). They have also focused on the rise in distributed energy systems, which some hope can be more inclusive and equitable (e.g. Thomas and Erickson 2021), while others offer more caution (Kruger and McCauley 2020).

A growing number of geographers and allied scholars have also suggested that the material outlay of infrastructure in local places provides an important gathering force for participation of polities who may be excluded in decision-making centers or by seemingly neutral market-driven processes (Bridge, Özkaynak, and Turhan 2018; Bosworth 2022). This may be important to enable people to grapple with the wider implications of renewable energy development.

Though this literature on geographies of energy justice is rich and robust, there are gaps in relation to the case study in this Special Issue. Few critical geographers or allied scholars have brought these kinds of questions to bear in analyzing the workings of large-scale electric grids or their governance institutions. Not many have critically examined the kinds of policy mechanisms that are common in the current effort to promote renewable power in many regional-to-continental electric systems today, such as the creation of wholesale markets for electric products and services, the development of renewable portfolio standards, and mandates for long-term power purchase agreements for low-carbon electricity (though there are growing forays e.g. Bakke 2017; Angwin 2020; Boyd 2020; Stokes 2020; Özden-Schilling 2021; Vogel and Vogel 2021). There has also been little systematic consideration of the political exclusion of relevant people and places that are within the same electric connection but in separate political jurisdictions (one partial exception is the analysis of the role of Nordic hydropower in the German energy transition, e.g. Farahmand et al. 2015; Sovacool 2017). There has also been little critical analysis of how different decision-making processes in different jurisdictions governs different components of electricity infrastructure such as generation plants versus transmission networks, and how this intersects with questions of justice and sustainability.

Together, these three considerations—*connections* of spatial and material linkages, *contradictions* of political economies and political ecologies, and *contests* of divided political geographies—point to ways to organize critical analyses when we consider the promotion and development of renewable electricity. What they do not suggest is that we should oppose efforts to promote renewable electricity until we can fully restructure current institutions, political economies, and decision processes. The authors in this Special Issue recognize that, as Dustin Mulvaney (2019, 2,4) writes in his book on solar power, "[A]ll forms of energy development have impacts or pose new or different risks to specific communities, ecosystems, and landscapes.... Identifying and resolving issues with... power supply chains, construction activities, operation, decommissioning, and end-of-life management can ensure more sustainable and equitable outcomes." In short, we need to provide integrated analyses in concrete cases to highlight choices and tradeoffs among materials, locations, interconnections, funding strategies, policies, and decision-making systems, and move forward.

In this Special Issue, our empirical focus is an approach to reducing greenhouse gas (GHG) emissions for one US state, Massachusetts. The core elements of this approach are: a state-based GHG reduction target; a mandated long-term power purchase agreement that will pay for a high-voltage, long-distance transmission line; siting deliberations and permits for the line that must be constructed in one of the northern New England states; and hydropower generated in and transmitted across indigenous territory by the provincial utility Hydro-Québec. This is a relatively mainstream, large-scale, capitalist, partially market- and partially regulatory-driven effort, advanced by a progressive jurisdiction with clear commitments to both GHG reduction

and to environmental justice. It is an important case study because this kind of effort is rapidly becoming a model (e.g. Dunn and French 2022).

The focus on hydropower is important too, as despite the popular and scholarly attention to wind, solar. biomass, and geothermal, hydropower remains the largest source of renewable power in North America and the world. Hydropower is also increasingly important in the energy transition because of its flexibility—its ability to stop and start quickly, offering the ability to balance intermittent resources like solar and wind (US DOE 2016; IEA 2021a; Miller, Simonelli, and Stark 2022). Today, much of the development of hydropower is happening in the global South. However, unlike oil and natural gas, electricity needs uninterrupted wire connections to flow. Much of the remaining new hydropower for US markets will come from remote Canadian rivers, many in indigenous lands (US DOE 2016; IHA 2021; Vine 2021). Thus, for those interested in supporting a just and sustainable energy transition in the North America, it is important to consider issues related to hydropower, especially Canadian hydropower[2].

II. Electric Power from the Romaine Unamen Shipu River

In a remote corner of northeastern Québec, the provincially owned electricity company Hydro-Québec is completing the last of four major dams on the Romaine River, or the Unamen Shipu River in innu-aimun language. The Romaine Unamen Shipu River is in the Côte-Nord region, that is, the north coast of the St. Lawrence River. It is also in the territory of the Innu First Nation, their Nitassinan, where Innu people used to travel up and down rivers annually hunting, fishing, gathering, and meeting, but now mainly live in communities, both in colonial settlements of reserves, and in cities (Massell 2011; Evans-Brown et al. 2017) (see maps, Figure 1). The river has been central to the lives, identities, culture, and livelihoods of the Innu people for millennia (Productions Perceptions 3i 2021).

Development of the Romaine River is playing out differently from the earlier development in the James Bay, a region of Québec made famous for Hydro-Québec development. The development of rivers that flow into the James Bay in the 1970s-1990s sparked major political conflicts that extended into the US. In the end, Hydro-Québec built most of its planned huge dams and reservoirs in the James Bay region, along with hundreds-mile-long access roads and transmission lines, with profound ecological and social ramifications. However, because of the controversy and its timing, James Bay development also led to one of the most generous comprehensive land claim settlements with indigenous people, with the Cree, the Inuit, and the Naskapi peoples. This was the first modern-day treaty in North America if not the world, often (though not always) lauded for its equitable, inclusive and generous compensation and mitigation package that was provided in exchange for ceded lands (Carlson 2008; Desbiens 2013; Evans-Brown et al. 2017).

In the Côte-Nord region, in contrast, there is no comprehensive settlement, no treaty. Hydro-Québec approached local Innu communities one by one. The individual communities do not have legal sovereignty to negotiate a treaty; that requires the unified organization and agreement of 11 bands of the Innu nation, 9 in Québec and 2 in Labrador (of the Canadian

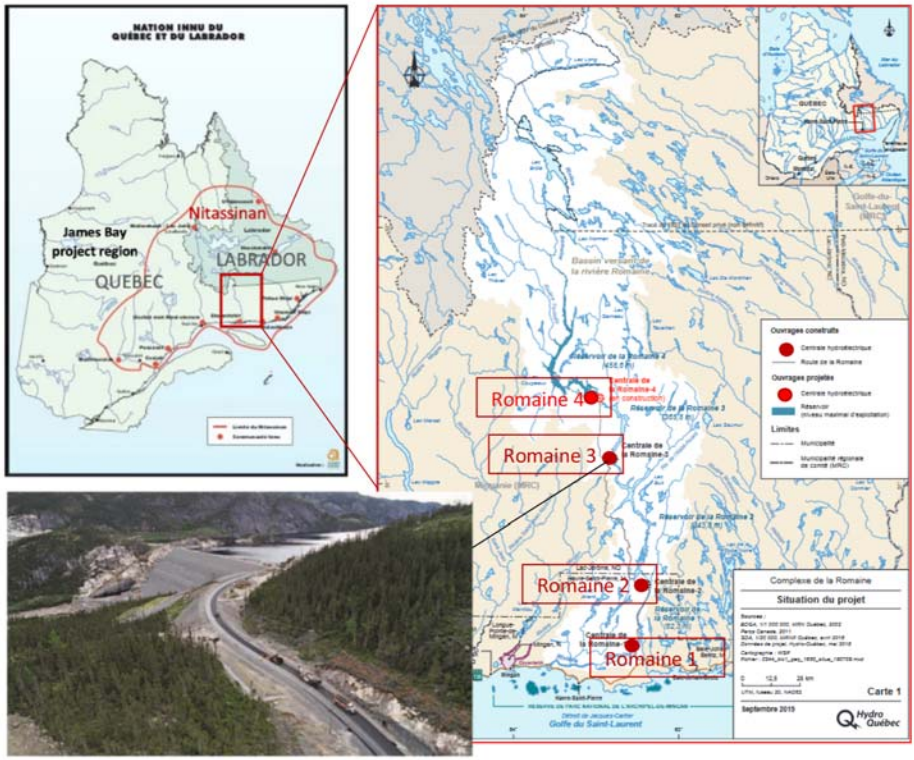

Figure 1. Locations of the Innu First Nations' Nitassinan and communities, the four Romaine River projects, and a photograph of the construction of an access road by Romaine-3. Sources: Hydro-Québec 2019a pp. 8, 16; Native Land Digital 2020. For similar maps see also Desmeules and Guimond, this issue, Maps 1 and 2; Hydro-Québec n.d.d.

province Newfoundland and Labrador). Instead, Hydro-Québec went into the communities, surveyed, in some cases started initial work, informed, and then negotiated. In the end the communities of Nutashkuan, Unamen Shipu, Pakua Shipu, and Ekuanitshit in the Romaine Unamen Shipu region all voted to approve agreements with Hydro-Québec. The settlement agreements allowed Hydro-Québec to build the four dams and reservoirs, and the transmission lines to connect them to the Hydro-Québec grid. For the Innus of Ekuanitshit, the band on the Romaine Unamen Shipu River, a 2009 agreement provided a $75 million package for economic and community development and cultural heritage activities and access, and preferred access to jobs on the construction sites (Desmeules and Guimond, this issue). These agreements are called Impact and Benefit Agreements. They are not treaties, and not fully public. They are privately negotiated between Indigenous communities and industry proponents. West of the

Romaine Unamen Shipu River, the Innu of Uashat mak Mani-Utenam also received a $125 million compensation package when key transmission lines ran through their Nitassinan; their package included economic development funds, environmental mitigation, jobs, and facilitated discussions on profit-sharing with mining companies. Public information has come largely from advocates, press releases, and reports, most of which preceded the agreements.

The electricity produced by the Romaine dams travels through new high-voltage transmission lines either north (from Romaine-3 and Romaine-4) or south (from Romaine-1 and Romaine-2), and then west to join the existing Québec grid. These interconnecting transmission lines themselves constitute major construction projects, investments in large fixed infrastructure across space and biophysical environment (Figure 2).

Figure 2. Transmission line from Romaine 2. Source: (Géomatique, Hydro-Québec Équipement 2015; Hydro-Québec n.d.a)

Once electricity from the Romaine projects joins the Hydro-Québec grid, it mixes with electricity from projects all over Québec and beyond. Thanks to the history of the James Bay, Hydro-Québec's electric grid is the most extensive in North America, connecting the generation facilities of 61 hydroelectric generating stations which generate from a system that includes 681 dams (Hydro-Québec n.d.d) (Figure 3).

Hydro-Québec's hydropower facilities produce far more electricity than Québec's residents and businesses need. For decades, the province has used its abundant, inexpensive hydropower as an economic development engine, drawing industry and investment to the province. Mines, aluminum smelting, bitcoin, and other electricity-intensive industries have grown up in Québec, powered by ample, cheap hydropower (Massell 2011; Desbiens 2013; Lowrie 2018; Hydro-Québec 2019b; Nolet 2020). When Hydro-Québec developed the James Bay projects, an additional goal became to export the excess, to provide direct revenue for the province (for broader context on the move to export electricity from Canada to the US see Froschauer 1999). In the 1980s and early 1990s, Québec and New England utilities and states worked together to build electric interties to send Hydro-Québec power to New England (NESCOE 2013; Swain 2019) (Figure 3). Today, about half of Hydro-Québec's exports go to New England (Hydro-Québec n.d.b, n.d.c).

For New England, imports of Hydro-Québec power currently constitute about 12% of the region's electric supply (ISO-NE n.d.). There has been considerable interest from New England to import more, both as a source of low-cost electricity and also as a central measure in their plans to reduce carbon emissions in the electric sector (NESCOE 2013; Stroup, Kujawa, and Ayres 2015).

Figure 3. Hydro-Québec's transmission grid, showing high-voltage interconnections to neighboring provinces and states (Hydro-Québec 2021).

However, on the US side, the political and economic geographies, and the mechanisms and institutions to develop electrical infrastructure are different from those in Québec. To begin, there are six different subnational jurisdictions in New England, that is, six different states, rather than the single subnational jurisdiction of the Province of Québec. The spatial distance between policymakers, electrical demand, and finance, all located primarily in southern New England and centered in Boston, Massachusetts, on the one hand, and the locations of hydropower potential and development in remote Québec, on the other, become much more fundamental where each is in a separate jurisdiction. The separations are even greater when there are in-between jurisdictions—the northern New England states of Vermont, New Hampshire and Maine—where a transmission line would need to be built (see Nolan and Rinaldi, this issue.)

There is also no giant publicly owned electric power company on the US side to finance large generation and transmission projects, negotiate settlements with local communities, or orchestrate environmental mitigation and local economic development. Instead, private companies and financing must be leveraged.

The fragmented governance of power generation, transmission and funding has led to a rather convoluted effort to pass policies in Massachusetts that can entice or mandate private-sector funding for a transmission to bring more Hydro-Québec power south. This Massachusetts-based policy making has been followed by close to two decades of efforts in Vermont, New Hampshire and most recently Maine, to get one or more physical transmission lines permitted and built.

III. Outline of the Special Issue Articles

This section outlines the articles of the Special Issue, highlighting both their individual contributions and the ways they work together to describe an integrated case study. The first article starts in Massachusetts, with a history of that state's drive for Hydro-Québec power. Authors Silverstein and Autery show that Massachusetts' initiative to import Hydro-Québec power grew out of a common activist and policymaker clamor to address climate change. In 2008 the state passed the Massachusetts Global Warming Solutions Act, and in 2010 followed with a mandate to reduce statewide greenhouse gas (GHG) emissions 25% below 1990 levels by 2020, 80% by 2050. But an ambitious numerical target did not answer the question, *how* to achieve these reductions? Silverstein and Autery provide insight into the politics of this "how" question in their article by showing the back-and-forth reports between the state and environmental groups. They show that the idea of importing Hydro-Québec power was supported by Massachusetts political leaders and agencies not only because it would be a large block of new low-carbon energy, achieving several percentage points of the GHG emissions reduction target at once, but also because it was thought to be inexpensive and relatively easy to obtain. Environmental groups argued that Hydro-Québec power was not a silver bullet, that it had significant environmental impacts, that costs might be higher than expected once a transmission line was built to bring Hydro-Québec power to Massachusetts, and that a transmission line was unlikely to be completed by 2020. Though the environmental groups

proved correct in their cautions, Silverstein and Autery argue that Massachusetts' continued decarbonization will involve increased Hydo-Québec imports.

Vogel takes up the next essay, providing background on Massachusetts' policy approaches to reducing GHG emissions. She argues that Massachusetts' approach to funding a new transmission line cannot be understood without a broader comprehension of late-20th-century and turn-of-the-21st-century electric restructuring. The main change wrought by electric restructuring in New England and elsewhere in the US was not privatization; most electric companies in the US had long been investor-owned. Rather, the major theme was the creation of markets and competition. To make competition work, policymakers separated the vertical functions of the old electric utilities—generation, transmission, and distribution—into different companies. But new competitive companies and the still-regulated distribution utilities found ways to influence or control markets, regulations, and the physical grid in ways that could protect them against too much competition. One way was to block regional funding for long-distance transmission. As a result, when Massachusetts wanted to import a large new block of Hydro-Québec power, it had to find a way to fund long-distance transmission itself. Using the regulatory authority it still retained, the state required its three electric distribution utilities to purchase a long-term contract for newly designated "clean" power; the contract could pay for transmission lines to reach existing low-carbon electricity. The utilities were allowed to put the costs onto their customers' rates—ironically much like funding systems prior to electrical restructuring. To balance out politically and discursively this government-directed regulatory mandate and funding system, the utilities were required to run a competitive Request for Proposals to select the vendor. Vogel argues that the proposal competition favored projects that guaranteed profits to utilities while externalizing costs onto other people and places and into the future, leading to political opposition, escalating costs, and implementation delay. This contribution shows us that the effort to meet decarbonization objectives using neoliberalized institutions, markets and competition can create convoluted and contradictory policy and outcomes.

The middle four articles focus on the in-between jurisdictions of New Hampshire and Maine, where there were deliberations over the siting of a high-voltage transmission line to electrically connect the end-point jurisdictions of Québec and Massachusetts. These produced much more public and protracted fights than in either Québec or Massachusetts.

Two contributions focus on the Northern Pass transmission line proposal in New Hampshire, first planned in 2008 and ultimately rejected by New Hampshire's Site Evaluation Committee in 2018, a rejection upheld by the New Hampshire State Supreme Court in 2019. In the first article on Northern Pass, Kroot aims to illuminate the role of rural areas, transmission infrastructure, and place-based attachments and solidarities that are often invisible to energy transition literatures and advocacy which is generally focused on other geographic scales. She forcefully argues against a not-in-my-backyard (NIMBY) framing of the protracted opposition to the Northern Pass project. Working from interviews with key stakeholders as well as analysis of material artifacts and site visits, Kroot produces a discursive analysis that shows Northern Pass opponents deployed a range of pro-environmental, solidarity, and anticorporatist positions. While interviewees were protective of place, their concerns were not confined to

their own places, or reducible to self-interest. Instead, they articulated larger sets of goals that aimed at alternative, more just, inclusive and equitable energy transitions. Kroot concludes that the "backyard" of rural areas like northern New England should not be simply spaces to be traversed, but partners and communities to be consulted, "a reminder of our interconnected energy futures" (p. 86).

Nolan and Rinaldi's study of New Hampshire's Northern Pass controversy reveals several layers of fraught politics in transmission project development and approval. Their article helps us understand geographically in-between jurisdictions and traditional regulatory bodies as sticking points in the low-carbon energy transition, and also potential forums for democratizing energy systems. The authors explain that Québec's and Massachusetts' desires to fund a high-voltage transmission line through New Hampshire are based not only on decarbonization intentions but also on the political-economic interests of Hydro-Québec, the province's state-run utility, and Eversource, Massachusetts' and New England's largest (investor-owned) utility corporation. People in rural and remote areas in Northern New Hampshire do not generally share the interests of those companies, and saw the transmission lines as obviously going *"somewhere else"* (p. 106), reinforcing felt histories of extractive relationships with southern New England. Opponents and New Hampshire state political authorities worked to influence the permitting process accordingly. Legislators and regulators opened decision making to wide participation, blocked the use of eminent domain to take land, and forced consideration of the effects on land use, employment, and the regional economy. The in-between, "transmission space" of New Hampshire became an open deliberative forum for New Hampshire citizens and interests, and it also became a destination for those from the end-point jurisdictions—Québec and Massachusetts— who did "not have the political sway to affect decision making in their own capitals"(p. 106). Nolan and Rinaldi's analysis confirms that "transmission routing and land use deliberation may be the greatest challenges during low-carbon energy" (p. 108) transitions, but, like Kroot, they argue this is an opportunity to protect the interests of rural people and places, and democratize the energy system.

Two contributions focus on the Maine-based transmission line project that succeeded the Northern Pass, variously referred to as New England Clean Energy Connect (NECEC) or the CMP (Central Maine Power) Corridor. In the first of the pair, Frederic uses telephone interviews of municipal officials, public hearings, and written reports, to trace the complicated process of NECEC permitting. Building from a brief review of several other transmission routing conflicts, Frederic notes that transmission conflicts are often urban-versus-rural conflicts, and also rural-versus-rural, as negotiated solutions often involve rerouting lines. He provides a rich array of empirical detail to help the reader, which enables him to explain why in Maine, much of the conflict played out in local government forums. In contrast to New Hampshire, state and federal authorities provided permits, and the governor strongly supported the line. Local governments did not have authority to stop the line, but they held public forums and voted on nonbinding resolutions. With extensive media coverage, it was here where much of the give-and-take negotiation happened, as well as the hardening of opposing positions. Eventually local activism led to a state-wide voter referendum to stop the line (see Epilogue for an update). Frederic argues that the Maine conflict is emblematic of a struggle to balance

local, regional, and global needs that will be increasingly common as we transition to non-fossil fuel energy. These will inevitably raise questions and conflicts of spatial justice, environmental justice, rural-vs-urban equity, expert-vs-public, and cultural conflicts.

McCourt finishes the series of four articles on the transmission conflicts with an article that lifts us out of either-or framing. To do this, he frames the Maine conflict by building from literatures that examine resource commons, enclosures, alternative economies, and discursive framings and communications. Following Lankford (2013), McCourt analyzes the language used by CMP Corridor proponents' and opponents' in public hearings in terms of how they portray the created and freed-up resources or "paracommons" to be produced by the transmission line. He categorizes statements into four kinds of perceived gains and impacts (Lankford 2014): the Proprietor System (Hydro-Québec, Central Maine Power, and Massachusetts customers), the Neighbors (communities around the new transmission line), the Wider Economy (Maine), and the Socioecological System (both the global climate and local and regional ecosystems and species). He finds that both proponents and opponents envision effects on all four categories, but they emphasize different recipients and different gains and impacts. In particular, proponents of the corridor emphasize gains to the Wider Economy in terms of electricity, electric rates, and economic development, and to the Socioecological System in terms of the global climate. Opponents perceive threats to the paracommons of regional tourism economies and the regional environment. McCourt suggests that this kind of analysis can both reveal unseen commonalities between opponents and also highlight competing interests, providing a more nuanced view of energy and environmental conflicts.

The final paper, previously published in French (Desmeules and Guimond 2019), takes us all the way North, to a close-up examination of the ways that the Romaine hydro-development is changing relationships to territory, river, and cultural identity felt by people from the Ekuanitshit Innu First Nation community. Authors Desmeules and Guimond use interviews to query the cultural, social and political experience of the community's changing relationship to the Romaine Unamen Shipu River. Most interviewees still feel a strong cultural identification with the river. In contrast, they have felt alienated from many aspects the Hydro-Québec development of the river and powerless to stop development plans. Many have experienced flooding and deforestation as profound cultural devastation. Much-touted job opportunities for indigenous communities have turned out mostly to be low-wage jobs in the construction work sites, where local Innu are largely segregated from and ignored by higher-paid white workers and Innu imported from other communities. Other benefits to the community from their settlement agreement have been experienced as mixed blessings. A much-appreciated fund pays for cultural research and business support—though it means that the cultural benefit from the river now flows through Hydro-Québec. The new access road to the four dams will provide the Ekuanitshit easier access to the river and the Nitassinan in general, but the road and the new rental lots for cottages will be open to everyone, meaning the territory is now shared with other people (non-indigenous local residents, hunters, fishers, tourists and others). This paper shows that renewable energy development is not simply a technical and material activity; it can catalyze new "dynamic and hybrid territorialities (cultural, political and social), in constant dialectic with daily experiences and new structural and socio-spatial relationships." This paper

shows the complexity of tradeoffs of renewable electricity development in remote locations, especially in indigenous communities.

IV. Contributions of the Special Issue: Connections, Contradictions, and Contests of Renewable Electricity

In this section I synthesize collective empirical and theoretical contributions of the Special Issue. I organize this section by the three themes reviewed at the beginning of this introductory essay: connections (spatial and material linkages); contradictions (political economies and ecologies); and contests (divided political geographies).

Connections of Renewable Electricity: From Green Massachusetts Energy Consumers, Through Northern New England Landscapes, to an Innu Community's Territory And River

The first contribution of this Special Issue is to make visible the wider spatial and material interconnections that are implicated in the effort to reduce greenhouse gas emissions in the state of Massachusetts by importing Hydro-Québec power.

Perhaps the most obvious interconnections are the material ones. Importing Hydro-Québec power links Massachusetts' desired energy transition to the radical alteration of previously undeveloped rivers in northern Québec ecosystems, and the carving-out of wide strips of boreal forest in Québec for roads and long-distance transmission lines. It also means similar carving-out of forest strips for transmission lines through remote northern parts of one or more of the northern New England states, and perhaps the construction and placing of interconnections buried underground or under water (articles by Kroot, Nolan and Rinaldi, Frederic, Desmeules and Guimond).

The Special Issue articles also show that these material changes mean a variety of impacts on human communities, values, economies, and identities, linking Massachusetts electrical consumers and energy transition advocates to a diverse array of changes across this electrically interconnected space. These include a reworking of First Nations people's relationships with their territories, landscapes, livelihoods, and identities (article by Desmeules and Guimond), visual and ecological impacts to valued landscapes in northern New England (articles by Kroot, Nolan and Rinaldi, Frederic, and McCourt), and payments and economic opportunities, and risks, for remote communities (articles by Frederic, McCourt, Desmeules and Guimond).

While many of these impacts and issues have been covered in the media in their respective state or provincial press (e.g. Pinette and Morissette 2010; Bever 2019; Evans-Brown et al. 2017), they only occasionally emerged into the Massachusetts policy discussions where the mandates for GHG reduction originated (e.g. Abel 2018).

The four articles on controversies over transmission lines in New Hampshire and Maine (by Kroot, Nolan and Rinaldi, Frederic, and McCourt) highlight an often-underemphasized topic in the energy geographies and energy justice literatures: the crucial role of transmission lines, given electricity's requirements for continuous physical wired connections, in shaping

the locations and impacts of potential electrical transitions (cf. Batel and Devine-Wright 2017; Özden-Schilling 2021). The landscapes and communities through which transmission lines run also emerge in these articles not as invisible lines connecting source to consumption but rather as tangible places full of ecological and human value, frequently rural and remote, with histories of extraction and settler colonialism, where transmission lines may feel like (and in fact be) yet another way to extract resources for the benefit of distant cities and centers.

The geography of transmission grid networks also emerges as important (article by Vogel). Where there are dense networks of open-flowing alternating current (AC) transmission lines, suppliers and consumers of electricity can interact in a fairly open market exchange, approximating the resource- and place-neutral goals of a competitive electricity marketplace. However, where there are few lines, a single new line can fundamentally alter the relationships between the resources and locations of generation and use.

Collectively, then, the Special Issue reveals that impacts on places of electric generation and transmission are directly implicated in a seemingly abstract GHG reduction target or a mandate to purchase a large block of clean electric power. This highlights the crucial importance of bringing these kinds of material and spatial interconnections into focus to ascertain wider issues of justice and sustainability.

Contradictions of Renewable Electricity: Geographically Remote Dams and Transmission Lines as Socioecological Fixes for Accumulation; Funding And Finance; Government Institutions and Policies

The second major contribution of this Special Issue is to reveal and analyze specific ways that the pursuit of renewable electricity development contradictions is entwined with political economies and political ecologies in northeastern North America. The seven articles reveal that while renewable energy may be advanced in the name of sustainability and justice in a progressive jurisdiction like the state of Massachusetts, the choice of *which* renewable energy and infrastructure, *where* renewable energy and transmission lines are built, and *how* the benefits and costs are distributed, may still have as much to do with securing the profits of powerful corporations and supporting the economic development ambitions of local, state and provincial jurisdictions and politicians as it does with reducing GHG emissions. This subsection is organized by the three kinds of contradictions laid out earlier: socioecological fixes, funding and finance, and government institutions and policies.

The construction of major dams in remote Québec and transmission lines in northern New England have acted as particularly promising *socioecological fixes* for capital. In other words, they have provided new geographies for investment, opportunities for capital seeking reliable profit, and inevitable socioecological impact. This includes the development of new resources (e.g. the Romaine River), new spaces (e.g. the Côte Nord), and new interconnections (e.g. a transmission line connecting the Québec and New England grids) (articles by Desmeules and Guimond, Nolan and Rinaldi). Several specific policies, institutions and infrastructures have also offered opportunities to extract especially renumerative or guaranteed profit, including a mandated,

customer-funded, power purchase agreement; a DC transmission interconnection whose owner will be able to control electrical flow between two major electrical grid regions; and new clean energy credits (article by Vogel).[3]

As in many areas of investor-led development the world over, owners and investors have worked to win these opportunities by offering jobs, perks and payments to local and state or provincial politicians in remote areas of northern Québec and New England where there has been limited development or where there has been longstanding economic decline. However, this has not always worked to win over local support (articles by Kroot, Nolan and Rinaldi, Frederic, McCourt, and Desmeules and Guimond), and proponents have also faced opposition from powerful companies that stand to lose their advantages to new competitors (article by Vogel).

Articles by Vogel, and Nolan and Rinaldi, provide insight into the contradictions of Massachusetts's drive for Canadian hydropower related to *funding and finance*. Despite the opportunities for large profit, the enormous costs of large dams and transmission lines have deterred investors. In the US, there was no way to fund a long-distance transmission line within the competitive regional electric markets created by neoliberal restructuring in the 1990s. As a result, Massachusetts' import of Hydro-Québec power was funded through a convoluted arrangement in which neoliberalized markets and financialized funding were strategically hybridized with guaranteed cost returns to the state's still-powerful electric utilities, billed to the utilities' customers (article by Vogel).

The case highlights several ways that renewable electricity development is entwined in contradictory ways with *government institutions and policies*. Unlike claims from critics of neoliberalization that electric sector reform has made governments unaccountable, Silverstein and Autery show that electric policymaking at least in Massachusetts is strongly influenced by environmental nonprofit groups and other advocates. At the same time, Vogel shows that the legacies of restructuring include far more opaque corporate actors. Desmeules and Guimond, together with this introduction, complicate our view of publicly owned electric utilities like Hydro-Québec, showing that they too may engage in exclusive decision-making, facilitate cultural dispossession, and be motivated by profit. The articles in this Special Issue thus provide nuance that contrasts both with mainstream policymakers' and analysts' embrace of markets and competition as the assumed best mechanisms for an electric system transition, and also with the sharp rejection of markets and profit motives by some critical scholars and activists. The articles here show that neoliberalized electric governance is both public and private, participatory and closed. The specific details matter, as they play out differently in different contexts across space and time.

Contests of Renewable Electricity: Material Connections, Jurisdictional Separations, Political Gathering Forces

The final major contribution of this Special Issue is to reveal specific ways that the political-geographical organization of decision-making shapes renewable energy development and the distribution of benefits, profits, costs, and impacts, particularly in Northeastern North America.

One clear emphasis the papers collectively make is the prominent role of *sub*national political decision-making forums and their spaces. Complementing Bridge, Özkaynak, and Turhan's (2018) Special Issue on national energy infrastructure, this Special Issue shows that in Northeastern North America, subnational jurisdictions—US states, a Canadian province, local jurisdictions, Indigenous Peoples and their traditional lands, and a regional electric governing body—are central sites of renewable electricity policymaking, with repercussions across state and international lines. Decisions and contests in these spaces determine preferred renewable resources, the placement of transmission and road infrastructures, the shape and size of mitigation and settlement packages, and allocations of benefits including electric power, claims to decarbonization, and profit.

The articles highlight three factors whose interaction has large influence over these subnational spaces' discourses, mobilizations and decisions: the location of proposed material infrastructure, the spatial jurisdiction of governing bodies, and the governing bodies' decision-making processes and membership. Across the articles, these three factors interact to enable and facilitate some discourses and mobilizations, while muting or blocking others.

In the end-point jurisdictions and governing forums, the three factors—location, jurisdictional geography, and decision-making process—interacted to limit or block open public debate about the specific material resources and geographic routes to bring low-GHG power from Québec to Massachusetts. However, in each end-point jurisdiction or decision-making forum, there was a distinct way they interacted to do this. In the northern end-point, thanks to Québec's large and inclusive spatial extent and the role of Hydro-Québec in the province's political economy, Hydro-Québec could plan and build dams, roads, and transmission lines in the province's remote periphery, and legitimize it with both discourse and financial flows that position hydropower as key to provincial economic development and a source of fiscal resources (article by Desmeules and Guimond; see also Hydro-Québec 2001; Desbiens 2013). In the southern end-point, Massachusetts had to work far more indirectly because the infrastructure would be built outside state territory, and because electricity was generated, transmitted, and distributed mainly by private-sector companies incentivized with neoliberalized policy mechanisms. But Massachusetts was also able to use these neoliberalized mechanisms to sidestep questions of impacts outside the state, arguing these costs would be internalized into markets or competitive proposals' costs (articles by Silverstein and Autery, Vogel). The third end-point governing forum, the regional grid operator, ISO-New England, is spatially extensive, including northern New England in its purview, but it could block open public debate because its rules are made in closed-door decision forums (article by Vogel).

It was the geographically in-between political spaces, where interconnecting transmission infrastructure was proposed—New Hampshire, Maine, and their local governments—that hosted the most open, inclusive, and contentious contests. Again, the interaction of location, jurisdictional geography, and decision process was key. The northern New England states had jurisdiction over transmission siting, but both the sale of the electricity and the ability to claim reduced GHG emissions would happen outside their borders. At the state level, they had the power to stop a transmission line that would provide them with no direct benefit; at the local level they could force rerouting around sites like sensitive stream crossings, delay decisions,

or bring about negative publicity. An additional factor that made these political spaces more democratically open and inclusive was that these jurisdictions had less neoliberalized, more traditional political and regulatory processes. Wide and unlimited publics could speak directly to material plans and impacts (articles by Nolan and Rinaldi, Frederic). A final factor in these contests was that there was a long history of extraction from northern New England by and for Massachusetts companies and residents, and in Maine, recent anger at Central Maine Power. The resulting resentment and suspicion could be amplified by opponents of the transmission lines.

A third contribution about the contests of renewable electricity concerns energy democracy. Nolan and Rinaldi, Kroot, Frederic, and McCourt, in their focus on contests over transmission lines in New Hampshire and Maine, affirm the role of material infrastructures as a gathering force for wide political mobilization (Bridge, Özkaynak, and Turhan 2018). Kroot argues that, rather than dismissing protest movements that stop infrastructure as selfish NIMBY movements, we should recognize them as advancing values of place and environment, airing legitimate historical grievances against extractive outside centers, inviting coalition-building across space—including First Nations voices that were not fully addressed in Québec—resulting in an important model of inclusive and democratic decision-making. Frederic's and McCourt's articles affirm and also complicate this point, showing that power producers who stood to gain or lose poured money in on both sides of the debates in New Hampshire and Maine, amplifying the political contests in ways that were neither simply about grass-roots-led environmental democratization nor pro- versus anti-development voices.

Together, the authors suggest that inclusive energy democracy requires the participation and consideration of the people and place-based concerns of remote and in-between places, as well as deeper transparency. In the absence of inclusive energy democracy in the end-point decision-making forums in Québec, Massachusetts, and ISO-New England, the activism, advocacy, and controversies that arose in New Hampshire and Maine represented in many ways a much-needed energy democratization. Frederic and Kroot put this in context of other fights, showing that opposition to pipelines and transmission lines has often been a crucial way for many actors and interests to influence energy development (cf. Bosworth 2022). McCourt argues that there needs to be a more open public discussion of how the benefits (as well as the costs) from electric policy and infrastructure should be distributed. Nolan and Rinaldi, and Vogel suggest that there needs to be more transparency about financial flows and corporate families, both of which have become opaque since electric restructuring, as this opaqueness may allow large portions of the rewards from renewable energy public investments to be channeled off to global financiers and investors. And both Kroot and McCourt emphasize the importance of alternate framings that consider commons resources and cross-place solidarities.

Contrary to lamentation about the way local and state politics can block infrastructure that is needed for an energy transition (e.g. Levitz 2022; Saul, Malik, and Merrill 2022; Roberts 2021), the articles in this Special Issue hint that a more democratic process might also be more efficient and effective. The political-geographical and socioeconomic separation between consumption, finance and decision-making on the one hand versus production, extraction and impact on the other clearly caused problems for the decision-making centers in this case

study, as local communities and states were able to mount effective resistance to stop and delay projects to which decision-makers and funders had devoted significant political and financial resources. A transmission line that had already been approved in Vermont provides a possible counter-example (article by Kroot). It was fully permitted following a robust political process, approved thanks to strong mitigation including burial of the line all along the route. However, it was rejected in Massachusetts' competitive RFP process, likely because of its additional cost compared to the proposed Northern Pass and NECEC lines. Several years and almost half a billion dollars later, with the Northern Pass line rejected and NECEC possibly headed toward rejection, the Vermont line might well stack up as having been a better option (see epilogue for more on this line and its owner).

V. Conclusion

What are the next steps for scholars and advocates of energy sustainability and justice in New England, Québec, and beyond? This Conclusion reflects on the collective lessons from all the articles for future analyses and advocacy related to a just, sustainable energy transition.

First, as outlined in this Introduction, this Special Issue suggests that to understand and address a full range of justice and sustainability considerations, we must consider the connections, contradictions, and contests of renewable electricity. Thinking about *connections* of renewable electricity means tracing the material and geographical implications of efforts to reduce greenhouse gas emissions, even when advanced through abstract targets, markets, and competitive mechanisms. Thinking about *contradictions* means analyzing the ways in which renewable electricity promotion is entwined with the political ecologies and political economies of capitalist economic development, which will inevitably have uneven impacts on wider sustainability and justice. Three key lenses to consider such contradictions are: renewable electricity development as a socioecological fix, the politics and political economies of funding and finance of renewable energy, and the entwinements of government institutions and policies that aim not only to advance an energy transition but also to provide development opportunities to powerful industries, companies, or regions. Thinking through *contests* means analyzing the way that divided political geographies may obstruct inclusive participation and thus energy democracy and justice. Within the analysis of contests of divided political geographies, it is important to consider how the interaction of three factors—location of proposed or likely material infrastructure, the spatial jurisdiction of governing bodies, and the governing bodies' decision-making processes and membership—may shape where, whether, and how different voices and values are included or excluded.

This Special Issue offers one effort to provide this kind of analysis. However, while the analysis of connections, contradictions, and contests is crucial, this Special Issue reveals that it cannot necessarily point to obvious or easy solutions. Rather, its usefulness is to help reveal trade-offs, to illuminate marginalized voices and concerns and uneven political-economic power, and to suggest more participatory and transparent processes.

The articles in this Special Issue suggest several more specific and practical lessons that come from the case study of Massachusetts' drive to import Hydro-Québec power. The first is

that when policymakers in jurisdictions like Massachusetts plan to advance renewable energy, if they want to do it while addressing issues of sustainability and justice, they need to think beyond their abstract targets and lofty goals to think through how reaching these targets will play out in the tangible world, including beyond their own jurisdictional boundaries. Where and in whose places and lands will infrastructure be built, or landscapes and ecosystems transformed? Providing forecasting analyses like these when abstract policy measures are passed would allow a much more inclusive consideration of possible tradeoffs, that are not always embedded in the costs of market prices and competitive bids.

In the second case-specific lesson, transmission emerges as both a major sticking point and an opportunity for a just and sustainable energy transition. As in the case of Massachusetts' aim to import Hydro-Québec power, new transmission is essential to enable a transition to renewable electricity (cf. Joskow 2020; Jacobs 2021; NREL n.d.; Roberts 2021). A wide range of people and environments will be impacted all along the routes of any line, and also across electrical networks, as new electrical routes alter geographies of generation and consumption. As new transmission lines are proposed and built, we are likely to see repeated opposition, as in New Hampshire and then Maine, particularly in in-between jurisdictions where people may perceive their lands and resources as being extracted for outside benefit. Policy analysts and policymakers are beginning to think about transmission issues, for example with studies of transcontinental transmission grids in the US and Canada (NREL n.d.), and a new Federal Energy Regulatory Commission initiative to expand transmission funding and expedite permitting (FERC 2022). Some pundits have advocated for an end to the ability of state and local jurisdictions to stop transmission lines through their territories, as was long ago done for pipelines (Roberts 2017 provides background on this idea). This Special Issue's case study suggests that an approach that limits local and state authority to challenge transmission lines might well enable new transmission lines that could enable renewable energy development and use (as in Québec), but it would be at the cost of reduced energy democracy and trampling of legitimate place-based values. An alternative approach is to bring in voices of communities along transmission routes earlier (cf. Susskind et al. 2022), to be far more willing to spend the cost to bury transmission lines (Swain 2019), and to work to build mitigation and local support agreements that truly help local communities, not just with construction jobs but with inclusive long-term benefits (cf. Columbia Basin Trust n.d.). Clearly, we need more scholars, activists, policy analysts, and policymakers actively engaged in trying to find ways to build transmission for an energy transition while remaining committed to energy justice across geographical space (e.g. Batel and Devine-Wright 2017; Özden-Schilling 2021).

Third, building on the previous two points, this issue's case study suggests that to advance energy justice and sustainability it is crucial to bring in voices of concern or opposition, even across political borders. Among the many places and communities that will be affected by renewable energy development are remote and rural areas through which large transmission lines must be built and will become permanent parts of the landscape. Voices in these in-between communities should not be dismissed simply as NIMBY; considering them fully offers an opportunity for more inclusive decision making and potentially less delay later. [4]

Fourth, this case study reveals that it is crucially important that we find a way to rollback

at least two key aspects of electric and corporate deregulation: the construction of opaque electricity corporations and exclusive decision-making processes; and the removal of oversight over electric profits. Driving many of the policy and funding choices in these articles were utility corporations and corporate families, which emerge as surprisingly powerful more than two decades after electric restructuring (cf. Peskoe 2021). It is not unreasonable that these corporations are part of the decision-making process. The problems are that because of utility company deregulation and other changes to corporate regulation, the influence of these companies is not well seen or understood, and they seem in many cases to be driving and shaping how we go about advancing an electric transition—often while they obstruct other options and a consideration of a full range of tradeoffs, sometimes to the public's detriment, and even their own. Additionally, the profits they generate from public policy and investment are unseen and accountable, and there is no way to ensure they are shared in proportion to public investments and publicly incentivized or guaranteed profits (Lusiani 2022; Vogel, this issue).

The Special Issue articles do not elaborate on the ecological impacts of major hydropower plants or transmission lines, but they show many people in New Hampshire, Maine and Québec voiced concerns for these. A sustainable, just energy transition must be responsible not only to the environmental threat to world climate systems, but also to local and regional species, ecosystems and biodiversity. This is a key tenet of the growing field of multi-species justice, and it is fundamental to a world that faces an extinction crisis as dire as the climate crisis (Ruckelshaus et al. 2020; Celermajer et al. 2021).

Equally, the articles do not touch much on the alternatives to a massive buildout of renewable energy. However, they make apparent that there are significant, geographically wide-ranging impacts of renewable energy development. No wonder transmission line opponents in New Hampshire and Maine point their fingers back toward Massachusetts, calling for reducing energy use in the centers of energy consumption, rather than focusing on importing renewable electricity from somewhere else. Another step for critical scholars of an energy transition is to focus not just on a shift to different energy sources, but how to dramatically reduce our energy consumption. There are bridges to be built with advocates and scholars of proposals like smart growth, reuse and repair, transportation mode shifts, and eating lower on the food chain (e.g. Hughes 2020; Weissman and Folger 2020; Mass EEA n.d.c; Project Drawdown n.d.). Critical geographers and allies could help illuminate the tradeoffs and competing interests between these and investments in large-scale renewable energy development (cf. Thoyre 2021).

Special Issue co-editor Matt McCourt and I hope this Special Issue serves as an empirical case and critical analytical lens for scholars and activists to build from. Our aim is that it can help support a just, sustainable energy transition attendant to the connections, contradictions and contests of electricity, in Massachusetts, New England, Québec, and beyond.

Epilogue

The articles in this Special Issue were finalized in 2021. As I finish this Introduction to release the issue online in Summer 2022, I offer readers an update.

On November 2, 2021, after the costliest citizen referendum campaign in Maine history (Popp 2021), Maine voters approved a measure to reject the NECEC transmission line to be built through the western Maine in order to bring Québec hydropower south to Massachusetts. Subsequently, the Maine Department of Environmental Projection suspended the permit for the project, and, with $450 million already spent, construction was halted (Popp 2021; Turkel 2022a). Currently some four different lawsuits are in play over the future of the line (Turkel 2022c). It is not certain, however, that the project is dead. Maine environmental regulators recently affirmed their permits (Turkel 2022b). We have yet to see whether Massachusetts may eventually have to go "back to the drawing board" to select a different proposal (Gelles and Philippe 2022).

In spring 2021, while still awaiting the outcome of its hydropower import initiative, Massachusetts passed a new Climate Roadmap law (Massachusetts General Court 2021). This law accelerates the state's GHG reduction timeline. In the face of slow movement on hydropower imports, neither this law, nor the updated Clean Energy and Climate plan issued a few months earlier in December 2020 (Miller et al. 2020), nor initiatives since, have specifically targeted hydropower imports. Instead, there is emphasis on wind and solar energy, and buildings, heating, and transportation improvements (Massachusetts General Court 2021; Young 2021; Shankman 2022; Mass EEA n.d.b).[5]

While Massachusetts' import of Hydro-Québec power has slowed, the provincial utility giant's production and ambition to export its hydropower has not. The last of the Romaine project dams is anticipated to be completed this year, 2022 (Hydro-Québec n.d.e). Hydro-Québec has also eagerly pursued other potential customers. Recently, New York City committed itself to a long-term contract to bring Hydro-Québec power to the city (Dunn and French 2022). Interestingly, the contractor is TDI, the same owner as the Vermont line that might be next on Massachusetts' list should the NECEC line be rejected by Maine.

This move by New York City, and the continuing pursuit of transmission contracts by companies like TDI would seem to affirm the suggestion by authors Silverstein and Autery in their article, that one way or another, Hydro-Québec imports will be part of Massachusetts future. Beyond Massachusetts, numerous national reports and initiatives have recently emphasized the importance of hydropower and long-distance transmission to the goal of reducing carbon emissions. Models show a crucial role for Hydro-Québec power to provide both baseload and flexible power and storage to the US Northeast and beyond (NREL 2021, NREL n.d.; see also FERC 2022; ISO-NE 2022).

I am unaware at this time of any initiative, much less progress, to bring back transparency and accountability to the financing and profits received by electric companies that come from public policy and customer-guaranteed returns. This accountability remains lost with the demise of the 1935 Public Utility Holding Company Act. Unlike Northern Pass and NECEC, TDI is not even part of a utility company conglomerate; instead, like a growing number of independent generation companies, this transmission company is part of an investment group—in this case, Blackstone. Though its stakeholder support and environmental impacts may be better, TDI's finances are perhaps even more inaccessible to the public than those of the utility families. The one major initiative related to transparency is a major push to open up the black box of ISO-

New England decision-making, led by state governors of New England and non-governmental organizations (Ropeik 2018; Jacobs 2020; Office of Attorney General Maura Healey 2020).

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This Special Issue is dedicated to undergraduate researchers, to the people and places of New England and Québec, and to the hope for a just and sustainable energy future.

Endnotes

[1] My usage of the term contradiction is theoretically broader and empirically more focused than Marx's and O'Connor's two contradictions of capitalism (O'Connor 1998), and Harvey's seventeen contradictions (Harvey 2014). My conception recognizes and builds on their deeper theorizations.

[2] Similar to US acquisition of Canadian hydropower, mainland Europe and Britain have been working to increase imports of Nordic hydropower (e.g. Farahmand et al. 2015; cf. Sovacool 2017; Reed 2022) .

[3] None of the articles in this issue investigate in detail the private-sector financing for any of these projects, but one must assume that there are powerful investors who stand to profit from Québec provincial bonds Hydro-Québec private contractors, Massachusetts electric utilities, and the utility corporate families that have proposed to build the power lines, and a host of contractors on the US side.

[4] Massachusetts has a new environmental justice policy that informs communities and groups of proposed energy projects. While a major step, it does not appear to include consideration during the development of abstract policy goals like GHG reduction targets, nor potential impacts on communities outside state borders (Mass EEA n.d.a).

[5] The new state environmental justice policy (note 4) was created as a part of the climate roadmap law.

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GREEN MASSACHUSETTS? CARBON REDUCTION
Goals and Strategies, and the Changing Role of Canadian Hydropower

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ABSTRACT

In the last 15 years, Canadian hydropower has played a key role in Massachusetts' carbon reduction goals. There has been considerable debate about what that role should be. We frame the story of this debate with a focus on the key events and decision-makers in order to provide a narrative for contextualizing the events in which the articles in this special edition were written. We employ a close reading of key documents and policy to assemble a chronological account of the evolution of Hydro-Québec in Massachusetts' energy future. In 2008, the Massachusetts Global Warming Solutions Act established an agenda of reducing emissions across the state by setting emissions reductions targets, later set at 25 and 80 percent below the 1990 level by 2020 and 2050 respectively. State reports suggested expanding hydropower imports from the provincially owned hydroelectric company Hydro-Québec. As 2020 approached, the Baker Administration signed the Energy Diversity Act of 2016 requiring utilities to enter contracts to buy clean energy, expecting to replace fossil fuel generation with Hydro-Québec electricity. We compare the key rationales as they evolve in state publications and policy, and environmental advocates' publications. We conclude with three lessons derived from the outcome of this history: (1) new blocks of clean energy are needed to reach emissions targets, (2) accessing new electricity generation will bring similar debates, (3) Massachusetts' decarbonization desires remain tied to Québec.

Key words: Massachusetts, Hydroelectric Imports, Greenhouse Gas Emissions, Hydro-Québec

Introduction

In its 2010 Clean Energy and Climate Plan, the state of Massachusetts set a 2020 deadline to reduce greenhouse gas (GHG) emissions statewide by 25 percent from 1990 levels (Breslow 2010). This target grew out of the Global Warming Solutions Act of 2008, which required the state to set a GHG emissions reduction target for 2020 (Massachusetts General Court 2008 §3(b)).

Achieving this 30-year reduction in GHG emissions required dramatic changes in energy use and infrastructure. Many of these changes had already started by 2010 when the 2020 target was set. Starting at the end of the 1990s, electric generation underwent a major fuel switch in New England, which shares a regional grid and market from which Massachusetts draws most of its electricity. Prior to this switch, natural gas "was a mere 15 percent of the region's fuel used to generate electricity in 2000. By 2014, natural gas had jumped to over 45 percent" (O'Connor 2015, 23). New natural gas-fired power plants emitted "almost 30 percent less carbon dioxide (the leading contributor to climate change) than oil fired plants and 45 percent less than coal-fired plants" (Stein 2004). According to the U.S. Energy Information Administration "electric operators in New England have been both generating more electricity from natural gas and importing more hydroelectric generation from Québec over the past decade" (Grubert and Booth 2014). Even with this headstart on the 2020 goal, over the last 10 years, the 25 percent reduction target sparked a heated debate.

By 2015, new comprehensive data showed that the state would achieve well over 20 percent GHG emissions reductions by 2020. However, it also became apparent that it would be challenged to reach the mandated 25 percent reduction from 1990 levels by 2020 (GWSP 2016). The extra percentage points and the looming goal of 80 percent reduction by 2050 became the focus of an intense bout of policy reports, advocacy, a lawsuit, new regulation, and new legislation.

As reliance on natural gas rose and coal and oil plants were retired, Massachusetts faced the challenge of providing energy "in the winter when large amounts of natural gas are always needed for space heating" (O'Connor 2015, 23). This seasonal pattern causes price spikes and necessitates firing "oil plants...to maintain electric system reliability" (O'Connor 2015, 23). Expanding hydroelectric imports from Hydro-Québec, a Canadian provincial electrical company, was seen as attractive, because "Canadian hydro resources are extensive and have low operating costs" (Breslow 2010, 45). New England began importing Hydro-Québec electricity through a transmission line in 1990 (Swain 2019). In 2015, Hydro-Québec had "a massive hydropower portfolio of 38,000 megawatts," but the transmission line was at capacity (O'Connor 2015, 26). Building on the existing relationship with Hydro-Québec in order to bring more hydroelectricity to Massachusetts through a new transmission line was an early strategy in Massachusetts' plan to reach its emissions reduction goal (Breslow 2010). Stakeholders from Hydro-Québec, New England utility companies, and Massachusetts government officials advocated for this approach, and worked to bring hydropower to Massachusetts in order to replace the state's remaining fossil fuel generation and reduce GHG emissions (Kuser 2017).

Under pressure from a Conservation Law Foundation lawsuit, the state issued a request for proposals that would lead to a plan to build a high-voltage transmission line connecting Hydro-Québec to southern New England (CLF 2016; Kuser 2017). Hydro-Québec worked with Massachusetts utility companies to push expansion of hydropower exports in response to Massachusetts' request for proposals (Kuser 2017; Nolan and Rinaldi, this issue). When Eversource's Northern Pass transmission line project was rejected by the state of New

Hampshire (Nolan and Rinaldi, this issue; Kroot, this issue), Massachusetts looked to the New England Clean Energy Connect transmission line through Maine (Mass DOER 2018). Delayed by local opposition in both states, no such line has been completed by the end of 2020. Nonetheless, a future transmission line is likely to play an important role in the Clean Energy and Climate Plan's even more ambitious target, a 2050 goal of 80 percent reductions from 1990.

This article traces the evolution of Massachusetts' carbon reduction strategies following the Global Warming Solutions Act of 2008 (GWSA), specifically the focus on hydropower imports from Hydro-Québec. We researched the context for the GWSA and the plan for achieving these carbon reduction goals published in 2010. Progress reports published by the state of Massachusetts and scorecards published by the Environmental League of Massachusetts provide two perspectives on the work done in the state over the course of the first twelve years of the GWSA. Key decisions and events in the first half of the timeline of this story include a transition to a Republican governor and a lawsuit by the Conservation Law Foundation. In the latter half of this timeline, Massachusetts passed the 2016 Energy Diversity Act, requiring Massachusetts utilities to solicit long-term contracts for clean energy generation, along with six additional clean energy regulations. When the Northern Pass transmission line through New Hampshire was rejected, the Massachusetts Department of Utilities approved the decision to move forward with the Clean Energy Connect transmission line through Maine. This chronological framework allows us to perform a close reading of policy and stakeholder publications in order to reveal the rationales behind state strategies, critiques by environmental groups, key decisions and future implications of the debate around Canadian hydropower imports.

Following our chronology, we offer an analysis section that identifies the key patterns in this history. State publications and legislative action indicates that hydroelectric imports were attractive for the potentially short timeframe for accessing new electricity, the cost-effectiveness, and the balance that hydroelectric imports could provide in a renewable energy system. On the other hand, environmental groups emphasized the difficulty that routing a new transmission line posed and advocated for a breadth of solutions in order to reach Massachusetts' emissions goals. Advocates worried that a focus on efforts to build a new transmission line would distract from more local renewable infrastructure development. They also highlighted concerns with the very categorization of large hydroelectric as low-emissions, pushing the state to properly account for carbon emissions associated with reservoirs and flooding from dams (GWSP 2014; 2016). Additional stakeholders within and outside of the state of Massachusetts advocated for and against importing additional hydroelectric power, including local energy generators and the utilities involved in building the envisioned transmission line.

This chronology provides important context for other articles in this special edition that explore the public controversies around transmission of imported Canadian hydropower in New Hampshire (Nolan and Rinaldi, this issue; Kroot, this issue) and Maine, and some of the impacts of Hydro-Québec on rivers and First Nations in Canada (see Desmeules and Guimond, this issue).

Designing a Plan for Emissions Reductions in Massachusetts

Massachusetts has long been a leader in reducing environmental impacts from electricity generation (Vogel, this issue). For example, the state made energy efficiency a central focus in 1987 with the New England Energy Policy Council's "Power to Spare" report (Cohen 1987). Since then, Massachusetts' energy efficiency initiatives have remained strong "through Republican and Democratic administrations and [have] reduced consumption by one third from projections" (Cowell 2012). Massachusetts Renewable Portfolio Standards were "created by the Electricity Restructuring Act of 1997 and activated by regulations in 2002" and require "Massachusetts Retail Electricity Suppliers to obtain from qualified sources certain percentages of the electricity needed to supply their retail customers" (Mass DOER 2018). Massachusetts is also part of the Northeast's Regional Greenhouse Gas Initiative, "the nation's first market-based cap-and-trade program to reduce carbon dioxide emissions from power plants" (Kimmel and Burt 2009, 312). In 2007, Governor Patrick announced "a bold step to make Massachusetts the first state to recognize the interdependence of energy and the environment, combining the state's environmental agencies and energy agencies into one cabinet level secretariat, the reconstituted Executive Office of Energy and Environmental Affairs" (Kimmel and Burt 2009, 296). This reorganization was intended to allow new collaboration and progress in the field of energy and environmental policy in Massachusetts, and preceded the state's adoption of binding emissions reduction targets.

While a federal emissions cap has yet to pass in the United States, several states have taken their own steps to set GHG emissions reductions targets (GWSP 2014). The Patrick administration promoted an emissions target as an attractive policy to meet climate goals while promoting economic growth through innovation and renewable energy development (Murphy 2010).

The Global Warming Solutions Act of 2008

The GWSA was one of five major environmental laws passed by the Deval Patrick administration in 2008 (Kimmel and Burt 2009). At its core, the GWSA required the Massachusetts Executive Office of Energy and Environmental Affairs to establish an emissions reduction goal across all economic sectors between 10 and 25 percent below the 1990 emissions levels by 2020, as well as a long-term goal of 80 percent GHG reduction by 2050 (Breslow 2010).

The first step required by the GWSA was detailing greenhouse gas emissions in Massachusetts in 1990 and using this data to set a short-term emissions reduction goal for 2020. Section 2(a) of the GWSA outlines the Department of Environmental Protection's new responsibilities to "monitor and regulate emissions of greenhouse gases with the goal of reducing those emissions." This monitoring was accomplished with a regional greenhouse gas registry and reporting system collecting data from greenhouse gas emitters and periodic updates on progress and reported data. Section 3(a) of the GWSA established mandatory reporting of the state's largest sources of emissions by 1 January 2009, as well as requiring the Department of Environmental Protection to assess the 1990 GHG baseline and 2020 projections.

Language in the GWSA suggests the involvement of other New England states and close Canadian provinces in reaching GHG emissions reduction goals. The law states in Section 7(c): "[T]he executive office and the department may work with the participating regional greenhouse gas initiative states and other interested states and Canadian Provinces to develop a plan…to facilitate the achievement of the greenhouse gas emissions limits." The greenhouse gas registry was also designed to include 'leakage,' or increase in emissions outside the state that might be caused by decreases in state emissions, including "transmission and distribution line losses from electricity generated within the state or imported from outside the Commonwealth" (Massachusetts General Court 2008 §1; §5). These sections suggest regional involvement in meeting Massachusetts' climate goals and create a framework for importing hydroelectricity from Hydro-Québec.

The next step in implementation was to decide on a target and develop a plan. By 1 January 2011, the state was required to have established a 2020 emissions target and a plan for achieving it.

Clean Energy and Climate Plan, 2010: Designing a Plan to Meet Emissions Reductions Goals in 2020 and 2050

On 29 December 2010, the state published the Massachusetts Clean Energy and Climate Plan (CECP) for 2020 (Breslow 2010). This report detailed emissions data collected and analyzed since 2008 and the potential strategies for reaching a 2020 GHG emissions goal. The CECP prioritized reducing emissions, improving air quality, and setting a national example. But the plan also emphasized the economic development opportunities of environmental leadership, leading Massachusetts to "become more energy independent, and jump start its economy with new technologies, new companies, and new jobs" (Breslow 2010, 12). After two years of deliberation, public comment, predictions, and technical assessment, Massachusetts set the GHG emissions reduction goal for 2020 at 25 percent emissions reduction from 1990 levels (Breslow 2010, ES-1).

Through the CECP, we begin to trace the state's explicit interest in expanding hydropower imports. The Secretary of Energy and Environmental Affairs announced the state's interest in expanding transmission lines, which were already providing "8.5 percent of New England's electric consumption," that could bring additional Canadian hydropower to Massachusetts (Breslow 2010, 45). The report suggested taking advantage of "inexpensive clean power" available in Québec by creating a new transmission line through northern New England (Breslow 2010, 45). This transmission line was expected to provide up to "1,200 MW of clean energy and up to 5 million tons of emissions reduction in the Commonwealth," or "15 percent of Massachusetts' present electricity demand" (Breslow 2010, 45). The plan anticipated challenges with this project stemming from the transmission lines, which "involve federal, state and local permitting, and often raise siting concerns, with potential delays from legal action" (Breslow 2010, 46). The state asserted that expanded hydropower imports could reach Massachusetts through a transmission line through New Hampshire, "the Northern Pass transmission line being developed by two Massachusetts utilities, NSTAR and Northeast

Utilities, in partnership with Hydro-Québec" (45). At that point, clean energy imports (i.e., Canadian hydropower) were expected to provide 5.4 percent of Massachusetts' overall 25 percent GHG emissions reductions from 1990 levels (Breslow 2010, ES-6).

The "hundreds of jobs" created by a new transmission line aligned with the state's goal of new job creation (Breslow 2010, 45). The authors of the CECP acknowledged that "while the vast majority of these jobs will be in New Hampshire and Québec, it is likely to have spillover effects in Massachusetts" (2010, 45).

The CECP did acknowledge that "not every one of these policies must be implemented to its fullest extent in order to achieve the 2020 mandate" (Breslow 2010, ES-8). Given variations in predictions and Business as Usual emissions levels, the state was expected to reassess which strategies based on state mandated progress reports every five years for the purpose of tracking emissions reductions (Breslow 2010, ES-5). But the desirability of importing Canadian hydropower had been explicitly endorsed as a promising strategy on the basis of significant short-term emissions reductions, cost and economic development goals.

History: Changing Projections and Strategies for GHG Emissions Reductions

With the CECP for 2020 released, the state now had to move forward with a host of policies and programs to reach its 2020 target of 25 percent reduction of GHG emissions from 1990 levels. To demonstrate its progress, the state was required to release reports on the 2008 GWSA every five years, as well as an update the 2010 CECP. This requirement meant a major report was published every two or three years, four in total by the time the 2020 deadline would be reached, including: GWSA Progress Reports in 2013 and 2018, and CECP Updates in 2015 and 2020. Each report showed a change in the state's view of the role that Hydro-Québec imports would play in reaching the 25 percent GHG reduction target for 2020.

Each report was also an opportunity for scrutiny. As the state issued report after report, a coalition of environmental groups, led by the Environmental League of Massachusetts, calling themselves the Global Warming Solutions Project (GWSP) both encouraged and critiqued the state's actions and plans. Two "scorecards" written for two different governors in 2014 and 2016 suggested growing concern. This concern was echoed by a 2014 lawsuit from the Conservation Law Foundation accusing the state of violating the requirements of the GWSA. In 2016, the state Supreme Judicial Court ruled in favor of the plaintiffs. In response, the state passed legislation that could fund a transmission line to bring Hydro-Québec power to Massachusetts, and new clean energy standards to further incentivize it. Even so, by 2018, it was clear that no such transmission line would be built by 2020. The percentage targets had to be calculated and met without Hydro-Québec power. Hydro-Québec power was still embraced as part of its 2050 goals.

This section describes each of these reports and policy developments in turn, highlighting changes in the way the state and environmentalists portrayed importing power from Québec

within the context of plans to meet the 2020 target of 25 percent reduction of GHG emissions from 1990 levels, and the evolution of state policy. The following section will summarize the key stakeholders' arguments and actions and their evolutions, and lessons from this history.

Global Warming Solutions Act Progress Report, 2013

In December 2013, the Executive Office of Energy and Environmental Affairs released a five-year progress report on the GWSA (Mass EEA 2013). Among the accomplishments listed were: growing "Massachusetts' clean energy sector...by 11.8 percent in 2012" and developing a "new Clean Energy and Climate Performance Management System to track and document progress on GHG reduction strategies" (Mass EEA 2013, 6). The 2013 Five-Year Progress Report emphasized the goals of "cost-effective," "efficient" energy, and "economic growth" (Mass EEA 2013). The EEA progress report reasserted that a "key tenet of the Patrick Administration's vision on climate change is that aggressive action to reduce global warming emissions can advance economic growth." (Mass EEA 2013, 2).

The Five-Year Progress Report acknowledged "that more can and must be done to position the state to achieve the 2020 emissions limit and move onto a trajectory consistent with a minimum 80 percent reduction in emission levels by 2050" (Mass EEA 2013, 7). Among the emphases on what should be done: import a large new block of Canadian hydropower. The Patrick Administration was driven to pursue hydroelectric imports because of the pressure to "increase the pace of GWSA implementation" to meet the 2020 deadline (Mass EEA 2013, 8-9).

The Mass EEA (2013, 43) report itself drew attention to the renaming of one of eight key strategies, from "Clean Energy Imports" to "New Clean Energy Resources." Expanding clean energy resources beyond imports reflected a "broad approach to expanding regional access to new, large scale, clean energy resources such as large hydro and both onshore and offshore wind energy" (Mass EEA 2013, 43). This goal was given a "medium" likelihood of meeting the 2020 target, and an anticipated emissions reduction of 5.3 percent (down only slightly from the original projection of 5.4 percent in 2010) (Mass EEA 2013, 6-7). Wind power was promoted as "the Commonwealth's largest indigenous energy resource" (Mass EEA 2013, 9). Hydropower imports still held potential, but the 2013 Five-Year Progress Report made it clear that the state was expanding its search for new energy resources.

Among the initial strategies for GHG emissions in the GWSA, some progress was slow due to "a reduction in state resources available to implement them," while others led to emissions reductions that "occurred much faster than initially anticipated" (Mass EEA 2013, 8). For example, cost effective energy efficiency, which was expected to account for 7.3 percent of emissions reductions in the 2010 CECP, had fallen to 7.1 percent by 2015, as "electric savings fell short of the annual goals implied by the 2020 Plan" (Mass EEA 2013, 34). Slow progress and a low likelihood of timely implementation for some of the original strategies served as a driver for importing hydropower from Hydro-Québec.

Regionally, in 2013, New England governors came to an agreement to work together to secure affordable, clean, and reliable energy. Governor Patrick, along with the other five New England governors, agreed that "the New England States believe that investments in local renewable generation, combined heat and power, and renewable and competitively-priced heating for buildings will support local markets and result in additional cost savings, new jobs and economic opportunities, and environmental gains" (Malloy et al 2013, 1). At this point in 2013, there were a number of directions for Massachusetts to go in order to reach its goal to reduce 25 percent of emissions by 2020.

Global Warming Solutions Project's 2014 Scorecard: Questioning the Timeline and Emissions Reductions of Hydropower Imports

In 2014, the Environmental League of Massachusetts organized the aforementioned Global Warming Solutions Project (GWSP), a coalition of local and regional environmental advocacy groups. The GWSP released its own report, or "Scorecard," assessing Massachusetts' progress since the GWSA was passed (GWSP 2014). Unlike the state's report, the Scorecard projected that Massachusetts would meet "four-fifths of the legal mandate," or 20 percent reductions below 1990 levels, not the required 25 (GWSP 2014, ES-ii).

The GWSP report recommended a number of policies that could close this gap and push Massachusetts beyond the required 25 percent emissions reduction. Their first recommendation was to dramatically increase energy efficiency investments by making sure utilities actually met their targets, include the cost of carbon emissions in calculating cost-effective efficiency investments, and adopting a higher buildings "stretch code" for towns designated as Green Communities. The coalition also suggested developing "appropriately-sited, cost-effective transmission lines to bring additional renewable power into Massachusetts" and adding renewable thermal energy to the Alternative Energy Portfolio Standard. In the category of transportation and land use, the scorecard suggested a mileage reduction pilot program, "smart driving education," zoning reform legislation, regulation to prevent an increase in motor fuel emissions, and regulation to improve bicycling, transit and walking. From non-energy emissions, the scorecard suggested legislation to "reduce methane leaks from the natural gas distribution system" and promulgate regulations to reduce refrigerant leakage (GWSP 2014, 7-9).

The GWSP brought attention to critiques of the Northern Pass projects' ability to provide the amount of electricity initially suggested by the 2010 Clean Energy and Climate Plan. Of the 1,200 MW line, the scorecard assumes, for lack of better data, that only "two-thirds of the power goes to Massachusetts", with "some percentage going to at least Northeast Utilities' subsidiary in Connecticut" (GWSP 2014, 18). This "would yield approximately a 3.0 percent cut in overall GHG emissions in 2020," in contrast to the state's anticipated 5.4 percent cut (GWSP 2014, 19).

The GWSP called into question the timeline for achieving new hydropower imports from Hydro-Québec, determining it would be "unlikely that a line could be completed and in operation by 2020 along with zero carbon resources that would feed the line" (2014, 18).

Alternatively, the scorecard suggests, "other sources of low- or zero-carbon power could become available in time, such as wind power from northern Maine or other hydropower from eastern Canada (Newfoundland and Labrador, for example), but the state's Five Year Review does not present evidence of their likelihood" (GWSP 2014, 18). Based on the scorecard's estimated 10 percent likelihood of a new transmission line bringing 3 percent of emission reductions, the GWSP (2014, 19) concluded that strategy would lead to "only a 0.3 percent cut in the state's emissions in 2020, rather than the 5.4 percent forecast in the 2020 Plan."

The GWSP also identified concerns with "the assumption of the delivery of zero-carbon power" from Canadian hydropower (GWSP 2014, 19). The GWSP wanted to know "what fraction of Canadian imports is likely to come from already-existing hydroelectric facilities and what fraction would require new dams and flooding" (2014, 19). If new dams were built and "additional land is flooded in order to provide for Massachusetts' power needs, the GHG increases from the flooding should be added to our state's overall emissions" (GWSP 2014, 19). Even existing dams "result in permanently taking those forests out of commission as carbon 'sinks'... and this lost GHG reduction capacity must be taken into account" (GWSP 2014, 19). The coalition's critique of the Commonwealth's emissions reductions projections, its timeline for transmission line permitting and construction, and its carbon accounting methodologies contradicts the optimism of Massachusetts politicians and policy-makers.

In concert with the Scorecard, the Conservation Law Foundation filed a lawsuit against the Commonwealth of Massachusetts for its "lack of action on the GWSA" (Samenfeld-Specht 2018, 6). The Conservation Law Foundation, a New-England based regional foundation dedicated to conservation through litigation and policy, "had fought hard to pass the GWSA back in 2008" (GWSP 2014, 6) and continued to advocate for environmental action as a member of the GWSP (GWSP 2014). The Conservation Law Foundation believed "the State's lack of action had begun to endanger the GWSA's first legal milestone: to cut climate pollution by 20 percent below 1990 levels by 2020" (GWSP 2014, 6). The organization felt that legal action was necessary in order to ensure "that Massachusetts will continue to lead the region, and the nation, in fighting climate change" (GWSP 2014, 7).

Clean Energy and Climate Plan Update, 2015: State Government Optimism Under a New Administration

In early 2015, there was a change in leadership in Massachusetts from the Patrick Administration (D) to the Baker Administration (R). The legislature remained Democratic in both chambers, however. That year, the Executive Office of Energy and Environmental Affairs published a Five-Year Update of the Massachusetts CECP for 2020 originally released in 2010. Secretary of Energy and Environmental Affairs Matthew A. Beaton did not express the same doubts as the GWSP. He wrote, "a greenhouse gas (GHG) emissions reduction of at least 25 percent by 2020 is attainable...[F]ull implementation of this Clean Energy and Climate Plan (CECP) Update will set the Commonwealth on course for a sustained, vibrant state economy with environmentally responsible economic growth" (Mass EEA 2015, V). Previous reports, including the 2010 Clean Energy and Climate Plan, anticipated that not all of the strategies

would or could be fully implemented. Beaton's statement suggested a new urgency in achieving full implementation in order to meet the legally binding reductions requirements.

It was in this report that imports of Canadian hydropower rose to the top of the plan. Although every policy was stressed in order to reach approaching targets, "this CECP Update identified two policies in particular that when fully implemented will result in immediate and substantial benefits: the import of cost-effective, low-carbon hydroelectric power generation and Class-1 renewable resources; and vehicle GHG emissions standards" (Mass EEA 2015). It was evident that Canadian hydropower would be of particular importance, although the expected emissions reductions had dropped from 5.4 percent (2010) to 5.3 percent (2013), and then to 4.2 percent in 2015. Without this policy, the calculation of predicted improvements suggested there was a risk of failing to meet the 2020 emissions target. This renewed emphasis on the Clean Energy Imports policy was marked by a return to the language of "Clean Energy Imports," instead of using the "New Clean Energy Resources" strategy named in the 2013 GWSA Progress Report (Mass EEA 2013, 2015).

Additionally, the report stated that slow progress in other areas of emissions reductions put pressure on the state to find a single, large block of emissions reductions. Cost effective energy efficiency solutions, which were expected to account for 7.3 percent of reductions in 2010, then 7.1 percent in 2013, were only expected to account for a 5.8 percent reduction (Mass EEA 2015, 12). As the deadline got closer, all available strategies for reaching the 2020 goal were becoming important, and failure to reach some goals put more pressure on clean energy imports.

2016 Scorecard: Global Warming Solutions Project's Growing Caution

Following the 2015 CECP Report, the GWSP released another "Scorecard" assessing the progress made towards GWSA targets. In contrast to the Baker administration's confidence and reinvigorated support for Canadian hydropower imports, there was a growing tone of urgency in the 2016 Scorecard. The GWSP reported that "without new policy action, Massachusetts is not likely to achieve our 2020 requirement of 25 percent below 1990 levels and remain on track to achieve the 2050 requirement of 80 percent below 1990 levels" (GWSP 2016, 5).

The nonprofit coalition again highlighted the concerns over transmission line project approval and emphasized Secretary of Energy and Environmental Affairs Beaton's own assessment that without "the incorporation of at least 1,200 megawatts of hydropower into our generation mix, it will be very difficult to meet our 2020 goals the 2020 GHG reduction requirements without large-scale hydropower imports from Canada" (Metzger 2016, 1). As a keystone part of the Baker Administration's plan to meet the 2020 goal, the coalition cautioned that "it is not clear that the transmission would be in service in time to deliver the full 4.2 percent" (GWSP 2016, 10).

The report also re-emphasized the difficulty of accounting for the carbon emissions of large-scale hydroelectric power, given the "initial 'pulse' of GHG emissions from the organic matter that is submerged and then decomposes" when a new dam is built (GWSP 2016, 24).

Additionally, the report stated that this administration's focus on hydropower threatened to "undermine or delay development of in-region renewable energy resources, such as onshore and offshore wind" (GWSP 2016, 10). This critique was especially important, the report argued, in the context of the long-term goals that the Massachusetts government had laid out for achieving future GHG emissions reductions. If hydropower imports played an even bigger role in meeting 2050 emissions goals, "potentially up to 2400 MW of hydropower," the GWSP (2016, 24) warned that this scenario could crowd out in-region wind production from transmission line access. The concern that reliance on imported hydropower could have long-lasting impacts by undermining the development of a diverse, regional renewable sources undercut the state's goals of energy independence and job creation (GWSP 2016; Breslow 2010).

Conservation Law Foundation Lawsuit: 2016 Update and State Response

In May 2016, the Massachusetts Supreme Judicial Court released its ruling on the 2014 lawsuit brought by the Conservation Law Foundation in conjunction with the Massachusetts Energy Consumers Alliance and four teenage plaintiffs. The Conservation Law Foundation argued that the state had failed to uphold section 3 (d) of the GWSA, which required that "the department shall promulgate regulations establishing a desired level of declining annual aggregate emission limits for sources or categories of sources that emit greenhouse gas emissions" (GWSA 2008). Conservation Law Foundation's lead lawyer Jenny Rushlow determined this to mean, "the DEP has discretion over which carbon sources to regulate, but not whether to regulate" (WBUR News Room 2016). The state argued, "sulfur hexafluoride, RGGI, and LEV regulations satisfy the mandate" (*Kain v. Department of Environmental Protection* 2016, 3). According to the Massachusetts Supreme Judicial Court, these regulations were insufficient-- "Massachusetts has failed to meet its legal obligation to set and enforce annual limits on greenhouse gas emissions" (WBUR News Room 2016). In its ruling, the Massachusetts Supreme Judicial Court affirmed that the Department of Environmental Protection must:

> ...promulgate regulations that address multiple sources or categories of sources of greenhouse gas emissions, impose a limit on emissions that may be released, limit the aggregate emissions released from each group of regulated sources or categories of sources, set emission limits for each year, and set limits that decline on an annual basis. (Kain & others vs. Department of Environmental Protection 2016, 39).

In other words, the Department of Environmental Protection would have to pass regulations. Those regulations would need to identify a total amount of GHG emissions -- measured in carbon dioxide equivalents, not just a percent -- that would be reduced, and designate an amount that would come from each sector. That amount would set a regulatory limit. The amount would need to go down in each sector each year, and the total reduction following these limits must reach the 2020 target.

The decision was critical to spurring new action from the government of Massachusetts, given the approaching deadline. Shortly after the ruling, "the Department of Environmental Protection reached out to CLF and asked for input on the proposed regulations" (Samenfeld-Specht 2018, 7). In September 2016, Governor Baker issued Executive Order 569, *Establishing an Integrated Climate Change Strategy for the State*. The executive order required the Department of Environmental Protection to pass regulations by 11 August 2017 to meet the requirements of the GWSA as affirmed by *Kain*. The order also required the Secretary of Energy and Environmental Affairs to publish a Climate Adaptation Plan and a comprehensive energy plan within two years. The executive order mandated a number of emissions reports, revised GWSA requirements for agencies like the Massachusetts Department of Transportation, and directed that the state continue to lead in the "reform of regional wholesale electric energy and capacity markets to ensure that state mandates for clean energy are achieved in the most cost-effective manner" (Baker 2016).

Advancing Canadian Hydropower Imports to Massachusetts, Part 1: 2016 Energy Diversity Act

The court ruling also led to a reinvigorated enthusiasm for Canadian hydropower. A June 2016 editorial in the Boston Globe posited that the slow progress of wind power, combined with the Supreme Judicial Court's ruling holding the state to a strict reading of the 2020 goal, solidified the importance of Canadian hydropower in meeting the state's 2020 goals (Editors 2016b). This solution, supported by both former Governor Patrick (D) and current Governor Baker (R), would also allow Massachusetts to make critical progress towards the requisite 80 percent reductions by 2050 (Editors 2016a, 2016b). With pressure mounting from multiple stakeholders, hydropower became increasingly important to Massachusetts' success in emissions reductions and efficient electrification.

Even before Baker issued his Executive Order, there was already a push in the Massachusetts legislature to act. However, legislators and lobbyists disagreed over the role of hydropower versus New England-based renewable power, and also over adding new electricity versus reducing carbon emissions in other sectors. Under time pressure, electricity was seen as the relatively low-hanging fruit compared to major changes in transportation, buildings, or land use. At the end of the legislative session, a more inclusive Senate bill was set aside for a simpler House bill that focused on clean electricity. Among the choices for clean electricity, the bill also offered a compromise: it would mandate both offshore wind *and* "clean energy" from either northern New England wind farms or Canadian hydropower (Chesto 2016).

In August 2016, the Massachusetts legislature passed an *Act to Promote Energy Diversity*. This legislation was a clear response to the 2020 GWSA goals and the Conservation Law Foundation lawsuit. The clean energy portion of the law required Massachusetts investor-owned electric utilities to "solicit proposals for clean energy generation and, provided that reasonable proposals have been received,..enter into cost-effective long-term contracts for clean energy generation" (Massachusetts General Court 2016 §12). There was a parallel requirement to solicit proposals for offshore wind.

The language of the Energy Diversity Act of 2016 "gave utilities a role in developing the request for proposals as well as a role in selecting the winning proposal" (Environmental League of Massachusetts (ELM 2018) Specifically, the three Massachusetts investor-owned distribution utilities, Eversource, National Grid, and Unitil, together with the Massachusetts Department of Energy Resources, would release a Request for Proposals for clean energy. Proposals could be for new generation, or they could be for transmission lines that would connect to an existing generation source. The same team that wrote the proposals would then evaluate them: the three utilities and the Department of Energy Resources. After a winning bid was selected, the distribution companies were to "enter into a contract with the winning bidders for their apportioned share of the market products being purchased from the project" (Massachusetts General Court 2016 §83D(g)). Each utility would purchase a portion of the power proportional to how many customers each utility had.

The Energy Diversity Act had specific criteria that were required for winning bids. These illuminate the broader desired purposes of Massachusetts lawmakers and advocates. These criteria included: enhanced electricity reliability; guaranteed energy delivery in winter months, along with contributing to reducing winter electricity price spikes; cost effectiveness for electric customers, with cost-effectiveness "taking into consideration potential economic and environmental benefits to the ratepayers"; project viability in a commercially reasonable timeframe; and where feasible, the creation and fostering of employment and economic development in Massachusetts. In addition to these requirements, preference was to go to proposals that combined "new Class I renewable portfolio eligible resources and firm hydroelectric generation" and would benefit "low-income ratepayers in the commonwealth without adding cost to the project." As described later in this paper, these would be important factors in the review of the contract by the Massachusetts Department of Public Utilities in 2019.

The utilities and the Department of Energy released their request for proposals in March 2017(Mass DOER et al 2017). In January 2018, the Massachusetts government announced its decision to move forward with Eversource's Northern Pass transmission line, which "would bring up to 1,100 megawatts of electricity from power producer Hydro-Québec" (Chesto and Abel 2018).

Within the state, "the choice of Eversource and Hydro-Québec instantly drew fire from the New England Power Generators Association and from environmental groups" (Chesto and Abel 2018). While Secretary Beaton assured that an "independent evaluator was hired to oversee the process," critics were skeptical. They pointed out that the "law required that the big electric utilities be involved in the decision-making process," including Eversource, and the winning project was an Eversource project (Chesto and Abel 2018).

The even bigger controversy, however, was in New Hampshire itself. Activists in and beyond the state had been fighting against the line for years. (Kroot, this issue; Nolan and Rinaldi, this issue). In February 2018, barely after a week after Massachusetts announced it the winner, the state of New Hampshire rejected Massachusetts' top choice transmission line, Northern Pass, setting back plans to get Hydro-Québec's power to Massachusetts.

When it became clear that Northern Pass would not be going through, the project fell to the distribution companies' next best choice from the request for proposals, a transmission line through Maine called New England Clean Energy Connect, spearheaded by Avangrid through its subsidiary Central Maine Power (Chesto 2018). Power purchase agreements and transmission service agreements were later signed in June 2018 (Mass DPU 2019).

Advancing Canadian Hydropower Imports to Massachusetts, Part 2: 2017 Clean Energy Regulations

As the solicitation for clean energy imports that came out of the Energy Diversity Act wound its way slowly through local, state and federal permitting processes, there was another way that Massachusetts law moved to advance imports of Canadian hydropower. This time, it was amidst a wider set of decarbonization initiatives: the rulemaking that was required by the GWSA and the Supreme Judicial Court's *Kain* decision. A total of six regulations grew out of the Kain decision and the governor's Executive Order. Two of these dealt with transportation, one with natural gas leaks, and one with sulfur hexafluoride emissions from large machinery. That left two that dealt with electricity. One required reductions from carbon dioxide emissions from fossil-fuel electric generating facilities (Mass DEP 2016).

The sixth regulation was a new "Clean Energy Standard" (CES) which would be added to the existing renewable portfolio standard. Electric suppliers would now be required to acquire "clean energy," which was defined as Class I Renewable Portfolio Standard energy (Class I renewables was a set of preferred kinds of renewable energy built since 1997 that did not include large hydropower) or other energy that produced less than half the emissions of a new natural gas plant. Beyond this, the regulations specified that any other generation "that is retained pursuant to" the clean energy Request for Proposals from the Energy Diversity Act were clean energy generation. In other words, this was a second state commitment to put the financial support of electric customers into bringing new Hydro-Québec power to Massachusetts. This regulation was passed in December 2017 (CMR 2017 7.75(2) and (6) Clean Energy Standard).

2018 Global Warming Solutions Project

The selection committee had selected Northern Pass in part because it was the farthest along among the proposals in terms of permits and planning, and thus most likely to be completed by the 2020 deadline. With the demise of the Northern Pass transmission line and the turn to the New England Clean Energy Connect Line through Maine, the Environmental League of Massachusetts' GWSP was vindicated in its longstanding doubt: a new large block of Canadian hydropower would not be brought to Massachusetts by the end of 2020. Despite the passage of the *Energy Diversity Act* and the new *Kain*-inspired regulations, the Environmental League of Massachusetts' 2018 yearly Report Card, published in collaboration with many of the same organizations that participated in the GWSP, asserted that they were "disappointed that the Commonwealth is lagging in many areas where we should be leading" (ELM 2018, 2). According to the League (ELM 2018, 2-3), leadership was "falling short" and "agency staff are stretched extremely thin and only have time to be reactive rather than proactive in addressing the many issues before them."

The League criticized the Energy Diversity Act selection committee's decision to select Northern Pass' transmission line, which "would transmit only large hydropower and no Class 1 renewable resources." The League questioned this "hydro-only" transmission line, when "a more diversified approach could have been a boost to the domestic renewable energy sector." Avangrid's New England Clean Energy Connect transmission line would "also transmit only large Canadian hydropower and includes no solar or wind energy." The focus on hydropower was described in the report as "a missed opportunity to develop a more diversified set of renewable resources such as on-shore wind and solar." While the report did not oppose importing hydropower, there was clear disagreement with the selection of a "hydro-only" approach to reducing carbon emissions (ELM 2018, 11).

The League's recommendation for renewable energy in Massachusetts was to bolster programs in Massachusetts like the SMART (solar) program and increase Renewable Portfolio Standards, and "ensure that the next phase in the development of offshore wind moves forward quickly" (ELM 2018, 12). Finally, the League began to look beyond the 2020 goal and assess Massachusetts' ability to reach its 2050 emission reduction goal. The League suggested that the state "Support efforts to extend the GWSA regulations to 2050" and "set a goal of a 50 percent emissions reduction from 1990 levels by 2030 to be on the path to meet reductions of 80 percent by 2050." While the League was not encouraged by the progress of hydropower imports thus far, they encouraged Massachusetts to promote wind as "a major source of energy for New England" and approved the state's decision to "to procure viable and cost-effective energy storage." Both of these solutions would set Massachusetts on a better track to not only meet the 2020 goals, but also the long-term 80 percent emissions reduction goal (ELM 2018, 14).

GWSA 10-Year Progress Report, 2018

In 2018 the Massachusetts Executive Office of Energy and Environmental Affairs (Mass EEA) published the GWSA 10-Year Progress Report (Mass EEA 2018). Despite the demise of Northern Pass and the GWSP's critiques, the state in 2018 proclaimed success and confidence. In 2018, "the latest statewide GHG inventory by MassDEP shows that GHG emissions in 2016 were 21.4 percent below the 1990 baseline level." Based on these levels, the 2018 Mass EEA Report claimed Massachusetts was "on track to meet the 2020 emissions limit of the GWSA" (Mass EEA 2018, 10).

In this report, it remained clear that the state intended to expand hydroelectricity imports, if not in time to reach its 25 percent reduction target by 2020, then to meet its 80 percent reduction target by 2050. Previously "Clean Energy imports," in the 2018 Mass EEA report "this policy is renamed to Clean Energy Procurement to reflect the procurement of hydroelectricity resources and offshore wind, both of which will be online in the 2020s" (50). The report emphasized the importance of hydroelectric imports for achieving emissions reductions beyond 2020:

> ...[R]eductions after 2020 will require actions to 'reduce, decarbonize, and electrify' the energy system, with electrification driving significant electricity demand. Recognizing that emissions could increase if this demand is not met using clean

> generation... New clean energy from Canadian hydroelectric generation and large-scale wind energy are the keystone of the Commonwealth's strategy for further reducing GHG emissions from energy generation. (Mass EEA 2018, 46).

Looking forward, then, large-scale renewable power remained central to Massachusetts' plans to meet its 2050 target, and importing Canadian power continued to play an important role, as did Massachusetts-based renewable development.

Advancing Canadian Hydropower Imports to Massachusetts, Part 3: 2019 NECEC approval

In June 2019, the Massachusetts Department of Public Utilities approved the New England Clean Energy Connect line proposed power purchase agreements (Mass DPU 2019). A number of stakeholders participated as intervenors and "limited participants." Critical questions were raised by the Massachusetts Attorney General's Office; by environmental groups including the Acadia Center, the Conservation Law Foundation, and the Sierra Club; by owners and representatives of existing New England merchant generators, including the New England Power Generators Association and NextEra; and by trade groups of energy-consuming businesses, including the Associated Industries of Massachusetts, The Energy Consortium, and the Western Massachusetts Industrial Group. Defending the agreements on each point were the Massachusetts Department of Energy Resource and the parties to the agreement: Hydro-Québec and its partner, utility Central Maine Power, owned by Avangrid; and the three Massachusetts distribution utilities.

A major part of the docket reviewed whether the contracts fulfilled the Energy Diversity Act's criteria. A brief review helps to reveal the deeper questions over importing Canadian hydropower to Massachusetts, and the position this crucial state regulator took. It is worth noting that the approval was later challenged but upheld by the Massachusetts Supreme Judicial Court (Gheorghiu 2020).

One key question was: Was the Hydro-Québec power to be delivered via the power purchase agreements incremental? The legislature had specifically allowed hydroelectric generation as eligible, so the question of methane emissions from reservoirs did not come up. The Department of Public Utilities ruled that under the statute's definition of firm, "hydroelectric generation provided without interruption for one or more discrete periods designated in a long-term contract, including....though [sic] the diversity of multiple units," Hydro-Québec power was firm. And, because it was firm, it was incremental, as past imports have largely been "through non-firm commercial deliveries that fluctuate depending on market conditions and transmission constraints" (Mass DPU 2019, 18-64, 18-65, 18-66: 29, 59).

Another key question was whether the Hydro-Québec imports through the power purchase agreements would *guarantee energy delivery in winter months, and help reduce winter electricity price spikes*. NextEra, an electric services company, argued that the supply obligations and ability to deliver hydroelectric power set by the Power Purchase Agreement (PPA) cannot "guarantee winter delivery and reduce winter price spikes" (Mass DPU 2019, 69). New England Power Generators Association similarly argued that there was "no basis for the Department to

conclude that the PPAs will guarantee energy delivery in the winter months as required" (Mass DPU 2019, 70). The Department of Public Utilities ruled yes, because the power purchase agreements included scheduled guaranteed deliveries for each month of the 20-year contract, including December, January and February.

A third question was whether the contracts would *enhance electric system reliability*. Several stakeholders said this was questionable because of the transmission constraints between northern and southern New England. The Department of Public Utilities ruled that because New England is an interconnected regional grid, delivery to Maine counted as improving reliability.

Was the project viable in a *reasonable timeframe*? Yes, because the generation is already being produced, and the contracts for transmission have critical milestones, require justification for any extensions, and provisions for fines if the commercial operation is not achieved on time. The due date for commercial operation was 13 December 2022, with limited allowances for delays.

Perhaps most important to a public utility commission, were the power purchase agreements *cost-effectiv*e for electric customers? The distribution utilities had employed a consultant to predict future cost of energy, environmental attributes and transmission, who had estimated that the "total cost of the energy and environmental attributes will be below the market value of energy and CECs over the term of the contracts by a value of $3.962 billion" (Mass DPU 2019, 109). Representatives of potential competitors to this new Hydro-Québec power from the New England Power Generators Association and NextEra argued there would need to be additional transmission lines built to bring the power from Maine to Massachusetts, which would cost an additional $5 to $10 billion, making the projects not cost-effective. The Department of Public Utilities found the consultant's report to be reasonable, disagreed with the need for new transmission between Maine and southern New England, and asserted that the distribution utilities had shown that there were other qualitative benefits as well, "including benefits related to reliability, environmental impacts, employment, and economic development" (Mass DPU 2019, 110). Employment and economic development would come through the construction of the new transmission line, and the economic benefits of reduced-cost power.

Thus, in this key legal arena, the import of new Hydro-Québec power was supported as a strategy for GHG reductions in the state of Massachusetts.

Advancing Canadian Hydropower Imports to Massachusetts, Part 4: 2020 Clean Existing Energy Regulations

In summer 2020, Massachusetts adopted an amendment to the 2017 Clean Energy Standard: it added a standard for clean *existing* energy (CES-E) built before the publication of the original, 2010 Massachusetts Clean Energy and Climate Plan. To qualify, a generation unit "must demonstrate that it... [i]s located in either Massachusetts, New Hampshire, Connecticut, or Eastern Canada (Québec or Newfoundland and Labrador); and... [c]ommenced commercial operation before January 1, 2011; and... "[i]s a nuclear or hydroelectric generation unit with a nameplate capacity greater than 30 MW" (310 CMR 7.75 Clean Energy Standard, 2020).

This standard was not related to the newly contracted New England Clean Energy Connect line, but it was still aimed to use imports of Canadian hydropower to help achieve the GHG emissions reduction targets from the Clean Energy and Climate Plan. It would support continued imports of Canadian hydropower through older transmission lines -- either from Hydro-Québec, or possibly from Newfoundland and Labrador, via either Québec or New Brunswick. The amendments would also support payments to retain nuclear power plants within the regional grid. As the Department of Environmental Protection's background document explained, the revised standards would help:

> ensure compliance with the 2020 emissions limit... under the authority of the GWSA, which requires Massachusetts to reduce statewide GHG emissions by 25 percent relative to a 1990 baseline.... The CES-E is important to "lock-in" the contribution of these existing resources to Massachusetts' clean energy supply in 2020 and beyond (Mass DEP 2019).

Clean Energy and Climate Plan Update & Legislation, 2020-21: 2050 Roadmap

In 2020, Baker announced his "intent to pursue the more aggressive net zero target to further reduce emissions" (Mass EEA 2020a) Secretary Kathleen A. Theoharides of the Executive Office of Energy and Environmental Affairs determined "that net zero emissions by 2050... is a reasonable and appropriate 2050 statewide emissions limit necessary to adequately protect the health, economy, people and natural resources of the Commonwealth" (Mass EEA 2020a). This new 2050 goal, up from the original GWSA mandate of 80 percent emissions reduction, was the focus of planning for the 2050 Decarbonization Roadmap report (Mass EEA 2020b). In the 2050 Decarbonization Roadmap, published in December 2020, the state encouraged "an integrated portfolio of clean energy" in which "resources needed to ensure a reliable electricity supply during such a sustained low-wind period include clean electricity imported over interstate transmission lines" (Mass EEA 2020b, 62). This report affirmed that the anticipated "New England Clean Energy Connect 100 percent Hydro project will provide 9.5 Terawatt-hours of clean hydropower and increase regional transmission capacity by more than 1 GW" (63). Looking beyond 2020, Massachusetts policymakers continued to see Canadian hydropower as important to balancing regional renewable energy sources.

As we were finishing up this article, on 26 March 2021, Governor Baker signed *An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy*. While still focused on reducing GHG emissions, unlike the earlier legislation and regulations reviewed above, it did not focus on imported Canadian hydropower as a centerpiece. Rather it focused on acquisition of new offshore wind energy, increasing the Renewable Portfolio Standard, various kinds of efficiency, electrification of transportation and heating, solar incentives, and environmental justice. Like the 2050 Decarbonization Plan, it aimed for net-zero emissions in Massachusetts by 2050 (Massachusetts General Court 2021; Office of Governor Charlie Baker and Lt. Governor Karyn Polito 2021; Walton 2021). Meantime, the New England Clean Energy Connect line faced new hurdles in Maine (Wade 2021).

Analysis: Stances and Strategies on Importing Canadian Hydropower to Meet Massachusetts GHG Emissions Reduction Targets

In this section we analyze first, Massachusetts' approach, strategy and action relative to importing Canadian hydropower as a strategy to meet its GHG reduction targets; next, those of the GWSP and the Environmental League of Massachusetts; and finally, some other considerations that have been part of this debate and evolution that are also important to this story.

Understanding Massachusetts' Drive for Hydro-Québec Power

The history we have detailed shows Massachusetts' continuing emphasis from 2008 to 2020 on importing Canadian hydropower, primarily from Hydro-Québec. It was often embraced as a linchpin strategy to reduce GHG emissions and reach the state's ambitious GHG emissions reduction targets. This emphasis showed up in a series of state reports, and was codified into state law in legislation in 2016 and regulations in 2017 and 2020. Nonetheless, there were evolving roles and rationales for this emphasis, and in the most recent legislation, in 2021, it is largely missing. How can we understand both the emphasis and its evolution?

The policy reports published by the state promoted three key rationales for expanding hydroelectric imports as a key strategy for meeting state GHG emissions reductions targets. State reports cited (1) Canadian hydropower's ability to meet a tight timeline for emissions reductions targets, (2) the cost-effectiveness of hydroelectric imports, and (3) the ability of hydropower to provide balance in a renewable energy system. The balance among these, and the way they were used to support particular strategies, shifted over time. This evolution also showed up in the way that Canadian hydropower was included, or not, in legislation, regulations, and the Department of Public Utilities decision on the New England Clean Energy Connect long-term contracts.

First, across all the state reports, hydroelectric imports were promoted as a relatively fast and achievable means of emissions reductions. This was emphasized particularly strongly in the earlier reports. Massachusetts established "the most aggressive set of measures to address climate change of any state in the country," according to the state's 2013 progress report, tied to a strict timeline of reaching the first short term goal by 2020 (Mass EEA 2013, 1). State publications prior to the 2018 progress report posited that expanded hydroelectric imports would be achievable in time to provide emissions reductions for the 2020 goal. However, between the establishment of Massachusetts' carbon reductions goals and the first deadline of 2020, numerous other emissions reductions strategies were slow to get off the ground. Emissions reductions from energy efficiency consistently underperformed (Mass EEA 2015, 12). Cape Wind, which was supposed to generate 468 MW of power, and was slated to be "the first offshore wind project in the United States, and ... create 600 to 1,000 jobs" (Breslow 2010, 4) faced costly resistance and litigation from powerful land-owners, indigenous communities, and wildlife agencies before eventually being abandoned (Swain 2019). In light of these delays, Hydro-Québec's existing relationship to Massachusetts and its already-existing

capacity to export hydroelectricity were cited as factors that could help bring these expanded imports online by the 2020 deadline (Mass EEA 2015, 92). While the state acknowledged the uncertainty of "siting concerns, with potential delays from legal action," the reports also noted "several competing transmission projects" already in development (92). In the 2010, 2013, and 2015 reports and plans, the state's narrative thus promoted hydroelectric imports as an achievable source of emissions reductions within the strict 2020 timeline.

Later, however, these claims grew less enthusiastic and less optimistic. By 2018, the state's reports were not counting new Hydro-Québec imports in their plans for meeting the 2020 targets. This was because of the delays that came from New Hampshire's rejection of the Northern Pass transmission line.

Even then, however, Massachusetts policymakers continued to believe that Hydro-Québec power could be brought to the New England grid relatively quickly compared to other not-yet-built generation. This was apparent in the language of the 2016 Energy Diversity Act, and especially in the Department of Public Utility's 2019 approval of long-term contracts with the New England Clean Energy Connect line, as they deemed that the project, whose initial contract deadline was 2022 but might be delayed for specific reasons, was viable within a reasonable timeframe.

The second rationale supporting expanding hydroelectric imports as a key strategy for meeting state GHG emissions reductions targets was the cost-effectiveness of hydroelectric imports. Our investigation of Massachusetts carbon reduction policy highlights recurring references to the promise of hydropower imports providing cost-effective energy and price stability. State policies and progress reports consistently identified hydropower imports from Hydro-Québec as "inexpensive clean power" (Breslow 2010, 45). The 2010 CECP suggested that hydroelectric imports would present "no additional costs...to ratepayers or taxpayers" (45). The 2010 CECP and subsequent 2015 update promoted hydroelectric imports' ability to improve energy price stability (Breslow 2010; Mass EEA 2015, 92). The 2015 Update also continued to argue that a competitive bidding process to select long-term contracts to deliver this power would "minimize costs to ratepayers" (Mass EEA 2015, 92). The contracts between Massachusetts utilities and Avangrid, signed in 2018, was for the "purchase of 9.45 million MWh of electricity from Hydro-Québec each year" through Avangrid's New England Clean Energy Connect transmission line. For this electricity, "utilities owned by Eversource, National Grid and Unitil will pay a total levelized price of $0.059/kilowatt hour" (Walton 2018). The Department of Public Utilities' approval of these contracts hinged in part on its judgment that these contracts would reduce electric customers' bills. Comments from intervenors and participants in the Department of Public Utilities also suggest that concerns about cost relative to other power options was a key part of whether parties believed that hydropower imports through the New England Clean Energy Connect line were desirable (Mass DPU 2019).

The third major rationale for hydropower imports as a key strategy for Massachusetts to meet GHG emissions reductions goals was that Canadian hydropower could help alleviate imbalances and strains in the resource mix at particularly crucial times. This rationale became more important over time, almost inversely with the declining emphasis on timeliness. A transmission line connecting Massachusetts to more hydroelectricity was consistently promoted

by the state as a source of seasonal balance in Massachusetts' energy system. More recently, it has been emphasized as an important resource in optimizing renewable energy resources across the region. The narrative that hydropower can provide balance in Massachusetts' energy system was repeated throughout publications, particularly as the state began to think beyond 2020. The original CECP promoted additional hydropower imports' ability to "significantly improve the region's fuel diversity, improving energy security and price stability" (Breslow 2010, ES-2). Two of the criteria for approval of long-term contracts under the 2016 Energy Diversity Act related to this issue: guaranteed winter delivery, and help reducing winter price spikes. Winter electric reliability and price spikes have been important concerns for some years since the region turned predominantly to natural gas generation. This is because New England produces none of its own natural gas, and in deep winter cold, the gas supplies imported to the region are needed for heat, and an inadequate supply is left for electric generation. This leads to electricity price spikes and use of fuel oil, a more GHG-emitting option (see e.g. NERC 2020). The 2018 state progress report highlighted that "the NECEC Project will be particularly beneficial during the winter months when the region experiences high energy prices due to reliance on natural gas for both electricity and heating" (Mass EEA 2018, 52).

In the more recent legislation, rulemaking and reports, the state began to focus also on the ability of hydropower to balance out intermittent renewable power. The 2016 Energy Diversity Act allowed for clean energy proposals in which hydropower would "firm up" Class I renewable resources, many of which are wind power. The 2050 Decarbonization Roadmap suggested that the construction of a transmission line connecting Québec to Massachusetts would allow the state "to export offshore wind power to Québec can enable the optimal use of hydropower and offshore wind resources across the broader Northeastern region" (Mass EEA 2020, 65). The state maintained that, "to affordably and reliably operate an electricity grid based on variable renewable generation, a balanced portfolio of clean generation technologies shared across a broad geographical region is needed" (Mass EEA 2020, 23).

Environmental Advocates' Concerns with Hydroelectric Imports

While the state of Massachusetts advanced imports of Canadian hydropower as a key strategy for meeting state GHG emissions reductions targets, environmentalists treaded more carefully, voicing enthusiasm for the goal of reduced emissions, but not necessarily the strategy of hydropower imports. Behind the scenes, environmental groups and their allies were not always of the same opinion; some, like the Union of Concerned Scientists, supported importing Canadian hydropower (Kimmell 2019), while others, like Sierra Club Massachusetts, were opposed (Norton 2017). One of the leading environmental groups, the Conservation Law Foundation, opposed Northern Pass but then helped negotiate an agreement to support the New England Clean Energy Connect (O'Neill 2019). Amidst this array of opinions, the Environmental League of Massachusetts and the larger GWSP coalition sought to bridge these differences for maximum influence. In reading these coalitions' reports and policy scorecards, we identified three repeated concerns with the policy of expanding hydroelectric imports. Two were in almost direct opposition to the state's positions.

The coalitions' most consistent -- and prescient -- criticism was that hydropower imports could not be acquired in time for the 2020 target. Already in their 2014 climate scorecard, the GWSP raised concerns with the state's narrative that a new transmission line could be completed by the 2020 deadline. Citing the Northern Pass project, which "was specifically identified in the 2020 Plan," the scorecard highlighted "significant challenges" that threatened to delay developments (GWSP 2014, 18). The GWSP described the challenge of overcoming "all the necessary political, regulatory and financial hurdles within the next couple of years" (2014, 18; see also Breslow 2010, 45). This concern was highlighted again in the GWSP's 2016 report, questioning the state's assertion that one of the "several competing transmission projects" in their 2015 progress report could bring 4.2 percent of emissions reductions by 2020 (2016, 92).

If the state was overly optimistic about hydropower imports, that put policymakers' rosy estimates about meeting the 2020 target into question. While the state argued Canadian hydropower would help balance other renewables, environmental advocates cautioned that relying on expanding hydroelectric imports to bring the necessary emissions reduction by the 2020 deadline could delay progress on in-state and regional renewable energy development. In 2016, the scorecard expressed concerns that "calling for imports of hydropower alone, would likely undermine or delay development of in-region renewable energy resources, such as onshore and offshore wind" (GWSP 2016, 10). This was specifically in relation to legislation submitted to the Massachusetts Senate by Baker, S. 1965, enabling "electric companies to enter into 20+ year contracts for up to 2400 MW of hydropower" (23) -- a precursor bill to the 2016 Energy Diversity Act. In this scorecard, the GWSP seemed to see hydropower imports as a necessary part of a decarbonization path for the state and region. They suggested that hydroelectric imports would be important for the 2050 mandate. Still, they were not enthusiastic. They emphasized that "any long-term contracts for clean energy supply must include a significant percentage of Renewable Portfolio Standard (RPS) eligible resources, especially onshore wind to avoid crowding these resources out of transmission opportunities" (GWSP 2016, 24).

One member of the GWSP, the Conservation Law Foundation, found other means besides reports and scorecards to force the state to speed up on a range of measures. Their 2016 victory in the state Supreme Judicial Court forced more rapid-fire legislation and rulemaking in state government. The environmentalists' ambivalence about hydropower imports as probably necessary in the long run, but no silver bullet, was reflected in the policy that emerged from the lawsuit. This included the 2016 Energy Diversity Act's mandate for long-term contracts for both wind and "clean" power, and the clean energy regulations that followed in 2017 and 2020. In both the 2016 legislation and 2017 and 2020 regulations, the state avoided defining large hydropower as renewable, but explicitly defined it as mandated "clean" energy to include imported energy from large hydropower.

This was significant because earlier, the GWSP had repeatedly expressed concerns with the classification of large hydroelectric power as "very low-emissions" (GWSP 2014, 2016; see also Breslow 2010, 45). A 2012 study by Synapse Energy Economics Inc. cited by the GWSP noted that "there is not yet scientific consensus on methods for estimating GHG emissions from hydropower" (Steinhurst et al. 2012, 15). This study identified significant sources of

carbon emission from hydropower in "newly flooded reservoirs... due to the decomposition of biomass covered by the flooded reservoir" as well as "the elimination of a terrestrial biological community and its replacement by an aquatic biological community" (Steinhurst et al. 2012, 15). Environmental advocates presented concerns in 2014 with both existing dams and the possibility of future dam construction, with inconclusive information about "what fraction of Canadian imports is likely to come from already-existing hydroelectric facilities and what fraction would require new dams and flooding" (GWSP 2014, 19). Advocates argued that these emissions "must be properly accounted for when tallying lifecycle emissions reductions from hydropower facilities" (GWSP 2016, 24). Still, most Massachusetts groups seemed to have come to accept that large hydropower would be counted as low-emitting, and was preferred over fossil fuel generation. We infer this from their lack of protest on this point in the Department of Public Utilities deliberation over the New England Clean Energy Connect line in 2019 and in the comments on the clean energy revisions in 2020.

Conclusions: The Role of Canadian Hydropower in Massachusetts' Future Efforts to Meet GHG Reduction Targets

In this article, we aimed to provide a narrative for understanding the stakeholders and rationales that have been involved with Massachusetts' push to bring Canadian hydropower, and particularly Hydro-Québec power, to the state as a key strategy to meet its GHG emissions reduction targets. Our paper provides context for understanding where the state is in 2021, and the story behind the other articles in this special edition.

By mandating greenhouse gas emissions reductions from 1990s levels of 25 percent by 2020 and 80 percent by 2050, the state of Massachusetts embraced a massive political, economic, and social challenge. Reaching these levels of carbon emissions on such a tight timeline required a transition to non-fossil-fuel sources of energy or a dramatic reduction in greenhouse gas emissions usage across sectors, or both. While energy reduction strategies across sectors were included in the plan for reaching both the 2020 and 2050 goals, relying only on reduction without a large increase in non-fossil-fuel energy would require dramatic social and economic change. The state reports and legislative and regulatory action identified in this history highlight the state's determination and its rationales to continue replacing fossil-fuel energy sources with low-emissions power. Connecting Massachusetts with existing generation in Québec through a transmission line was an attractive policy action for state policy makers for its cost-effectiveness, apparent speed to completion, and ability to provide balance to a renewable energy system.

Still, how much, when, *how*, or even *whether* Hydro-Québec power would play a major role in meeting Massachusetts' GHG emissions reduction targets was still unknown in the first half of the 2010s. The 2016 Energy Diversity Act and subsequent clean energy regulations, as well as the Massachusetts Department of Public Utilities' 2019 approval of the New England Clean Energy Connect line, helped answer some of these questions. Even now in 2021, however, the import of large volumes of Hydro-Québec power that was expected following the 2016 Energy Diversity Act, the 2018 selection of the New England Clean Energy Connect line, and its 2019 approval by the Massachusetts Department of Public Utilities, still awaits further approvals.

Massachusetts' difficulty in importing a large new block of Hydro-Québec power demonstrates the complexity of replacing fossil-fuel generation with clean power. "Clean" power has to come from somewhere, be transmitted from there to its destination, and someone has to build that transmission and pay for it. Despite the fact that large hydropower is now defined in Massachusetts policy as "clean," many environmental advocates in the state questioned whether it was a desirable policy option to reach GHG emissions reduction targets. They asked whether large hydropower would actually result in the level of emissions reductions expected by the state and raised concerns that it would draw resources and focus away from in-state and local renewable generation development.

But importing large hydropower from Hydro-Québec has been controversial for Massachusetts not only because of Massachusetts-based questions about the emissions reductions it could bring. It has also been difficult because electricity needs to pass through continually interconnected transmission lines, and those need to be sited in physical locations that cross both country and state(s) borders. Massachusetts legislators and the companies that aimed to build the transmission lines did not acknowledge the full potential of complexities of running a transmission line through New Hampshire or Maine. While environmentalists foretold the challenges, state leaders remained blithe until near the end of the timeline.

This history provides three key lessons that will be valuable as Massachusetts looks to its 2050 emissions deadlines. First, reaching the 2050 emissions target will require significantly more new blocks of low-emission electricity generation. Due to the emissions reductions that followed the regional fuel switch to natural gas, Massachusetts was at a significant advantage when beginning its work in 2010 to reduce emissions by 25 percent from the 1990 level (ISO NE 2017). Achieving the levels of emissions reductions needed to reach the 80 percent reduction mandate by 2050–now net zero, in the brand-new 2021 climate roadmap law–will require new strategies and blocks of low-emissions energy, which may come in the form of Canadian hydroelectric imports. While opponents in Maine are still organizing drives for referenda that could stop it, the transmission line through Maine has been permitted and is scheduled to be completed by the end of 2023. In addition, Massachusetts continues to plan for significant wind and solar development. This will not only require transmission infrastructure but new generation infrastructure.

The second lesson is that accessing new electricity generation will bring debates, both in the state of Massachusetts and at the site of generation and transmission, which is likely to slow the progress of new development. As much as state priorities and interests changed in the years since the GWSA, the needs and input of additional stakeholders have evolved. Importing large new volumes of hydropower would change the balance of energy generators in southern New England, favoring customers but potentially hurting existing generators (Vogel, this issue). Balancing the needs of different stakeholders and advocates has caused significant delay, both within and outside Massachusetts. We suspect that whether through the New England Clean Energy Connect or another route, new Hydro-Québec electricity will eventually flow to New England, but it will continue not to be the easy fix state leaders thought it might be. Future transmission and generation infrastructure development can be expected to encounter similar debate in order to balance the needs of stakeholders and legislative and regulatory mandates.

Third, Massachusetts' plan to achieve decarbonization by 2050, as outlined in the 2050 Decarbonization Roadmap (Mass EEA 2020b) and expected in the new climate roadmap law, will involve Canadian hydroelectricity imports; therefore, Massachusetts' decarbonization desires will continue to impact the future of Northern New England and Québec. The Decarbonization Roadmap, published at the end of 2020 by the Baker administration, suggested that the state's goal was to establish a "balanced regional electric grid dominated by renewables" (Mass EEA 2020b). To satisfy this, new developments in wind, solar, electricity storage, and "several new high-voltage transmissions lines to Canada and New York that will allow sharing of low-cost clean energy, including hydropower, with the Commonwealth's neighbors in the Northeast" would be needed (Mass EEA 2020b, 23). As the other papers in this special issue show, GHG reduction imperatives in Massachusetts thus have wide implications for distant rivers and First Nations in Québec and the people and landscapes of northern New England . As it stands in 2021, Massachusetts' decarbonization goals remain tied to Canadian hydropower, and Hydro-Québec interests will continue to remain tied to Massachusetts.

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LEGACIES OF ELECTRIC RESTRUCTURING FOR A New Electric Transition: Neoliberal Paths for Canadian Hydropower

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ABSTRACT

The current transition in our electric systems away from fossil fuels is shaped by a previous electric system transition, electric restructuring. Can the neoliberal tools we built some two decades ago—and the regulatory remnants and responses—achieve the deep environmental and social change we now seek? This article analyzes the institutional, political-economic, and geographical effects and legacies of electric restructuring, focusing on Massachusetts and New England. It analyzes five realms of change: (a) generation; (b) transmission; (c) distribution and retail supply; (d) regional wholesale markets; and (e) deregulation of electric utility corporate structure. It shows how the legacies of these changes shape Massachusetts's approach to importing Hydro-Québec power. Today's main market tools in the electric sector are inadequate to fund long-distance transmission in the United States, as investors cannot tolerate the high financial risk. Massachusetts's approach to importing Québec hydropower unfolded in four steps: 1) the 2016 Energy Diversity Act; (2) a Request for Proposals to fund a transmission line through northern New England; (3) the selection of a winning proposal, and 4) the addition of clean energy credits to the state renewable portfolio standard. These put the cost of a new line onto Massachusetts's electric customers, guaranteed profits to the transmission owner and the state's still-regulated utilities, and offered multiple income streams to Hydro-Québec. The proposal competition favored projects that externalized costs onto other people and places, and into the future—leading to political opposition, escalating costs, and implementation delay. This history helps reveal key legacies and limits of electric restructuring and its role in decarbonization as well as wider sustainability and justice.

Key words: electric markets, energy geographies, infrastructure, Hydro-Québec, Massachusetts, neoliberalism

I. Introduction: A Current Energy Transition Built On The Legacies Of Electric Restructuring: Neoliberal Paths For Climate Mitigation?

Today, as activists call for an energy transition away from fossil fuels, they increasingly call for that transition to rest on commitments to social and environmental justice. A large focus for that effort is in the electric sector: changing from fossil fuel electric generation to use of renewables and other low-carbon sources; and then switching other sectors like transportation and heating to electricity. Yet many of the tools, institutions and markets that are available to promote a fuels transition in electricity were created or reshaped by another transition in the electrical system which happened only a couple decades ago: electric restructuring. Though this previous electric system transition is most accurately called restructuring, the word "deregulation" that is often used flags the broader context: electrical restructuring was part of a global trend of neoliberalization, in which economic activity was commodified, deregulated, privatized, and/or marketized.

This article aims to contribute to the special issue by detailing why and how electric restructuring is key background to understand Massachusetts's drive to import Hydro-Quebéc power. To do this, I analyze of several institutional, political-economic, and geographical effects of electric restructuring. Electric restructuring unfolded in the United States, Massachusetts and New England largely between 1978 and 2005. I illuminate how these changes and their effects have shaped the political alliances, policy choices, financing, and some of the likely outcomes of Massachusetts's effort to import Hydro-Quebéc power as one strategy to meet its greenhouse gas reduction targets. In the process, I also illustrate many of the ramifications of electric restructuring that so far have been largely missing from the literature.

As a host of geographers have shown (e.g., Robertson 2007; Mansfield 2009; Castree 2011; Lave and Doyle 2021), the very act of commodifying and marketizing any kind of biophysical resource can have unintentional and often negative effects. In the case of a ubiquitously used resource like electricity, market price affects the rhythms of extraction, commerce, manufacturing, work, consumption, and waste in myriad places, communities, and ecosystems. All this happens often with little attention to local sustainability or wellbeing. Further, neoliberal instruments and approaches often change who can influence electric policy and markets, and to what ends, while obscuring those effects behind a veneer of a naturalized market. Competition and deregulation are portrayed as opening access to a variety of market entrants, but they are often promoted by those who hope to achieve market dominance through early entry or other means.

As Harvey (2007) and many others have shown, neoliberalism was intended to "fix" a growing crisis of accumulation of the 1970s, in which business owners and investors had an increasingly difficult time finding places to invest capital where they could reliably earn a profit. Electric restructuring, with its new markets and investment opportunities, was a way for large electric consumers to reduce costs; for utility corporate families to alleviate limits and restrictions on potential profits; and for investors to open a whole new world of profitable opportunities in new generation technologies, new electric market commodities, and a range of electric services (see e.g., Hirsch 1999; Borenstein and Bushnell 2000; S. N. Isser 2003).

Recognizing that the current transition was built on a previous one with strong neoliberal foundations raises the question: As we collectively push for a profoundly urgent reduction in carbon emissions, can the neoliberal tools and institutions we have built in the electric sector achieve the deep environmental and social change we seek?

This article does not pretend to answer that question fully. My goals here are narrower and more empirical, laying groundwork for further analysis. Focusing on one state and one region, I ask what, exactly, electric restructuring did—in terms of institutional, political-economic, and geographical change. I then outline some important implications for Massachusetts's current effort to import a large block of Hydro-Quebéc power under the state's 2016 Energy Diversity Act.

Massachusetts has long been a leader in efforts to reduce the environmental impacts of its energy generation and use; it has relatively strong commitments to social justice principles including access to and affordability of electric power; and it was also a leader in electric restructuring. For these reasons, for those interested in just social and environmental change in our energy systems, it is an excellent place to examine the legacies of electric restructuring. The direct and tangible connections between Massachusetts policy and Quebéc's hydropower also enable close tracing of some of the material, social and environmental linkages, as illustrated throughout this special issue.

To orient the reader and provide background, I provide a short overview of some of the literature on energy geographies, electric grids and markets, and a brief policy history of electric restructuring. The two main Parts of the article follow, Part II on New England electric restructuring and its consequences, and Part III on the implications for Massachusetts's imports of Hydro-Quebéc power. In a concluding Part IV, I ask what some of the lessons about how we think about the legacies of electric restructuring as we seek and analyze a new electric transition.

Geographies of Electric Grids and Markets

In recent years geographers have produced a robust energy geographies literature (for overviews see: Huber 2015; Calvert 2016; Harrison and Popke 2017; Bridge et al. 2018). They have helped illuminate the ways that energy geographies are changing and contested across a host of scales, locations, technologies, and policy and market contexts. Bringing geographers' insistence on connecting the theoretical with the concrete, they have shown the ways that broad ideas like an energy transition, renewable power or climate mitigation are linked to capital accumulation strategies, state strategies and apparatuses at multiple levels and scales, and environmental and social exploitation and change. Geographers have traced these interlinkages through to specific policies, technologies, locations, environments.

Few geographers have thus far, however, undertaken deep explorations of electric policy and history, especially not at the scale of grids and regions. Connor Harrison has been one geographer who recently has led the way, examining early twentieth century electric history, and most recently, the accumulation strategies within the current U.S. electric system (Harrison 2013b; 2013a; 2020; see also Heiman and Solomon 2004; E. Vogel 2008; 2012; Howell 2011).

Others have written about electric restructuring and its legacies, but often from an engineering, economic or political science standpoint (e.g., Joskow 2003; Borenstein and Bushnell 2015; S. Isser 2015; Litvinov, Zhao, and Zheng 2019). This article aims to bring the analytical strength of geographical scholarship, within and beyond the energy geographies literature, to these topics. I ground my analysis in geographers' and allies' long insistence that neoliberalism is not a single thing; rather, there are many neoliberalisms, and to understand their effects, one must delve deeply into empirical specifics, tracing a host of variations and path dependencies (Brenner and Theodore 2002; Castree 2011; Heynen et al. 2007; Mansfield 2009). My treatment of restructuring here is about specifics far more than generalizations.

In this paper I am particularly interested in those large-geographic-scale regional and even subcontinental electric systems sometimes called "the grid" (Bakke 2017; Cohn 2018). I have been particularly inspired by historians' and historical geographers' long and detailed expositions of the development and consequences of infrastructural systems, whether electrical systems, energy infrastructure, waterworks, and railroads and roads, that act to move and metabolize a host of resources across space (Hughes 1983; White 1995; 2011; Gandy 2002; Coutard and Rutherford 2015; Jones 2016). How the electric grid is governed, how its products are bought and sold, who owns and controls these products and their movements—all of these have enormous influence on lives and spaces in all corners of this continent. And in the last 25 or so years, many regions of the United States and Canada have fundamentally altered how their regional grids are governed.

An Abbreviated Policy History of Electric Restructuring in the United States and New England

Electric restructuring came relatively late and piecemeal in the United States, compared to restructuring in other sectors. This is because electricity was a complicated commodity for a number of reasons, including: it could not be stored; it could be bought and sold only where there were existing transmission lines; both the buyers and the sellers of electricity were politically and economically powerful; there were large and expensive "stranded assets," i.e. power plants with already-invested capital that might no longer be competitive in a freer market; electricity was recognized as essential for all people and therefore selling strictly based on ability-to-pay would not be politically viable; and electricity was regulated by fifty states as well as the federal government (U.S. EIA 1996; 1998; Hirsch 1999; Borenstein and Bushnell 2000; S. N. Isser 2003; S. Isser 2015; Joskow 2003; Heiman and Solomon 2004).

The first step in Unites States' electrical restructuring was the federal 1978 Public Utilities Regulatory Policies Act (PURPA). PURPA allowed a few small independent generators to be established. This began to crack open the monopolies of electrical utilities as well as the assumption that the electric sector needed to be vertically integrated (Hirsch 1999). There was no major electrical restructuring legislation in the 1980s, but in Massachusetts and New England, utilities, large industrial customers, environmental groups and regulators began to collaborate and negotiate, creating innovative approaches to promote conservation and efficiency, reduce costs, and plan regional electrical expansion on an integrated basis (Cohen 1987; NEES and CLF 1989; Raab 1994).

The heart of electric restructuring policy change happened in the 1990s. The 1992 federal Energy Policy Act (EPAct 1992) allowed still more independent generation. In 1996, the U.S. Federal Energy Regulatory Commission (FERC) issued Orders 888 and 889 requiring open-access transmission, which would allow any company's electricity to flow on a given transmission line. These 1996 FERC Orders also encouraged the formation of regional Independent System Operators, or ISOs, that would manage regional generation and transmission in competitive and open-access systems (U.S. EIA et al. 2000; U.S. EIA 1996; 1998; The Electric Energy Market Competition Task Force 2007). In 1997, the New England Power Pool created ISO New England and the region's first competitive wholesale markets (NEPOOL and ISO-NE 1998).

Support for restructuring varied among the fifty states. In New England, with some of the country's most expensive electricity, five of the six New England states passed restructuring legislation in 1996 or 1997 (Vermont was the exception). State Restructuring in these five states required or encouraged investor-owned electrical utilities to sell off their generation assets and reorganize their transmission assets into independent corporate affiliates. It allowed competitive retail supply and created Renewable Portfolio Standards (RPS) in which retail suppliers had to get an increasing percent of their generation from renewable sources (Polestar Communications & Strategic Analysis 2003; 2006; Wadsworth 1997; Reishus Consulting 2015).

Often overlooked or underemphasized in histories of electric restructuring was a major deregulatory shift in electric utility corporate structure, geography and finance. Driven by their falling profits, electric companies and investors called for release from restrictions on their investment opportunities. The Public Utility Holding Company Act of 1935 (PUHCA 1935) had kept utilities tightly restricted in geography, corporate form, and speculative investments since the Great Depression. It was first weakened in 1978 with the Public Utility Regulatory Policies Act (PURPA), further weakened with the Energy Policy Act of 1992 (EPAct 1992), and fully repealed by EPAct 2005 (APPA 2005; Congressional Research Service 2006; Bolton and Rosenthal 2016).

II. Institutions And Consequences Of Electric Restructuring In New England

This part of the article analyzes key effects of electric restructuring in Massachusetts and New England. I focus on fundamental institutional changes and their political, economic and geographic repercussions. I organize this part by the three main components of a traditional vertical utility: generation, transmission and distribution. To these I add two overarching changes in the electric sector: ISOs and regional markets, and changed corporate structure.

a. Generation: Independent Power Producers

The first key change wrought by restructuring was the creation and growth of independent power producers (IPPs), sometimes called merchant generators or competitive power suppliers, in the place of utility-owned generation plants. In most of the United States, including New England, vertically integrated, state-regulated, investor-owned utilities owned generation, transmission and

distribution throughout most of the twentieth century. An independent power producer is not owned by the local regulated electric utility, but rather by a separate company. An IPP owner's goal is to sell the plant's generation—and, as other markets have been developed, other commodities like renewable energy credits and capacity—at the highest price it can (Wadsworth 1997; U.S. EIA 1998; Hirsch 1999). Under the new system, owners and investors spend money to build an IPP and then recoup costs (if they can) through competitive markets and contracted sales. The change to the new system is illustrated in Figure 1.

Prior to restructuring, utilities earned profits under a system often called *rate-of-return regulation*. Under this system, utilities reported their investment costs to state utility commissions, and were usually allowed to set their customers' prices, or electric *rates*, to cover the costs plus a profit. Utilities spent more money, built more infrastructure, and earned more profit—virtually guaranteed. Under this system, regulated utilities were incentivized to continually build large plants, connect them to demand centers with ample transmission lines, and then promote electrical demand to follow (Hirsch 1999 called this the "utility consensus.")

Many of the realized benefits of electric restructuring came from the rise of IPPs. Smaller and more efficient power generation plants proliferated, most of them natural gas combined cycle plants. A number of the large coal, oil and nuclear plants previously owned by utilities closed. This fuel shift, and continued investments in energy efficiency and conservation, were the largest sources of Massachusetts's greenhouse gas reductions for its Clean Energy and Climate Plan targets for 2020 (see Silverstein and Autery, this issue). Equally important as a success of electric restructuring, the direct financial risk of building new generation is on shareholders, not electric customers (U.S. EIA 1996; 1998; Hirsch 1999; Joskow 2003).

Often less remarked upon, the proliferation of IPPs also changed the political balance of power in electric policymaking in New England (and elsewhere). IPPs themselves constituted an entirely new set of political players. In New England, many of the IPPs are represented by the New England Power Generators Association (NEPGA), which has grown to be an economically and politically powerful trade organization. Additionally, large industrial and commercial electric customers, organized in trade associations such as Associated Industries of Massachusetts (AIM) and The Energy Consortium (TEC), gained new leverage over electric power policy. They had always had sway, because owners and investors could threaten to leave New England for other regions where electricity costs were lower (see e.g., E. Vogel and Lacy 2012; Koistinen 2013). As electric restructuring proceeded, manufacturers could compel electric policy change without having to move; they could simply threaten to abandon utilities by purchasing electricity directly from new IPPs. This threat in the 1990s helped convince utilities and others to support restructuring (NESCOE 2015a).

To synopsize, the rise of IPPs led to a successful shift from large utility-owned, customer-financed plants to smaller, more efficient, investor-financed plants. With this came a shift to gas generation and a resulting reduction in greenhouse gas emissions. IPPs became new political and economic players; industrial and commercial customers gained further power.

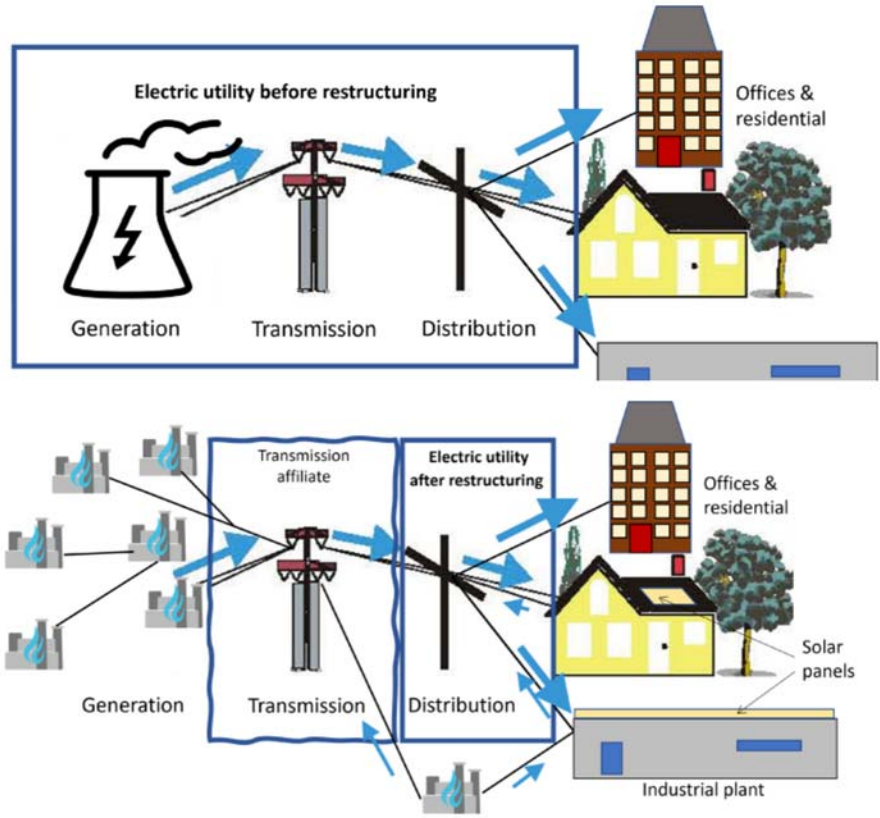

Figure 1. Massachusetts investor-owned electric utility before and after restructuring, showing unbundling of generation, transmission and distribution, and the rise of IPPs. Only distribution remains a state-regulated utility, though transmission is generally still owned by the same parent company. Most of the IPPs are efficient combined cycle gas plants, while most coal plants have shut down. An industrial plant receives wholesale power directly from one of the gas generation companies. The industrial plant and the residential house also now have photovoltaic solar panels that produce electricity that is sent into the grid. Adapted by author from U.S. EIA et al. 2000 Fig. 2, p. 9. Natural gas icon from Oregon Department of Energy.

b. Transmission: Open Access But Not Open Geographies

A second key change under electric restructuring was that transmission was required to become open access with "nondiscriminatory" pricing, i.e., equally accessible and the same cost to anyone who wanted to transmit electricity. However, transmission itself could not easily become competitive. The change in transmission, and lack of change, exemplify the complexities of neoliberal restructuring in practice, and its material and geographical consequences.

Transmission lines are the long-distance and medium-distance higher-voltage lines that carry electricity between cities or other relatively distant locations. Transmission lines are like pipes carrying drinking water from scattered reservoirs to myriad cities and towns. The higher voltage lines are like bigger pipes and carry more electricity. A map of New England's electric grid is provided in Figure 2. Different colors and thicknesses of the lines represent different voltages of the wires. Virtually all transmission lines in New England are on alternating current (AC) which allows electricity to flow freely anywhere in the interconnected grid, from any location of supply to any location of demand. As can be seen in the map, in some places, there may be a web of transmission lines so that electricity that cannot access one transmission line can flow along a different route. Figure 2 makes evident that much of southern New England—Connecticut, Rhode Island, and Massachusetts, extending into southeastern New Hampshire—fits this description. Even so, some connections are better than others—for example, Rhode Island is far more connected to Massachusetts than to Connecticut. In more remote locations, including in much of northern New England, especially if one wants to transmit high volumes of electricity, there may be only one route available.

Before restructuring, transmission lines were controlled by the local electric utilities and the regional parent "holding companies" that owned them (more on holding companies later). Transmission pricing was regulated by the Federal Energy Regulatory Commission (FERC), but the costs were bundled into utilities' cost basis they took to state regulators. In other words, transmission pricing and profits worked under the same rate-of-return system as for generation investments, but with a federal regulator involved as well: utilities invested in infrastructure, regulators approved these costs plus a percentage return, and companies profited.

In the first two-thirds of the twentieth century, integrated utilities built many transmission lines to get their newly developed generation to market. Sometimes, such as when they built larger plants than their own customers and/or local networks could use, they built interconnections so they could sell power to other utilities. However, the historic utility-by-utility construction of transmission lines left bottlenecks where electricity generated in areas of high supply may not always be able to reach neighboring areas of high demand. Transmission investments slowed in the latter part of the century as utilities' costs continued to increase and electricity demand did not.

Some nondiscriminatory transmission tariffs developed under the New England Power Pool (NEPOOL), which organized itself after the Northeastern blackout of 1965 (NEPOOL 2002). FERC orders in the late 1990s made nondiscriminatory pricing mandatory and universal, and New England states' restructuring from the late 1990s to the 2010s required investor-owned utilities to separate out transmission portions of their business into independent affiliates.

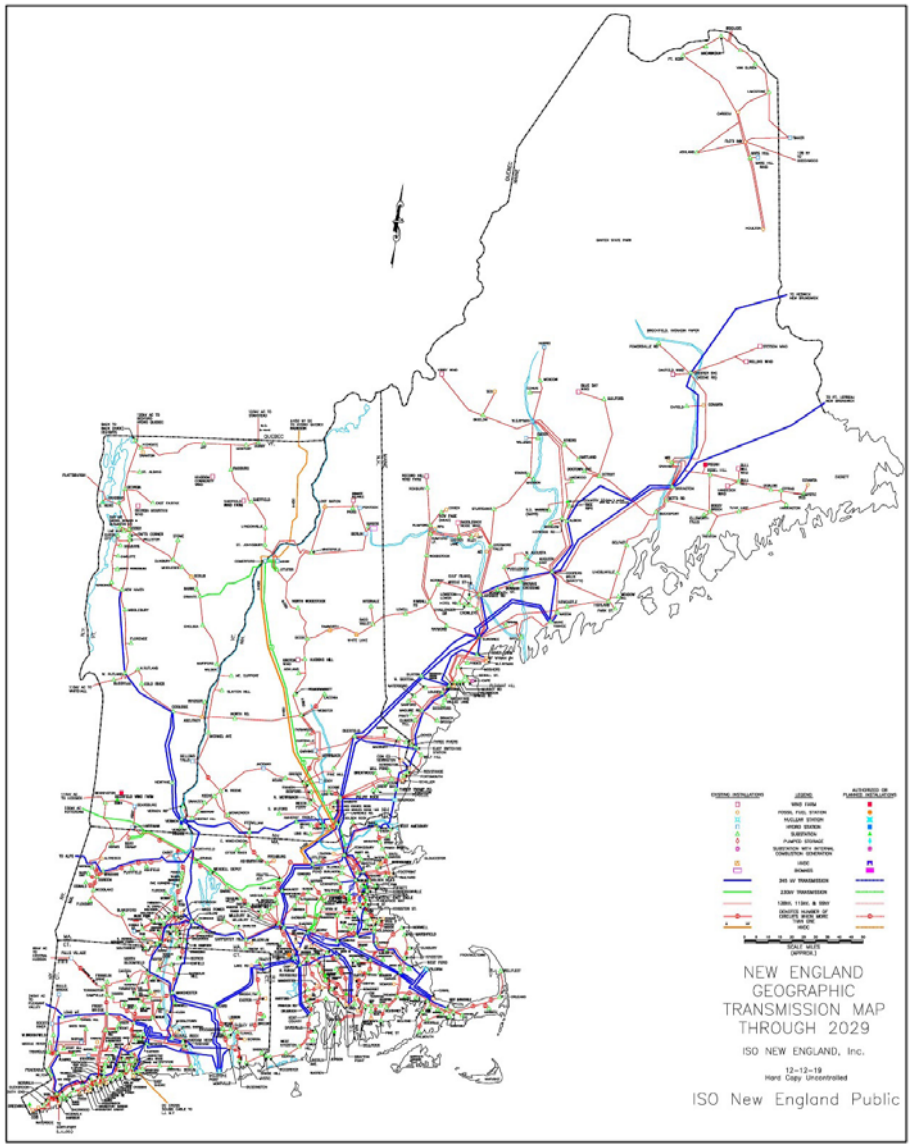

Figure 2. New England's transmission grid, including lines planned out to 2029. Source: ISO-NE 2019a. Permission granted; image provided on an "as is" basis.

Figure 3 summarizes a geographical understanding of some of the changes that resulted from restructuring, including transmission.

Open-access transmission was essential to competitive electric markets because it made competition among generators possible. Competition with equal access to the market is necessary to be an interchangeable commodity – and access to the market includes the physical ability to get to market buyers. Only if different generators could get their electricity onto the same grid and be able to send their electricity to the same set of locations and customers could they be competitive (Joskow 2003). To make transmission open-access, transmission services also had to be separated more clearly as their own commodity—different from transmission's previous role as one part of the formerly vertically integrated product of generation, transmission, and distribution.

However, for several reasons, commodifying transmission services and making transmission open access did *not* create competition among transmission providers. First, there is generally only one transmission line on any given route. Also, because building transmission is expensive, companies have rarely invested in new transmission infrastructure without a guarantee of revenue. And, once transmission lines are built, some kind of cost- and revenue-sharing among those who use the same transmission lines is essential because of the physical properties of interconnected electrical wires running alternating current (AC): electrons flow freely.

Indeed, in many ways, transmission in New England has become more *collective* since restructuring—though perhaps collusive would be a better word, as transmission planning and funding are largely controlled by a limited group, the region's transmission owners. Cost and revenue allocation are now controlled by FERC-approved agreements developed by the region's Participating Transmission Owners and ISO New England. Under these agreements, if the ISO and transmission owners agree that a new transmission investment is essential to meet the ISO's regional plan, the line is approved, and the costs can be put onto utility customers' bills under a more regionalized version of rate-of-return funding (ISO-NE n.d.f, n.d.h; Participating Transmission Owners 2005).

Transmission investments have risen significantly since restructuring, especially in regional congestion zones and areas of new demand (ISO-NE n.d.g). However, virtually all the approved transmission projects are for reliability—that is, essential transmission investments that ensure the grid functions as expected under a variety of circumstances. Reliability improvements have helped make the grid more resource-efficient and thereby reduced carbon emissions. They have also provided reliable sources of profit for existing transmission owners and their utility corporate families. However, long-distance transmission lines offer the potential for even more dramatic efficiencies and carbon reduction, because of the ability to balance out different kinds of renewable generation and different timing of electrical generation and demand, across multiple climates, landscapes, and time zones. But long-distance lines are almost impossible to fund through the ISO's regional planning and cost-sharing systems. This has to do with the power of existing transmission owners, and their utility affiliates, in ISO decision making. There are provisions for regional funding of within-region transmission for market efficiency or public purposes (see e.g., ISO-NE 2019b; Saravanan 2020), but these provisions are rarely if ever used (Jacobs 2019; 2021; Roberts 2021). FERC attempted to incentivize inter-regional lines in 2010

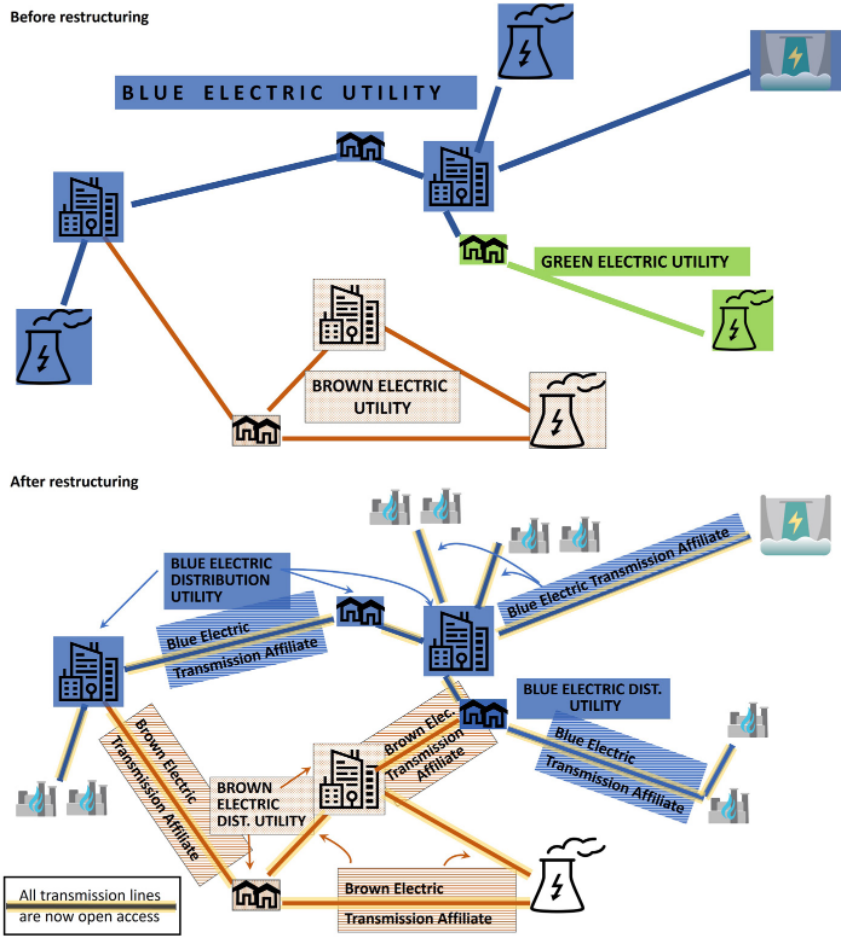

Figure 3. Electrical institutions and geographies before and after investor-owned transmission lines become open access. Before restructuring, each utility owned a generation plant and transmission lines, and each served a number of towns and cities. After restructuring, generators are now IPPs (no background color), most of them natural gas plants; and transmission lines are now open access with a non discriminatory tariff (indicated with yellow outline). Electricity now travels on any transmission line for the same "postage stamp" transmission fee. This allows all the generators in the region to compete with one another to provide the power that will be delivered to end-use customers, regardless of location or ownership. The utilities still control local distribution, and utility affiliates own transmission lines. A few short new transmission lines have been able to be funded, to improve reliability. The diagram also shows a consequence discussed later in the paper, further mergers and acquisitions, in which Blue Electric has bought Green Electric. Figure by author. Natural gas and hydropower plant icons from Oregon Department of Energy.

with Order 1000, which encourages competitive interregional interconnections that can be allocated to two regions' customers. However, garnering sufficient approvals for transmission lines under Order 1000 has proved time-consuming and difficult, and ISO-NE has yet to see a line built under its provisions (Joskow 2019).

While transmission interconnections improve economic efficiencies, they also speed the impacts of electric use on a widened range of people and places. As offices, warehouses and stores turn on their lights around Boston this morning, multiple gas generators turn on across Massachusetts, southern New Hampshire and Rhode Island. There are myriad impacts on local communities, environments, and economies. If better long-distance transmission is built, these effects will expand geographically and multiply.

Ironically, interregional connections also offer a geographic and market opportunity to intrepid--or strategic— transmission entrepreneurs: the potential to profit from a scarce asset in the geography of electric grids. If an interregional transmission line happens to be a direct current (DC) link, which creates a barrier to free electron travel between two AC systems, then the owner can have particular control. Still, the costs to build DC transmission lines are even higher than AC transmission, and multi-level regulatory approvals are uncertain. As a result, would-be entrepreneurs have often sought to ensure that their costs to build interregional lines will be paid. The challenge is to find a way to get construction paid by a collective cost-sharing system while gaining a geographically unique or unusual asset.

To summarize, open-access transmission was essential to developing competition among generators, but for the most part, the unbundled transmission sector itself did not become competitive. Because of their high expense, new transmission investments usually require guaranteed funding paid by retail electric customers. Funding is normally approved by ISO New England in a decision process dominated by existing transmission owners. Transmission construction today is mainly for reliability; few long-distance transmission lines are built. Long-distance transmission development could enable better use of renewable generation, with beneficial impacts on climate and on many local areas with polluting fossil fuel generation. But it also will reshuffle impacts onto myriad other local peoples and places. If funding mechanisms are developed and profits can be assured, new long-distance transmission lines have the potential to provide windfalls for early developers.

c. Distribution & Retail Supply: Continuing Utility Regulation, Competitive Suppliers, Renewable Energy Credits

On the surface, electric utilities appear to have been significantly reduced by restructuring. In most of New England, they had to sell off their generation assets, while their transmission components became separate corporate affiliates. The only part that is still a utility under state regulation is distribution. These distribution utilities could no longer rely on new investments in generation, and concomitant promotion of electrical consumption and local economic development, to provide regular streams of accumulation. In multiple ways and at a series of decision points, electric restructuring posed potential existential threats to electric utilities.

Among these: in the 1990s, utilities faced bankruptcy because of stranded assets, and in the early 2010s they feared a "death spiral" of loss of customers if large, wealthier customers turned increasingly to their own independent renewable generation paired with local storage (Denning 2013; Bronski et al. 2014).

Yet investor-owned utilities successfully sought out new justifications, new allies, and new sources of profit. By the late 1980s, leading Massachusetts utilities were working with nonprofit groups promoting energy conservation and "decoupling," in which utilities could set rates that would allow them to profit, even if electricity sales declined. They worked with low-income advocates, noting that guarantees of universal electrical service could not be assured without state-regulated utilities (NEES and CLF 1989; Raab 1994; Hirsch 1999). A central part of the negotiations over state restructuring in the 1990s was whether utilities' stranded asset costs would be paid; utilities largely won that fight (Borenstein and Bushnell 2000; Kenison 2004; Reishus Consulting 2015). And in their new complex corporate structures (see Section e) their parent companies sought to grow businesses that could win under new competitive markets, while solidifying and expanding the bread-and-butter proceeds of electric distribution utilities and regionally funded transmission affiliates (Northeast Utilities 2006).

In addition to regulating utilities and their rates, New England states also regulate competitive retail electric suppliers to some extent. A bit of background is needed to understand the concept of "competitive retail suppliers." Because investor-owned distribution utilities for the most part no longer generate their own power , when they sell electricity to their customers, they must buy that electricity wholesale and then resell it to retail customers. However, all five New England states that restructured also allowed for retail choice. This allows retail customers to choose a competitive electric supplier. The competitive supplier then becomes the company that purchases wholesale electricity and sells it to retail customers. In New England's restructured states, the distribution utility still delivers the electricity through its local wires and sends the customer's bill, but it is the competitive supplier's electricity prices that are reflected on that bill.

State regulation of retail supply provided a mechanism for restructuring to include mandates for investment in electric conservation and efficiency, and renewable energy. For some of these mandates, the mechanism continued traditional regulatory practices from before restructuring: fees added to utility bills that then paid into a fund (see e.g., Mass DPU n.d.a). However, states also adopted a new neoliberalized approach to renewable energy development, renewable portfolio standards (RPS). In Massachusetts, the first RPS was in the 1997 state restructuring act itself (Massachusetts General Court 1997).

An RPS purports to require that a certain percentage of all generation comes from eligible renewable sources. The way it does this is to require that all investor-owned electric suppliers either purchase a certain number of renewable energy credits (RECs) or pay a fee called an "Alternative Compliance Payment." Generation companies (IPPs and others) that produce eligible renewable energy can sell RECs as well as electricity and earn a second revenue stream. Under electric restructuring, RECs became new commodities in a new regional market (separate from the ISO markets). The regional REC market provides an indirect avenue to

help fund generation in renewable energy, by incentivizing additional investment into doubly profitable generation. The Alternative Compliance Payments play an important role as well, as their state-prescribed rate also serves as a price ceiling on market-traded RECs. If electric suppliers cannot acquire enough RECs below this price, Alternative Compliance Payments in effect become a more traditional regulatory approach of a fee mechanism. Alternative Compliance Payments in Massachusetts go to the state Clean Energy Center, which also works to promote renewable energy development (Mass DOER n.d.a)

The REC markets have been continually tweaked so they work effectively and incentivize desired generation technologies. Initially the Massachusetts RPS covered only certain categories of renewable energy built after 1997. Several years later, Massachusetts energy agency staff decided to incentivize old renewable power to stay on line, so they renamed the original RECs REC Class I and added a REC Class II for renewables built 1997 or before. Most Class II RECs in Massachusetts come from old hydropower dams—though large hydropower was not and is not considered "renewable" in Massachusetts policy, unless it is certified as low-impact (Mass DOER 2017). There have been other RECs and REC-like commodities added to the Massachusetts RPS system, including alternative energy credits, solar carve-out RECs, a storage credit called the Clean Peak Standard, and, most recently, Clean Energy Credits (CECs) in 2017 and Clean Existing Energy credits (CES-E) in 2020 (more on "clean energy" in Part III). For standards that incentivize new sources, the percent in the RPS goes up each year – but by how much depends on what is needed to incentivize investment, and that too has been adjusted multiple times (Mass DOER n.d.a, n.d.b). As shown in Figure 4, to meet myriad goals for particular kinds of resource acquisitions, the Massachusetts market-based RPS system has become quite complicated.

	Clean Energy Standard (CES) [1]							Other Mandates (Excluded)**	
	"Clean Generation"			"Clean Existing Generation"					
Year	RPS Class I [2]	Other "Clean Generation"	Total CES	CES-E	RPS Class II [3]	RPS Class II Waste Energy [3]	MA Renewable Energy Requirement *	APS [4]	CPES [5]
2019	14%	4%	18%		2.7%	3.5%	24.2%	4.75%	0.0%
2020	16%	4%	20%		3.2%	3.5%	26.7%	5.00%	1.5%
2021	18%	4%	22%	20%	3.6%	3.5%	49.1%	5.25%	3.0%
2022	20%	4%	24%	20%	3.6%	3.5%	51.1%	5.50%	4.5%

Figure 4. A summary of Massachusetts Renewable Portfolio standards and related standards. Retail electricity sold in 2021 must include at least 49% renewable, clean or other preferred sources. See Part III re. renewable versus "clean." Figure source: Colonial Power Group 2021; reprinted with permission.

In sum, electric utilities are still crucial and powerful players in electricity provision in New England. Also, state regulation of electric distribution utilities and electric suppliers has continued not *despite* neoliberal restructuring, but rather has been a crucial *part* of restructuring. In particular, state regulation has enabled a neoliberalized approach to renewable

energy development through the development of renewable energy credits and their markets. Like the ISO markets created through restructuring (see next section) RECs are market-based, but have been repeatedly altered for policy reasons. And, with all their complexity and their success, renewable and other portfolio standards have not yet been enough to come close to eliminating greenhouse gas emissions in Massachusetts's electric sector. As the state builds other steps for reducing greenhouse gas emissions (GHG) emissions in Massachusetts, the state's utilities continue to play lead roles.

d. ISO New England & Regional Wholesale Markets

One of the most heralded and analyzed changes in electric systems since restructuring has been the rise of regional wholesale markets, regionally coordinated transmission grids, and Independent System Operators (ISOs) to manage both. ISO New England is today one of nine ISOs in North America.

ISO New England's role is multi-fold. It runs a variety of markets, including just-in-time electricity (the real-time energy market); a specific financial futures market (the day-ahead energy market); a market for generators that promise to be available to generate three years in the future (the capacity market); markets to pay for quick-response generation (reserves and regulation); and a market for investors to profit from, or hedge against, transmission bottlenecks (financial transmission rights). It manages the fulfilment of bilateral contracts. It has special payments to make sure no company loses money by doing what the ISO directs it to do. To make all these markets and contracts work in real time, and to ensure no transmission line is overloaded, the ISO also directly controls minute-to-minute generation for most New England generators as well as the use of demand resources, while allowing for possible unexpected shutdowns of large resources on the grid. The ISO has rules that limit undue market-power dominance by any one company. The ISO facilitates multi-stakeholder regional grid governance, convening forums for discussing and changing rules. Collaborating with these governance institutions, the ISO regularly makes changes to market design and sometimes adds new markets. Finally, to make all of this work, the ISO collects and publishes a range of data, detailed studies and analyses, and offers trainings to market participants and others (ISO-NE n.d.a, n.d.e; Withers et al. 2021).

Like the other ISOs of North America, ISO New England uses an auction and stacking system to prioritize the use of the least expensive resources. In an auction, companies offer bids of how much, at what price, and in what time frame they want to sell. The ISO stacks offers from least to most expensive. In some markets there is also a demand stack, while in others demand is determined by the ISO, and in the real-time market it is defined by actual usage on the grid. Demand-response resources can also bid into several of the markets. The line where the supply stack meets demand or crosses the demand stack marks the set of resources that will be used during the considered time frame. The marginal bid price for the last resource added onto the stack or subtracted from the stack is the price that all resources are paid (ISO-NE n.d.d).

The central and transformative role of the ISOs is well recognized, and many have described and studied the function and economic effects of specific ISO markets and mechanisms (for more detailed overview of ISOs, see ISO-NE 2013; U.S. FERC 2020; APPA

2021; Cleary and Palmer 2020). Fewer have thought critically about the broader effects of using competitive pricing, or governing electricity via the rules of a competitive market (cf. E. Vogel and S. K. Vogel 2021). These questions are the focuses here. Because prices are abstract and often assumed to be efficient and natural, they are largely out of view of mainstream media, and most environmental and energy activists. Yet the wholesale prices of electricity, capacity, and other commodities act as crucial markers that motivate competitive generation and power purchases; seasonal, daily and minute-to-minute power plant operation; and short- and long-term investment , and thus have profound geographic, economic and material implications.

The intention of price within a competitive market is to treat identical commodities as the same. In the case of electric commodities, price represents the numbers, speeds, volumes, geographic location, potential, etc. of moving electrons. How the costs and benefits are distributed—how electricity is made, what kinds of communities and environments it comes from or travels through, who and what it impacts along the way, how it is used, and who gets to use it—is unseen by these markets. Some of these things get internalized into price, though not evenly. Generation may be more expensive if the local community puts up a fight to stop infrastructure siting, or if there are stronger environmental or labor rules; or it may be less expensive if facility construction is subsidized, or lands are easily acquired. Infrastructure built in communities with less political capital or without legal authority to stop development will be more "cost-efficient" in a competitive market.

Today, day-ahead prices vary hourly, real-time energy prices can change every five minutes, and regulation prices can change within seconds. This is true at over 1000 distinct price node locations across the New England grid. The intent of these changing price signals across time and space is to maximize "social welfare," defined in terms of total production costs—while keeping the system in balance (Withers et al. 2021; ISO-NE n.d.c). It also has profound impacts on real places and people. For example, changing prices on energy markets can make river flows from hydropower plants increasingly volatile, as these plants open and shut their turbine flow gates according to price signals—with disruptive impacts on river ecologies and on local communities and economies who depend on river flow.

Prices and price volatility also affect corporate behavior. There is both tremendous opportunity for profit and high financial risk. A number of companies that invested in generation, transmission, energy services, and other competitive sectors soon after restructuring in New England and elsewhere have faced major losses and even bankruptcies since restructuring (Joskow 2003; Lucian et al. 2003; Bushnell 2004; Lambert 2006; Gifford et al. 2017). Unable to count on rate-of-return profits, electric companies have sought to reduce their risk and increase their profits by influencing market rules, lowering their state and local taxes, reducing some regulations, adding other regulations and programs, or, sometimes, getting out of the competitive business entirely (Northeast Utilities 2006; Camerato 2018; Anderson 2020; Biewald et al. 2020; Pelzer 2020) (Camerato 2018; Anderson 2020, 2020; Biewald et al. 2020; Jacobs 2020, 2021; Pelzer 2020). It is worth noting that through these strategies, one of the claimed benefits of restructuring—that it puts the risk on shareholders rather than customers—may be undermined by political and corporate behavior.

This relates to another major role that ISO New England plays: making the rules and practices of the electric power markets. There is nothing automatic or natural about what electric power market prices are or how they are determined. They depend on a host of rules and practices rooted in ISO decision making and advised by NEPOOL members (more on NEPOOL members in the next section). Electric restructuring thereby has led to another result: electricity operations and governance have become more opaque and less open to the public. Not only are prices generally considered in the abstract, without illuminating specific local impacts; also, specific data about generator operations, market bids, and profits are protected by ISO rules to preserve competitiveness. The ISO has stricter confidentiality than most federal agencies under the Freedom of Information Act (ISO-NE 2020). Governance in the ISO and NEPOOL is less open than that of a state utility commission (Jacobs 2020). NEPOOL has tried hard to ban the press from its meetings—and if it cannot ban the press, at least ban reporting (Heidorn, Jr. 2019).

To recap, ISO New England and its wholesale markets are among the most dramatic and touted results of electric restructuring. Well beyond the basics of coordinating purchases between electric generators and users, the ISO manages a complex range of markets that have robust participation from a wide variety of companies and financial investors. All these markets depend on sellers' bids and on price signals reflecting the marginal-price resource. These prices change over time and space, which means that these price signals can have profound ramifications for where and when resources are used and the effects of the electric system on people and environments. These markets allow many opportunities for profit and loss, and have led ISO market participants, who dominate ISO governance, to shape these markets in various ways. How these electric markets are governed, and the results, are largely opaque to the public.

e. Deregulation Of Electric Utility Corporate Structure And Finance

A final fundamental change of electric restructuring, too often overlooked, is that the corporate structure and finance of electric utilities was altered along neoliberal lines. These changes were multiplied for newly competitive companies in the deregulated sectors that had formerly been part of vertically integrated utilities. The governance of the grid was also opened to a host of new members from newly complex corporations.

The central legal change was the gradual weakening and ultimate repeal of the federal 1935 Public Utility Holding Company Act (PUHCA 1935), and its replacement with the 2005 Public Utility Holding Company Act (PUHCA 2005). The original PUHCA 1935 had been passed after speculative investments in the electrical sector helped cause the 1929 stock market crash. PUHCA 1935 restricted utility holding companies, that is, corporations that owned electric and gas utilities, to two levels of corporate ownership. Utility holding companies could have a parent corporation—Northeast Utilities, for example—and subsidiary utilities, such as Connecticut Light & Power and Western Mass Electric Company, but no further corporate levels. PUHCA 1935 also required that sibling utilities under the same corporate parent had to be physically interconnected, i.e., geographically contiguous (Funigiello 1973; Hirsch 1999).

PUHCA 1935's geographical restrictions made for strong ties between utilities and local cities and regions. There was often robust local civic investment by utilities, and a sense of mutual dependence among cities, states, utilities and regions, oriented to promoting local and regional economic growth. Holding companies were regionally based, and in New England, many of these banked in Boston (Smith 1949; Landry and Cruikshank 1996; Koistinen 2013).

Some of these geographical implications are shown in Figure 5. The service territories of Northeast Utilities subsidiaries in New Hampshire, western Massachusetts, and Connecticut can be seen to be geographically contiguous. The map shows the 2012 merger, post-PUHCA 1935, with another major utility holding company, NSTAR.

Under PUHCA 1935, electric utility holding companies were also restricted from a variety of speculative and self-dealing investment strategies and had strict limits on their political activities and campaign contributions. To ensure restrictions were followed, utility holding companies' account books were under close review by the Securities and Exchange Commission (Hargis 2003; APPA 2005; Congressional Research Service 2006; Bolton and Rosenthal 2016). The result was unusual stability and predictability. Utilities became the "quintessential widows and orphans stocks," offering stable dividend incomes to a "remarkably dispersed ownership" (Bolton and Rosenthal 2016, 2, 3).

However, by the 1970s, as electric profits became scarcer (for deeper background see Hirsch 1999; Beder 2003), utilities formed a political coalition with manufacturers who hoped for cheaper electricity. In New England and elsewhere they were often supported by environmentalists who hoped to stop the continued construction of ever-larger and more expensive nuclear, coal and oil plants. Together they called for deregulation of the electrical sector and the weakening of PUHCA. Exemptions from PUHCA were created in PURPA in 1978 and in EPAct 1992, and PUHCA 1935 was repealed entirely in EPAct 2005 (Hargis 2003; EEI 2006).

Today, electric companies and their assets may be owned by out-of-state utility giants or by financial companies that see them primarily as financial assets (see e.g., E. Vogel, Urffer, and Donlon 2021). Rather than investing locally, corporate owners may pressure local towns to lower their taxes, and they may locate their headquarters and bank accounts according to other tax advantages (e.g., Marcus 2019; 2020). Federal regulation of electric utility holding companies is now primarily by FERC, and FERC typically considers only whether actions harm over-all competition. The result has been an enormous rise in mergers and acquisitions, corporate complexity, speculative investments within utility corporate families, and expansion into new sectors and geographies. Electricity utilities may increasingly be managed by higher-up corporate owners to provide potential high profits rather than steady reliable profits. Shareholders are now larger and higher-risk investors, no longer conservative widows and orphans (Beder 2003; Bolton and Rosenthal 2016). At the same time, these conglomerates retain utilities at their core, providing an element of financial security and loan collateral not enjoyed by other non-utility-owning corporations—potentially enabling pyramid investment schemes as they did in the roaring 1920s, (Funigiello 1973; Thakar 2008; Prechel and Istvan 2016; Hempling 2018).

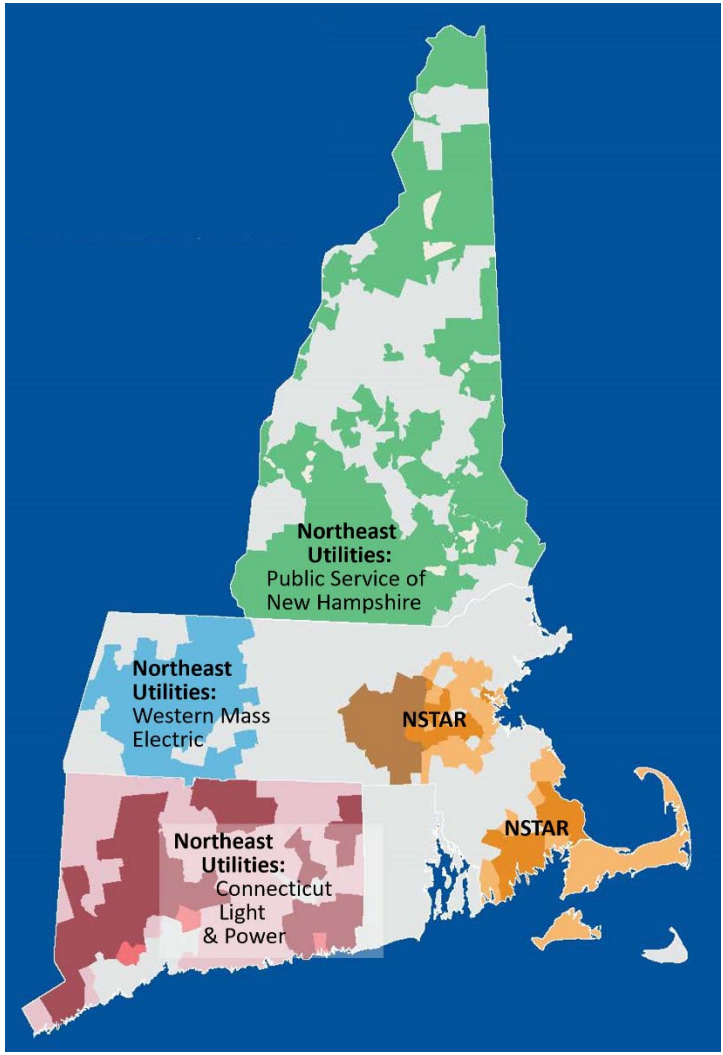

Figure 5. Map of Northeast Utilities and NSTAR merger in 2012, creating the company that would later be renamed Eversource. Prior to the repeal of PUHCA 1935, Northeast Utilities had included the geographically contiguous Western Mass Electric, Connecticut Light & Power and Yankee Gas, and Public Service of New Hampshire. The addition of the non-contiguous NSTAR could only happen after the repeal of PUHCA 1935. Source: Northeast Utilities 2013. Reprinted with permission.

Once approved, today's utility-containing conglomerates are far less transparent and far harder to regulate than in the days of PUHCA 1935—especially since neoliberal policies have reduced agency funding, narrowed regulatory criteria, and devolved many responsibilities to smaller-scale and lower-level jurisdictions. There is also significantly less public input and accountability (Thakar 2008; Prechel and Istvan 2016; Hempling 2018). Corporations that own utilities may use their increased political sway in state, national and even international policy to undermine climate mitigation and other public-purpose mandates, or reshape them around profitable mechanisms (e.g., Russell and Kurniawan 2019; Biewald et al. 2020; Stokes 2020; Hall, Culhane, and Roberts 2021).

While electric corporations were transforming, there was also a related change in New England Power Pool (NEPOOL) membership. NEPOOL's 1996 proposal for a "complete restructuring of the wholesale electricity business in New England," that led to the creation of ISO New England also involved "opening up NEPOOL membership to all market players" (NEPOOL 1997). In 1995, NEPOOL's 91 members were all utilities, most of them small municipally owned utilities. Within 3 years, membership numbers had more than doubled. New members included IPPs, aggregators and marketers eager to participate in competitive markets (NEPOOL 1996; 1999; NEPOOL and ISO-NE 1998; ISO-NE 2000). Today's 514 members are now divided into 6 equally weighted voting sectors: generation (11 members), transmission (5 members), suppliers (130 members), alternative resources (20 members), publicly owned (59 members), and end users (38 members) (NEPOOL 2020; n.d.). Many of these participants are subsidiaries of large corporate families, some of them utility holding companies. By dominating small-membership voting sectors like generation or transmission, or by having membership for multiple subsidiaries that fit into different voting sectors, large corporate families have the opportunity to dominate NEPOOL voting. Meanwhile, state attorney general offices, environmental and consumer nonprofits, and others, share the one-sixth vote in the End User Sector. Only recently have the rules of markets and voting become publicly contested or even analyzed (Ropeik 2018; Yoo and Blumsack 2018; Jacobs 2020; Office of Attorney General Maura Healey 2020; Pazniokas 2020; ISO-NE n.d.b).

To summarize: the change in corporate structure and governance of electric companies has been a major and under-recognized transformation of electric restructuring. The weakening of PUHCA 1935 and its final repeal in 2005 opened the door for wide-ranging mergers and acquisitions and greater complexity of electric utility-owning corporate families. Today, the flows of money and decision-making in the corporations that own electric utilities and other electric companies are poorly regulated and opaque to the public. The loss of PUHCA 1935 also cracked open the long allegiance between electric companies and their geographic service areas, reducing many electric companies' interest in local and regional investments. It changed investors and investment incentives from conservative and stable widows and orphans to more speculative and riskier actors and interests. In ISO New England (and many other ISOs as well), this problem is made worse because the stakeholders who participate in ISO governance are largely market participants who profit off the market, with limited public-interest involvement, and meetings are closed to the public.

III. Implications for Massachusetts Imports of Hydro-Québec Power:

The previous Part described several significant institutional, political-economic, and geographical changes associated with electric restructuring. This Part shows some ways these changes have shaped Massachusetts's recent drive to import Hydro-Quebéc power. This applied example helps reveal key legacies, and limits, of electric restructuring.

The desire for Massachusetts to import Hydro-Quebéc power did not arise primarily from electric restructuring. New Englanders have long looked toward their northern neighbor Quebéc as a possible source for extra electricity because its electricity was cheap and ample, whereas New England has for much of the last century had some of the most expensive electricity in the United States (New England Council Power Survey Committee 1948; Haggstrom 2017). In the 1980s, well before most aspects of electric restructuring had unfolded, three direct current (DC) transmission interconnections were built to connect Hydro-Quebéc's and New England's grids, one running all the way to Massachusetts (NESCOE 2013; see also Stroup, Kujawa, and Ayres 2015). The recent policy driver for Massachusetts to import a new block of Hydro-Quebéc power is the state's 2010 mandate to reduce GHG emissions (Silverstein and Autery, this issue).

Ironically, on the other side of the international border—where electricity is generated, transmitted and sold by a giant government-owned corporation—the legacies of electric restructuring are a significant driver for hydropower exports. If low-cost Hydro-Québec power can reach southern New England, it has the potential to underbid other electric generators, potentially becoming a dominant part of the New England electric market. There are considerable opportunities for profit in the energy, capacity, and reserves markets, and in bilateral sales agreements, for a giant hydropower producer. Hydro-Québec restructured itself back in the 1990s in order to sell to the new wholesale electric markets in the United States (Froschauer 1999; Hydro-Québec 2001). Since its restructuring, a priority for Hydro-Quebéc has been to "improve its profit margin and provide a greater return to its shareholder," the Province of Quebéc (Hydro-Québec 1997, 9). One of the ways to increase profit is to export more power. To further this effort, Hydro-Quebéc has been constructing over the last ten years yet another major hydropower development, a four-dam project on the Romaine River to be completed in 2022 (Hydro-Québec n.d.; see also Desmeules and Guimond, this issue, E. Vogel and McCourt, this issue), so it has plenty of electricity to spare.

But electricity cannot get from Quebéc to Massachusetts except through the physical interconnection of a transmission line, and the current lines do not allow Massachusetts and the rest of southern New England to make full use of the electricity Hydro-Quebéc has to offer. Hydro-Quebéc and its owner, the Province of Quebéc, can relatively directly and independently approve, fund, and build remote dams and long-distance transmission lines on the Canadian side of the border (e.g., Hydro-Québec 2021). The transmission bottleneck is on the United States side: there is insufficient transmission from northern New England to the population and economic centers of Boston and the rest of southern New England. In New England,

transmission construction is undertaken by investor-owned companies who must earn a profit while working with multiple states and ISO New England. The key question for Massachusetts policymakers has been how such a line could get funded.

How Restructuring Shaped Massachusetts's Policy Approaches To Fund A Transmission Line

Before restructuring, an ambitious vertically integrated utility might plan a transmission line, get approval from FERC, build the line, add the investment to its cost basis with its state utility commission, and the utility commission would likely allow retail rates to pay for it. After restructuring, this financing arrangement is generally no longer possible.

In the generation sector, competition has facilitated the construction of new infrastructure. Competitive companies build generation and recoup costs (or not) by selling on the wholesale markets. But as explained previously, transmission is rarely built without guarantees of cost recovery. A line from Hydro-Quebéc to southern New England is not needed for electrical reliability, so the usual ISO cost-sharing mechanisms do not apply. And, as described earlier, the other means to fund transmission lines through the ISO have rarely if ever been used.

The other post-restructuring mechanisms that help fund some electric infrastructure could not in the early- to mid-2010s provide extra funds to incentivize the line. The RPS was lower than the GHG reduction targets, and Hydro-Quebéc power does not count as renewable under Massachusetts's RPS anyway, as its dams are recognized as having high environmental impact, as well as impacts on First Nations people. Nor could the ISO's capacity market provide the additional revenue, since the ability to provide power to the New England market could not be guaranteed three years in advance until all permits and funding were secured.

Thus, Massachusetts policymakers, stakeholders, interest groups and lobbyists had to look for a different mechanism to incentivize and fund the construction of a high-voltage transmission line from the Hydro-Québec grid to the state. Twenty-odd years after electric restructuring, revenues would still need to be guaranteed by government mandate or regulation, and one way or another, that meant electric customers would be required to pay the cost to protect investors and shareholders from undue risk.

The central steps used by the state of Massachusetts to incentivize and fund the construction of a long-distance high-voltage transmission line to import a large new block of Hydro-Quebéc power were (1) the 2016 Massachusetts Energy Diversity Act, (2) a follow-up Request for Proposals, and (3) the selection of a winning proposal. These were also supported by 4) the addition of clean energy credits to the state renewable portfolio standard.

Step one was the 2016 Energy Diversity Act (Massachusetts General Court 2016). It required Massachusetts's three investor-owned utilities to contract for long-term purchase of 1200 MW of "clean energy generation," defined specifically as *either* new Class I REC eligible resources *or* hydroelectric generation, or a combination of the two. This legislation emerged out of a compromise among interest groups partially shaped by electric restructuring. The two Massachusetts governors of the 2010s (one Democrat, one Republican) and many business leaders had advocated, like many of their predecessors, for larger volumes of Canadian power as a route to low-cost supply. Environmental advocates, deeply ambivalent about large hydropower

as a solution to climate change, pushed for more emphasis on wind (see Silverstein and Autery, this issue). So did political representatives from southeastern Massachusetts, who hoped for wind-based economic development in their part of the state. Hydro-Quebéc's U.S. arm, HQUS, was unsurprisingly an active supporter of hydropower imports (e.g., Young 2016). In contrast, the New England Power Generators Association (NEPGA), the organization of New England IPPs, opposed hydropower imports. What Hydro-Quebéc had to gain in market share by reaching southern New England markets, existing New England IPPs had to lose. NEPGA's rhetoric, however, was more principled: it defended the competitive market and opposed the entry of "non-competitive," or subsidized, electric generation (NEPGA 2013; Dolan 2015). NEPGA also got a well-respected former utility commissioner to advocate for competition on their behalf (Tierney 2015). The irony is that NEPGA's enthusiasm for the competitive market was also a defense of the competition-limiting physical constraints of existing infrastructure. In the end, the statute was a compromise, requiring "clean" power rather than hydropower, limiting the requirement to 1200 MW, and pairing that with a parallel requirement to acquire 1200 MW of off-shore wind.

Requiring distribution utilities to acquire generation in a way that would pay for a transmission line went against a key tenet of restructuring, the importance of unbundling generation, transmission and distribution. Unfortunately, Massachusetts had no direct regulatory power over transmission tariffs with which to fund a line. The state *did* have the authority to regulate distribution utilities, though, so this was a regulatory approach that could work. The chosen funding mechanism also strengthened and provided profit to Massachusetts's state-regulated utilities, still a politically and economically powerful group. It might not appear beneficial to utilities that they were mandated to purchase 1200 MW of power. However, they were allowed to include those costs in their rate applications to the state Department of Public Utilities, which meant putting them onto their customers' bills. This arrangement is like the old rate-of-return mechanism in which development of large-scale generation was a primary route to increased utility profits. The 2016 Act also allowed up to 2.75 percent remuneration for the utilities beyond their costs, a rate later approved by the Massachusetts Department of Public Utilities (Mass DPU 2019). Thus, acquiring Hydro-Quebéc power was another in a long line of policy solutions that used state regulation of investor-owned electric utilities to achieve a policy goal, while guaranteeing profits to utility shareholders.

Step two of Massachusetts's approach to incentivize and fund Hydro-Quebéc imports was the issuance in early 2017 of a competitive Request for Proposals (RFP). This was a way to bring in competition, even with a required power contract, guaranteed cost recovery, and guaranteed utility profits. Following advocates of competition (e.g., Joskow 2019), the RFP was shaped around performance standards and incentives. The winning proposal would be lower-cost, relatively easy to permit, and buildable in a short timeframe (Mass DPU 2019).

Step three was the development of a selection committee and the selection of a winning proposal. The selection committee consisted of representatives from the Massachusetts's three remaining investor-owned distribution utilities, with staff from the state Department of Energy Resources as advisors (Mass DOER 2017; Mass DPU 2019). The utilities' decision-making power in the committee was important, or at least legitimized, because the utilities would be the ones purchasing the contracted power. It is impossible to evaluate their role fully, however,

because even though the committee consisted of representatives of state-regulated utilities and a state agency, and the decision steps were laid out and explained, the committee meetings were not public.

From 53 proposals, the selection committee initially chose Northern Pass as the top selection, with the New England Clean Energy Connect (NECEC) a close second. Both would build a new high-voltage transmission line to bring Hydro-Quebéc power to southern New England, one through New Hampshire and the other through Maine (Massachusetts Clean Energy 2017).

Building a major new transmission line under this RFP was a desirable opportunity for whoever won the competition, for multiple reasons that had only a little to do with electric restructuring. As explained above, construction costs would be paid by electric customers. For any electricity transmitted above the contracted quantity, and for years to follow, the transmission line owner would earn money as a transmission provider. Moreover, both winning proposals were direct current (DC) lines. DC lines are more efficient at high voltages and long distances. But DC lines also have the advantage that they do not allow electrons to flow freely to and from the AC grid. Thus the future owner would be able to control electricity flow. There is only one other high-volume existing interregional connection between Quebéc and southern New England. Thus, a company that builds a new high-voltage DC line has the potential for extra profits based on controllable geographic scarcity.

One aspect of restructuring that was prominent in the decision-making among proposals was the corporate complexity and hydra-like influence of utility-owning companies and other electric corporations. The number one pick of the selection committee, the Northern Pass line, was co-owned by Hydro-Quebéc and Eversource Energy Transmission Ventures, Inc. The latter firm was part of the same corporate conglomerate, Eversource Energy, as Massachusetts's largest utility, NSTAR, which calls itself Eversource, and New Hampshire's largest utility, Public Service Company of New Hampshire (PSNH), also called Eversource (Eversource n.d.). Thanks to its earlier acquisition of PSNH, corporate Eversource owned much of the right-of-way in New Hampshire on which the transmission line would be built (see Nolan and Rinaldi, this issue; Kroot, this issue). (See also Figure 5.) Northern Pass had been under development for some years so could claim it was ahead in key criteria for the selection committee: it was well on its way in getting permits and could be built in a short timeframe. Still, it is hard not to suppose that Northern Pass rose to the top in part because Eversource the Massachusetts utility was a dominant member of the selection committee itself. Corporate Eversource's many affiliates likely also had collaborated to ensure that other options were not available before the competition. They were likely active in ISO transmission governance and in NEPOOL, voting against other transmission options, like having ISO tariffs pay for a long-distance line to bring Maine wind to Boston. While this is unknown because those meetings are not public, it is known, thanks to Massachusetts's open lobbying records, that Eversource had lobbied in the Massachusetts legislature to kill programs that would have promoted other kinds of renewable energy (Hall, Culhane, and Roberts 2021).

Despite Eversource's many years organizing and strategizing and millions of dollars spent on Northern Pass, the line was rejected by New Hampshire (see Kroot, this issue; Nolan and Rinaldi, this issue). Maine's NECEC then moved forward, though at the time of this writing it

is still facing court and state referendum challenges (McCourt, this issue; Frederic, this issue). Though not co-owned by a Massachusetts utility, NECEC also reflects corporate restructuring of utility holding companies. It is co-owned by Maine's largest utility, Central Maine Power (in Maine) and Hydro-Quebéc (in Quebéc). Central Maine Power is now a subsidiary of national energy giant Avangrid, and the international and even-more-giant Iberdrola.

Part of the rationale behind competition is that it reduces costs. The competitive approach adopted by Massachusetts's RFP meant that successful competitors had to lower their monetary costs. However, this also meant externalizing costs onto other people and places, and into the future. The winning companies' proposals did not offer to bury their transmission lines for much of their route, as this is expensive, even though that would have provided for less impact to rural scenery, a crucial economic resource in northern New England, and part of local and state identity. Among the losing proposals was yet another long-distance DC transmission line co-owned by Hydro-Quebéc, the New England Clean Power Link, routed through northern New England's third state, Vermont. Significantly, New England Clean Power Link had been fully permitted and was therefore even closer to ready to build than Northern Pass. New England Clean Power Link had faced little opposition in Vermont because it was to be fully buried, either underwater through Lake Champlain, or underground (TDI New England and Hydro-Québec 2017). However, this had also raised the costs, and it is likely based on the selection criterion of low cost that the selection committee favored Northern Pass.

But minimizing the amount of line that would be buried ended up meaning a lot more political opposition, escalating costs, and implementation delay, which were not included in the bids. Even after the Maine-based NECEC was selected, it has added costs to its projects to accommodate opponents within Maine, including more miles of buried lines and extensive mitigation and economic development funds (see Frederic, this issue; McCourt, this issue).

Farther away and even more external to the Massachusetts decision were the costs of settlement agreements with First Nations and environmental mitigation associated with large-scale hydropower development in Quebéc. These costs were part of the decision process in Massachusetts only insofar as they were embedded in the price to purchase Hydro-Quebéc power. Any impacts that were not included in those settlements or mitigation were entirely external to the costs informing Massachusetts decision-making.

Step four of Massachusetts's approach to incentivize and fund the construction of a long-distance high-voltage transmission line to import a large new block of Hydro-Quebéc power was the addition of clean energy credits to the state's renewable portfolio standards.

As explained above, Hydro-Quebéc power does not qualify as renewable in the Massachusetts RPS. However, the 2016 Energy Diversity Act defined new hydropower as "clean." The next year, 2017, a few months after the RFP for clean energy was issued, state regulators generalized this concept by creating Clean Energy Credits (CECs), a new RPS category that can include both hydropower and nuclear power (Mass DEP 2020). Thus, the transmission line to southern New England that is funded through the 2017 clean energy RFP will earn for its owners not only a 20-year contract with guaranteed revenues, but also additional revenues from selling a newly created commodity, CECs. Both the contract and the CECs will be paid for by Massachusetts retail electric customers (the RFP through the distribution utilities and the CECs through retail electricity providers, both incorporated in the same utility bill).

To encapsulate this complex policy story: collective funding via the ISO was unavailable to pay for a long-distance transmission line, and it was too risky a venture for capitalist firms without guaranteed funding. So, Massachusetts had to devise a different policy mechanism to get a transmission line built to bring Hydro-Quebéc to southern New England. A utility-paid long-term power purchase agreement made use of the state's continuing regulatory authority over distribution utilities, while also offering guaranteed profit to those same utilities, who remain economically and politically powerful long after electric restructuring. Policymakers inserted competition in the form of a competitive RFP, though the selection committee was made up of representatives of Massachusetts's three surviving investor-owned distribution utilities and meetings were not open to the public. The two winning projects were co-owned by corporate siblings of large utilities—the first choice, Northern Pass, by a sibling of Massachusetts's largest utility, and the second by Maine's largest utility. The utility corporate families had already helped defeat other options to lower GHG emissions. The performance standards of the selection favored projects that reduced costs; however, political opposition forced both proposals' owners to promise to bury key portions of the line, an added expense, and New Hampshire still rejected the number 1 pick, and the number 2 pick is contested in Maine, adding still more expense and years of delay. After the RFP selection, Massachusetts added "clean" energy credits to the state's RPS, allowing Hydro-Quebéc power sold over the new line to earn a second incentivizing revenue stream without having to meet the standards of low-impact hydropower that would be required for "renewable" energy.

Geographical Implications: The Wide Social And Environmental Justice Ramifications Of Bringing Hydro-Quebéc Power To Massachusetts

Massachusetts's acquisition of a large new block of Hydro-Quebéc power to Massachusetts via a new high-voltage transmission line has profound geographical implications. The implications center not only around the impacts of the line itself but also the ramifications of physically interconnecting remote extraction locations with centers of consumption.

It is likely though not guaranteed that importing a large new block of Hydro-Quebéc power will not only help Massachusetts meet its GHG reduction goals but will in fact result in a net reduction of GHG emissions (Rogers 2016; Dimanchev, Hodge, and Parsons 2020; Mass EEA 2020; Silverstein and Autery, this issue).

But there are many other consequences. In Québec, scores of major dams and many rivers—almost all in First Nations territory—may be affected by both regular and intermittent changes in southern New England electric demand. Hydro-Quebéc power will come through a DC connection so responses to price changes cannot be instantaneous. However, Hydro-Quebéc can certainly respond to, and profit from, seasonal and daily changes in electric prices, and can likely respond to real-time price changes within minutes. This means New England ISO market optimization is likely to incentivize greater river flow volatility in remote Quebéc.

If enough electricity flows south at profitable rates, Hydro-Québec may build still more large dams on other pristine rivers in First Nations territory, expanding the number of geographic locations affected by southern New England electric demand (Hydro-Québec 2019; Storrow 2019).

In Québec, more hydropower means more construction, mining, and wage labor, with all the attendant benefits, costs and complications of capitalist economic development and politics in remote indigenous lands. The social impact may be determined in part by profit-sharing, compensation and mitigation agreements with First Nations bands, as well as labor and land practices (Desbiens 2013; Guimond and Desmeules 2018; Desmeules and Guimond, this issue). These impacts are not part of Massachusetts policy decision making process.

Meanwhile, on the southern end of the line, electric prices may go down, which may facilitate electrification of other sectors, may change manufacturing, cause the closure of current IPP generators or other fossil fuel infrastructure, and impact local economies in diverse ways (Conaway 2006; Tierney 2015; Howe 2016; Dimanchev, Hodge, and Parsons 2020).

Absent regulations or settlement agreements, profits from the future transmission line are much less likely than historically to accrue to Maine, or even to Boston, where financing for Maine corporations was often located. Instead, they will be shared among the national and international shareholders of Avangrid and Iberdrola.

IV. Legacies And Lessons Of Electric Restructuring For Massachusetts's Effort To Reduce GHG Emissions By Importing A Large New Block Of Hydro-Quebéc Power

In this concluding Part, I draw some overarching themes and lessons from my analysis of New England electric restructuring and its influence on Massachusetts's approach to securing hydropower imports from Hydro-Quebéc as a means to reduce the state's greenhouse gas emissions.

The first lesson is that the institutions, interests, and processes shaped by electric restructuring underlie the ways we in Massachusetts and New England manage electricity, how we strive to mitigate climate mitigation, and how we undertake electricity infrastructure projects like a transmission line to bring Hydro-Quebéc power to Massachusetts. Electric restructuring here has not primarily entailed privatization as it often has in other global regions (see e.g., Guy, Graham, and Marvin 1999; Kellow 1996); most electric companies were already investor-owned before restructuring, and most publicly and cooperatively owned utilities remained publicly and cooperatively owned. Rather the overarching theme has been the infusion of markets and competition into seemingly every electric policy strategy. Though markets and competition are designed as resource-neutral and place-neutral abstractions, they have had profound material and geographical consequences--from proliferating gas plants in southern New England to a lack of transmission investments in northern New England to the incorporation of a growing range of places and resources into fluctuating operations responding to five-minute price signals.

At least as important has been the profound change in the institutions that run our electric system. This includes the creation of ISO New England and the transformation of NEPOOL membership; the disappearance of oversight from the Securities and Exchange Commission and the rise of FERC, with its regulatory focus on competition as core public good; and the reemergence after more than three quarters of a century of giant, complex, and ever-more-

powerful electric corporate families. Restructuring has also created entirely new kinds of political players and alliances, such as southern New England generators who may resist new entrants into the ISO-New England market; and it has altered old ones such as the sometimes-uneasy alliance among utilities, their transmission affiliates, state policymakers, large electric users, and environmental groups.

A second key point that becomes evident is that electric restructuring is not a single thing. Like neoliberalism more broadly, it is a multiple and constantly changing set of policies, practices, assumptions, attitudes and institutions. Nor is it somehow "pure"--purely private-sector, competitive, or market-based. Electric restructuring has incorporated deliberate regulation and mandates and has required repeated market tweaks and creation of new commodities and markets to meet public policy goals. In some cases, as in transmission planning and cost and revenue allocation, electric restructuring has meant more collectivization of operations and decision making, not less. There is still ample rate-of-return funding with costs of development put on electric customers, just as in the old days of regulation, and plenty of guaranteed profits. In many cases these cost burdens and profit guarantees are essential to make the markets and competition work. All these and a variety of mandates and fees are often blended with competition, as in the long-term contract for Hydro-Quebéc power that may be delivered by the NECEC line. In short, the markets and competition that have resulted from electric restructuring have and will continue to have many varying, changing, incomplete and hybridized parts.

Third, while electric restructuring has clearly been an opportunity for new strategies of accumulation (Harrison 2020), in Massachusetts and New England at least it also has genuinely advanced or complemented a number of environmental and social public policy goals (cf. Castree 2011; Mansfield 2009). This included a rapid fuel switch to natural gas which helped dramatically reduce the state's carbon emissions. Through Massachusetts state mandates and fees, the restructured electric system also continues to support energy efficiency and electric service for low-income residents. The ever-expanding and diversifying state renewable portfolio standard has helped promote a range of new kinds of generation. State mandates for long-term power contracts, structured within competitive systems of performance standards and bids, may yet produce new off-shore wind and high-voltage transmission lines to import Canadian hydropower. Massachusetts and New England have also created new markets and regulations to protect and promote goals outside of cost reduction--electric reliability, for example, and future investments in capacity. None of these public purpose outcomes are inherent to the markets or competitive systems. They have required human beings inside and outside of policymaking and policy-implementing institutions who have paid attention to how the markets and systems they created actually work for companies, customers, and resources, and who have regularly worked or fought to change them (cf. Berk, Galvan, and Hattam 2013; S. K. Vogel 2018).

Fourth, at almost every step, it seems, companies have tried to find a way to avoid too much competition because of the very real financial risks entailed. One of the surprises is how much this is still done with rate-of-return funding, even though ending this cost-based system was a major rationale for restructuring. Rate-of-return funding is particularly dominant for transmission investments. This includes the long-term contract for Hydro-Quebéc power,

although its mechanism is distinct from the usual reliability-driven transmission funding through the ISO. Another limit to competition has been the geography of transmission lines. Much of what has motivated the political fights in Massachusetts over wind versus gas pipelines versus Canadian hydropower has to do with protecting now-incumbent gas generators from new competition that might come in via new transmission lines (or helping those incumbents with new gas pipelines). A crucial corollary to the ubiquitous effort to contain competition is that electric restructuring has not entirely kept the risks and the costs on shareholders rather than electric customers. Rather, intolerant shareholders burned by early competitive disasters have found ways to use public policy to reduce their risk.

Fifth, the institutions and systems that grew out of restructuring rely above all on price as the key decision criterion. However, as geographers have long noted, price is neither neutral nor objective. The price of a generation plant or transmission line depends, for example, on the level and sophistication of local opposition, and the decision-making structure of the jurisdictions in question. What price does, however, is help to separate the impacts and politics in these sites from the vision of those who craft broader policy and markets. Once infrastructure is built, prices in regional electric markets enroll distant and remote landscapes and people into rapid response to demand from bigger cities like Boston.

Finally, all this has profound geographic implications—and, as a corollary, for wider concerns of environmental and social justice through the transition to low-carbon electricity. Anyone who cares about rivers, landscapes, communities, climate, environmental justice, etc. may find their resources of concern affected by legacies of electric restructuring. There are risks in pairing urgent policy to mitigate climate change with the now-common mechanisms and abstractions of electric markets and competition, especially in concert with increasingly complex, consolidated and obscured corporate power (cf. McCarthy 2015). The legacies of electric restructuring include not only markets, prices, and competition, but also restructured corporations and new interest-group coalitions. These have led to collusive decision-making, constraints on infrastructure geographies, and continued guaranteed profits for major economic interests at retail customers' costs, as part and parcel of Massachusetts's and New England's current energy transition.

Electric markets, competition, grids, and the institutions associated with them are human creations and can be influenced and reshaped, but not if they are taken for granted. Geographers and other critical scholars have important roles to play in making visible and comprehensible the institutions and geographies we have inherited from electric restructuring, and in illuminating their wide ramifications. Making these linkages legible is particularly important if we want to work toward wider social and environmental justice as we advance a new electric transition toward low-carbon-emitting power. This article has been an attempt to lay some of the groundwork to help make this possible.

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Endnotes

[1] Much of electric restructuring did not apply to publicly owned utilities. In New England states, as in most others that restructured, publicly owned utilities were not required to unbundle, and many are still vertically integrated. Massachusetts has about 40 municipally owned electric utilities.

[2] Some investor-owned electric utilities own some generation facilities. In Massachusetts, for example, there are provisions for them to own solar power generation facilities (Mass DPU n.d.b). New Hampshire's largest utility, Public Service Co. of New Hampshire (PSNH), challenged many restructuring provisions and delayed unbundling for many years (Kenison 2004).

[3] If low-cost Canadian hydropower increases its market share in New England, customers' electric prices will not necessarily go down. That will only happen if and when Canadian hydropower becomes the marginal resource on the New England grid.

[4] This mechanism of rate-of-return acquisition of new generation has been used for other resources beyond Canadian hydropower, in Massachusetts as well as in other states (see e.g., NESCOE 2013). This includes the parallel RFP for wind energy in the 2016 Energy Diversity Act (Massachusetts General Court 2016).

[5] Prechel and Istvan (2016) point out that this kind of naming may make citizens who know and trust their local utility assume the trustworthiness of its often higher-risk sister (although Frederic, this issue, suggests the opposite has happened for the NECEC line through Maine, which is owned by the not-well-trusted Central Maine Power).

[6] The Clean Energy Standard includes RPS-eligible generators, but it also includes those that: "[d] emonstrate net lifecycle GHG emissions of at least 50% below those from the most efficient natural gas generator (e.g., hydro, nuclear, etc.)" and are "located in the ISO-NE control area, or... in an adjacent control area and utilize new transmission capacity" and "commenced commercial operation after 31 December 2010." In case there was any doubt from that three-part description, the regulation specifies that energy procured pursuant to the 2016 Energy Diversity Act counts for CECs (Mass DEP 2020; Mass EEA and Mass DEP 2017).

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"NEW HAMPSHIRE IS NOT YOUR EXTENSION CORD:"
Understanding Opposition to Transmission Lines in Northern New England

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ABSTRACT

New England represents a critical arena for imagining the multiple scales and geographies of energy transition. To the south, the densely-populated states of Massachusetts, Connecticut, and Rhode Island power the regional political economy and increasingly aspire to expand their reliance on low-carbon energy sources. To the north, Hydro-Québec, Canada's largest hydropower producer, stands poised to increase its hydroelectric production and electricity exports to the northeastern United States as it envisions its future as North America's "leading provider of clean energy." Citizens of northern New England, however, have argued that this vision for regional energy transition leaves them the role of "extension cord." This paper analyzes grassroots opposition to the Northern Pass project, a proposed high-capacity transmission line that would have increased imports of Québecois hydroelectricity to southern New England. Drawing on interviews and from discourse and material analysis, this paper argues that opposition to Northern Pass was motivated by complex notions of stewardship, solidarity, resistance, and contestation that, rather than simply standing in the way of energy development, work to imagine more just futures for this transnational energy system at multiple scales obscured by accusations of NIMBYism, or the Not-In-My-Backyard movement.

Key words: Transmission Infrastructure, Power Lines, Rural Energy Transition, NIMBYism, Discourse Analysis

Introduction

New England represents a critical arena for imagining the multiple scales and geographies of energy transition. To the south, the densely-populated states of Massachusetts, Connecticut, and Rhode Island power the regional political economy and increasingly aspire to expand their reliance on low-carbon energy sources. To the north, Hydro-Québec, Canada's largest hydropower producer, stands poised to increase its hydroelectric production and electricity exports to the northeastern United States as it envisions its future as North America's "leading provider of clean energy" (Hydro-Québec n.d.). Citizens of northern New England, however,

have argued that this vision for regional energy transition leaves them the role of "extension cord" (see, for instance, Savage 2018; Protect The Granite State n.d.)

This paper documents grassroots opposition to the Northern Pass project, a proposed high-capacity transmission line that would have increased imports of Québecois hydroelectricity to southern New England. Amidst the most contentious permitting process ever to come before New Hampshire's Site Evaluation Committee (Forest Society 2017), opponents of Northern Pass formed an eclectic coalition united in opposition to the project and its corporate backers. Why was Northern Pass so widely opposed in New Hampshire?

In answering this question, this paper fills several gaps in previous energy geography literature by addressing the significance of electricity transmission infrastructure (Bridge et al. 2013; Huber 2015; Calvert 2016) and considering the particular role played by, and imagined for, rural communities in energy transition (Marsden 2016; Jefferson 2018; Naumann and Rudolph 2020). This study also critiques the ways in which the Not-In-My-Backyard movement (NIMBYism) is used as a blanket explanation for opposition to energy projects, building on arguments previously focused on cases in Western Europe (e.g. Burningham 2000; Devine-Wright 2013a), and applying them to the particular sociopolitical contexts of transnational energy systems in Québec and New England. This study agrees with this body of literature that accusations of NIMBYism in popular discourse (and, by extension, in some academic work) obscure more nuanced attachments to place and sociopolitical positionalities. In place of NIMBYism, this paper argues for a more productive analysis of opposition to energy projects that centers notions of the "backyard" as a potential site for energy justice, rather than as bastions of privilege.

Drawing on interviews and material analysis, this paper argues that opposition to Northern Pass was motivated by complex notions of stewardship, solidarity, resistance, and contestation that, rather than simply standing in the way of energy development in the "backyard," work to imagine more just futures for this transnational energy system. Four dominant discourses emerged in opposition to the project: (1) a need to preserve the natural heritage of New Hampshire; (2) a sense of solidarity along the proposed route as well as north into indigenous territories in Québec; (3) a resistance to the dominance of corporate utilities; and (4) a desire for a more democratic and distributed energy future for the region. Opposition to Northern Pass was therefore driven not (merely) by self-centered concerns over property values and viewsheds, as NIMBYism generally assumes, but by humanistic attachments to place and community and by sociopolitical solidarities against unilateral energy planning by corporate powers. However, these solidarities and subjectivities operate at scales obscured by accusations of NIMBYism.

The paper concludes by considering the implications of opposition to Northern Pass for the future of energy in New England. Instead of viewing northern New England as an "extension cord" between Hydro-Québec and Massachusetts, Northern Pass underscores the significance of transmission geographies for successful energy transitions and emphasizes that rural communities are key stakeholders to be consulted, rather than obstacles to be traversed. This, in turn, pushes analyses closer to issues of justice than those of privilege assumed by popular accusations of NIMBYism.

New Geographies of Energy?

Much of what is "new" about the new geographies of energy is not only the transition towards lower-carbon energy sources, but the emergent spatial patterns and sociopolitics associated with changes to broader energy systems (Zimmerer 2011; Bridge et al. 2013; Huber 2015; Calvert 2016). Because these changing energy geographies are occurring against the backdrop of existing socioecological landscapes, they inevitably introduce new and exacerbate existing uneven power dynamics that complicate notions of a just energy transition (Bridge et al. 2013; Huber 2015; Calvert 2016). Framing energy transition as a distinctly spatial process foregrounds the extent to which past, present, and future energy regimes are themselves, as Bridge et al. (2013, 33) argue, "geographies of connection, dependency, and control."

The emerging literature on just energy transitions considers the political and infrastructural changes necessary to shift from fossil fuels to renewable energy sources, and situates these changes within larger questions of energy, environmental, and social justice. Given the political, economic, and ecological importance of energy systems, justice within transitions is a multifaceted goal. Prior research has explored just energy transitions in such diverse dimensions as elite power (Mayer 2019; Sovacool and Brisbois 2019), scale (Bouzarovski and Simcock 2017), settler colonialism (Willow 2016), centralized vs. distributed systems (Burke and Stephens 2018; Levenda et al. 2018), and urban-rural dynamics (Kelly-Reif and Wing 2016; Marsden 2016; O'Sullivan, Golubchikov, and Mehmood 2020). Of particular interest to this project is the geographic unevenness of energy transitions: as O'Sullivan, Golubchikov, and Mehmood (2020, 6) argue, "low carbon energy transition highlights how energy is interwoven within spatially organized uneven power relations" in a way that is "reflective of already uneven spatial distributions of social, economic, and political power." Transmission geographies provide an important site for exploring this unevenness. For most communities, a large-scale shift in the energy system will manifest spatially in the form of new transmission infrastructure, rather than new forms of energy extraction, generation, or consumption, because the locations where carbon-intensive energy is extracted and generated will likely be distinct from the sites of either large-scale low-carbon generation or small-scale distributed generation (Naumann and Rudolph 2020).

Conflicts over pipeline construction are perhaps the most salient of these new transmission geographies, as in the case of the Keystone XL, Dakota Access, and Kinder Morgan pipelines. Both pipelines and power lines work to connect disparate people and places, bringing new peripheries into existing energy systems (Cidell and Lechtenberg 2016; Lawlor and Gravelle 2018). Pipelines and power lines embody the distance between urban and suburban centers of energy consumption and rural (and sometimes indigenous) spaces of energy extraction and generation (Cidell and Lechtenberg 2016; Lawlor and Gravelle 2018; Davies 2019; Simpson 2020). Because of the capital required to develop longitudinal transmission projects, both pipelines and power lines tend to embed the power of large corporate entities at the expense of smaller-scale, community, or household energy production (Bridge, Özkaynak, and Turhan 2018). For these reasons, especially in the North American context, both pipelines and power

lines can be situated within broader settler colonial projects, and conflicts around siting – particularly around pipelines – has elevated movements for indigenous sovereignty (Bosworth 2018; Simpson 2019).

At the same time, however, there are key differences between pipeline and power line geographies. For one, while there is some discussion of land rights (particularly around rights-of-way) and indigenous rights around power line conflicts, these have not generated the same salient movement for indigenous justice as have the Keystone XL or Dakota Access pipelines, for example (for exceptions to this generality, see discussions of energy infrastructure and First Nations in Québec, e.g. Desbiens 2004, 2009, 2013). Beyond this, opposition to pipelines often discursively highlights the materiality of the fuel being transported, be it oil or liquefied natural gas, and the risk posed to local ecosystems and communities by potential spills (Barry 2013; Mitchell 2013; Bosworth 2018, 2019; Lawlor and Gravelle 2018). In contrast, because power lines transmit electricity rather than liquid fuel, opposition may be more focused on the physicality of the infrastructure rather than the materiality of the energy, as discussed in greater detail below. This is reflected as well in the framing of transmission development: while emerging pipeline projects are often justified as necessary to transport fossil fuels to market, new power line projects are increasingly proposed as part of renewable energy transitions, casting power line infrastructure in direct contrast with pipeline development (Bridge et al. 2013; Huber 2015; Calvert 2016). Longitudinal power lines, therefore, are discursively produced as both essential infrastructure for energy transition and as an investment *against* pipelines and other forms of carbon capital. This framing, in turn, may have implications for the ability of protesters to gain solidarity from other actors who might otherwise be sympathetic to questions of energy justice.

Longitudinal power lines have historically been understudied relative to other geographies of energy extraction, generation, transmission, and consumption (Soini et al. 2011; Healy and Barry 2017), with much of the previous research conducted by industrial psychologists or engineering consultants concerned with factors such as perceptions of risk and height acceptability, rather than more social constructivist concerns such as place attachment (Furby et al. 1988; Priestley and Evans 1996; Soini et al. 2011; Healy and Barry 2017). Furthermore, because large-scale generation of low-carbon energy is land intensive, these new systems of generation and transmission are liable to be situated in primarily rural areas (Marsden 2016). However, as Naumann and Rudolph (2020) argue, energy studies has largely failed to substantively engage with rural studies and vice versa, despite rural areas being critical for successful energy transitions, leading to a general dearth of rural theory in energy geography (see also Marsden 2016; Jefferson 2018). Taken together, this lack of attention towards longitudinal power lines and the rural landscapes through which they are routed further obscures the significance of the transmission question and the perspectives of rural stakeholders in energy transitions, particularly in the North American context.

A major exception to this pattern is the body of work on transmission lines in rural areas of the UK and the Nordic countries, especially in conjunction with a rise in the construction of both on- and off-shore wind farms (Benediktsson 2007; Newson 2010; Cotton and Devine-Wright 2011; Gant, Robinson, and Fazal 2011; Cain and Nelson 2013; Keir and Ali

2014; Keir, Watts, and Inwood 2014; Batel and Devine-Wright 2015; Devine-Wright 2015; Mueller, Keil, and Bauer 2017; Stefánsson, Sæþórsdóttir, and Hall 2017; Lienert, Sütterlin, and Siegrist 2018). Much of this scholarship has been concerned with NIMBYism, a catch-all term used to describe local opposition to infrastructure projects, usually in wealthier white communities. Calls of NIMBYism generally presume that privileged communities oppose development near their homes – that they would otherwise support in other areas – because of self-centered concerns, such as visual aesthetics or property values, which are juxtaposed against issues surrounding the urgencies of climate change, for instance, or the historic and ongoing environmental racism towards communities of color. However, many recent studies, particularly in the UK, have critiqued these narratives of NIMBYism commonly used by the popular press, politicians, developers, and some academics (see Burningham 2000; Wolsink 2000; Hubbard 2006; van der Horst 2007; Devine-Wright and Howes 2010; van der Horst and Toke 2010; Bridge et al. 2013; Devine-Wright 2013b, 2013a; Burningham, Barnett, and Walker 2015, 201; Eranti 2017). These authors raise important points that question the assumptions inherent to criticisms of NIMBY behavior: for instance, Burningham (2000, 65) points out that "attempts to protect one's own backyard are inevitable and perhaps even environmentally positive." Speaking pragmatically, Bridge et al. (2013, 335) argue that "understanding place attachment and the emotional responses that people can have to energy landscapes provides a more productive approach than simplistic assertions of NIMBYism for analyzing conflicts over energy landscapes."

Framework

Discourse analysis is a useful tool for untangling complicated and often conflicting environmental imaginaries. Because rural landscapes maintain conflicting roles as sites of resource extraction, environmental preservation, prospective development, urban and suburban escapism, and rural livelihoods, contested decision-making around these landscapes often becomes entangled with contested relationships with the landscapes themselves. For authors like Woods (2003, 287), an attention to discourse is useful for contextualizing conflicts between natura-ruralist and utilitarian perspectives of windfarm development in rural Wales: "to understand the coalition-building and campaign organization, the motivations of participants, the representations and arguments, and the ultimate outcome, the researcher needs to understand the complex negotiation of discourses of nature, landscape, environment and rurality which frame collective and individual actions." Similarly, in their analysis of the socioecological construction of working forests in the Northeast, Wolf and Klein (2007, 989) argue that a focus on discourse can reveal "the essence of [a contested issue] as represented by underlying assumptions, the values or stakes recognized by the actors and the priorities they attach to the various considerations that structure the problem." Discourse analysis, then, becomes a powerful tool to unravel the contested environmental politics, place attachments, and value judgments associated with prospective infrastructural development in rural areas (see also Adams, Perrow, and Carpenter 2004; Takala et al. 2017).

Methods

This study seeks to analyze the discourses through which members of the opposition understood and articulated the prospective impacts of Northern Pass on the landscape. In rejecting NIMBYism as a blanket explanation for opposition to a plan framed by its opponents as a renewable energy project (e.g. Burningham 2000), this paper begins from the assumption that oppositional discourses were legitimate and suggestive of more complicated attachments to place, landscape, stewardship, and sociopolitical solidarities than stereotypical NIMBY values of property values and viewsheds (cf. Daley et al. 2017; Devine-Wright 2011; Batel and Devine-Wright 2015; Eranti 2017; see also McCarthy 2002).

After receiving IRB approval for this project, research was conducted primarily between June 2018 and May 2019, following the refusal of New Hampshire's Site Evaluation Committee (SEC) to grant Northern Pass its permit but before the SEC's decision was upheld by the New Hampshire State Supreme Court. Given this project's focus on discourse, the bulk of data comes from interviews. The primary purpose of these interviews was to determine the stake of each interviewee in the Northern Pass Project, to elucidate different understandings of place, to capture different environmental and place-making narratives, to explore the environmental and energy politics that arose around the project, to convey the lived experiences of individuals involved and impacted by Northern Pass, and to understand different framings used to understand the project. These interviews provided both humanistic and sociopolitical narratives about the opposition that together tell complex stories about attachments to the natural landscape, solidarity against what was seen as heavy-handed corporate energy planning, and (at times surprising) social and political resistance strategies. Because of the expertise that many of the interviewees acquired during the ten year permitting process, the interviews also fleshed out the complicated empirical history of the project. These interviews were complemented by analyses of materials ranging from Eversource press releases, Hydro-Québec sustainability reports, to anti-Northern Pass road signs, as well as guided tours of the proposed route.

Semi-structured interviews were conducted with a pool of twenty individuals, seventeen of whom were official intervenors in the SEC process (official third parties with an eligible stake in the permitting process, for instance property owners abutting the proposed route). The first wave of interviewees was identified from the official list of SEC intervenors, primarily representatives of local NGOs with public contact information. From this initial pool, a snowball process was used to identify a second wave of interviewees, in order to take advantage of the grassroots nature of the opposition. This second wave primarily included private citizens and local, county, and state government officials. Interviews were conducted in person, with the exception of one held over the phone, and lasted an average of one hour; all but one consented to be recorded. Recordings of the interviews were transcribed and analyzed using Atlas.ti, where they were coded for discursive patterns and mentions of particular topics, such as landscape preservation, historical preservation, coalition building, renewable energy, corporate bullying, SEC reforms, and energy futures. These codes were used to identify the four core discourses discussed in greater detail below.

Five of the interviewees represented state, regional, or national NGOs headquartered in Concord, NH; eight lived in and around the area of the White Mountain National Forest; six lived in northern Coos County; and one worked with the Pessamit First Nation in Québec. Of these, five were current or former elected officials representing municipal, county, and state governments. While Northern Pass stood to impact a wide swath of the state, the interview pool reflected a focus on New Hampshire "north of the notches," an area loosely corresponding to the White Mountain National Forest and northwards into Coos County, which has a higher proportion of protected landscapes and fewer existing miles of right-of-way, and where opposition to Northern Pass was particularly strong. (In the map provided in Figure 1 below, the portion of the route in Coos County extends northwards from Dalton and Whitefield.)

As part of these interviews, stakeholders provided me with tours of the proposed route of the line, in Sugar Hill, Easton, Franconia, Bethlehem, Stewartstown, and Pittsburg. My observation of the route provided a grounded understanding of the current extent of infrastructural development in the area and contextualized the proposed impact of the overhead lines and the buried sections.

Interview and observation data were complemented by analysis of material artifacts produced by members of the opposition, including flyers, maps, pamphlets, websites, newspaper articles, op-eds, buttons, t-shirts, bumper stickers, roadside signs, banners, documentaries, political satire, and political advertisements. Photographs of these artifacts and of sites along the proposed route were also uploaded to Atlas.ti and coded using the same schema.

The Northern Pass Project

Northern Pass was a proposed 192-mile high voltage direct current (HVDC) power line, designed to carry 1090 MW of electricity from Québec, south through New Hampshire to its eventual customers in Massachusetts. The project represented a joint partnership between Hydro-Québec, a for-profit corporation wholly owned by the province of Québec, and Eversource, one of the leading energy providers in New England. Amidst protests that lasted throughout the ten year lifespan of the project, Northern Pass eventually agreed to bury roughly sixty miles of the line, primarily the section passing through the White Mountains National Forest, an important tourist destination popular with hikers, as well as in northern Coos County, where it faced difficulty acquiring rights-of-way. A map of the project is given in Figure 1.

Northern Pass began its planning in 2008, following the passage of Massachusetts's Global Warming Solutions Act. In 2016, Massachusetts's Energy Diversity Act called for a formal request for proposals to deliver upwards 9,450,000 MWh of energy to the state, operational by 2022. The proposal decision committee eventually selected Northern Pass as its first-choice candidate in January of 2018 (for a more detailed history, see Autery and Silverstein, this issue). While a full discussion of the merit of Hydro-Québec's electricity as "renewable," "clean," and "green" energy is outside the scope of this paper (though see Autery and Silverstein, this issue), it is worth contrasting Hydro-Québec's electricity mix – 99.6 percent of which came from hydroelectric production in 2019 (Hydro-Québec Sustainability Report 2019) – with

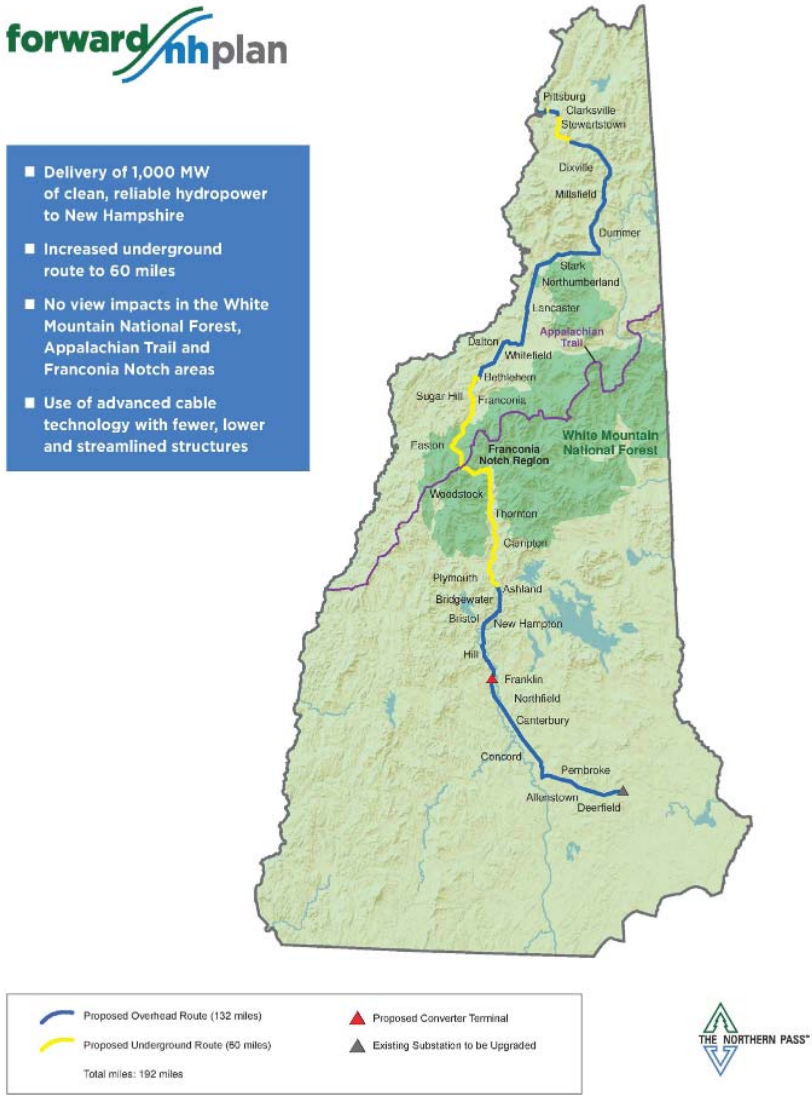


Figure 1. Final proposed route, including aboveground and buried sections. Image from Northern Pass LLC and reprinted with permission.

Massachusetts' existing energy mix, where roughly two-thirds of electricity generation came from natural gas in 2020 (Energy Information Administration 2020).

Interviewees described how opposition to Northern Pass arose soon after the plan began its initial planning processes. Several state, regional, and national NGOs emerged as important information-brokers for the opposition, mostly notably the Society for the Protection of New Hampshire Forests (Forest Society), and some municipal or county governments were especially active in disseminating legal information, such as Grafton County. Key early victories were secured in the state legislature with broad bipartisan support, for instance revising state eminent domain code to exclude elective transmission projects. However, most of the opposition consisted of individual intervenors (as well as those who were not eligible to intervene in the SEC process) who coordinated via email listservs, online forums, and word-of-mouth. While NGOs were able to solicit some funds to back the opposition, with the Forest Society in particular fundraising to purchase conservation easements to block the initial route through Coos County, most individual intervenors paid out-of-pocket for the costs of surveying their properties, attending SEC permit hearings, and the production and distribution of anti-Northern Pass materials.

In 2014, opponents of Northern Pass were able to enact major reforms to the New Hampshire Site Evaluation Committee (SEC), the state body responsible for issuing permits to energy projects in the state. These reforms formalized the criteria for successful permits, most notably requiring that projects be found to not unduly interfere with the orderly development of the region. Northern Pass submitted its SEC application in October of 2015, and over the course of the next three years, the SEC received an unprecedented 160 motions to intervene; testimony from 154 witnesses; and 2176 exhibits over seventy days of official hearings. In February of 2018, shortly after Northern Pass was formally selected by Massachusetts, the SEC unanimously voted to reject Northern Pass's proposal. Northern Pass appealed the SEC's decision, which was later upheld by the New Hampshire State Supreme Court in July of 2019, effectively killing the project.

Despite its rhetoric of renewable energy and improved energy independence and security for the region, then, Northern Pass was overwhelmingly opposed in New Hampshire, especially in the northern half of the state, a sparsely populated area with limited existing large-scale infrastructural development. Despite economic stimuli included in its Forward NH Plan, Northern Pass was widely seen by opponents in New Hampshire as a corporate project for the benefit of suburban and urban communities in Massachusetts, imposed on their communities by outside powers (see Nolan and Rinaldi, this issue), as seen in Figure 2.

Proponents of Northern Pass, meanwhile, widely caricatured the opposition as NIMBYs. Framing the project as renewable energy and critical for economic development in the state, one particularly prominent editorial in New Hampshire's largest newspaper, *The Union Leader*, argues:

> Our best acronym now is BANANA: Build Absolutely Nothing Anywhere Near Anything. Every new project is opposed for some reason or another, often for any reason at all... The problem with these banana people is that they don't understand

What you Need to Know about The Northern Pass Project

The Northern Pass Project will not serve New Hampshire.
It is like a monstrous extension cord that crosses New Hampshire to supply electricity to Massachusetts, Rhode Island and Connecticut. Just 10 percent of the energy will come into New Hampshire.

Major environmental and conservation organizations in the state are opposed to the project.
The destruction to our magnificent landscape will not be salvageable. New Hampshire's beautiful forests, including the White Mountain Forest, are world famous. It will take hundreds of years to replace the trees and landscape that will be destroyed by the clear-cutting and construction necessary to build the massive towers and high voltage lines.

This massive project is designed to fix a problem that doesn't exist.
The state already generates more power than it uses, and electricity demand has been trending downward.

New Hampshire consumers will eventually pay the price on their energy bills.
Northern Pass is really just a money making scheme for HydroQuebec and Eversource at the expense of NH consumers.

Claims of job creation are exaggerated and economic impact on local communities are downplayed.
Any jobs created by the Northern Pass Project will be temporary construction jobs – unlikely to last more than two years. Chambers of Commerce representing communities along the line have opposed the project because of its negative economic impact, including harming local tourism, real estate and local energy economies.

Figure 2. Opponents of Northern Pass argued that the project relegated New Hampshire the role of "extension cord" within regional energy transitions, rather than full partner. Image from Protect the Granite State, Inc. and reprinted with permission.

> that the status quo is a bad thing and needs to be changed, not preserved... We can read the numbers and realize that New Hampshire is on the verge of becoming a backwater. The dynamic state we once were is now limping along, sore and bedraggled. Stagnation and electric costs are not two different things. Reducing the cost of electricity requires having more of it. Having more of it requires building things, the infrastructure necessary to create a modern life, to power the machinery and technology that are part of well-paying jobs. (Arlinghaus 2015)

Accusations of NIMBYism specific to Northern Pass, then, presented the project as a form of progress for New Hampshire and New England as a whole, and criticized the "backyard" as a 'backwater' desperately in need of development. The opposition's focus on landscape preservation, for instance, was recast as a 'build nothing' dogma that was pitted against the infrastructure development necessary for 'well-paying jobs' for the rest of the state, hinting at a class element. In the case of Northern Pass, charges of NIMBYism were less about the validity of the project for regional carbon emissions, and more about the value of the "backyard" itself.

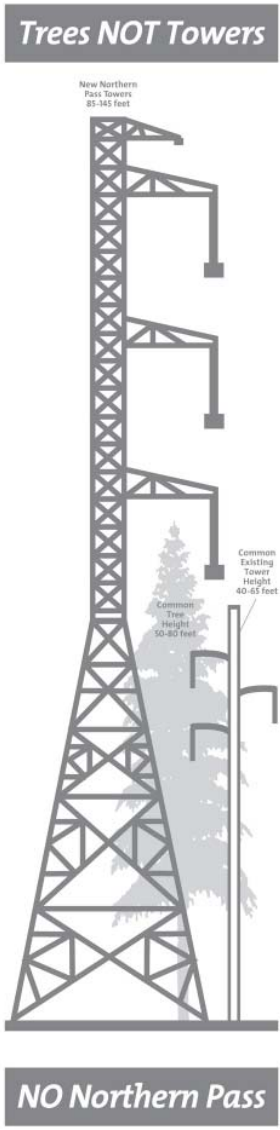
Trees Not Towers: Oppositional Discourses

Northern Pass, and the Massachusetts legislation that formalized its intended market, framed itself as an environmentalist project, aimed at reducing regional carbon emissions and promoting a transition towards low-carbon energy transitions. Why, then, was Northern Pass so widely opposed in New Hampshire? Four key arguments were put forward by stakeholders in opposition to the project as proposed, all of which function at scales obscured by accusations of NIMBYism and, as Burningham (2000) argues, are 'perhaps even environmentally positive.'

Preserving the Natural Heritage of New Hampshire

Foremost among these discourses was a sense of the "natural heritage" of New Hampshire that stood to be destroyed by the intrusion of high-capacity power lines. Epitomized by the oppositional slogan "trees not towers," this discourse argues that New Hampshire, and particularly the northern half of the state, is no place for the scale of industrial development imagined by Northern Pass. The opposition discursively deployed the notion of landscape as natural heritage through two overlapping forms: that of the natural landscape, with its wilderness character and lack of overt human presence; and that of the cultural landscape, particularly as shaped by small-scale dairy farming, logging operations, and historic White Mountain tourism. These two discourses coproduce a sense of natural heritage that in turn embeds a broader articulation of local and state identity and sense of place.

Stakeholders expressed a fierce attachment to the natural landscape, particularly of the North Country. Of course, New Hampshire is already latticed with a system of existing rights-of-way that cut through even otherwise underdeveloped tracts of forests, though the majority of the current infrastructure in these corridors is strung on wooden poles that do not rise above the tree canopy. The refrain common among interviewees – that these existing poles are not



"taller than a pine tree," as seen in Figure 3 – reveals that rather than being measured in terms of carbon emissions or reductions, opponents of Northern Pass viewed sustainability in terms of disruption to the preexisting landscape. This is doubly true for the land trusts and conservation organizations interviewed, who have formal and sometimes legal obligations to protect and preserve their conservation lands in their current forms in perpetuity.

In other cases, the relevant landscape is more culturally defined. The federal permitting process through the U.S. Department of Energy included compliance with Section 106 of the National Historic Preservation Act, in which Northern Pass was required to document the historical and cultural resources that stood to be impacted by the project. Rather than the historic buildings and old barns that might come to mind when imagining historic resources, however, the cultural artifact that came into question was the entire cultural landscape of New Hampshire itself, particularly after the National Trust for Historic Preservation declared the landscape of New Hampshire to be an official National Treasure in 2015. Here, the landscape that comes to matter is the amalgamation of centuries of human occupation and modification overlaid on top of the biophysical landscape, albeit one that largely ignores indigenous landscape patterns. For instance, the Sugar Hill area of the White Mountains National Forest was home to a series of historic hotels that were constructed in particular viewsheds, and preserving these viewsheds in their existing form, opponents argued, was just as critical to the historical preservation of these hotels than the protection of the buildings themselves.

Repeated in interviews is the notion that these landscapes – both natural and cultural – must be "protected," "preserved," and "perpetuated," with Northern Pass described as a "scar," "gash," or as "destruction." The argument that the opposition

Figure 3. Oppositional discourses measured the impact of Northern Pass in terms of its disruption to existing landscapes. Image from the Society for the Protection of New Hampshire Forests and reprinted with permission.

makes here, then, is not about climate change and impacts to regional carbon emissions, as is emphasized by Massachusetts' legislation, but rather is focused on protecting those particular landscapes that are most significant to the place attachment of particular communities. This is reflected within the interview pool itself: from conservation and preservation organizations, to second home owners, dairy farmers, and local governments, stakeholders have positioned themselves as having a vested interest in protecting their home landscapes that transcends simple property values.

Connecting Across the Grid

As Northern Pass altered its route over the course of the project – angling for federal and U.S. Forest Service permits, negotiating for rights-of-way, and reacting to the outpouring of public opposition – it attempted to strategically address stakeholder concerns, most notably by agreeing to bury fifty-two miles of the line in and around the White Mountain National Forest, where there were both stronger environmental regulations and the presence of generally-wealthier members of the opposition. However, and in contrast to the assumptions of NIMBYism, there arose a discourse of solidarity across the proposed route of the line and even extending "upstream" of the project into Québec, where the bulk of electricity is generated on indigenous territories. In this way, the proposed route of Northern Pass mapped onto a new sense of solidarity across communities that spanned socioeconomic divides, political affiliations, and national borders: the scale of the social movement began to map onto the scale of the transmission geography itself.

In talking to stakeholders about why it was important to oppose Northern Pass, especially after Northern Pass agreed to bury the line in certain places but not others, these stakeholders stressed the importance of protecting the entire corridor rather than just their own backyards. For instance, when asked why it was important to oppose Northern Pass even after the decision to bury the line through her town, one resident of Sugar Hill, a wealthy town to the northwest of the National Forest, replied:

> Well, what about Coos? You can't just pick and choose [between towns]. You can't let one group off the hook and still destroy the others.

This sense of cross-corridor activism also carried across the border, especially after Canadian activists had begun communicating with communities and NGOs in New Hampshire. One stakeholder in Stewartstown, NH, near the proposed border crossing, described it as:

> I think with the border just nearby, it's making it clear cut between your reality on this side and our reality... I mean, that border is not so significant for people with a common goal.

This discourse of solidarity points more to the potential for collective action than the degree of hypocrisy assumed by accusations of NIMBYism, where opponents would otherwise support projects if they occurred outside of their backyards, though it remains to be seen whether this collectivity persists now that the project's permit application has officially been rejected.

Opposing Corporate Utilities

As the project evolved and stakeholders increasingly criticized Northern Pass's outreach and community relations, opposition to Northern Pass became closely tied to an opposition to Eversource and Hydro-Québec and to corporate utilities more generally. Attempts by Northern Pass to utilize and expand its rights of way were seen as an attempt to "bulldoze," "snow plow," or "trample" over the landowners on whose lands the rights-of-way were granted. Another stakeholder living in Stewartstown remarked:

> [Eversource] acted like, if they had to, they would buy the whole state of New Hampshire. It's a turn off. You know, they weren't trying to work with us. They were just trying to trample all over us.

This 'turn off' was echoed by the vast majority of interviewees, almost all of which used the term "arrogant" to describe their impression of Northern Pass, Eversource, and Hydro-Québec.

This was exacerbated by Eversource's deteriorating sense of credibility. Northern Pass attempted to address its loss of credibility, particularly in the SEC hearings, through expert testimony, but these experts also had very little currency. The opposition pointed to many flaws in their testimony: for instance, quoting studies on the negligible impacts of power lines on property values that only looked at urban areas; stating that they had expertise in burying high-capacity power lines in areas with cold winters when none of their cited projects had yet taken place; or promoting the expertise of a general contractor who turned out to have numerous safety infractions on record. Corporate utilities were no longer assumed to be benevolent experts in energy planning and development.

Opposition to Northern Pass points to the need to work collaboratively with communities to plan energy projects, rather than acting unilaterally, even when utilities technically possess the necessary rights-of-way. Even the most stalwart of opponents acknowledged that large energy corporations would likely be necessary to quickly shift to lower-carbon energy sources; as one official for a conservation organization remarked, "We need the Eversources of the world to get this done." Opponents argued that even more top-down approaches to energy transition must work more closely with communities, citing the example of Vermont's New England Clean Energy Link, a competing project that secured all of its permits with minimum opposition after working closely with communities, agreeing to bury the entirety of the line, and proposing a substantive Lake Champlain clean-up package.

In this way, oppositional discourses pushed for greater transparency, credibility, and inclusivity in the energy planning process, rather than taking the technocratic proposals and rationales of utilities at face value. In turn, opposition to Northern Pass has the potential for making future energy planning in the region more equitable by establishing the precedent that energy projects will not be approved without sufficient community outreach and collaboration.

Emerging at the convergence of these three other discourses, the opposition worked to contest the vision of energy transition put forward by existing energy behemoths like Eversource and Hydro-Québec, as well as by the southern New England states that are the dominant political and economic actors in the region. These contested visions take multiple forms that might better approximate the sort of heterogeneous, distributed, and democratic energy geography imagined by energy transition.

Stakeholders pushed back against a vision for the future that retained the status quo of large, centralized utilities generating energy en masse and distributing it at a profit over long distances. In the vision of energy transition embodied in Northern Pass, existing corporations such as Eversource and Hydro-Québec would retain control over energy markets, and the spatial impact of energy transition would be disproportionately borne by rural landscapes in northern New England bisected by high-capacity transmission lines, and by indigenous communities in Québec on whose lands large hydropower presents historic and ongoing socioecological impacts (see Desmeules and Guimond, this issue). The interview pool suggests that opposition to Northern Pass may lead to some lasting shifts: interviewees spoke anecdotally about an increased adoption of home solar by opponents, while town and county governments referenced the creation and reinvigoration of town and regional energy commissions and an influx of interest and investment in town, county, and state master plans for energy development. Beyond this, oppositional discourses pushed for more radical futures: wide-spread distributed generation with rooftop solar; locally-controlled wind energy; renewed investment in biomass plants that could support local timber industries; and funding for energy conservation measures. Taken together, then, what is contested is not the need for an energy transition, but the prescribed energy futures that would protect the power and profits of a few corporate utilities at the expense of communities, indigenous groups, smaller energy producers, and more transformative ideas of energy transition.

Conclusions: The Future of Energy in New England?

A more critical approach to transmission infrastructure, and energy geographies more broadly, grapples with the inevitable role that transmission infrastructure plays – and will play – in mediating low-carbon energy futures, while taking seriously the prospective impacts of energy development to rural landscapes and communities. This account of opposition to Northern Pass argues that community objections to transmission infrastructure development go beyond a narrow focus on property values and viewsheds, and that a focus on oppositional discourses reveals complex narratives of stewardship, solidarity, resistance, and contested energy futures that would be obscured by blanket accusations of NIMBYism.

With these complexities in mind, this analysis of Northern Pass aligns with previous critiques of NIMBYism that argue that NIMBYism fails to account for the "place-protective behaviors" (Devine-Wright and Howes 2010, 278) of opponents of large-scale energy projects. The reasons for this opposition are much more complicated than NIMBYism assumes, and, as Burningham (2000) suggests, might even be 'environmentally positive' in their ability to foster stewardship ethics, promote awareness and engagement with broader energy systems, empower distant and often marginalized actors, and actively contest energy futures prescribed by corporate utilities and other privileged entities. Rather than blocking progress and energy transition by opposing Northern Pass, this paper argues that the anti-Northern Pass activists were creating spaces for more inclusive and productive discussion of the planning and implications of regional energy transitions. The "backyard," then, is not an obstacle to energy transitions, but a key site for contesting injustice and demanding greater collaboration, consent, and solidarity in energy projects.

Though Northern Pass has lost its appeal in the New Hampshire Supreme Court, a similar project in Western Maine, the New England Clean Energy Connect (NECEC), continues to progress through Maine's permitting processes and appears likely to be constructed (see the articles by Frederic and McCourt, this issue). Further research is needed to understand the differences in sociopolitics between New Hampshire and Maine that could explain these differentiated outcomes – for instance, whether different patterns of land ownership in New Hampshire versus western Maine streamlined the permitting process for the NECEC. A number of other longitudinal power line projects remain active in northern New England and New York, and Hydro-Québec continues to grow its hydroelectric capacity in anticipation of increased exports (Desmeules and Guimond, this issue). It remains unclear whether transnational activism around hydroelectric development on First Nations and Inuit territories will continue and, if so, in what forms, though a number of interviewees anecdotally reported they were still in contact with Pessamit activists and had been planning to visit for the salmon spawning prior to the Covid-19 outbreak.

Northern Pass demonstrates that northern New England – despite being less populated, less affluent, and less politically-influential than its southern counterpart – may not simply consent to being the "extension cord" of Northeastern energy transition. However, it is difficult to imagine New England succeeding in reducing its reliance on natural gas without some contribution from Vermont, New Hampshire, and Maine. What is needed, then, is a not an extension cord but an extended conversation that seeks to imagine, propose, contest, and enact energy transition for the region at a broader scale and with a broadened sense of who ought to be at the table. The example of Northern Pass pushes us to consider what a less uneven geography of energy transition might look like for New England – where northern New England is not a space to be traversed, but a partner in energy planning; where local communities are not obstacles to be overcome, but stakeholders to be consulted; where power lines are not merely a means of connecting point A and B, but a reminder of our interconnected energy futures.

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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.

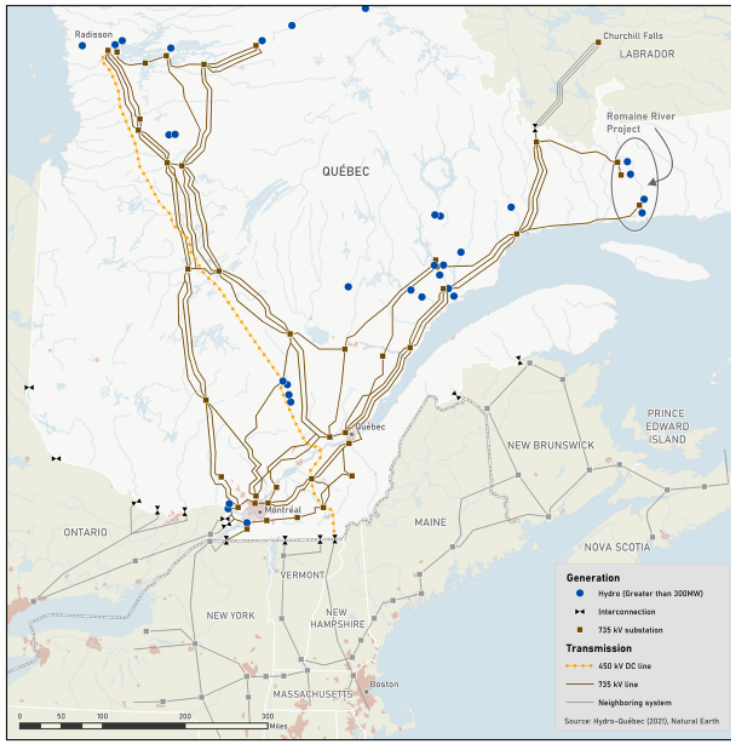

Figure 1. The Hydro-Quebec transmission system, showing the Romaine River Project and the distance required to bring that power to southern New England. In addition to the vast grid north of the US-Canada border, the transmission system south of the border must traverse either upstate New York or one 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).

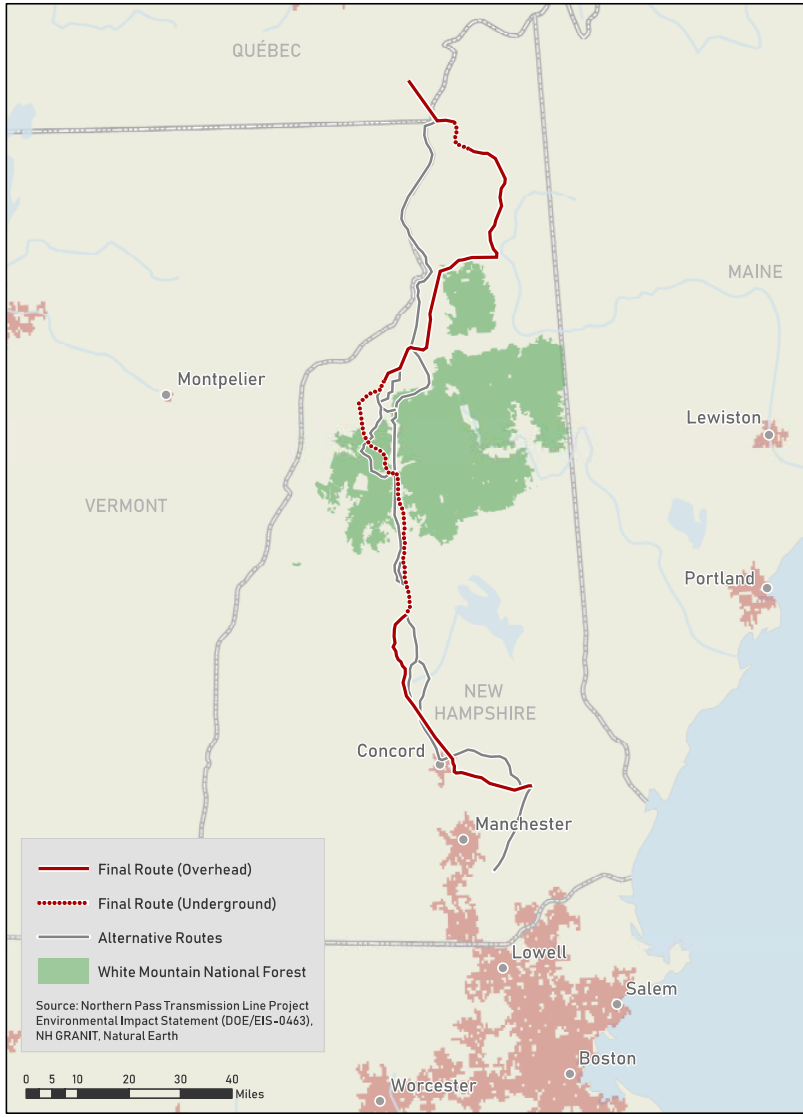

Figure 2. The Northern Pass Transmission Project, showing both the final and alternative routes considered by the U.S. Department of Energy in the project's Environmental Impact Statement. The proposed final route would have been buried through the White Mountain National Forest and in portions of Coos 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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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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NEW ENGLAND CLEAN ENERGY CONNECT:
Electric Power Transmission Conflict in Maine

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ABSTRACT

This study examines conflicts surrounding a proposed 145-mile corridor and transmission line through economically stressed west central Maine to transport Canadian hydro-produced power to markets on the New England grid. Massachusetts represents nearly half that market and in 2016 the state enacted legislation to reduce its dependency on fossil-fuel produced electrical energy. Central Maine Power Company, a Spanish-owned firm, was awarded a contract to build the line. The proposed project, New England Clean Energy Connect, is facing substantial opposition from the fossil fuel industry, selected environmental groups, second homeowners and some recreational interests. Proponents are government leaders who seek expanded property tax sources, labor unions because of construction jobs, electric rate payers, potential broadband users, and those that think the project will reduce fossil fuel use and slow climate change. Maine Governor Janet Mills expressed support and much public debate surrounded the proposal. The project has obtained all the required state and federal permits. Opposition calling for a statewide referendum on the issue submitted the required number of petition signatures to force a vote. The Maine Supreme Court declared the referendum question unconstitutional, thus, preventing it from appearing on a 2020 ballot. A second referendum drive is underway for the November 2021 ballot. Project opponents filed a lawsuit to overturn a permit associated with the new right-of way section of the line. A federal injunction is currently prohibiting construction in that new section and the case is in court. In February 2021 construction on the corridor began. Much remains unresolved, and it is likely the courts will continue to play a major role in the battle. This study illustrates the struggle to balance local and regional needs in a New England context and illuminates the broader global dynamics of a changing energy geography.

Keywords: energy policy, conflict resolution, globalization, environmental justice.

"Despite, the sometimes enormous, costs and long delays caused by strong opposition to transmission line siting and construction, both utilities and governmental regulators seem baffled at why the public objects so vehemently. At the same time, opponents are equally baffled at why their objections go unheeded." (Furby et al.1988,19).

Introduction

In Maine, the proposal to build a large transmission line to bring Hydro-Québec power to Massachusetts has raised a major public debate. In this article, I frame this dispute as in many ways representative of infrastructure conflicts that will be increasingly common as society transitions to non-fossil fuel energy. As authors in the growing field of energy geography have argued (Jones 2016; Solomon and Calvert 2017; Bridge el al 2018; Baka and Vaishnava 2020) this energy transition will require vast new infrastructure that will inevitably raise questions and conflicts of spatial justice, environmental justice, rural-vs-urban equity, expert-vs-public, and cultural conflicts. Huber and McCarthy (2017) highlight that this transformation involves repurposing much of the earth's surface to accommodate energy production and transmission, solar farms, wind towers, hydropower reservoirs and distribution lines. Landscape values play a central role in how society manages this change. This study examines the values and perspectives at the heart of the transmission corridor controversy in Maine.

The need to meet growing global demand for electrical energy has produced many kinds of conflicts, in a range of interconnecting locations. A complex system of generation, distribution and consumption encompasses both urban and rural regions. The now largely market-driven (in New England at least—see Vogel this issue) process of getting electricity from generation sources to end users has been accompanied by environmental protection concerns and public policy debates about types of fuels (Tomain 2017; Bezdek et al 2019), transmission modes (Bakke 2016), energy use and related impacts (Lambert 2015), and especially climate change (Hoffman 2015). The scale of discussions and decision-making ranges from worldwide (Romm 2016) to regional (Thiebault and Young 2017; U.S. Department of Agriculture 2018), to local communities (Ford et al 2013; Turkel 2020a) to individual households (Irland 2019). Each region, community, business enterprise, and person should consider benefits and costs of different options. Every choice produces winners and losers. Sometimes it is you and your neighbors and in other situations people who live far away are most impacted.

As conflicts arise, differing sides must choose how to frame and leverage their interests and arguments. Leaders of large urban centers argue that power supply is critical to economic growth and quality of life while those living in remote places may feel that they suffer from negative effects of generating and transporting power (Furby et al 1988; Hongoltz-Hetling 2020a; Hongoltz-Hetling 2020b). Balancing power supply, energy use and conservation, and environmental impacts shape energy policy arguments. The struggle to reduce climate change causing fossil fuel consumption by developing and maintaining renewable energy sources results in urban places seeking cleaner supplies from distance realms. Also, trends to transition away from fossil fuels toward renewables tend to stabilize or deduce energy costs over time compared to rising or fluctuating costs of fossil fuels (Commission for Environmental Cooperation 2008,17). Tomain (2017) notes that energy advocates and environmental scientists talk past each other making resolutions challenging, if not impossible. Hoffman (2015) argues that cultural conditioning has a major influence on how people process knowledge about climate change. This explains much about why it is difficult to change minds by exchanging information.

Infrastructure development often generates complex arguments about social and environmental justice. The nature of these debates has been examined by a variety of scholars and the following observations summarize several of their major findings.

David Harvey (1996), a leading voice regarding the question of spatial justice, is convinced that environmental justice is driven, in part, by issues of spatial equality. Schlosberg (2007) frames environmental justice to include a just distribution of benefits (resources, opportunities, and freedoms) and burdens (costs, risks, and unfreedoms) within society. Historically much work in the field of environmental justice has focused on racial, income and social inequities (Rhodes 2003). Redd, Jacobs, and Halliday (2020) argue that environmental justice is a constantly shifting framework for addressing questions about the interface of society and environment.

Conflicts between urban and rural places concerning waste disposal, power generation and transmission, and pipeline construction are common flashpoints. Not-in-my-back-yard (NIMBY-ism) is a dimension of these discussions and negotiations surrounding features that do not make popular neighbors (see Kroot, this issue). Rural-vs-urban stress is, in part, a function of the need for cities to rely on rural space. Rural residents often view these metropolitan-driven wants as an invasion of their places. Proposed projects are often promoted, in part, in terms of the amount of money that is to be injected into the impacted area through direct up-front investment (such as construction jobs and purchase of local materials) and incentives (including investment of money for broadband expansion and school programs (Goldberg and Keyser 2013; Wallace and Colgan 2017). These monetary promises do not necessarily move proposed endeavors forward (Simora, Frondel and Vance 2018).

Traditional strategies of local protest and legal action to stop projects are compromised by the rise of an expert class (people with scientific and technical training) and public realization that members of that group manage and render judgements on the need for individual projects and related permitting (Cohen and Ottinger 2011). They suggest that society has reached a point where only science and technology can produce solutions to problems caused by science and technology. How to influence decision makers and who should influence them is contested by some and may be changing the social norm. Environmental justice is a goal within this context; however, justice is a subjective concept.

Power transmissions lines are a frequent cause of clashes (Furby et al 1988; Cain and Nelson 2013; Lienert et al 2015; McCauley and Stephens 2017). Resolving differences in these disputes involves balancing many perspectives in project permitting. Furby et al 1988,38) concluded that, "the prospect of negative health effects carries more weight in regulatory and legal battles than such concerns as aesthetics and property values ". Adversaries bring many arguments to the table, however, not all adversaries and arguments carry the same weight.

Building from this literature, my study of the proposed construction of a northern New England high-voltage transmission line considers the way that regulatory processes work and infrastructural geographies have contributed to an impassionate debate in which both sides make broad claims about sustainability, democratic participation, and equity.

High-energy demand Massachusetts moved to replace fossil fuel power with renewable forms of generation (see Autery and Silverstein, this issue). Central Maine Power Company (CMP), part of Connecticut-based Avangrid, which is owned by the Spanish global energy firm Iberdrola, won a bid to construct a 1,200 megawatts transmission line through western Maine to transport Canadian hydropower to the southern New England market (Central Maine Power Company 2017). An awareness of the project's timeline clarifies the ensuing struggle that CMP faced before constructing the line (Table 1).

I here provide a brief introduction to the proposed transmission line and its regulatory process and range of proponents, opponents, and narrative framing. The Maine route was selected following the rejection of the competing Northern Pass high-voltage line through New Hampshire (see Kroot, this issue, and Nolan and Rinaldi, this issue). The proposed corridor and transmission line, New England Clean Energy Connect (NECEC), generated much debate while working its way through the regulatory permitting process. Proponents and opponents mustered their facts and talking points. Both sides have a support base made up of a broad representation from various business sectors, levels of government, environmental organizations and both major political parties. CMP submitted its proposal to the various state and federal permitting agencies that needed to approve the project, and each has granted a permit to allow construction. In addition, bills to delay or block the project have been defeated in the Maine Legislature and an effort to hold a statewide citizen-initiated referendum was struck down by the Maine Supreme Court. As I write this in spring 2021, a second NECEC opposition attempt is underway to hold a statewide citizen-initiated referendum on the project. Corridor opponents filed an appeal of an approved permit and it is currently under review by a Boston Federal Appellate Court.

Agency hearings were well attended, and public participation was vocal as each side took turns in making its case. Volumes of written comments poured into the agencies. Much information for and against NECEC was disseminated in the press. Position literature and advertisements appeared in newspapers and mailboxes, on television, internet, radio, and roadside posters. Project construction has begun in areas not under appeal. This struggle plays out as CMP strives to meets its contractual obligation of having NECEC operational by May of 2023. The opposition continues to try to stop the project.

My examination of the proposed construction of a Maine power transmission line is intended to contribute to better insight into the kinds of opposing views and how they are leveraged in siting large infrastructure elements in rural places. First, I structure this study in the context of other contested transmission lines through rural America. Next, research methods are discussed. A project overview describes NECEC's origin and character, and some of the concerns it raises. Following the overview, formation of proponent and opposition groups is examined. I then trace the struggle to determine the outcome of the proposed enterprise. To wrap up the study I provide a summary of the project conflict and its implications for future infrastructure investments, especially power lines through rural areas.

Date	Event
Fall 2017	CMP installs new metering system and overbills many ratepayers (unresolved)
*2/15/18-2/28/18	Mass. Dept. of Energy Resources accepts CMP's NECEC bid
5/4/2018	Chairs of Maine Leg. Committees on Env. /Natural Res. and Energy/ Utilities oppose NECEC
5/22/2018	Maine Senate President and some Leg. leaders declare support for NECEC
10/18/2018	CMP amends NECEC plan to bury transmission line at Kennebec Gorge
*02/19/19	Gov. Mills and other parties sign NECEC agreement to move project along
3/25/2019	Farmington native, Gov. Mills makes speech in support of NECEC at the town's annual meeting and residents vote 262-102 to oppose NECEC
*04/11/19	Maine PUC approves NECEC permit
6/8/2019	Bill to require new greenhouse gas study of NECEC fails in Maine Legislature
6/11/2019	Bills to give towns power to block NECEC and to delay permitting pass Legislature
6/12/2019	Gov. Mills vetoes 6/11/19 bills and Legislature sustains vetoes
6/19/2019	Study bill passes Maine Legislature for state to acquire ownership of power companies
09/11/19	LUPC deadlocks on NECEC permit over impact on Beattie Pond
9/18/2019	CMP acquires alternate route around Beattie Pond
*01/08/20	LUPC approves NECEC permit
2/3/2020	Stop the Corridor presents referendum signatures to overturn PUC approval of April 11th, 2019
5/9/2020	Maine Supreme Court allows referendum to go forward
*05/12/20	DEP approves NECEC permit
5/14/2020	CMP Avangrid files suit in court to stop referendum on constitutional grounds
7/10/2020	Governor Mills announces $170 million agreement for Hydro-Quebec to provide discount power to Maine.
*8/13/20	Maine Supreme Court declares referendum question unconstitutional, thus preventing its appearance on the November ballot.
10/27/2020	Opposition groups file lawsuit against U.S. Army Corps of Engineers for not preparing environmental impact statement on NECEC.
*11/4/20	U.S. Army Corps of Engineers grants NECEC an approval.
*1/15/2021	U.S. Dept. of Energy grants NECEC permit.
1/15/2021	U.S. Court of Appeals (First Circuit) imposes temeraroy injunction regarding opposition lawsuit filed on October 27th. 2020, thus preventing construction from starting on the new section of corridor (Canadian border to Moxie Gore).
*2/19/2021	NECEC Construction underway on established portion of corridor, first tower raised.
2/22/2021	NECEC opponents present signatures to Maine Secretary of State calling for second referendum.
Future	Possible referendum lawsuits, court decisions and additional municipal permits.

*Milestone

Table 1. NECEC Timeline.

Background: Some Contested Power Lines in the United States

To understand NECEC and the controversy surrounding its construction a review of several contested U.S. high-voltage transmission lines is helpful. The search for reasonable accommodations to meet the wishes of both opponents and proponents of such projects is often elusive. Actions in these confrontations include official testimony at hearings, rallies,public votes, agency permitting, appeals, lawsuits, gunfire, vandalism, and court decisions.

The following examples highlight this pattern. In the early 1970s a proposed power line from North Dakota coal-fired generators into Minnesota generated an intense backlash by landowners and residents along the prospective route who vigorously opposed its construction (Wellstone and Casper 2003; Anderson, S. 2020). However, the investors obtained all the necessary regulatory approvals to build the line. During its completion there were widespread protests along the corridor, sometimes involving vandalism and shootings. The line is now in place and delivering power to Minnesota consumers.

A 1991 proposal for a transmission line through rural Monroe County in West Virginia, the site of scenic New River Gorge, resulted in a broad grassroot uprising against the proposed route (Towers 2000). In this situation local citizens were able to organize opposition at a community scale to protect New River and its environment. A critical point in the contest occurred when the U.S. Forest Service and the Parks Service were able to convince American Electric Power to reroute the line further south in Virginia, thus, avoiding the contested region altogether. This solution represents a successful strategy in driving an offensive infrastructure component to another location. The completed line now delivers electrical energy from the Wyoming County Station in West Virginia to the Virginia marketplace.

Plans for the Great Northern Transmission Line were initiated in 2008 and permitting began in 2012. The line to deliver Manitoba hydro-electric power to Minnesota was energized on 1 June 2020 (Johnson 2020). This twelve-year period from inception to completion reflects the long timelines needed to bring large infrastructure projects to fruition. The transmission corridor was promoted to blend Canadian hydropower and Minnesota wind generation to ensure stable year-round energy for the Duluth region (Shaffer 2016). The Great Northern project had limited opposition along its length. This included lobbying for rerouting away from environmentally or culturally sensitive areas. The primary investors, Manitoba-Hydro and Minnesota Power, appear to have taken a successful proactive public relations approach in laying the groundwork for their project. Wade Pavleck, Chairman of the Koochiching County (Minnesota) Board of Supervisors expressed his pleasure to representatives of the transmission corridor at a board meeting in 2018 (Jackson 2018):

> "I just want to compliment you. The reason this worked and went smoothly in Koochiching County, and I think on the entire route, is you had people come in and meet with homeowners who are going to be affected and make changes to your original proposal...and avoid those homes or help people out. It made a big difference."

The international component of this project lends it a degree of similarity to the Québec-to-New England proposals, with electric energy surplus Canada providing power to large markets in the United States.

The Northern Pass proposal to deliver Québec hydropower to the Massachusetts market resulted in widespread opposition. Opponents were alienated about the environmental and economic risks to the recreational industry. Of particular concern were negative visual impacts on the White Mountains and rural landscapes to their north. Historically significant viewsheds were highlighted as worthy of protection. A critical point in the resulting turmoil was the decision by the New Hampshire Site Evaluating Committee, a regulatory agency, to reject the Northern Pass application. On appeal, the New Hampshire Supreme Court upheld that decision, killing the New Hampshire endeavor. The Québec to southern New England electric power marketers turned to Maine for a solution (Kroot, this issue; Nolan and Rinaldi, this issue).

These examples suggest that the outcome of large powerline projects is shrouded in uncertainty. Some, such as the North Dakota/Minnesota line, faced violent opposition yet were completed. The West Virginia and Manitoba-Minnesota proposals underwent long but largely peaceful debates. The role of regulatory agencies and the courts were of paramount importance. Environmental justice is illusive but appears to have been largely achieved in West Virginia and New Hampshire with the rejection and then relocation of the line through other routing options.

These past case studies highlight the ways that transmission lines, in particular among energy infrastructures, involve conflict between rural and urban and between different rural landscapes. The outcome of projects may depend in part on regulatory processes in each jurisdiction across which transmission lines travel, as well as how project leaders engage with diverse stakeholders and potential opponents. If lines are to be built, conflict resolution seems to entail moving lines from areas valued for scenery or other environmental values to those that are less so (Furby et al 1988; Cain and Nelson 2013). My study contributes to this mix of case studies and hopefully sheds additional light on how power lines are sited.

Research Methods

This study examines the values and perspectives at the heart of the NECEC transmission corridor debate in Maine. To do this, I reviewed the key stakeholders and their positions. Information was gathered from public hearings, debates and informational meetings, an examination of written records, and telephone interviews with municipal officials from impacted communities. During March and April 2019, I conducted open-ended telephone interviews with a municipal official in each of the fifteen incorporated towns and cities that NECEC passes through to determine their early attitudes toward the project. By this time the project had become contentious, and I agreed to keep the interviews confidential because some were reluctant to express their thoughts publicly, thus, I assigned a number to each respondent. These interviews documented perceived benefits and detriments for their communities and

beyond. What did these officials consider as potential project impacts and why did some support it while others opposed? These findings are discussed in a following section on support and opposition. Additionally, between February 2018 and April 2020, I attended fifteen meetings and hearings related to NECEC conducted by the towns of: Anson, Farmington, New Sharon, and Starks; three state regulatory bodies: Maine Public Utilities Commission, Maine Department on Environmental Protection, and Maine Land Use Planning Commission; one county commission: Somerset County Commissioners; and one federal agency: U.S. Army Corps of Engineers.

NECEC, an emotional and contentious issue, produces a wide range of reaction. I place these local officials and their initial thoughts about the line within the context of the larger public engagement surrounding NECEC.

The Project

This section provides an overview of the project, explaining its basic parameters, its siting challenges, and its positive and negative impacts. The next section will dive into details of supporters and opponents and their views.

NECEC is a 145-mile link through western Maine designed to deliver direct current (DC) power from provincially owned Hydro-Québec generation facilities in norther Québec to Lewiston, Maine where it will be converted into alternating current (AC) and injected into the New England power grid. About 80 percent of the power will flow to Massachusetts with most of the balance available to Maine. The nearly $1 billion cost of construction is to be paid for by Massachusetts consumers (Central Maine Power Company 2017; Maine Public Utilities Commission 2019; Dickinson 2020; Clean Energy Matters 2020; Stop the Corridor 2020; see also Vogel, this issue). Two-thirds of the line will be located within an already existing corridor that CMP has owned and utilized for decades with the remainder occupying a new right-of-way through woodlands in Maine's unincorporated townships (Figure 1). Some segments of the existing transmission network south and east of Lewiston will also undergo major upgrades to accommodate an increased power load. An additional 75 feet of clearing along the existing CMP corridor is required to provide space for the NECEC project. A newly acquired right-of-way through the forest linking Québec to the existing corridor will entail a 54-foot-wide cleared strip its entire length. The narrower cleared width along the new right-of-way is a permit condition imposed on NECEC to limit vegetation removal in this new section. Tower height is approximately 95 feet, taller than much of the forest vegetation. The new portion of the corridor is through a working forest and attempts to avoid protected natural areas and recreational resources. The established corridor section passes through a mix of woods, farmland and built environments.

Siting the Corridor

CMP faced a challenge in selecting a NECEC path through Maine. As suggested by earlier high-voltage power line conflicts, opposition to transmission lines is often resolved by locating

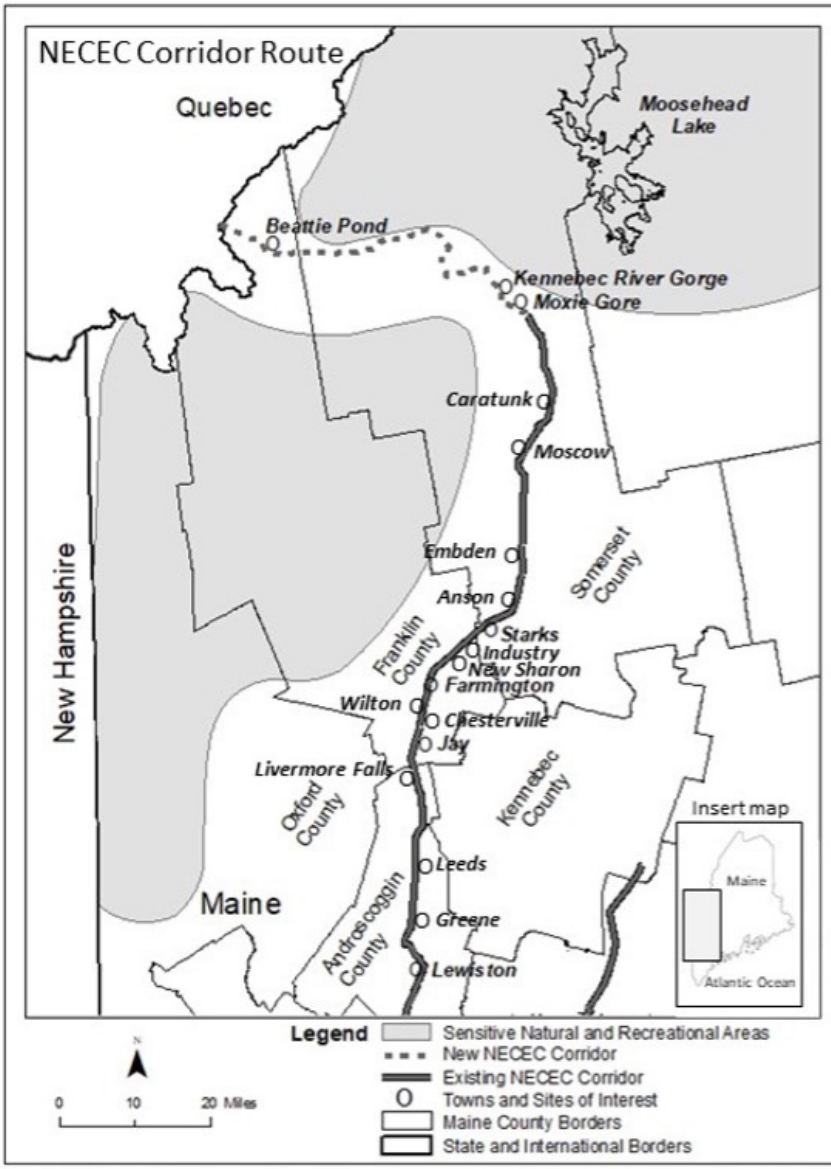

Figure 1. NECEC Corridor Route. (Prepared by Univ. of Maine at Farmington Geography Laboratory.)

these facilities through less valued landscapes.

Western Maine is dominated by vast forests, mountains, and water features. The region's overall economy is under stress with poverty levels above the state average (Maine Center for Workforce Research and Development 2016). Companies wishing to site corridors in rural areas often negotiate by promising economic development opportunities in depressed rural areas, effectively promising an infusion of urban investment and opportunity (Goldberg and Keyser 2013; Wallace and Colgan 2017). The area supports wood product industries, water extraction and bottling, and recreation enterprises such as skiing, whitewater rafting, hiking, hunting, fishing, and boating. There is still a modest amount of agriculture left from its highwater mark of a century ago. Imbedded in this fabric are small towns and the city of Lewiston (pop.36,225). Farmington (pop, 7,762), a college community and Franklin County seat is the corridor's second largest population cluster (Table 2). The northern half of the route is tied together by a few significant paved highways, light duty public roads, camp roads, thousands of miles of logging roads and a rail line. Much of the region has natural resource protection status. Southern sections of NECEC pass through a more developed landscape.

Municipality (north to south)	Pop. 2019 (est)	NECEC property tax value	Initial position	New position
Caratunk	65	$13,956,484	support	oppose/neutral**
Moscow	505	$41,977,105	support	oppose/neutral *
Embden	950	$20,225,104	support	oppose *
Anson	2,384	$21,951,777	support	oppose/neutral *
Starks	636	$18,999,760	support	oppose/neutral *
Industry	931	$10,693,497	support	oppose/neutral **
New Sharon	1,415	$ 4.868,570	neutral	oppose/neutral *
Farmington	7,762	$22,623,614	support	oppose/neutral *
Wilton	3,960	$2,516,720	support	oppose/neutral *
Chesterville	1,350	$2,192,377	support	oppose/neutral *
Jay	4,623	$22,176,922	support	oppose/neutral *
Livermore Falls	3,157	$24,960,290	support	oppose/neutral *
Leeds	2,314	$26,773,087	support	no change **
Greene	4,339	$20,747,724	neutral	no change **
Lewiston	36,225	$304,787,411	support	no change **
* Town vote ** Board vote				

Table 2. NECEC host municipalities, populations, added corridor tax values, initial position of officials, and town and select board votes regarding the corridor. Source; citypopulation.de/en/usa/maine/adim (last accessed 15 November 2020); Dickinson, T. 2020 Letter to board of assessors. Town of Starks 22 July; Interviews by author; Natural Resource Council of Maine. http://www.nrcm/programs/climate/proposed-cmp-transmission-line-bad-deal-maine/ (last accessed 15 November 2020)

NECEC line routing was planned by CMP to avoid sensitive lands and waters as well as protected areas. This new right-of-way will intersect with an existing CMP transmission corridor in the unincorporated township of Moxie Gore and occupy a portion of that strip of land the remaining distance to the project's converter station in Lewiston. Major concerns related to siting were primarily in the new 53 miles from the Canadian border to the existing

corridor. Visual and environmental impacts needed to be minimized to protect nature and reduce project opposition. Protection of the Appalachian Trail viewshed was of great significance to hikers and recreationalists. Two points of contention unrelated to the trail were at the Kennebec River Gorge, a popular whitewater rafting site, and remote Beattie Pond, a noted fly-fishing destination. CMP agreed to bury the line under the river and relocate the corridor away from the pond viewshed, thus, resolving the issues (McGuire 2018; McGuire 2020). Importantly, these decisions were encouraged or requested by the oversight regulatory agencies. Negotiated solutions have been common in government permitting at every level. Siting issues in the existing corridor are largely confined to impacts of widening the cleared section, tower height, avoiding wetlands, and other environmentally fragile places. This siting challenge involves many of the complexities exhibited in previous examples cited: lowest impact routing, mitigation strategies, and stakeholder posturing are particularly noteworthy.

Impacts of NECEC

The potential impacts of NECEC are numerous and have extensive implications (Table 3). Wallace and Colgan (2017) note many positive contributions in their comprehensive evaluation of the economic impact of the project. Delivery of 1,200 megawatts of renewably sourced energy to the New England grid, 20 percent of which is available to Maine, will likely result in energy cost savings and energy price stability (Peaco, Smith and Bower 2017). New NECEC property will add to town and city taxable valuation and generate additional monies to support local government services. Lewiston will gain 7 million new tax dollars per year after construction and the small town of Starks with a population of 636 will receive about $350 thousand in new taxes (Rice 2018, Starks 2019). Construction jobs will increase during the project building phase. This number could be as high as 1,600 and they pay above local wage scale. A settlement agreement valued at $260 million between various stakeholders and CMP in March 2019 added additional benefits (Mills 2019). These include a relief fund for retail electricity customers and low-income ratepayers, dollars for broadband expansion, heat pump installations, electrical vehicle charging stations, and renewable energy development research. In July 2020, Governor Mills announced an agreement for Hydro-Québec to provide $170 million of discounted power to Maine (Andrews and Burns 2020). Projected CO2 reduction is another positive impact of the project and a driving force in the Massachusetts initiative to have the line built (Autery and Silverstein, this issue).

Possible negative impacts are also extensive. Massachusetts will receive the benefits (electric customers in that state pay for the project) while Maine gets the direct biophysical impact. Environmental damage caused by clearing a new swath through the woods will be profound. Wetlands, waterways, ponds, and wildlife habitat are likely to suffer damage. Many opponents are convinced that NECEC will not slow climate change and argue that the greenhouse gas, methane, produced by water management for power generation (large flowages behind big dams) offsets any gain from projected CO2 reduction. Greenhouse gas emissions from hydropower are difficult to measure and there is uncertainty about their impact (Steinhurst, et. al. 2012; Lohan 2020). Creation of these northern Québec power reservoirs disrupt native

peoples and make it difficult for them to live traditional lifestyles (Fortin 2001; Abel 2018; also see Desmeules and Guimond, this issue). In addition to questions about greenhouse gas emissions from impoundments, Lohan (2020,1) agrees that extensive flooding also destroys native cultures and wonders if, "...big hydro with its reservoirs and dams, is green enough to be worth the cost." Visual degradation to much of western Maine is a concern. Some citizens argue that viewsheds of hiking trails, rafting rivers, scenic highways, lakes, and ponds are in peril. Recreation businesses may suffer as tourists turn to other less tarnished regions for outdoor adventures. Owners of recreational second homes may be hurt by a decline in the quality of porch vistas leading to lower property values. Current nonrenewable and biomass electrical power producers may suffer from NECEC bringing less expensive Canadian energy into the marketplace (see also Vogel, this issue).

Positives	Negatives
Energy cost savings	Mass. gets benefits and Maine the burden
Energy price stability	Environmental damage (land clearing, wetland/waterway, wildlife habitat)
Growth in property tax revenues	Will not slow climate change
Deliver 1200 megawatts to New England grid	Visual damage (Kennebec Gorge, Appalachian Trail, porch views)
Create construction jobs	Economic damage (recreation business, decline in property values, competition for other energy producers
Reduce CO_2 emissions by about 0.265 million tons in Maine (3.5 million tons in Mass.)	Impact of large hydro-power impoundments in Canada (greenhouse gas emissions and displacement of traditional cultures).
Rate relief fund for CMP customers	
Broadband expansion	
Heat pump installation fund	
Electric vehicles charging station fund	
Energy research grants	
Technology and economic grants to Franklin and Somerset counties	

Table 3. Potential positive and negative NECEC impacts on Maine.

Support and Opposition

Having provided a broad overview of the project, its siting conflicts, and its potential positive and negative impacts, I now turn to a more detailed accounting of the proponents and opponents and their views. My research focused in particular on the leaders of local (town and county) decision-making bodies.

As the NECEC proposal made its way into the information, debate and permitting arenas, two distinct sides emerged. The division was not along clear lines of environmental, party politics, or economic status (Table 4).

Supporters	Opponents
Governors' energy office	Stop-the-Corridor
Maine Office of Public Advocate	Fossil fuel generators
Conservation Law Foundation	Natural Resources Council of Maine
Acadia Foundation	Patagonia Action Works
Union of Concerned Scientists	Sierra Club
Industrial Energy Consumers Group	Audubon Society
Maine State Chamber of Commerce	Rafting interest (most)
International Brotherhood of Electrical Workers	Sporting groups (many)
Western Mountains and Rivers Corp.	Northwoods second homeowners (most)
Maine Snowmobilers Association	Recreational groups (many)
Municipal leaders (most)	Municipal voters (most)
Labor groups (many)	Solar and wind power interest (most)
Hydro-Quebec	Indigenous people
Central Maine Power	

Table 4. NECEC Supporting and opposing organizations and groups.

Support

Project supporters included most state government leadership, especially Governor Mills and the Maine Office of Public Advocate. The following groups are behind the endeavor. Economic and business interests are represented by the Industrial Energy Consumers Group, Maine State Chamber of Commerce, International Brotherhood of Electrical Workers, and many other labor groups. The Conservation Law Foundation, Acadia Foundation and Union of Concerned Scientists are environmental organizations. Maine Snowmobilers Association is from the recreation sector. The Western Mountains and Rivers Corporation was formed by regional leaders to administer NECEC mitigation money to protect environmental, economic, and recreational interests in the corridor area of northern Somerset County.

When CMP representatives first approached local officials in the fifteen host municipalities, most of them initially supported NECEC (Table 2 and Figure 1). However, under opposition pressure their positions often shifted. Leadership of Lewiston, with a new converter station promised, voiced strong support for the line (Rice 2018). During early 2018 CMP conducted an in-depth informational conference with municipal officials in each host town or city. These first impression events appear to have done much to gain support for the project. Significant local tax benefits were highlighted in these discussions. An overview of new NECEC tax value in each town and city indicates big gains in many places (Table 2). Except for Lewiston, which will have a converter station, these numbers largely reflect taxable value of the new corridor transmission line at approximately $3 million per mile.

In spring 2019 telephone interviews with municipal officers, I asked about their first reaction to the project and what factors their board considered in making an initial decision to support, remain neutral, or oppose NECEC. Individual reactions ranged from strong support to outright rejection (Table 5). Respondents offered thoughts on everything from tax benefits,

dislike of CMP, to no confidence in former State Senator Thomas Saviello, an outspoken opponent of NECEC. Official #7 suggested citizens opposed to the project were ill informed. This great variation in individual thoughts was fuel for discussions as boards took positions on the transmission line (Table 6). Interviewees said their boards considered both local and broader impacts. The most important local benefit was taxes (87 percent) with broadband expansion (20 percent) a distant second. Environmental risk (47 percent), visual degradation and decline in property values (27 percent), and market loss for competing energy businesses (20 percent) were local negatives.

Support
Official # 1. "Our municipality would see a big boost in tax base and local jobs."
Official # 2. "NECEC would hurt local biomass industry but would increase the town's tax base."
Official # 3. "I have little confidence in former State Senator Thomas Saviello, a NECEC opponent."
Official # 4. "The additional tax base would help our community. Many people hate CMP more than they hate the NECEC project."
Oppose
Official # 5. "NECEC would hurt our area biomass business. New Hampshire turned down the Northern Pass proposal. Why would we want a project like that here?"
Official # 6. "NECEC would damage both our environment and property values."
No Position
Official # 7. "Most people who are against NECEC don't know where it passes through our town."

Table 5. Sample quotes from municipal officials along NECEC route.

Boards considered impacts at the state, regional and global scales. Slowing climate change (20 percent), more regional jobs (20 percent) and reduced energy costs (20 percent) were the primary benefits they saw beyond their local communities. Negatives beyond the respective boards' town or city boundaries were a dislike for a place, organization, or person (33 percent). Massachusetts, CMP, Hydro-Québec, Natural Resources Council of Maine, and former Senator Saviello all took hits. This suggests that project support and opposition is a function of

Perceived local benefits	Taxes 13 (87 percent)
	Broadband expansion 3 (20 percent)
	Lower power costs 1 (7 percent)
Perceived local negatives	Environmental risk 7 (47 percent)
	Visual degradation and lower property values 4 (27 percent)
	Damage to competing energy sources 3 (20 percent)
	Public road damage during construction 1 (7 percent)
Perceived positive impacts at state, regional, and global levels	Slow climate change 3 (20 percent)
	More regional jobs 3 (20 percent)
	Lower regional energy costs 3 (20 percent)
Perceived negative impacts at state, regional, and global levels	Dislike for CMP, Hydro-Quebec, Massachusetts, Natural Council of Maine, or former State Senator Thomas Saviello 5 (33 percent)
	Damage to the Maine environment 3 (20 percent)
	Depress the Maine economy 2 (13 percent)

Table 6. Factors municipal officials considered most important in their initial response to the NECEC proposal.

what officials think about the actors who are involved, as well as the enterprise itself. Damage to the Maine environment (20 percent) and economy (13 percent) were additional board considerations. The majority of town and city leaders felt that growth in tax base, jobs, and the move away from fossil fuels outweighed the project's undesirable aspects.

Opposition

As opposition became more organized, activists formed Stop the Corridor, a coalition of many of the opposing voices. It coordinated NECEC resistance at many levels from town meetings and hearings to state legislative proceedings. Notably, Stop the Corridor managed a successful drive to force special town meeting votes in corridor and nearby municipalities to overturn early leadership support (Cover 2020). This activity was most intense during

the spring and summer of 2019 and was exemplified by the Farmington, Maine annual town meeting of March 25 at which Maine Governor, and Farmington resident, Janet Mills spoke to convince townspeople to support the corridor. The previous week she had endorsed NECEC. Farmington voters weighed in 262-102 against the project (Ohm 2019b). This shifting from support to opposition at the municipal level was part of a broader phenomenon, discussed in the "Struggle to Determine the Outcome" section in my paper.

Fossil fuel power generators stand to be to the biggest losers in this battle because their prices may be undercut by inexpensive Canadian hydropower. They have provided much support to oppose the corridor. Also, most solar, wind and biomass generators have concerns about market share. Several environmental organizations are against NECEC because of possible damage to natural resources. The Sierra Club, Audubon Society, Patagonia Action Works and Natural Resources Council of Maine are all outspoken with the latter taking the leadership role among this group. Recreation concerns such as whitewater rafting, hunting, fishing, hiking, and the businesses that they support opposed the transmission line.

Individual citizens have largely opposed the corridor. Their views have been heard through hearings, town meeting votes, editorials in the press, radio shows and opinion polls. Issues of concern are similar to those expressed by the various organizations. There is also a question raised as to why Maine should agree to a project that New Hampshire rejected.

The Struggle to Determine the Outcome

In this section I follow arguments and resolutions in the struggles to reach accommodations at various scales and in many arenas, local, state, and federal. These policy battles played out in town halls, commission chambers, agency hearings, in the judicial system and the court of public opinion. This contest is examined as I chronologically track significant clashes and their outcomes.

The NECEC war involves a classic public policy controversy that requires time to reach a conclusion. Nine significant milestones (Table 1) in this clash have been 1.) CMP wins a bid to construct a transmission line through Maine, 2.) Governor Mills and other parties sign an agreement supporting NECEC that calls for additional benefits for Maine, 3.) Maine PublicUtilities Commission (PUC) approves the line, 4.) Maine Land Use Planning Commission (LUPC) permits project, 5.) Maine Department of Environmental Protection (DEP) issues project permit, 6.) Maine Supreme Court declares referendum question on NECEC unconstitutional, 7.) U.S. Army Corps of Engineers (Army Corps) approves corridor permit, 8.) U.S. Department of Energy grants a permit, and 9.) NECEC construction begins. Incidences large and small play out in the struggle and lesser events contribute to arriving at milestones.

The struggle to determine the project outcome began with what would appear to have little to do with NECEC itself. In fall 2017 CMP installed a new metering system that was not properly vetted, resulting in widespread billing errors that angered ratepayers. This problem is still not fully resolved and continues to be a major public relations nightmare for the power company (Turkle 2020b). That negative image has made it difficult for CMP to gain public trust as a utility company. The winter of 2018 saw the Massachusetts Department of Energy

Resources accept CMP's bid to construct a transmission line to enable Canadian hydropower to reach the Boston area market, thus, birthing NECEC as a Maine public policy issue .

Local Fight

Although they have limited powers to control a project of this scale, levels of government closest to the people found themselves at the forefront of much of the NECEC fight. Maine counties have no authority to regulate development. Unincorporated townships that entail most of the northwestern portion of the state are under the jurisdiction of the Land Use Planning Commission (LUPC), a state agency. Despite their lack of power, county commissioners were lobbied by both corridor proponents and opponents to take positions. Each side saw this as a strategy to influence public support. Hearings and resulting votes favoring the proposal infuriated the opposition which demanded the matter be revisited hoping for more favorable outcomes. Somerset County Commissioners continued to support the NECEC while Franklin County Commissioners withdrew theirs (Ohm 2018; Ohm 2019a). The primary focus of these discussions included growth of the tax base, the status of a modest income areas with forestry, open land, low-impact recreation uses, and widespread economic stress. County hearings and commissioner votes received extensive press coverage and heightened public awareness about the nature of NECEC.

In contrast to counties, Maine municipalities do have development oversight powers through their planning boards. Also, towns and cities may enact ordinances to protect local resources and address community health and safety needs. However, in Maine the regulatory abilities of the local governments do not extend to blocking projects of statewide importance such as NECEC. These planning boards have authority over limited land use issues that could include stream crossing regulations, wetland protection and erosion control. At this time, CMP is moving through the required steps to gain permits from municipal planning boards. On 22 January 2020, a NECEC site plan review was submitted to the Town of Starks Planning Board and the review process began on February 5 (Central Maine Power Company 2020). The town granted a permit on 3 June 2020 (Town of Starks 2020). Some corridor town planning boards have postponed their actions in apparent efforts to delay NECEC. For example, the Town of Jay board voted to table the CMP project application until all state and federal permits had been awarded (Perry 2020a, Perry 2020b).

Early support from local government leaders attracted the ire of Stop the Corridor and its allies. Opposition launched a successful effort to have towns hold official, but non-binding, votes on NECEC. In many cases citizens petitioned the selectmen (the elected administrative board of the town) for such balloting. In those towns that held such votes citizens opposed the corridor. The Farmington meeting falls into this pattern. Residents perceived that benefits to individual towns were outweighed by environmental degradations, economic impacts on local biomass plants, negative feelings about CMP, and the role of Canadian and Spanish energy companies and their profits. Communities nearest to Lewiston, the site of the project's converter station and largest concentrated investment, did not turn against the corridor. Prospects for significant local economic growth were of prime consideration in these places. The municipal political arena also experienced pressure from citizens and opposition groups to

enact moratoriums to delay town permitting of the project (Meanear 2020). The legal status of such a move is uncertain as it represents a possible overreach of municipal powers and a rule change in the middle of permitting. In Maine, planning boards are mandated to base their decisions on scientific information rather than on ideological opinions. Legal challenges are likely to arise when planning boards do not follow objective consideration of evidence. Also, the Maine PUC has the authority to override local decisions that block utility infrastructure projects of statewide significance. Given the limitations of municipal power over a billion-dollar project that is of interest to all New England, it is difficult to understand how small towns can alter the permitting process in a meaningful way. However, these discussions do allow the public to participate, and most of the debate forums were filled. Despite unresolved local permitting questions, CMP moved ahead with corridor activities that do not require permits (Murphy 2020a, Turkle 2020c). These included site inventory and analysis and the installation of wooden matting that allows equipment to cross wet ground. The mats are to be removed after project completion. By early April 2020, $300 million in construction contracts had been awarded by NECEC (Turkel,T 2020d).

State Fight

As expected, the area closest to the proposed corridor was the stage of the most heated confrontations surrounding NECEC. However, the issue has encompassed all of Maine. Both pro and con sides are convinced that this project represents a watershed moment for the State's. economic and environmental future. At the state government level dialogue surrounding the corridor was extensive and contentious. Public, political, business, and environmental interests swiftly reacted to the February 2018 CMP contract with the Massachusetts Department of Energy Resources to build a high-voltage transmission line through Maine.

Maine legislative leadership soon split over the issue. On 4 May 2018, the chairs of the committees on environment/natural resources and energy/utilities wrote a joint statement in opposition (Saviello, et al. 2018). However, these committee positions did not translate into success in stopping the corridor through legislative action as many members of both the House and Senate supported NECEC. Party politics played almost no role in the division. Members of the legislative bodies were subjected to intense lobbying by interest groups and individual citizens representing both sides of the issue.

Following its examiners recommendations of 29 March 2019, the Public Utilities Commission approved a NECEC permit on April 11. (Maine Public Utilities Commission 2019; Turkel 2019a). This action set in motion a series of reactions by corridor opponents in the legislature and in June two bills to block or delay the transmission line passed. Governor Mills vetoed both and her vetoes were sustained (Miller 2019). A few days later the lawmakers passed a measure to provide for the study of state acquisition of all privately owned power companies in Maine (Turkel 2019b). The bill involved broad charges that CMP was an inefficient private company, and that Maine would be better served by a state-owned power utility. The summer of 2019 saw a blizzard of news, spot advertisements and debates about NECEC.

Acquisition of project permits involved three state and two federal agencies, the PUC decision was the first of these regulatory authorizations needed for the project to go forward.

On 11 September 2019, the LUPC deadlocked on permitting NECEC because of its impact on remote Beattie Pond in northern Franklin County. A week later CMP acquired an alternate route around the pond and the LUPC granted a permit 8 January 2020 (McGuire 2020). On 13 March 2020 DEP staff recommended that the department grant a permit to CMP and it did so on May 12th (Anderson, J 2020; Thistle 2020). The Army Corps granted a permit November 4th (Hoey 2020b) and a U.S. Department of Energy permit was approved 15 January 2021 (Collins 2021).

Another political front gained attention on 4 March 2020 as Stop the Corridor and its fellow NECEC opponents presented a referendum petition with enough valid signatures to the Maine Secretary of State to trigger a statewide vote in November to overturn the PUC decision of 11 April 2019 (Murphy 2020b). The following week, March 13, CMP filed court papers charging opponents with violating Maine signature gathering laws (Collins 2020; Hoey 2020a; Andrews 2020a). August 13th was a bad day for NECEC foes as the Maine Supreme Court found that voters do not have a constitutional right to overturn a regulatory decision, thus, closing this line of attack (Andrews 2020b).

As the NECEC war progressed both sides became more organized. Major disagreements arose, often in the context of regulatory standards. For example, in October 2018 CMP amended its plan and agreed to bury the line beneath the Kennebec River Gorge, thus protecting a prime whitewater rafting site from visual damage (McGuire 2018). A second anti-corridor referendum calling for a vote in November 2021 was approved by the Maine Secretary of State (Andrews 2021). Such a public vote may come too late to have any influence on NECEC. Opponents (including Sierra Club Maine) filed a lawsuit against the Army Corps for not doing a more comprehensive environmental impact statement, rather than the less intensive environmental assessment that was produced. In response to this suit, on 15 January 2021 the U.S. Fifth District Court of Appeals granted a temporary injunction preventing construction from beginning on the corridor's most contentious section, the 53 miles of new right-of-way between the Canadian border and Moxie Gore (Collins 2021a).

Construction Begins

With the pressure to meet a contract deadline for project completion, efficiencies in using equipment and crews already brought to the region, and the advantages of working on frozen ground in the Maine woods, NECEC management elected to begin construction on the portion of the transmission line not covered by the injunction. Examples of these pressures are the NECEC's contract with a Wisconsin based company to clear and widen rights-of-way. Under the agreement NECEC is obligated to pay $690 thousand a week to cover the cost of equipment expenses related to any project delays. Also, power purchase obligations with Massachusetts utilities require NECEC to pay financial damages if electricity is not flowing by the contracted completion date of May 2023 (Turkell 2021). Contractors erected the first tower on 19 February 2021 (Valigra 2021). This is a high-stakes gamble as NECEC decision-makers are betting that future court decisions, referenda, and legislative actions will be in the project's favor.

Posturing and Corporate Restructuring

Confrontational posturing hardened on both sides as the corridor contest evolved. In part this is reflected by the ongoing avalanche of legal and political actions of the opponents to stop the line and a reorganization of the corporate structure of the entities building the line. Murphy (2020c) notes two typical reactions that reflect the tone of the NECEC conflict. Sierra Club Maine volunteer leader, Becky Bartovic, protested, "The criteria for requiring an environmental review statement has absolutely been met and the Army is derelict in its duty not to have done so." Jon Breed, Executive Director of Clean Energy Matters, a political action committee formed by CMP and Avangrid remarked. "After two years, millions of dollars and more than a dozen attempts to use legal action to derail the clean energy corridor the Natural Resources Council and its allies have yet to succeed. Their conduct is shameful." Three weeks after the U.S. Army Corps granted its permit Sandra Howard, a leader in Stop the Corridor, commented (Howard 2020), "CMP would like Mainers to think their destructive corridor through an undeveloped region of western Maine is a done deal, but that is simply not the case." How will this ongoing pressure impact regulatory agencies, legislative bodies, courts, and the corridor's prospects?

Companies that encounter barriers to moving projects forward sometimes reorganize their business model and enhance their talent pool. The long power line struggle tarnished CMP's character as a reliable and respected member of the utility community. To rehabilitate their public image and invigorate the corridor project CMP and NECEC have undergone recent changes in leadership, corporate structure, and resource support. David Flanagan, a well-respected former CMP CEO, has been rehired to better address public relations. Flanagan's 1994 to 2000 role in guiding the company to a position of economic success and popular respect was not overlooked when he began his work in the fall of 2020 (Turkle 2020e). During 2020, Avangrid, CMP's parent company, formed a separate entity, NECEC Transmission, LLC, to oversee the corridor's construction (New England Clean Energy Connect 2020). The genesis of this new company dates from a 2019 Maine PUC directive for a separate firm to be created to own NECEC assets and manage construction of the corridor. This order was to insulate CMP and its existing customers from any risks associated with the project (Rich 2019). In addition, it created distance between CMP's tarnished reputation and the transmission line. Spain's Iberdrola renewed its focus on moving NECEC forward with a leadership visit to Maine and by providing more resources (Valigra 2020). Hydro-Québec infused additional money and marketing efforts into the NECEC campaign (Van Allen 2020). Proponents hope these changes will benefit NECEC while opponents are inclined to argue that it is only a matter of moving deck furniture around on a sinking ship.

Update, Analysis, and Implications

In this section I provide an update on NECEC as this article goes to press. Additionally, a discussion focuses on spatial and environment justice in the context of Maine and New England power policies and reflects on ways my study deepens our understanding of questions concerning future energy geographies.

Update

Despite ongoing legal challenges to stop the corridor, in February 2021, construction began. This event highlighted the pressure on both sides to refocus on their respective goals of stopping the corridor or building it.

Communities along the NECEC route continue to discuss the corridor and its impact while local planning boards review project related applications under their jurisdiction. State oversight agencies, legislators, and the governor are engaged in the ongoing corridor dialogue. All state and federal regulatory permits have been awarded. Proponents and opponents promoted their cases on various fronts; regulatory, court, legislative, and public opinion. New large-scale events and small battles continue to appear. In late March 2021, the NECEC contribution to broadband expansion in rural Maine became a significant aspect of the State's effort to improve internet access for its underserved populations (Collins 2021b). This topic exemplifies a new issue that has become front and center as coronavirus pandemic related needs to provide remote learning for children and support for the growing number of adults working from home. Broadband represents a new NECEC related focus and presents a dilemma to those who support its expansion but oppose the corridor. It is uncertain what secondary issues might play a significant role in tipping the transmission line battle in favor of one side or the other.

Legislative committees are receiving bills for additional CMP related studies. Courts and voters are likely to have more to say before the corridor debate is settled.

Analysis

The balancing of needs associated with southern New England energy demands, production sources, and environmental concerns play out on the Maine countryside. A Massachusetts desire to move toward renewable sources of electrical power resulted in a plan to acquire Québec hydropower for use in the Massachusetts market. CMP was awarded a contract to construct the transmission line through rural Maine to deliver Canadian power to the New England electricity grid. This proposed power corridor resulted in heated public policy confrontations about shifting energy strategies at various scales, local, regional, and global.

Environment, spatial, and energy justice in Maine, New England, and Québec are examined by all the authors in this special issue. Furby et al (1988) and Kroot (this issue) address the urban and rural conflict as a factor in framing arguments. Development possibilities and associated economic benefits drive interest in rural communities (Goldberg and Keyser 2013; Wallace and Colgan 2017). Expert vs public confrontations sometimes generate hostile environmental and social policy discourse (Cohen and Ottinger 2011). Relationships among levels of government occasionally produce complicated and confusing regulatory processes (Towers 2000; Cain and Nelson 2013; Kroot this issue). Examples of transmission corridor conflict resolution by rerouting them to protect landscapes and environments (Towers 2000; Lienert et al 2015; Kroot this issue) point the way toward conclusions that all stakeholders may not be happy with. All these dimensions intersect in the NECEC struggle.

Renewable energy demands by Massachusetts, the catalyst for NECEC, called into question the electricity supply and demand nature of New England's power network and its shifting needs (Vogel this issue). These changing power dynamics involve broad impacts on the region. The question of who benefits and who loses in this energy restructuring pitted groups against each other, rural versus urban, native peoples of Québec versus city dwellers in Boston, citizens of western Maine versus southern New Englanders, and corporate profits earned by foreign companies versus economic benefits to remote areas of Maine.

Harvey (1996) and Rhodes (2003) argue that spatial, environmental, and social justice is a shifting interface of society and environment. Public discourse surrounding NECEC brought this to the forefront. Opponents of the project argued that rural Mainers and First Nation Peoples of Québec were asked to pay too high a price in helping meet the southern New England demand for more renewable energy. Western Maine town level discussions and votes highlighted disagreement among neighbors over progress. Rural communities contain wide variations in values about what kind and how much change is acceptable.

The rural/urban dichotomy of society was highlighted in the us-versus-them posturing of rural Maine against urban Massachusetts. Corridor opposition argued that people from away are damaging our place (Howard 2020). Proponents countered with benefits of investments in rural Maine (jobs, tax benefits, etc.) regional infrastructure improvements, (power networks, broadband expansion, etc.), and broad climate change mitigation (Mills 2019). The different perspectives were widely argued on the public stage. The discussions frequently pitted experts, trained scientist, against public participants. Local state and federal permitting agencies listened to and read a mix of scientific facts and emotional opinions in reaching conclusions based on their best judgements.

As the debates and discussions surrounding the corridor moved through the years, results tended to favor the project. However, amendments to the original proposal were adopted to protect environmentally sensitive locations and valued landscapes such as Beattie Pond and the Kennebec River Gorge. This mitigation strategy is often part of the permitting process. To date, the proponent's arguments are moving NECEC forward. My study highlights the confrontational nature of expanding major infrastructure projects into rural places and suggests that long struggles should be expected.

Resolutions resulting in construction hinge on each side negotiating in good faith and this appears to have been the case in successful powerline sittings in the above section on contested powerlines in the U.S. Failed proposals such as Northern Pass in New Hampshire suggest a limited understanding of local cultural dynamics on part of project developers. They appear to have underestimated the value of historic viewsheds.

Globalization and its impacts at micro and macro scales are intricately connected to local and regional environmental justice debates. Urban markets depend on supplies of goods from rural areas and rural transportation networks to deliver them. People located at each source, route, and destination feel a degree of stress when they perceive threats to their respective environments, lifestyles, and values. NECEC drew these feelings to the public arena. Native peoples in Canada, small towns in Maine, city consumers in southern New England, global and regional energy corporations, and many levels of government are engaged in this energy war.

Implications

Future energy geographies are evolving as new energy dynamics drive local, regional, and global power needs. Environmental, spatial, and energy desires of society generate questions of equity. This study builds on the work of Bridge et al (2018), Baka and Valishava (2020), and Huber and McCarthy (2017) in calling for the examination of new spatial patterns of energy (especially electricity) production, transportation, and consumption. The siting of transmission lines will be a critical point of conflict in shaping these new energy geographies (Cain and Nelson 2013; Lienet et al 2015) My investigation of NECEC is intended to contribute toward an improved understanding of some of the dynamics of creating new energy geographies.

The second decade of the 21st century begins with an atmosphere of political contention in which opposing groups often talk past each other. Solutions seem elusive as entrenched adversaries battle to arrive at their own version of environmental and spatial justice. How should decisions about siting transmission lines and other big infrastructure investments be made? As the continuing struggle over the NECEC transmission line illustrates, environmental justice is a journey, not a destination.

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MAINE'S CMP CORRIDOR AS A "PARACOMMONS": The Spatial Politics of Gains and Harms among Proprietors, Neighbors, Socioecological Systems and the Wider Economy

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ABSTRACT

Schemes for linking hydropower to electricity users in the northeastern US have ignited intense controversies that have slowed down or sunk several infrastructure projects. Maine's Spanish-owned utility monopoly, Central Maine Power, proposed the most recent transmission project, the New England Clean Energy Connect (NECEC), or CMP corridor, a $1 billion 145-mile transmission line to bring electricity from Hydro-Québec to Massachusetts through western Maine. Proponents of the CMP Corridor highlight the project's carbon impacts, rate savings, construction jobs, mitigation package, and property tax impacts. But, the CMP Corridor has also drawn intense grassroots opposition for its impacts on fisheries, wildlife, recreational tourism, scenic amenities, and development of domestic renewables. The Corridor opposition has been dismissively characterized as "not in my backyard" (NIMBY) politics, but multiple sessions of public testimony by opponents and proponents articulated a wide range of perspectives and engaged in wider critiques that can be effectively understood as competing claims on the "paracommons." This article uses a content analysis of 113 public testimonies to guide a close reading of opponents' and proponents' statements. The spatial politics and overlapping concerns that drove negotiations tied to future gains and harms that may result from the Corridor.

Key words: CMP Corridor, paracommons, energy transition, energy justice, spatial politics, Maine

Introduction

The New England Clean Energy Connect (NECEC) project proposed by Central Maine Power (CMP), a subsidiary of Spanish electric utility multinational Iberdrola, would link Hydro-Québec's hydroelectric generation to Massachusetts consumers by routing a transmission line through western Maine. Most often referred to as the CMP Corridor, the project's promotional website promises a $950 million investment upgrading 145 miles of corridor with

a new high-voltage direct current (HVDC) transmission line, including cutting 53 miles of new corridor (NECEC 2020). The HVDC line will be supported by an estimated 850 95-foot tall towers and the cleared width of the corridor will vary from 54 feet to more than 150 feet (NECEC 2020).

Originally proposed in response to the 2016 RFP associated with Massachusetts' Act to Promote Energy Diversity (H.4568; see also Nolan and Rinaldi, this issue; Silverstein and Autery, this issue; Vogel, this issue), the project would add 1.2 GW of transmission capacity, about 13 percent of CMP's current load and roughly twice the capacity of the recently decommissioned Pilgrim nuclear power plant in Plymouth, Massachusetts (NECEC 2020). Massachusetts has entered into a 20 year contract with Maine CMP and Hydro-Québec for 9.45 TWh annually, about 90 percent of the power transmitted through the corridor to replace retiring nuclear, oil and coal generation facilities and meet its carbon reduction targets established in the Commonwealth's Global Warming Solutions Act (GWSA) of 2008 (Walton 2018; NECEC 2020; see also Frederic, this issue; Silverstein and Autery, this issue).

The NECEC website lists a variety of benefits of the project including lower electricity costs, reduced regional carbon emissions, 1,600 construction jobs, $18 million per year in local taxes, $200 million in grid investments, as well as benefits associated with a mitigation package that includes funding for broadband expansion, tourism and economic development funding, and support for educational institutions (including my employer, the University of Maine at Farmington), the Passamaquoddy Tribe, electric vehicle (EV) infrastructure, heat pumps, and decarbonization planning (2020). The value of the various components of the mitigation package listed on the web page is $264 million, dispersed over 5 to 40 years (NECEC 2020). As delays pushed the project past its 2020 deadline, subsequent negotiations over summer 2020 resulted in an additional $140 million from Hydro-Québec in the form of discounted electricity, as well as $20 million in EV and heat pump incentives for Maine consumers (Anderson 2020).

The CMP Corridor, like New Hampshire's Northern Pass proposal before it, has ignited widespread controversy. A range of opposition groups have emerged including astroturf campaigns[1] funded by fossil fuels-based power producers (e.g., "Stop the Corridor"), as well as highly mobilized grassroots citizens groups (e.g., "No CMP Corridor"). Opponents articulate a wide range of concerns, from the impacts of herbicide spray on fish and wildlife, to scenic impacts on the regional tourism economy. The CMP Corridor is one among a steady stream of local and regional controversies pitting different sets of pro-environmental values and positions against each other. Utility-scale solar and wind installations, pipelines and pipeline regulations, biomass incineration and processing, expansions of natural gas infrastructure, dam removals, and a variety of conservation projects have all generated heated opposition, splitting constituencies along sometimes surprising fault lines, subject to recriminations over corporate influence or claims of corruption, leading to unsatisfactory decision-making outcomes.

A variety of recent geographical research examines Maine's unsettled terrain of environmental politics in far ranging scales and settings. For instance, Harrison (2006) analyzes the cultural and political conflicts emerging from Burt's Bees founder Roxanne Quimby's efforts at landscape-scale conservation and national park designation. His investigation focuses on the ways putative acts of green consumption become implicated in landscape-scale

initiatives and regional politics far beyond a product's lifecycle, contributing to conflicts around conservation efforts. Correia (2010) investigates the erosion of forest products certification goals, and biodiversity practices more broadly, as Maine has emerged as a site of intensifying extraction by new classes of financial owners (see also, Hagan *et al*. 2005). Hanes (2018) delves into the conflicts over aquaculture that surface in leasing hearings. His comparative analysis shows the value of different communication strategies, including mapping and other visualization techniques, for allaying opponents, concerns, as well as the role of regional context in determining local acceptance of aquaculture. A variety of authors explore the debates and displacements enacted through conservation acquisition programs and "traditional use" (Acheson and Acheson 2009; Cottle and Howard 2012), in particular the enclosures enacted by a new class of timberland investors who have used large-scale conservation easements to disrupt long-standing access regimes and extract payments from local, state and national actors (Kay 2017). In a different context, Brewer (2012) and Brewer et al. (2017) reports on fissures and deliberative openings between experts and resource users, in particular regulators and lobstermen in Maine fishing communities. And, Miller (2019) examines the theoretical underpinnings of Maine's sustainable development initiatives and institutions, finding the very terms of the debate over supposedly competing environmental, economic and social interests limiting their transformative potential. Collectively, this growing body of research contributes to an increasingly nuanced understanding of the spatial dimensions of Maine's environmental politics, attendant to the state's status as a resource periphery subject to recent episodes of restructuring. These various authors account for larger social or political economic contexts constraining participants in environmental controversies, e.g., the knowledge politics, forces of industrial restructuring, regulatory regimes, environmental discourses, etc., while also attending to the possibilities for alternative environmental futures, whether by questioning policies like certification (Correia 2010) or large-scale conservation (Harrison 2006; Kay 2017) or by emphasizing practices of citizen engagement and participation (Brewer 2012; Brewer et al. 2017; Hanes 2018).

Notwithstanding this growing body of geographical research describing Maine's complicated terrain of environmental politics, the controversy over the CMP Corridor can be too easily read through the lens of NIMBY politics or taken as a sign of an intractable divide between rural traditionalists and cosmopolitan progressives. Doing so fits the debate into convenient ideological camps but misses the wide range of arguments for and against the Corridor, the wider critique of both Corridor proponents and opponents, as well as the overlapping concerns that both proponents and opponents share.

This paper attempts to understand this wide range of Corridor positions, the wider critique proponents and opponents engage in, and the shared concerns of the two camps through a close reading of public testimonies selected based on a quantitative content analysis. In order to code both proponents' and opponents' testimonies with a common analytical framework that avoids the reductionist tendencies mentioned above, I develop and deploy Lankford's (2013, 2014) concept of the paracommons to understand the CMP Corridor debate as an active negotiation, or "competition over freed up resources obtained by changing the efficiency of usage" (2013, 9). In order to better understand the stakes of this competition over the gains and harms of the new transmission line, I first review the energy justice literature for insights into the unevenness

of low carbon energy transitions, as well as recent contributions to studies of resource populism that highlight the transformative possibilities of energy activism. The paper then elaborates on Lankford's paracommons before using Lankford's framework to code and analyze public testimonies provided during permitting process.

Energy Justice and Resource Populism

A growing body of research grapples with controversies over energy transitions akin to the CMP Corridor. For instance, an emerging energy justice literature is particularly attentive to low carbon transitions and the debates they animate (Sovacool and Dworkin 2015; Batel and Devine-Wright 2017; Bouzarovski and Simcock 2017; Avila 2018; Williams and Doyon 2019). Geographers and others adopting an energy justice framework proceed from the recognition that energy transitions are always more than technical accomplishments, involving questions about uneven distributions of material conditions, how decisions are made, and whose voices are recognized in policy deliberations (Sovacool and Dworkin 2015, 437). Attention to these concerns serves social justice as well as instrumentalist goals, such as insuring wider social acceptance of low carbon transitions (Williams and Doyon 2019), particularly important given the unprecedented impending societal investments in energy systems (Jenkins et al. 2017).

Bouzarovski and Simcock (2017) develop an explicitly spatial justice approach to the unevenness of energy geographies. They draw on distributive, recognition-based, and procedural theories of justice to focus attention on *where* energy resources are concentrated, *whose* needs are recognized in energy policy and discourses, and *how* democratic legitimacy for energy investments is secured (Bouzarovski and Simcock 2017, 641). Their foremost concern is the production of energy deprivation and energy poor households. For instance, they suggest that low carbon transitions funded by rate payers, as the Massachusetts contract with Hydro-Québec requires (see Silverstein and Autery, this issue; Vogel, this issue), exact a greater toll on low income households while benefitting them less (Bouzarovski and Simcock 2017, 641; citing Boardman 2010; Oppenheim 2016; Stockton and Campbell 2011). Bouzarovski and Simcock (2017, 640) are also attuned to the ways regional variations of household incomes and energy needs (i.e., based on climatic factors and infrastructure) produce "end use energy deprivation" that must be addressed through spatially just energy production, transmission, distribution and consumption.

The uneven burdens of low carbon energy production are a central focus of Yenneti et al. (2016) and Yenneti and Day (2015, 2016). Their research examines the spatial injustices of a large-scale solar project announced as a benign renewable energy investment that nonetheless enacts "the enclosure of commons and land acquisitions under the narrative of infrastructure development [that] alienate vulnerable communities from their sources of livelihood and increase their precarious status" (Yenneti and Day 2016, 97). Yenneti and Day (2015, 2016) variously analyze the large-scale solar project from procedural and distributive justice lenses. Taken together, this energy justice analysis identifies mechanisms of coercive state power, including misinformation and extralegal land acquisitions that dispossess inhabitants and displace livelihoods. Yenneti et al. (2016) argue these energy injustices foster long-term resentments, distrust, and delays around low carbon transitions.

Batel and Divine-Wright (2017, 2020) examine perceptions of large-scale low carbon energy infrastructure development, specifically transmission line siting, from an environmental justice perspective. Their focus group respondents relate grievances that constitute an instance of "carbon colonialism," whereby relatively wealthy regions fulfill binding carbon reduction targets by developing low carbon generation and transmission in distant, historically colonized regions, while maintaining their own high levels of energy consumption (Batel and Divine-Wright 2017, 5). Drawn from rural communities of southwest England and Wales that are impacted by transmission lines, these respondents "go beyond so-called Not in My Back Yard motives" (Batel and Divine-Wright 2017, 11) as they craft narratives of energy infrastructure injustices, interwoven with historical grievance, which can be understood, through an energy justice lens, as a struggle for recognition. Avila (2018) is similarly concerned with reframing NIMBY narratives of local opposition to low carbon energy development. Analyzing twenty cases of wind farms opposition from nearly every world region, Avila (2018, 613) emphasizes the justice claims that animate local resistance to uneven low carbon energy development, arguing: "Rather than framing opposing voices as selfish expressions blocking the cultural change needed to move towards renewables, the political value of these movements resides in their capacity to expand the possibilities of imagining alternative energy futures." Avila (2018, 600) finds wind farm opponents' alternative political imaginaries gathering around long-standing values of landscape and wildlife, as well as "the defense of territories, livelihoods and community-based development projects."

The energy justice literature's attentiveness to the uneven burdens of specific energy projects and the power of their critique to produce alternative, more just energy transitions resonates strongly with emerging research on resource populism (Bosworth 2018; MacArthur and Matthewman 2018). Bosworth (2018) is centrally concerned with the counter-expertise—or "minor science" (Secor and Linz 2017)—voiced by opponents to Keystone XL and Dakota Access Pipeline projects during environmental review proceedings. Rooted in a cross-class environmental populism, this counter-expertise serves to articulate a collective identity that, although "partial, fragmentary, and largely unsuccessful in constructing a durable political subject" (Bosworth 2018, 585), nonetheless "created the conditions of possibility for deeper resentment toward state and corporate forces as well as opening possibilities for more politically radical forms of pipeline opposition" (585). MacArthur and Matthewman (2018) likewise locates radical political potential in populist resistance to elite, corporate capture of energy transitions, while taking an additional step of identifying Maori collective ownership of specific low carbon energy enterprises alongside sweeping advocacy for more just and collective forms of energy transitions. MacArthur and Matthewman thereby pivot from the juridico-ethical concerns of energy justice and resource populism to an alternative economic framing aligned with commons perspectives. This paper also attends to the energy justice concerns of CMP Corridor opponents and proponents, for example expressed in their claims of uneven energy outcomes and decision-making practices, local/regional grievances, and the spatialities of energy justice. But it is also crucial to understand the CMP Corridor debate as a struggle over the future freed-up resources produced by the new transmission line, for which Lankford's "paracommons" concept is required (Lankford 2013, 2014).

The Paracommons

Lankford's concept of the paracommons responds to debates around efficiency and the "rebound effect" that are increasingly important in the context of sustainability transitions that are either planned or underway (Druckman et al. 2011; Saunders 2013; Lankford 2013, 2014; Gillingham et al. 2016). Perhaps the most popular narrative of energy efficiency posits that technological progress brings efficiency gains leading directly to reductions in resource usage thereby delivering widespread environmental and economic benefits. The counter-narrative associated with the rebound effect holds that any resource savings produced by efficiency gains are potentially undercut by changing behaviors as consumers respond to price signals and gains in personal income. The rebound effect says, in short, that efficiency gains do not produce proportional reductions in resource usage because consumers end up increasing their consumption as a result of those efficiency gains. Commonplace examples of a rebound effect include rising fuel economy leading to increased personal vehicle use (Hughes et al. 2008), energy saving appliances leading to increased household electricity usage, and energy efficient LED lighting technology leading to new lighting applications (Kyba et al. 2016).

The rebound effect has been a long-noted phenomenon, dating to William Stanley Jevons' (1865) observation that increasingly efficient steam locomotives led to greater aggregate coal consumption. Subsequent and ongoing debates in environmental economics have estimated the size and significance of rebound effects in various contexts, leading some to argue that the significance of rebound is overstated (Gillingham and Kotchen 2013). Nonetheless, analyses of rebound effects by economists and other analysts lead to policy interventions that pair taxes with efficiency improvements to offset the potential for rebound.

Lankford (2014) responds to the rebound effect by first recognizing that efficiencies do not guarantee socioecological gains, pro-environmental outcomes, or widely distributed savings. He cautions, "[W]ithout careful planning and forethought, the material gains arising from increased efficiency may not end up where we expect or intend. Under many circumstances, such material savings will not 'return to nature' and therefore, paradoxically, will not reduce natural resource consumption." (Lankford 2013, 14). In order to account for these unintended, squandered efficiency gains and promote careful planning, Lankford develops the concept of the paracommons, a discursive domain of debate and negotiation that governs the competition over future gains of sustainability transitions. In Lankford's terms, "A liminal paracommons contains a 'space' (or field of potential options) associated with socioecological systems undergoing efficiency changes" (2013, 14). Within this space, the freed up resources produced by efficiency gains (or "paragains") can be redirected to four parties or destinations: 1) the "proprietor system" responsible for making the efficiency gain; 2) immediately connected neighbors who seek to sustain benefits or raise productivity; 3) the socioecological system, or common pool, where gains are returned in the form of conservation and productivity; and/or, 4) the wider economy, including government, urban or industrial demands (see Figure 1). Identifying these four destinations in a negotiation over some prospective efficiency gain reveals the competing interests and outcomes gains may accrue.

The four distinct destinations within Lankford's paracommons bring clarity to the competition over efficiency gains, but his own empirical analyses also emphasize the complexity of tracking paragains through the four destinations within the paracommons: "Competition over resources takes place between these four parties, and many factors affect the destination of the resources as they cascade through the overall system, including not only changing practices and technologies, but also shifting perceptions about efficiency, waste and ownership" (Lankford 2013, 30). Perhaps the most important aspect of the 'para' prefix is that, in Lankford's words, it "signals uncertainty about the salvageability of the gain and its eventual size, location, timing and destination/ownership" (2013, 14). Thus, the paracommons framework can clarify but not resolve the terms of the negotiations in a controversy like the CMP Corridor. In other words, the climate benefits claimed by Corridor proponents of providing Massachusetts residents with hydropower would count as paragains for the sociological system *for those proponents*, but Corridor opponents will continue to contest these climate benefits, with their own contrary accounting of paragains emphasizing uncertainty surrounding Hydro-Québec's hydropower capacity, the loss of sequestration, the Corridor's negative impacts on regional renewable projects and other arguments that challenge the paragains that accrue to that destination.

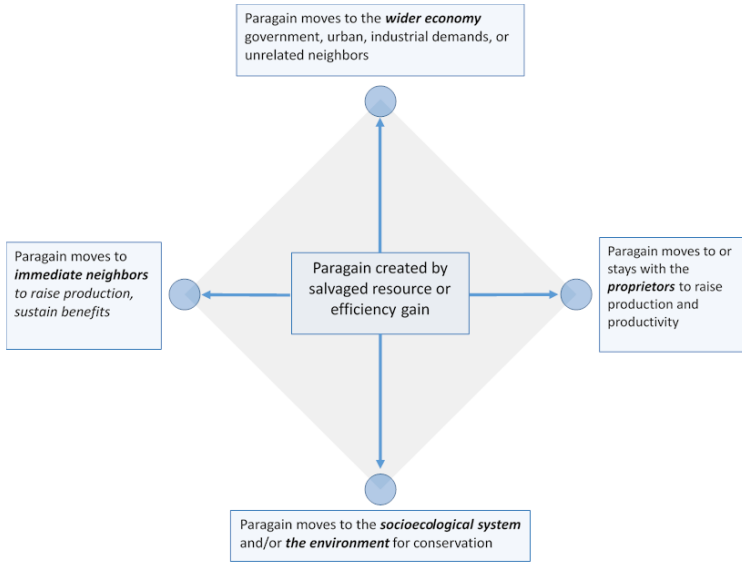

Figure 1. Diagram of the four destinations competing over paragains within a paracommons, based on Lankford (2014)

The Paracommons of the CMP Corridor

Lankford's concept of the paracommons enables the debates over the CMP Corridor to be understood as a complex but clearly demarcated struggle over future gains and harms presented by the powerline project. The *para*commons of the CMP Corridor is tied to material space of the Corridor itself, which can be understood as a more traditional terrestrial commons, i.e., *the de facto* commons of the Maine Woods, where multiple interests have claimed the informal access/use rights, in spite of private ownership (see, for example, Acheson and Acheson 2009). But the paracommons of the CMP Corridor exists in the future, as a site of struggle, based on CMP and Hydro-Québec promised efficiency gains as well as the wider array of proponents' and opponents' redrawing of paragains (and para*harms*) in relation to their respective destinations. In simplest terms, for Corridor proponents the paragains of the CMP Corridor may accrue to: 1) the Proprietor System, benefitting the producer (i.e., Hydro-Québec) and the distributor (i.e., CMP/Iberdrola) in the form of revenues, as well as the customers (i.e., Massachusetts ratepayers) in the form of lower electricity costs; 2) the Neighbors, in the form of mitigation payments, recreational uses of the corridor, and property tax revenues; 3) the Wider Economy, in the form of lower electricity rates, thereby spurring development and productivity increases, and lastly, 4) the Socioecological System in the form of a reduction in carbon emissions and air pollution due to avoided fossil fuel consumption. Meanwhile Corridor opponents may emphasize: 1) the paragains accruing to Québec, Massachusetts and Spanish-owned CMP, at the expense of Maine residents; 2) the harms that Neighbors incur as a consequence of foregone recreational activity, loss of livelihoods and scenic amenities; 3) the drain on the Wider Economy due to diminished tourism activity; 4) the damage to the Socioecological System resulting from herbicide spraying within the corridor in close proximity to sensitive fish habitat. This summary traces the broad contours of the CMP Corridor paracommons, but applying these four paragains destinations to the actual testimony of Corridor opponents and proponents can help identify both 1) the aggregate frequencies of paracommons destinations and 2) the more nuanced ways participants in the Corridor debate struggle over its potential gains and harms.

Methods

In order to apply the insights of the paracommons to the CMP Corridor debate I first coded 113 testimonies delivered over the course of approximately six hours of public hearings before the Maine Land Use Planning Commission (LUPC) and Maine Department of Environmental Protection (DEP) on 2 April and 4 April 2019, which I attended. There were 71 Corridor opponents and 32 Corridor proponents who participated in the hearings, held at the University of Maine at Farmington campus (10 participants provided testimony during both public hearings, so there are more testimonies than the number of participants). The LUPC and DEP invited written statements as well, but that testimony was not considered for this analysis. The transcribed verbal testimonies that I analyze below amount to over 48,000 words.

Many opponents (46 of 71, 65 percent) identified themselves as seasonal or year-round residents of transmission line communities or their immediate neighboring communities.

Others claimed livelihoods tied to recreation-based tourism. Several opponents represented organizations like Sierra Club, Say No to NECEC, Trout Unlimited, and regional watershed associations. A smaller proportion of proponents identified themselves as residents of transmission line communities (9 of 32, 28 percent). Proponents more frequently claimed livelihoods tied to construction and the forest products industry. Several proponents spoke on behalf of organizations like Maine Audubon, a chamber of commerce, and the Association of General Contractors. Approximately 40 percent of the opponents presented or identified as female, while 19 percent of the proponents presented or identified as female.

We can expect that numerous interested and important voices were not included in the formal political spaces of the LURC and DEP public hearings. Geographers and others have shown that political participation in environmental governance is subject to social exclusions, whether working from perspectives of feminist political geography (Cope 2004; Fincher 2004; Staeheli 2010), political science (Fischer 2000; Bryan 2003; Adams 2004; Rountree and Baldwin 2018) or political ecology (Sultana 2011; Camargo and Ojeda 2017; Nightingale 2018). In this case, these exclusions, whether identity- or class-based, would be interwoven with the challenges the LURC and DEP hearings posed in terms of travel and time commitments, access to information, and the unevenness of political participation. Thus, an examination of these transcripts is an inevitably partial exploration of the range of positions that opponents and proponents might take.

The goal of coding the public hearing transcripts is a content analysis that identifies the frequency and diversity of opponents' and proponents' references to paracommons destinations. These differences and similarities between opponents' and proponents' aggregate references then guides a closer examination of exemplary testimonies. This coding approach performs a first-level coding aimed at identifying the manifest meanings of the testimonies (Krippendorff 2004; Neuendorf and Kumar 2016) and thus does not pursue successive levels of coding and theme building to disclose the testimonies' latent meanings (cf. Cope 2010).

Using nVivo I performed subsentence, first-level coding of all word forms that could be aligned with one of Lankford's paragains "destinations" (i.e., the Proprietors, Neighbors, the Wider Economy, and the Socioecological System) and occurred with greater than 0.05 percent frequency. After reviewing the coded references in context I determined that references to the four paracommons destinations accounted for 12 percent (opponents) and 14 percent (proponents) of the testimony. In other words, I was able to code 4,034 words as belonging to paracommons destinations out of 34,345 total words of opponents' testimony. And, for proponents, I was able to code 1,864 words of 13,670 words of testimony. To account for the different word counts in opponents' and proponents' testimonies I report counts of paracommons references alongside their relative frequency as a percentage of all coded references. The resulting table in Table 1 shows the frequency of references to each destination in the CMP Corridor paracommons for opponents and Table 2 shows the frequency of paracommons references for proponents. In the analysis below, I compare opponents' and proponents' aggregate frequencies for each paracommons destination and use the patterns they reveal to highlight key testimonies that exhibit the spatial politics of the Corridor debate."

NECEC Opposition Testimony References	Frequency
Socioecological System	1675 / **42%**
Threats: Impacts, Herbicides, Destroy, Damage, Loss, Losing, Lost, Ruin, Crossings, Fragmentation, Harm, Risk, Cut, Fires, Spray, Scar, Permanent, Clearcut, Pollution, Chemicals, Threats	404 / **10%**
Environment: Environment, Nature, Habitat, Wild, Wilderness, Ecosystem, Earth	211 / **5%**
Waters: Waters, River, Pond, Lake, Streams, Wetlands, Spring, Waterways	185 / **5%**
Forests: Forests, Woods, Trees, Vegetation	168 / **4%**
Wildlife and fish: Wildlife, Fish, Trout, Animals, Bats, Species, Deer, Moose, Birds	162 / **4%**
Pro-environmental actions: Protect, Mitigate, Reduce, Renewable, Sustainable, Sequester, Sequestration, Preserve, Reduction, Save, Buffer, Conservation	154 / **4%**
Lands: Land, Mountains, Landscape, Valley	127 / **3%**
Climate: Climate, Carbon Emissions, Greenhouse, Global warming	113 / **3%**
Environmental qualities: Pristine, Health, Unique, Endangered, Threatened, Precious	68 / **2%**
Named common pool features: Kennebec, Moxie, Enchanted	28 / **1%**
Air: Air, Oxygen	27 / **1%**
Fossil fuels: Natural gas, Fossil fuels	27 / **1%**
Wider Economy	934 / **23%**
Energy: Power, Transmission, Energy, Electricity, Turbines, Windmills, Solar, Dams, Grid, Supply, Generation, Hydropower	362 / **9%**
Wider geographies: State, Statewide, Mainers, American, Nation, Country	167 / **4%**
Tourism: Scenic, Visual, Views, Travel, Tourism, Visit, Brand, Tourists	111 / **3%**
Development: Industry, Resources, Development, Production	94 / **2%**
Jobs: Work, Jobs	69 / **2%**
The economy: Economic, Economy, Opportunity, Markets, Export, Efficiency	65 / **2%**
Rates: Cost, Value, Price, Customer	43 / **1%**
Named wider places: New Hampshire, Portland	22 / **1%**
Proprietor	800 / **20%**
The corridor: Project, Corridor, NECEC, Hydropower, Towers, Poles	345 / **9%**
Proprietors: CMP, Hydro-Québec, Company, Business, Corporation, Utility, Shareholders	222 / **6%**
Named proprietor places: Québec, Massachusetts, New England, Canada, Canadian, Spain	132 / **3%**
Proprietor profit: Money, Compensation, Profit, Interests, Pay, Funds, Dollars	100 / **2%**
Neighbors	625 / **15%**
Land uses: Trails, Hiking, Hikers, Guide, Recreation, Logging, Snowmobile, Hunters, Hunt	138 / **3%**
Neighbors' places: Lot, Home, Camp, Property, House	117 / **3%**
Stakeholder groups: Public, Residents, Future generations, Owners, Tribes, Citizens	94 / **2%**
Community: Place, Local, Communities, Region	83 / **2%**
Named neighboring places: Jackman, Farmington, The Forks, Lewiston, Wilton, Franklin, Caratunk	73 / **2%**
Family: Children, Family, Grandchildren, Father, Grandfather	58 / **1%**
Jurisdictions: Town, Township, County	40 / **1%**
Qualities of neighboring places: Remote, Paradise	21 / **1%**

Table 1. Frequencies of CMP Corridor opponents' paracommons references.

NECEC Support Testimony References	Frequency
Wider Economy	630 / **34%**
Energy: Energy, Power, Electricity, Transmission, Megawatts, Grid, Solar, Hydropower, Generation, Nuclear, Capacity, Reliability, Supply	278 / **15%**
Development: Industry, Resources, Development, Production, Timber, Forestry, Construction, Infrastructure, Investment, Contractors	87 / **5%**
Jobs: Working, Workers, Jobs, Employment	63 / **3%**
Wider geographies: State, World, Mainer, Nation, Country	55 / **3%**
Rates: Costs, Rates, Rate payers, Customers, Consumers, Price, Demand	55 / **3%**
The economy: Economic, Economy, Opportunity, Efficiency, Markets	40 / **2%**
Tourism: Visual, Views, Visible, Scenic, Visit, Tourism	26 / **1%**
Named wider places: Pownal, Waterville, Baxter, the Coast, Cumberland	25 / **1%**
Socioecological System	587 / **31%**
Threats: Impacts, Fragmentation, Damage, Footprint, Cut, Clearcut, Crossings, Storms, Risk	92 / **5%**
Forests: Forest, Woods, Plants, Trees, Vegetation	80 / **4%**
Environment: Environment, Nature, Habitat, Wilderness, Wild, Earth, Ecology	75 / **4%**
Climate: Climate, Carbon, Greenhouse, Emissions, Global warming	73 / **4%**
Fish and wildlife: Wildlife, Animals, Fish, Trout, Critters, Deer, Birds, Species, Fisheries, Osprey	60 / **3%**
Lands: Land, Landscape, Mountains	44 / **2%**
Pro-environmental actions: Reduce, Mitigate, Renewable, Buffer, Preserve, Conservation, Green, Reductions, Sustainability	44 / **2%**
Waters: Water, Streams, Pond, Rivers, Lake, Wetlands	43 / **2%**
Fossil fuels: Fossil fuels, Natural gas, Oil, Coal	42 / **2%**
Environmental qualities: Pristine, Sensitive, Threatened	17 / **1%**
Named common pool features: Kennebec, Beattie, Gorge	10 / **1%**
Air: Atmosphere, Air	7 / **.4%**
Proprietor	349 / **19%**
The corridor: Project, Corridor, NECEC, Towers	183 / **10%**
Proprietors: CMP, Hydro-Québec, Company, Business, Commercial, Utility	77 / **4%**
Named proprietor places: New England, Québec, Canada, Canadian, Massachusetts, Connecticut	56 / **3%**
Proprietor profit: Pay, Compensation, Dollars, Funds, Funding, Money, Interests, Financial	32 / **2%**
Neighbors	298 / **16%**
Land uses: Snowmobiling, Recreational, Trails, Fishing, Logging, Hiking, Farm, Rafting, Hunting, Hiker, Guide, Canoe, Fisherman	83 / **4%**
Jurisdictions: Town, County, Township, Municipalities, Selectman	46 / **2%**
Community: Communities, Local, Place, Region	41 / **2%**
Named neighboring places: Lewiston, Farmington, Somerset, The Forks, Jackman, Starks, Franklin, Chesterville, Coburn	37 / **2%**
Stakeholder groups: Public, Residents, Citizens, Neighbor	31 / **2%**
Neighbors' places: Lot, Property, Home	26 / **1%**
Family: Children, Family, Grandchildren, Son, Daughter, Parent	21 / **1%**
Benefits to neighbors: Tax, Income	13 / **1%**

Table 2. Frequencies of CMP Corridor proponents' paracommons references.

The Paracommons of the CMP Corridor I: Proprietors and Neighbors

Calculating the frequency of terms identified with each paracommons destination provides an indication of the importance of each of the four destinations in opponents' and proponents' testimonies. For instance, the aggregate frequencies of references to the Proprietors and Neighbors were notably similar between Corridor opponents (20 percent for Proprietors, 15 percent for Neighbors) and proponents (19 percent for Proprietors, 16 percent for Neighbors). But the prevailing sentiment and breakdown within these destinations were different. For instance, opponents named Massachusetts (i.e., part of the Proprietors system) 46 times, compared to proponents mentioning Massachusetts 4 times. Moreover, opponents refer to the Commonwealth in a disparaging way, in some cases calling out the rebound effect to undercut Proprietors' claims on paragains:

- "The clear beneficiaries are CMP and its *owners*, their *shareholders* and Commonwealth of *Massachusetts*"
- "While the vast majority of benefits go to *Québec*, *Spain* and *Massachusetts*, Maine is left with a division between the residents of this state and its government and agencies bigger than any corridor will be"
- "I wonder if we are now experiencing something of the colonization imposed on habitats of the Abenaki from *Massachusetts* and international corporations from 200, 300 years ago"
- "We don't need to leave [future generations] a legacy providing more electricity to *Massachusetts* so they can enjoy air-conditioning"
- "Does it even make sense to destroy our Maine woods to satisfy *Massachusetts* need for electricity and their need to feel like they're going green and the *corporate greed* of two *foreign owned companies* who stand to make billions over the long run if this process goes through?"
- "I can't see making the *Spanish* any richer; they're already rich enough. I can't see making the stockholders of *CMP* any richer; they're already rich enough. And I can't see us supplying power to *Massachusetts* and making the people in *Québec* a little richer" (italics added to identify Proprietor references)

In these testimonies, Corridor opponents contest the Proprietors' claim on paragains by drawing on deep-seated grievances and anticorporatist language conveying their perception of injustice. Their criticisms betray a sense of rebound effect in their calling out the frivolous electricity uses (e.g., air conditioning, greenwash), and complicated spatial politics of the New England region (e.g., "destroying our...woods," sowing "division," histories of dispossession and "colonization").

Proponents, on the other hand, credit Massachusetts with funding the project, strengthening its claim on the Corridor paragains:

- "In addition to the project being paid for by *Massachusetts*, it's a huge economic influence on Maine and the Maine counties that will be going through the corridor"

- "Clean Energy Connect will deliver one billion dollars in jobs, taxes and other benefits in Maine, not *Massachusetts*"
- "This project is a good deal for Maine. *Massachusetts* rate payers will pay a billion dollars to bring existing clean hydroelectric power from *Canada* into New England"

Corridor opponents made 82 references to Québec, Hydro-Québec and Canada—sometimes co-mingled with Massachusetts references quoted above—enough to equal 2 percent of all coded paracommons references, about three times more frequently than Corridor proponents' 14 references to Québec, Hydro-Québec and Canada (i.e., .07 percent of coded references). The opponents, references to Québec were less freighted with grievance than Massachusetts references, but still likely to contest its claims on paragains, in some cases calling out Hydro-Québec's history of mistreating First Nations' lands and people:

- "I've been to where *Hydro-Québec* does all their clean energy and seen what it did to the native tribes in that area and it's disgraceful"
- "Meanwhile how does Maine benefit from this project? How do our children and grandchildren benefit? The benefits will only accrue to the shareholders of *CMP* and *Hydro-Québec*"
- "We're all in the same biosphere here, *Québec* and Maine, and if we go ahead with this project, I think that, you know, people in Maine will be complicit in the destruction of more habitat in *Québec* and then will be responsible for creating more demand to build more dams"
- "*Hydro-Québec* can shift power from existing markets in Ontario, *Québec* and other parts of *Canada* as well as New York and New England to feed *Massachusetts*. Those markets will then be forced to compensate with fossil fuels"
- "*Hydro-Québec* is a *Canadian* province company. If they want to make money off Maine, if they want to make money off New England, let them pay more money than what they're already offering, you know"

Corridor proponents' fourteen references to Québec, Hydro-Québec and Canada generally serve to substantiate the state-owned enterprise's (and province's) claim to paragains:

- "It will replace a huge amount of electricity from dirty fossil fuels with inexpensive renewable hydropower from *Canada*. In 2018 Hydro-*Québec* spilled more than enough water to generate *NECEC's* 1,200 megawatts"
- "*CMP* is constantly accused of lying and Hydro-*Québec*, which is the biggest source of clean energy in eastern North America, is accused of green washing. Meanwhile is anyone demonizing the *owners* of the fossil fuel plant, and by the way, the biomass plants, how many trees are they cutting? Those are the biggest funders of the opposition"
- "We know that one-third of New England's generated capacity will retire over the next decade and that capacity needs to be replaced. There is clean hydroelectric power in *Canada* for the taking"

While opponents see Proprietors hoarding gains, these proponents see Hydro-Québec and Canada as the unproblematic source of "clean" energy, which is "for the taking," and favorably compare Hydro-Québec to "dirty" fossil fuels producers who fund astroturf campaigns opposing the Corridor.

While both opponents and proponents reference Neighbors with similar frequency, their respective references are differently distributed. With 117 references (3 percent of all coded references) to a lot, home, camp, property, or house, the opponents were three times more likely to uses a *neighboring place* to support the Neighbors' claims on paragains compared to proponents who invoked these places twenty-six times (1 percent of coded references). When opponents reference these places, it often substantiates the harms they feel are disproportionately borne by Neighbors (and the Socioecological System), placing themselves and their claims within the landscape: "I own a sporting *camp* and campground which abuts the corridor along *Moxie Pond*. I'm opposed to the project for its impact on the scenic viewshed and its impact on a working forest, our pristine wilderness that has a working forest in it." But it may be worth emphasizing that references to Neighbors among opponents were the *least* frequent of the four paracommons destinations, notwithstanding the tendency to characterize Corridor opposition as a NIMBY phenomenon.

Proponents' references to Neighbors' places highlight the Corridor's benefits to Neighbors, epitomized by the business leader from coastal Maine who testified: "This project will boost jobs in the *region* by supporting employment for an average of 1,700 people per year over a six year period. Beyond that it will add to the permanent *local tax base* of the host *communities* and help to expand broadband in an area of the state that really needs it desperately and help fund essential economic development initiatives." The proponents argue that Neighbors' share of paragains is adequately factored into local taxation and mitigation packages, emphasizing benefits in economic terms, bridging paragains claims to the Wider Economy.

The Paracommons of the CMP Corridor II: The Socioecological System and Wider Economy

The largest difference between aggregate frequencies are between references to the Socioecological System, with 42 percent for opponents, compared to 31 percent for proponents, and a roughly complementary difference in references to the Wider Economy, which accounted for 23 percent of opponents, paracommons references and 34 percent of proponents paracommons references. In simple terms, this indicated that Corridor opponents' testimonies were more focused on the environment, environmental qualities and environmental features, like wildlife and water bodies, as well as threats and pro-environmental actions. On the other hand, proponents' testimonies were more focused on the Wider Economy, including gains in terms of electricity supply, the grid, reliability, rates and ratepayers, as well as broader concepts of development, production, efficiency, markets, and so on (see Table 2). This divergence in proponents' and opponents' public testimonies is worth detailing, especially because the CMP Corridor announces itself in pro-environmental language and emerges from Massachusetts' progressive climate policies.

Aside from opponents' greater aggregate frequency for Socioecological System references, their testimony was much more likely to reference threats (+100 percent), waters (+150 percent), pro-environmental actions (+100 percent), and environmental qualities (+100 percent), especially qualities that conveyed fragility (e.g., pristine, unique, endangered, etc.). Corridor proponents more frequently referenced climate (+25 percent) and fossil fuels (+100 percent), but it is worth noting that a significant portion of opponents' testimony (113 references, or 3 percent of total) explicitly referenced climate, in addition to climate-linked references to sequestration, renewable energy, and other pro-environmental concepts. In other words, the Corridor opponents' testimonies engaged with climate change and showed concern for climate change impacts as part of their more frequent and diverse references to the sociological system.

Opponents referenced twenty-one distinct environmental threats (i.e., with a frequency above the .05 percent threshold), whereas proponents referenced nine threats. Their assessment of threats to the Socioecological System were often grounded in specific charismatic species impacts

- [Y]ou cannot underestimate the impact on *wildlife*, be it *habitat fragmentation*, the loss of shade for cooling *waters* or the widespread use of *herbicides*—are all detrimental. I concern myself most with the *impact* on *brook trout*, a very *sensitive species* that is on its last leg in the eastern U.S., here in Maine, particularly in that region north. When the *species* is gone, it will be tragic.... [A]s far as mitigation is concerned, in my opinion no amount of today's dollars for alternative *habitat* tradeoff should be considered to compensate for this corridor....It is extremely shortsighted to sell our future for foreign profits and pennies per month to Mainers. In 100 years do we think our future generations will thank us for development or for *saving a unique* place...?

For this opponent, the specific impact of brook trout extirpation is explicitly linked to Proprietors' ("foreign profits") and Wider Economy's ("pennies per month to Mainers") appropriations of paragains.

Proponents also often conveyed urgency but with much less specificity about the threats to the Socioecological System or how the paragains of the CMP Corridor would accrue there:

- "We need the *clean* energy future. To suggest that the 'status quo is okay' is... sticking one's head in the sand. The long-term *viability* of the *planet* depends on a *carbon*-free future. If steps are not taken now to reduce *carbon emissions*, the *visual impacts* of power lines and potential *habitat fragmentation* will be the least of our worries. There will be wholesale negative changes in our *climate* and the *ecology* of our *planet*."
- "We all see daily reminders of the widespread *catastrophic* effects of *climate change* and *global warming*. The United Nations issued an urgent call to action in its 2018 special report. The secretary general of the UN said this report by the world's leading scientists is an ear splitting wake-up call to the world. It

> confirms that *climate change* is running faster than we are and we are running out of time. We are running out of time."

Proponents invoked global actors, like the United Nations, and the global scale, while using suitably strong language ("long-term viability," "catastrophic," "wholesale negative") for the urgency of climate crisis, but these testimonies were not in general anchored in the regional sociological system.

Corridor opponents testified to their concerns for the Wider Economy in 23 percent of the coded testimonies. Compared to proponents, these testimonies showed less concern for development (-60 percent), energy and energy infrastructure (-40 percent), and much more concern for tourism (+300 percent), including the regional recreation-based tourism industries tied to whitewater rafting and angling, which they saw as threatened by scenic and ecological impacts. For example, one opponent argued: "The *State* of *Maine* economically gets $3.5 billion a year from *tourists*. That number equates to 52,000 *jobs*. That number is dependent upon the pristine areas that people come to *visit* and see that they don't have in their own backyard." This opponent among others argued that the Corridor presents para*harms*, or degrades, the Wider Economy.

Corridor proponents engaged more frequently in testimony that emphasized the gains that accrue to the Wider Economy in general, with more diverse language centering on development and industrial capacity and more frequent (+300 percent) and diverse references to rates and rate-payers. A proponent representing a business association provided testimony particularly dense with paragains claims for the Wider Economy:

> NECEC...will lower *electricity supply prices* and even...out *energy price* spikes and uncertainty, which is never good for *business*. This project will result in millions of dollars of *rate relief* every year for *Maine ratepayers*. It will also provide increased *reliability* for *Maine* and the *ISO New England* region by delivering base load *energy* to replace retiring resources such as nuclear power set to close later this summer. There is real value in this *infrastructure*, which *Maine* will host and yet not pay to construct. It is also extremely important to ensure we have *reliable electricity* for the future.

While not every proponents' references to the Wider Economy contained the same specific and detailed claims for the Wider Economy's paragains, proponents in general showed a more sustained and sophisticated engagement with the Wider Economy destination.

Conclusion

By using Lankford's paracommons framework to code and then explicate the testimony of CMP Corridor opponents and proponents, the foregoing analysis clarifies the spatial politics of the controversy, while offering insights into the spatial politics of sustainability transitions more broadly. The quantitative content analysis of the frequency of terms associated with

paracommons destinations accounts for the range of perspectives of both constituencies, while also directing attention to key overlapping concerns and differences in Corridor opponents' and proponents' testimonies. Expounding on illustrative or representative testimonies reveals the wider critique of both Corridor proponents and opponents.

Opponents contest the Proprietors' claims (i.e., Massachusetts, Québec, and Spain) on future gains on the basis of deep grievances, greed, and anti-corporatist politics. Nearly half of opponents' coded references to paracommons destinations are associated with the Socioecological System, indicating both their concern for the threats posed by the Corridor, as well as their recognition of problem of the rebound effect. These references to the Sociological System are diverse, grounded in impacts on specific regional species and ecosystem dynamics, and show a significant concern for climate change and climate mitigation. Corridor opponents' references to Neighbors are rooted in place, but it is the least frequent paracommons destination opponents cite, complicating narratives that reduce their opposition to NIMBY politics.

Proponents, on the other hand, most frequently and favorably reference the Wider Economy in their testimonies, emphasizing widespread benefits to industry and economic productivity from grid investments and lower electricity costs. This language supports paragains accruing across Maine and the New England region. Proponents are more likely to approvingly cite benefits to the Neighbors, via taxation and mitigation, but their Neighbor references, while less place-based, do share a concern for land uses, family, and named locations. When proponents reference the Sociological System, they use a more narrow set of terms to frame environmental threats or pro-environmental actions—both of which are much less frequent—even as they advocate for the Corridor as a response to our urgent planetary climate crisis.

Lankford's paracommons framework helps appreciate that Corridor opponents and proponents are participating in current and ongoing negotiations over future, freed up gains of sustainability transitions—both the CMP Corridor, the Maine-based renewable energy projects it threatens, and alternative visions. There is considerable overlap in both constituencies' concerns for the Socioecological System, though differently expressed, and similar frequencies for Neighbors and Proprietors, with decidedly different sentiments. Much of the complexity of these diverging positions on the Corridor is directly rooted in the spatial politics competing perspectives bring to the controversy, whether rooted in regional grievances, local versus global, place-specificity versus planetary.

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Endnotes

[1] "Astroturf" describes deceptive practices of mobilizing citizens campaigns for or against controversial initiatives and practices. Astroturf campaigns gain legitimacy by hiding their corporate funders in order to appear as spontaneous mobilizations of grassroots citizens groups (Saint et al. 2009).

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DAMMING THE UNAMEN SHIPU ROMAINE RIVER:
Contemporary Transformations of Territorialities Among the Innu of Ekuanitshit

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ABSTRACT

Since 2009, Innu members of the community of Ekuanitshit have faced a major hydroelectric project on the Romaine River, an Unamen Shipu in innu-aimun language, integral part of the Nitassinan, their ancestral territory. In this paper, we study the project's impacts on the material and ideational relationship the Innu have with the river. We explore the idea that the project transforms the traditional relationship to territory into a more pragmatic one, marked by economic and political interests. Our analysis reveals that the Innu's territorialities, though partly transformed by increased contact—and sometimes conflict—with hegemonic non-indigenous society, remain anchored in a strong cultural heritage and a deep identification with territory. We argue that these seemingly differentiated conceptualizations, of traditions on the one hand and development on the other, are not incompatible. These conceptualizations comprise dynamic cultural, social, and political territorialities which are thus internal and external, ancestral and contemporary.

Key words: Indigenous territorialities, Innus, Resource development, Unamen Shipu Romaine River, Ekuanitshit, Nitassinan, Côte-Nord, Québec

Introduction

Major water, mining and forestry resource development projects in Northern Québec are disrupting indigenous territorialities (Asselin 2011; Desbiens and Rivard 2012). The Romaine hydroelectric mega-complex in the Côte-Nord region, which Hydro-Québec started in 2009, is no exception. The construction of four dams, power plants and reservoirs, at an estimated cost of CAN$6.5 billion, is causing a great deal of economic, environmental and social upheaval at the local, regional and provincial levels (Guimond and Desmeules 2019; Vincent 2008). Bordering the river, the Innu community of Ekuanitshit, consisting of approximately 600 members, is particularly affected.

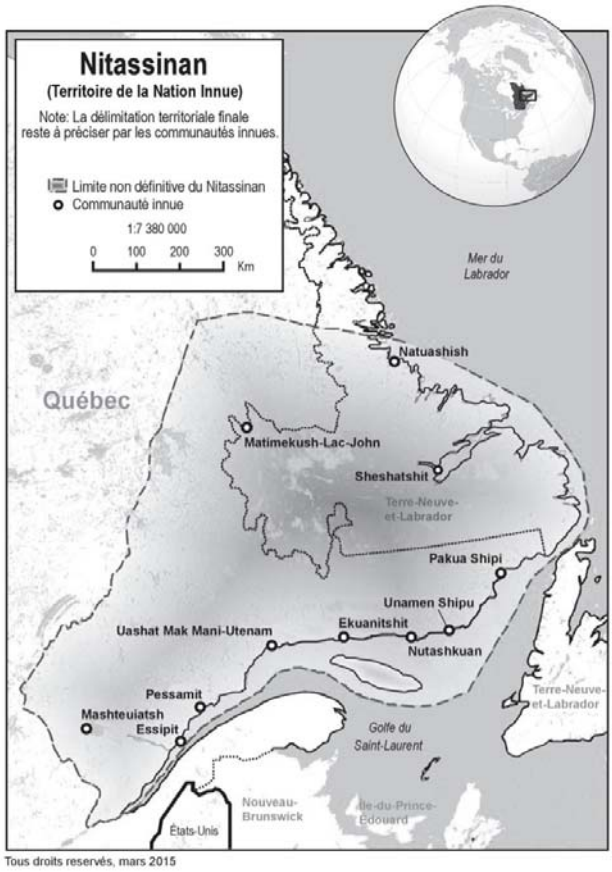
The impact study carried out on the Romaine project anticipated fairly positive benefits for the Innu communities of the region, including job creation, increased employability of Innu workers, business opportunities and an increase in income (*BAPE* 2009). The flooding of part of the territory and the addition of new access to it, as well as the changes in conditions for fishing, hunting, trapping and gathering, flowed more directly from the radical transformation of the environment. However, this study did not address precisely how the Innu experienced these transformations. Similarly, the environmental follow-up studies were limited to the measurable impacts on the use of the Romaine River by the Innu, and to an assessment of the mitigation measures in place (*Hydro-Québec* 2015). By limiting the impacts to their material dimension, these studies did not fully grasp their identity, cultural and socio-political significance, even though these aspects were strongly affected by the project.

Based on a cross reading of accounts provided by members of the Ekuanitshit community, Innu and non-Innu workers on the construction site and key regional players, the present article analyses the impact of the transformations on the territorialities of the Innu of Ekuanitshit. We examine the Innu relationship with the Romaine River in three parts: the river as it was experienced and represented prior to the major northern worksite; the context of the preliminary project negotiations, the arrival of the construction project and its impacts; and the participants' visions for the future in terms of post-Romaine and territorial development. To this end, we go back and forth between two scales of analysis: first, the river as an integral part of the Nitassinan at the material and symbolic levels, as experienced by the Innu; and second, the actual construction site and worker camps (Map 1, Map 2).

Multidimensional Territorialities

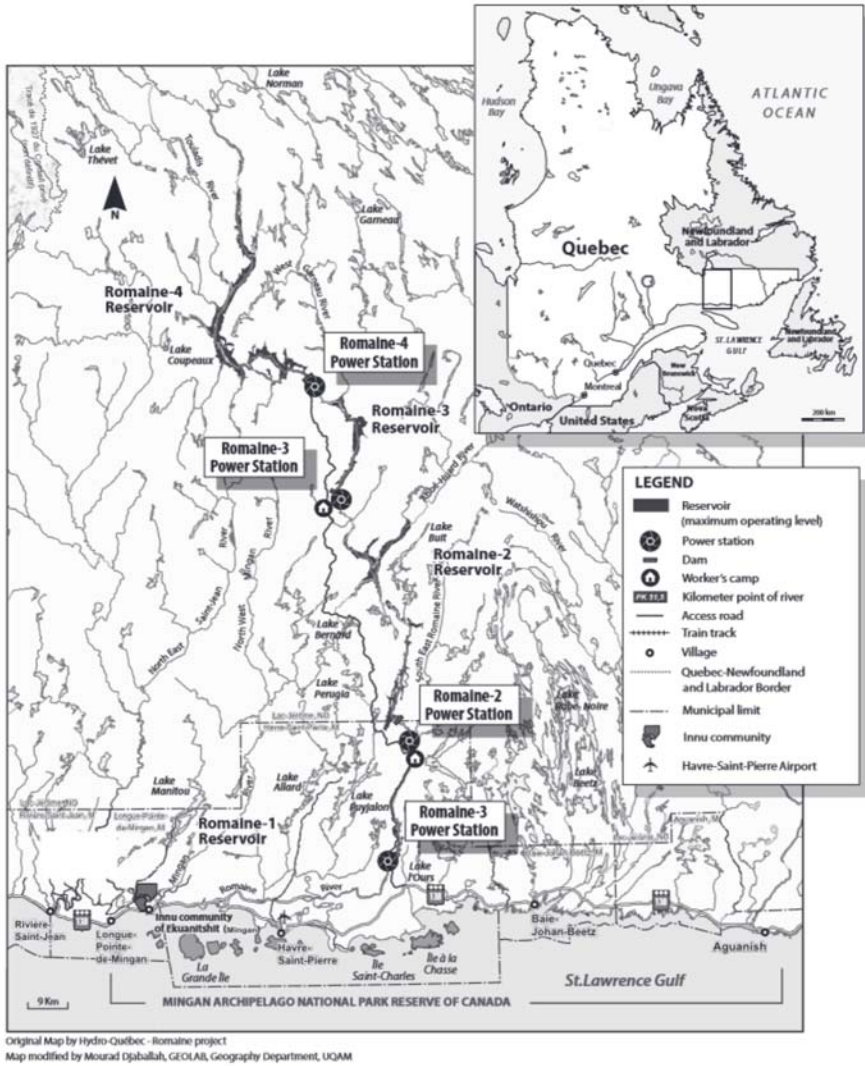
It is through territoriality that we explore the Innu relationship with the changing Unamen Shipu Romaine River. For this, we drew inspiration from the contrasting perspectives of Sack (1983) and Raffestin (1986; 1987), and we achieved this by employing a complementary approach, as do other researchers (Klauser 2012; Murphy 2012). Sack (1983, 1-2) defines territoriality as a desired, conscious strategy of spatial control: to affect, influence or control resources and people, by controlling area. Raffestin (1987, 5) is more interested in processes than in finality and, for this purpose, in the relations determining territoriality, which he defines as a set of relations maintained by man, insofar as he belongs to a society, with exteriority and alterity, with the help of mediators and instruments. In this way, we examine both the multiple relations that shape the territorialities of the Innu, as well as the desired purposes of control of, access to and governance of the Nitassinan.

Raffestin (1986) also raises the question of the multidimensionality of territorial experience, an idea that provides us with a gateway to introducing the dimensions explored in the present research. For this purpose, we retain the tripartite conceptualization of territoriality – cultural, social and political – proposed by Bédard (2017, 25): Territoriality works simultaneously in three complementary and interdependent registers of appropriation of and identification with the territory" The detailed results reveal these dimensions and their inseparable links. For now, let us just introduce how they are relevant to our analysis.



Map 1: Nitassinan, Innu Nation
Source: Map modified by Mourad Djaballah, GÉOLAB, Geography department, UQAM.
Original map by Nation innue [http://nationinnue.com].

From the outset, we raise the question of the cultural dimension of territoriality, given our interest in the transformation of Innu identity as it relates to the construction site. Bonnemaison (1981) and Di Méo (2002; 2004) place emphasis on the essential role played by relationships to the territory, as the geographical basis for the formation of identity. Territoriality reveals the way in which each individual forges their relationship to a territory via practices, identifications and representations (Di Méo 2006). Other researchers situate identity in the magic triangle of culture-territory-identity (Debarbieux 2006). Substantial resources – both material and ideal – drawn from the territory, and particularly symbolic via objects, things, landscapes and places, construct and consolidate identity (Gagnon 2013, 20). These assertions are especially fruitful in the study of indigenous territorialities, because the individual and collective identity of indigenous people has always been largely dependent on an organic link with the ancestral land (Leclair and Otis 2007, 14). However, we should not forget that many geographers go beyond the idea of a strictly internalized identity-related relationship with the territory by stressing that this relationship also stems from external influences: It is therefore not incongruous that territoriality, whether indigenous or non-indigenous, is bound to change over time as social changes multiply in a given territory (Desbiens and Rivard 2012, 562).



Original Map by Hydro-Québec - Romaine project
Map modified by Mourad Djaballah, GEOLAB, Geography Department, UQAM

Map 2: Primary infrastructure of the Romaine River hydroelectric project.
Source: Map modified by Mourad Djaballah, GÉOLAB, Geography department, UQAM.
Original map by Hydro-Québec – Romaine project, reproduced with authorization.

Methodology: Meeting the Innu of Ekuanitshit

Prioritizing oral histories and indigenous narratives (Maltais-Landry 2015; Vincent 2013), our privileged sources of information were qualitative interviews conducted with members of the Ekuanitshit community. In total, 18 interviews were conducted with 14 Innu from the community and four non-Indigenous who occupied special positions there, which gave them an intimate understanding of the issues related to the arrival of the Romaine project. Participants consisted of 10 women and 8 men between the ages of 25 and 67. The majority of them were between the ages of 35 and 55 (13/18).

The interviews focused on the material and ideational relationships to the territory of the Romaine River. More specifically, the participants were questioned about the activities practised there, their representations, the transformations underway, their relations with the non-indigenous people with regard to the project and the region, as well as their visions of the future in terms of post-Romaine and territorial governance. In addition to these interviews, some forty other complementary interviews were conducted, as part of a broader research project, with local, regional and extra-regional workers and former workers at the construction site, both Innu and non-Innu, in addition to key Minganois players. Alphanumeric codes, used throughout the article, were assigned to participants to ensure their anonymity (e.g. WKA11 is the code for woman, key actor).

The interviews were recorded, transcribed, coded and then analyzed using NVivo11 qualitative data processing software. The trends identified are expressed following the evolution of the river's transformation – that is, before, during and after the project – given that our interest in each of these three periods is not identical, with the period during which the work was in progress attracting more of our attention. Our analysis first looks at the cultural and identity dimension of the territorialities so as to address so-called traditional Innu territorialities; we then examine its social and political dimensions to better understand its relational function.

Stream of Memory: the River as Legacy

To start, we explore the traditional relationship that the Innu of Ekuanitshit maintained with the Unamen Shipu Romaine River, as expressed through their representations of the landscapes and functions of this river before the work on the dams began. The vast majority of participants interviewed evoked its main historical function as an "ancestral path" travelled by canoe to reach the hunting grounds to the north. The choice of which route to take between the Romaine and the surrounding rivers (Saint-Jean, Mingan) depended on the location of each family's ancestral lots. Because of the valleys, the steep terrain and the impressive portages of the Romaine River, many chose to join its course further north, at the planned location of the third and fourth dams. According to the accounts of two elders, the annual gatherings of Innu from all communities before the big autumn hunts were held near the planned location of the fourth dam (Map 2).

Although the participants pointed out that the river no longer served as a major route, since seaplanes and helicopters have long since replaced canoes, their representation of the river as an ancestral route reflected its role as a cultural and identity referent: This is fundamental. That's what we have to understand as Innu. Where we come from (WKA11).

The second dominant representation of the river, intimately linked to the first, concerned the varied resources it contains and that are precious to the Innu:

> The river reminds me of strength, something vast, something that has much to offer. The plants provide medicine, and the animals provide food. I see it as something infinite, really big, with lots of resources, as long as you respect them. That was before the project (W2).

The Romaine was in fact their ancestors' pantry. It was certainly used as an access route, but this route inland was part of a circular way of life that followed the rhythm of the seasons and the animals, their main sources of subsistence. Although the participants admitted that the river's role, use and frequentation have changed over time, it remains rooted in their culture. All the participants pointed to the role of their traditions as fundamental components: Innu Aitun is still very much alive (WI7). Innu Aitun encompasses both traditional activities and values that guide the Innu in terms of respect for the environment and resources. The activities noted – and that are still practiced on the river – are, in order of importance, salmon fishing, small game hunting (beaver, hare, porcupine, partridge, etc.), migratory birds near the islands opposite the mouth of the Romaine River (bustards, ducks), large game (caribou, bear, moose, etc.), as well as the gathering of medicinal plants, cloudberries, cranberries, crowberries, partridgeberries (also known as lingonberries or redberries), blueberries and raspberries

The last representation of the pre-worksite river is more contemplative, even nostalgic, as participant spoke of untouched natural landscapes. They evoked images relating to the beauty of the river, its strength, and its grandeur, as well as the serenity, peace and calm it creates:

> It also had therapeutic benefits. It had a calming effect. It's really calm... you heard only the birds of the Romaine River. There's one bird I can't hear any more. I went to the Romaine this year, during goose hunting season, just to hear that bird, but I couldn't hear it. I don't know if it has disappeared. It's a bird that actually sounds like flute music, extending far into the distance, like a stream (MKA5).

> The Romaine River... the one I have in mind, the one I remember, is the pre-project river. That's the one. It's as if I wanted it to remain as it was, as powerful as it was before (WKA14).

The well-being associated with finding oneself "in the woods" is central to the self-definition of the Innu we met. When asked about their attachment to and identification with the Romaine River, and more broadly with its territory, they were unequivocal:

> Innu who find themselves in the woods always feels good. It seems they understand that this is their place, the place where they feel good, where they feel complete, where they understand the reason for their being there (W2).

> The territory and being Innu amount to the same thing. You can't be Innu without the territory (WKA14).

At the Confluence: From River to Reservoirs

The Pre-Project: the Reign of Everyone for Themselves

The second time period under discussion is the project start-up and implementation. As early as the 1960s and 1970s, preliminary studies conducted by Hydro-Québec had revealed the hydroelectric potential of the Romaine River, despite the fact that the economic and political juncture was not very conducive to the project's realization. This was the first factor underlying the feeling of powerlessness of the participants interviewed regarding the construction of the dams: Everyone knew that there would come a day when they would be confronted with the project or have to express their views about it (MNI8). One participant recalls the almost prophetic words of her father when she was still a teenager: "He used to say: look at my hands and arms; no matter how strong they are, I will never be able to stop Hydro-Québec. Even if we scream and shout, it's going to come about regardless" (W13).

This feeling of powerlessness on the part of the Innu of Ekuanitshit was also partly attributable to the fact that the processes utilized during the pre-project phases (information and consultation sessions, negotiation of agreements) were conducted with each Innu community and Minganie municipality separately and behind closed doors. Many believe that Hydro-Québec used this socio-geographic segmentation by locality to boost the project's social acceptability. The lack of solidarity, prior to the project, from neighbouring communities bred resentment and disappointment regarding the missed opportunity to establish real bargaining strength: No one from the other communities came to support us, to say that they didn't want dams (WI9).

This feeling of bitterness was directly related to the Ekuanitshit Innu's attachment to the river. In fact, half of the people we interviewed believed that since their community, rather than the others, were the most affected, historically, geographically and culturally (WKA11), they should have been the first to be consulted and to give their opinion: Why did they [Nutaskuan] sign the agreement, and why did they sign first? This is not their river (WI7). Other interlocutors made broader statements about the fact that the decision-making processes in place ignored the Innu vision of the territory and its development:

> That's when I realized that there was a lack of respect in the relationship between the State Corporation and us. I was telling them that for us, the territory is sacred, something very important; it is where we lived, where our ancestors lived. All our spirituality is tied to the territory, including the entire animal world, and all would be affected. The answer I got was: here's the ice rink, and you will play on the ice with the rest of us (MKA15).

This quotation brings to mind an interesting analogy between the existing form of governance and a game whose outcome is known in advance: it's a game you are playing, but one you are sure to lose (WKA14). The very fact of entering into negotiations was in a way

tantamount abandoning the fight. The only room for manoeuvre resided in trying to maximise the benefits negotiated. Consequently, the Innu did not succeed in going beyond the existing framework.

In fact, in 2009 the community of Ekuanitshit was the last to enter into an Impact Benefit Agreement (IBA). Faced with increasing pressure to not miss the boat, it finally capitulated. In a community referendum held in March 2009, 78% of the members voted in favour of the project, despite the fact that the majority felt there was no real choice (WI7). Convinced that their protests would not stop the project, they sought at least to benefit from it as much as possible, especially in terms of royalties and work opportunities for the young people of the community.

Disturbed Landscapes

The start of the work in 2009 was a major turning point in the participants' representations. They were very explicit as to the multiple environmental impacts of the project. Flooding and deforestation were the two mentioned most frequently, as they related to the disruption of ecosystems, the depletion and waste of resources the Innu considered precious (in particular salmon, game and medicinal plants), and the disappearance under water of very significant sites:

> It is certain that with the flooding of the Romaine River, some of the stories and history of the Innu will be forgotten. There are important sites that will probably disappear: burial sites, places where customs and traditions are taught, temporary camps... The way the territory is occupied, you had the main camp, but the territories, the family lots, the portages... are so vast... It's the history of the community (MNI8).

The project's impacts affected not only the material landscape of the river, but also its ideational counterpart. The Innu's identification with the river was apparent in their comments concerning the broken, destroyed, massacred and devastated landscapes, and reflected a strong sense of belonging:

> When I took off along the road, it made me so sad, damn it. Just imagine what it was like there, the entire road winding through the mountains. You could see the mighty river, and you could only imagine it, in a year, two years, perhaps three, it wouldn't be the same (W1).

> Our river... what a pity (WI9).

The identity and cultural ruptures documented among the Innu and other indigenous peoples (Dallman et al. 2013) demonstrate the fundamental importance of territory in the formation of their identity. One participant eloquently summed up the importance of identity: Without territory, what are we? (WKA11).

The Innu workers on the Construction Site: An Invisible Workforce at the Bottom of the Employment Ladder

Other than the vast ancestral territory of the river, we examined aspects of the construction site and its camps through the prism of the socio-territorial experience of the Innu who worked there. Their marginal status was a determining factor in the emergence of new territorialities.

Based on the preferential commitments and measures adopted by Hydro-Québec for the hiring of indigenous workers, many members of Ekuanitshit decided to try their luck. While more than half of the participants we met mentioned a significant hiring boom at the outset of the work, the general impression was that the numbers later dropped sharply, with only a few dozen of its members still working there. While their low numbers provided a first indication of their marginal place on the site, their status was revealed above all in the types of jobs occupied, which were at the bottom of the pay scale, and not very highly valued. The most recent statistics obtained by the Ekuanitshit Innu Business Corporation (*Société des entreprises innues d'Ekuanitshit SEIE* 2016) reveal that of the 144 Innu employed by the corporation in connection with the Romaine project, from the various communities, 108 worked in the cafeteria or for the housekeeping service. The two other sectors where they were also heavily represented were technical maintenance (12) and camp security (15). More than half of all the workers interviewed as part of the broader investigation noted that outside the camps the indigenous population held a subordinate status and were almost invisible: I mostly see them in the kitchens, camp services, and so on. I don't see many working on the construction sites or machinery (MNI20); I am a cleaning lady. It's so demeaning; when you walk in the cafeteria over there, it's obvious they see you as an Innu woman (WW30).

A number of factors may explain this situation: low levels of education and distance from training institutions; lack of experience on the labour market; difficulties in landing a job with the non-indigenous companies that were sub-contracting; problems in adapting to the work site lifestyle (rigid routines, long shifts and work cycles, strict supervision); and the challenges inherent in learning new tasks, particularly as French is the Innu's second language and when the deadlines imposed by a mega-site let little time for adequate training and support.

Relationships between Innu and non-indigenous workers at the site were tenuous, largely because the trades were segregated. Workers tended to mix with their close colleagues in the camps, resulting in the formation of clans and closed circles. Various cultural and language differences exacerbated this socio-occupational cleavage. Contact between indigenous and non-indigenous workers was thus limited to everyday common spaces, and resulted in only sporadic and superficial interactions in the cafeteria, and in entertainment venues such as the bar-restaurant: The Innu hang out with the Innu, and the white people hang out with the white people (WXW24); There are not really any meaningful relationships. It's chat, it's polite, but no more than that (WXW26). These insignificant relationships were compounded by a marked indifference on the part of most non-indigenous people towards their indigenous counterparts. As a minority on the work site, the relationship with the Other was a more decisive factor for the Innu workers we interviewed. They were explicit about the multiple interpersonal difficulties

that affected them. From their perspective, the lack of connections stemmed from intercultural tension, persistent prejudice, discrimination, intimidation and even outright racism.

These work-related and social barriers could result in a lack of trust and self-esteem among the Innu, as well as other problems at the work site: loneliness, isolation, psychological distress, alcoholism and drug addiction. Although there were specific support services set up for them (psychologist, social worker, indigenous employment counsellor), as well as shaputuan, traditional indigenous sharing and gathering places, at the Murailles (kilometre 36) and Mista (kilometre 117) camps, many felt that these measures were inadequate in improving the Innus' experience at the work camps and encouraging them to stay. Some of these impacts would even affect the community of Ekuanitshit, as evidenced by an increase in drug use and family tensions related to debt, infidelity and the long absences of workers during their runs at the site. A more in-depth account of the Innu experience in terms of employment, space of encounter and sense of place at the Romaine worksite is available in Guimond and Desmeules (2018).

Reconciling the River and the Work Site: Innu or Hydro-Québec Territory?

The challenges and obstacles presented above shaped the Innu's relationship to the construction site territory, with the result that this relationship was becoming increasingly ambiguous. And how could it be otherwise when they lived and worked every day in a "White's" habitat and work environment in the heart of the ancestral territory to which they are culturally and historically attached? Asked about their feelings - or lack thereof - of being on indigenous territory, the workers' answers gave a glimpse of a sense of place marked by paradoxes.

Among the Innu who felt they were on indigenous territory, some of them shared vivid memories of walks in the forest and trips along the river. Others said that being surrounded by nature while they were at the work camp made them feel good: Wherever they happen to be in the woods, Innu can feel at home, (WXW24); I felt like I was in my territory (WXW24); I felt that the trailer [of the dormitory] was on my territory (MKA5).

In contrast, other Innu workers did not hesitate to state that their land had been stolen from them and that it was now Hydro-Québec's territory: This is no longer our territory. Someone stole it from us, took it from us. Actually, it's not just anyone, it's Hydro, to make money (WI7). The constant surveillance now imposed there was one of the main reasons given for this feeling (guards at the gatehouse, various security guards and inspectors at the camps, regulations, curfews and restrictions on certain activities [hunting and fishing], etc). They felt trapped or cut off from their culture:

> The work site is like a prison. You have to go through security, and when you enter, they [the guards] are there, and they make sure no one else enters. You have to provide identification. It's stifling. The Innu like freedom (WXW24).

Many shared this representation of a hostile, remote and inward-looking place: You feel like you're in a hole. You're afraid to breathe normally (W13). The feeling of being trapped was also manifested as a malaise, or even as fear, embodied by the presence of an evil spirit (W13) at the work site. Some linked the uneasiness they experienced to the destruction of their natural environment. In their view, there would henceforth be a cognitive and emotional dissonance

among the Innu: they were certainly on the territory of their ancestors, but they would simultaneously be participating in its destruction and restricting its use and access to it.

However, for some of the indigenous workers not everything was negative. The services provided at the camps, including meals, accommodation and recreational activities, were valued. Some workers even went so far as to say that the training provided at the work site and the pursuit of healthy lifestyle habits (sports, sleep, food) provided a kind of therapy that refocused them and made them feel serene. Certain problematic, challenging or stressful situations experienced in the communities may help explain why life on the job site was considered a respite, as was previously noted by Rodon and his colleagues (2013) in the case of Inuit jobs at the Raglan mine in Nunavik. The camp could thus be represented as an escape from the ills experienced elsewhere.

The Post-Romaine Period

Individual and Community Benefits

The final period under consideration relates to future visions of the Innu regarding the economic and territorial development of the region following the completion of the dams. While, as just outlined, the spin-offs from the Romaine project for individual Innu did not seem to reflect the hoped-for employment opportunities, for a number of them the experience was positive. The handful of respondents who held specialized jobs, such as heavy equipment operators, said they were more fulfilled professionally, individually and socially. Nevertheless, it was mostly Innu from outside the Minganie and Lower North Shore regions who held these jobs. Having had other work site experience, they seemed to adapt and integrate more readily, and took pride in their success: At meetings, I am the only woman, and Innu at that! The pride is twofold (T26). Others experienced individual enrichment:

> [The work site] has brought wealth. Wealth in the sense that there are people who have good jobs, are well paid, and have adapted to a work-camp way of life. Wealth in terms of training: with our agreement, we had access to training that was not available elsewhere. There are some who will leave with valuable work experience (MNI8).

On the other hand, debt was frequently raised as an important concern. Debts incurred following the purchase of houses, cottages, cars, snowmobiles, trips, etc., seemed to be more onerous without the high wages they had earned on the construction site. Some participants complained that the work camp had had a negative impact on their lifestyles, not only economically but also culturally. People were more stressed and, ultimately, the community was not really richer: Things change. But I have the impression that it's not changing for the better. People get used to this lifestyle. But it's not our lifestyle (WKA14).

At the community level, the Nishipiminan agreement, concluded in 2009 between Ekuanitshit and Hydro-Québec, provided for the payment of CAN$75 million in royalties, staggered until 2070. Various initiatives were set up to manage the money received: an economic

and community development fund, a training fund, an Innu heritage fund, a remedial work and access-to-the-territory fund, an Innu Aitun fund, an archaeological research program and a business support program. In the eyes of many indigenous and non-indigenous interviewees, the community of Ekuanitshit would benefit from the most lucrative agreement. It received the most royalties, and the 19 businesses created in parallel, grouped together as part of the Société des entreprises innues d'Ekuanitshit (SEIE), were successful (MNI93). Respondents working in community economic development were also quite optimistic about the future of these new diversified businesses, believing that they would continue to prosper after the completion of the dams.

Despite all this, slightly less than half of the participants were disappointed with the hoped-for benefits. The projects carried out were in fact one-time projects, and some promises have not yet been fulfilled, such as the paving of streets, the construction of an arena and a new community centre, more activities for young people, and so on. People have the impression that they are not seeing the colour of their money (WKA11). Royalties are administered like a puzzle: one piece at a time, one project at a time, and lacking a long-term strategic vision (WKA14).

The Innu Aitun Fund, according to more than half of the interviewees, stood out as the project's most positive spin-off for the community. The Fund, renewable every 50 years, in other words negotiated in perpetuity (MKA15), aims to maintain and continue the community's cultural activities. It is the fund that defrays the cost of seaplane or helicopter transportation required by families who wish to stay in the territory. It also finances an ongoing project for the construction of 32 new four-season cottages on the ancestral territory. Finally, it supports the extra-curricular activities of the Innu Aitun program at the primary and secondary school levels, aimed at transmitting traditional knowledge and customs to young people through various workshops and outings on the territory.

Access, Opening and Control of the Nitassinan

Cultural and identity-related characterization of the Innu territorialities of Ekuanitshit leads inexorably to a consideration of its political dimension. Referring to Sack's (1983) definition that territoriality is a conscious and desired strategy of territorial control, we now explore one of its concrete manifestations. The opening up of and access to the territory once the work has been completed is a major concern raised by more than half of the participants. Thus, the gateway to the Nitassinan is no longer the Romaine River but becomes, rather, its modern counterpart, the new 150-kilometre road joining the four hydroelectric power stations. This road symbolizes the idea of control in a tangible way. For now, the river seems inaccessible to the Innu accustomed to using it in the past: It's blocked. My grandfather is 78 years old. He has wanted to go see the construction site twice now. He's not allowed to go there or go through the barrier (W1).

When it comes to the future of this road, it is seen as both an advantage and disadvantage by the respondents. On the one hand, the territory will certainly be more easily accessible, especially since, with the Innu Aitun Fund, transportation costs to travel there will be borne collectively. On the other hand, the new road will be public, and therefore open to everyone:

> 150 kilometres to go see your territory is a long way to travel. Seaplane or helicopter costs amount to perhaps CAN$1000-1200. Now, you can also travel by land. However, the drawback is that the road will be public (MKA5).

> When we used to take the seaplane or helicopter, we were isolated; we had peace. Now anyone can travel there (W2).

There is already a very long waiting list for cottage leases, and for the cottages to be built by the road and alongside the lakes dotting the area. Hunting and fishing activities are very popular with the Minganois and Innu, though the arrival of the construction has increased the number of restrictions and the tensions with which these are associated. According to the respondents, clashes between Innu and non-Innu are now more common, especially near the mouth of the river where the former used to set their fishing nets. Others have concerns about dangerous white hunters (WKA11) and their methods, which are often disrespectful towards animals. Another believes that the Innu are going to have their fish spots stolen from them (MW3). In short, a new road means more people, more cottages, more activities and a concomitant loss of exclusivity for the Innu. During the early negotiations, the Innu did try to obtain control over the management of the road once the construction had been completed. However, roads in Québec belong to the public sector.

Contemporary Indigenous Territorialities, Between Interiority and Otherness

In the end, for the clear majority of the Ekuanitshit Innu we met, the project constitutes a sacrifice (of the Unamen Shipu Romaine River) rather than a development opportunity. For a little less than half, it is both a sacrifice and an opportunity. Finally, for a small minority, it is an opportunity. The Innu view that they had made a sacrifice can be explained, first, by the general impression that the pre-implementation phases of the project had been conducted hurriedly and under pressure. There is a common feeling that the project would be implemented regardless of any resistance, and that the indigenous population had to reach an agreement in order to benefit from it even minimally – and on an equal footing with the other groups involved. In short, there is a feeling of powerlessness with no real possibility of co-management. Second, given that environmental and social concerns continue to outweigh the positive benefits, which are taking a long time in coming, the sacrifice of the Romaine River looms particularly large. Finally, this feeling is reinforced by the Innu's continued strong attachment to the river as a source of identity:

> It was a very beautiful river. I think that the people who campaigned for the dam, for the economic aspects, for royalties or for employment, had no idea what they were going to destroy. They only saw the economic and monetary sides (WKA11).

> It was a sacrifice because we are Innu. We experienced a rupture, in our pride in being Innu and in our Innu way of life. We have been cut off from all this (WI7).

All these elements reinforce the impression that an important part of the community's territory, history and identity has been ceded in exchange for benefits that are insignificant for the majority of the population. If the political weight of the Innu had initially been greater, if their aspirations and concerns had been more widely shared and appreciated and, consequently, if the significance they attached to the river had been more highly valued, the project might perhaps have been able to improve intercultural dialogue on a daily basis and at the decision-making level. The validation and incorporation of indigenous knowledge and know-how in the deployment of natural resource development projects are more and more common (Jackson 2005; Tipa and Nelson 2012), though they are still contentious in Québec (Sioui 2018).

The fact remains that the tension between sacrifice and opportunity, between the ancestral and new meanings attached to the territory, and between heritage and future, is forging new relationships to the territory. The arrival of this project, by calling into question the traditional territorialities of the Innu, has given rise to new uncertainties, if not identity, political, and economic transformations. It has thus inevitably propelled a relationship to the river that was previously more internalized towards a relationship modulated instead by the Other, be it a worker from Southern Québec, a State Corporation or the public sphere. Under the impetus of this project, the territorialities of the Innu are being called into question, and must be renegotiated. As a result, they are in a way being driven, be they aware of it or not, to defending their material and emotional relationship to the Romaine River in the eyes of dominant society.

One thing is certain: the Innu territory is on the one hand a politicized entity given the claims made on and the intercultural relations with the majority population and its decision-making bodies. On the other hand, the territory is also an everyday living environment, constantly inhabited and meaningful both from the material and an ideational standpoints, the object and subject of a living culture seeking to reconcile its ancestral roots with its new aspirations. The Innu are indeed very sensitive to contemporary neo-liberal development projects, and are increasingly caught up with it, be it directly, in terms of employment, or indirectly (particularly through the creation of businesses). However, their increased visibility in regional development did not seem to signal any weakening in Innu identification with their territory, or in the ancestral relations they have with it. On the contrary, this visibility contributes to underscore their presence. Even if they have consented to the construction of the dams, the territory remains at the heart of their collective identity and their daily life.

The example of the Romaine project studied here illustrates that new ideas are not necessarily incompatible with traditions. Nash (2002, 225) states that the relationship between sacredness and modernity, far from being incommensurable, is continually under (re)negotiation. In this respect, the Innu Aitun programme is a noteworthy illustration of the tension between rupture and preservation. For the Innu interviewed, the establishment of this fund is a major counterbalance to the loss of important sites; it provides easier and more extensive access to the remainder of their ancestral territory. Paradoxically, from this perspective the Romaine project is both the source of the wound and the remedy. In other words, even if the project is a sacrifice for the majority of the participants, it is also a likely basis for re-appropriating the larger territory. The fund provides a glimpse of reconciliation between the preservation of identity and economic development, or at least a compromise that seems acceptable.

This is the case because in our view the project serves as a catalyst for dynamic and hybrid territorialities (cultural, political and social), in constant dialectic with daily experiences and new structural and socio-spatial relationships. In other words, these territorialities should no longer be studied in isolation as regards to its internalized components, but rather as a form of hybridization between heritage and becoming, sometimes voluntary, sometimes adopted and sometimes imposed, and which testifies, ultimately, to the complexity and uniqueness of the relationship to the territory maintained by the Innu of Ekuanitshit.

We worked mainly with the community of Ekuanitshit, however, extending this research to the other communities affected by the Romaine project would allow for interesting comparisons so as to better understanding the variables that shape relationships with the river (geographical proximity, land use, links with Hydro-Québec). In addition, given the major changes brought about by Northern development and resource exploitation, similar case studies on indigenous territorialities should be multiplied. Such in-depth studies are essential because there remain broader questions about the territorialities of the Innu and indigenous peoples, both here and elsewhere: Can traditional heritage and neo-liberal values really be reconciled by way of indigenous participation in development projects? To maintain their authenticity, must the role played here by indigenous people be limited to that of protectors of nature (Carter and Hollinsworth 2009)? Is this the only way to simultaneously safeguard their culture? How can their role be extended and their current marginal position in territorial development be surmounted while respecting their values (Desmeules et Guimond 2018)? In sum, more studies with a geographical perspective would provide a better understanding of contemporary indigenous territorialities.

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Abstracts

2019 Annual Meeting of NESTVAL

October 18–19, 2019, Framingham State University
Framingham, MA

Aaron Adams
University of Connecticut

A Comparative Usability Assessment of Augmented Reality 3-D Printed Terrain Models and 2-D Topographic Maps

Throughout history, cartographers have adopted new technological advances to facilitate spatial visualization. The printing press, aerial photography, and computer technology are just a few examples of this. In the 21st century, society is experiencing unprecedented rates of technological development, and many of these technologies offer potential benefits to facilitate spatial visualization. It is necessary to test the merits of these new technologies against the status quo to determine if it is worth investing the resources in implementing. The purpose of this research is to test a combination of two of these emerging technologies, augmented reality (abbreviated AR) and 3D printing, against traditional topographic maps to determine if they warrant further investigation as possible cartographic tools. To resolve this, I administered a series of spatial visualization tests to human test subjects to assess their performance with the different topographic representation. When I performed an analysis of the test scores, I found that subjects given the AR 3D printed terrain model performed better than those given a 2D map product. The results of this research will advise on the benefits of terrain models created using augmented reality and 3D printing and will inform future research on the topic.
Keywords:3D Spatial Visualization, 3D Printing, Augmented Reality, Cartography, Terrain Model

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Stephen Axon
Southern Connecticut State University

The Answer: Sustainability Science. The Question: Climate Emergency Declaration.

Framing responses to the climate crisis requires a diversity of interventions, policies, market-based approaches. However, it is clear that a focus on education alone is unable to target the deep-rooted unsustainabilities that pervade within U.S. politics, economics, and society. Rather, sustainability science perspectives – and approaches – are needed to overcome the shortcomings and barriers that face the climate emergency. Education, and the provision of information,

without further interventions that target climate-related actions are unlikely to change behaviour. This is particularly noticeable given the inequalities and inequities that exist within the American education system. Sustainability science is emerging as a dynamic and evolving transdisciplinary effort addressing the symbiosis between human activity and the environment, providing visions and scenarios indicating transition pathways towards global sustainability while elucidating relevant decisions and agents. To that end, sustainability science is purpose-bound and aimed at action; links science and policy in an integrated participatory manner; and interdisciplinary, if not transdisciplinary. Moving towards a science of sustainability allows for the involvement of both academic and social extended communities to become involved in addressing the multi-faceted unsustainabilities that face U.S. communities while also being directly engaged in identifying, creating, and implementing policies and solutions. In this paper, I present a constructive critique of education-centric approaches to climate change while offering suggestions where a critically responsive applied sustainability science could lead to transformational change in the dominant unsustainable regime that prevails in the U.S. *Keywords: Sustainability Science, Climate Emergency, Applied Sustainability, Public Engagement, Equity, Equality*

Darren Bardati
Bishop's University, Québec, Canada

Participatory Agroecological Assessment of Farmers' Capacity to Adapt to Climate Change in Malawi

The author of this study developed a heuristic technique called 'participatory agroecological assessment' for use by smallholder farmers in Malawi to examine their vulnerability to threats due to changing climatic conditions. Rooted in a participatory action research paradigm, they collected data jointly with Malawian farmers near Chilanga, Kasungu District, through detailed observations of landscape and farm plot scale conditions, and through interviews with key informants over the span of four weeks in June 2016. Farmers participated in workshops to co-construct a set of twenty-four assessment indicators, based on contextually appropriate agroecological practices, to perform the assessment. The findings of the assessment provide empirical evidence about the farming system's vulnerability to drought, while also serving as recommendations to guide farmers in their transition toward agroecological practices, thereby enhancing their adaptive capacity to climate change. *Keywords: Agroecology, Participatory Action Research, Adaptive Capacity, Climate Change, Malawi*

Katrishia Bell
Eastern Connecticut State University

Let's Not Sugar Coat It

Many suffer from diabetes which can be a serious, life-threatening disease. States in the southeast are known for high rates of obesity and physical inactivity which are leading contributors to diabetes. If untreated, diabetes can have negative effects, thus, evaluating the spatial distribution of diabetes prevalence and statistically evaluating the influence of physical inactivity and obesity, as well as socioeconomic factors, to explain diabetes prevalence is critical in determining an approach to reduce diabetes in this area. Results indicated that clustering of high rates of diabetes occurred in Alabama, Mississippi, Georgia, and Tennessee. Although physical inactivity, obesity, and all socioeconomic variables except educational attainment were significant in explaining diabetes prevalence (95% confidence interval), the global regression model only explained 64% of diabetes prevalence rates in the southeast. The variability in the strength of all socioeconomic and health factors identified as significant in predicting diabetes suggests that the southeastern states would benefit from participating more heavily in the CDC's state and local public health prevention programs which include lifestyle change and education recognition related programs.

Erick Bora
Eastern Connecticut State University

Breathless in the Southeast: How Do We Stop it?

COPD, currently the 4th leading cause of death worldwide, is projected to become more problematic by 2030 unless appropriate actions are taken to reduce the major risk factors that contribute to COPD. However, the spatial distribution of individuals with COPD and the many potential factors that contribute to this disease make prevention methods difficult to discern at a national level. Thus, COPD must be evaluated at a local scale. This study analyzed the spatial distribution of COPD prevalence per county for the area south of the Ohio River and east of the Mississippi River which has experienced the highest COPD prevalence in the United States. Additionally, this study statistically analyzed the significance of socioeconomics, air quality, physical inactivity, household size, smoking, and occupation in predicting observed rates of COPD. Results show that high COPD rates clustered in eastern Kentucky, western Virginia, and southern Missouri, which correlated with areas of high smoking rates. Smokers, age, construction workers, healthcare workers, and physical inactivity were statistically significant in predicting high COPD prevalence. Thus, medical and healthcare professionals should focus on addressing these issues in this area of the country to reduce the risk of COPD.

Matthew Bourdon
University of Massachusetts Amherst

General Overview of How Geospatial Technologies are Used for Mineral Rights and Ownership Within the Oil & Gas Industry

As the world proceeds to develop new technological systems to better our way of life, both for personal and commercial use, the Oil & Gas Industry drives its attention to digital mapping and spatial databases to enhance the industry's efficiency. Companies in many of the oil and gas producing states, such as Texas, use spatial data to understand and organize what lands and assets are available for purchase. When said company chooses to buy land, they may also have to acquire the resources located beneath the surface at an additional cost. Transactions like this are happening everyday, all over the country. Geospatial systems come into hand because they allow buyers and sellers to look for lands under their own specifications. Companies that deal only with the buying and selling of properties can store their assets within a geospatial database and upload new information when it comes about. Having the data stored online or in private databases allows buyers and sellers that are not from the area or state to have the right to understand what's on the market. This project will provide an overview of how such data is stored and what methods are used for organizing it. *Keywords: Royalties, oil, gas, geospatial data, mapping, Texas.*

Robert S. Bristow and Anna Therien
Westfield State University

Cultural Resource Monitoring of the Appalachian Trail with LiDAR

Monitoring cultural resources in parks and protected areas is greatly enhanced using Light Detection and Ranging (LiDAR). For this example, a pilot inventory of cultural resources is illustrated for the United States National Park Service lands that protect the Appalachian Trail (AT) in Massachusetts. A history of the National Park lands will begin with settlement patterns in the 19th century Berkshire County through the beginning of the 20th century when the lands reverted to natural forest cover and the property was then managed by a local timber company. Fast forward to the 21st century and advanced remote sensing technology aids in the discovery of this lost history. To help in the resource monitoring, these remote sensing data are corroborated with historic records to identify the historical archaeological resources in the corridor. The findings are then added to existing management plans to help protect the national park with a more complete understanding of the historical human impacts in the backcountry of New England. *Keywords: LiDAR, Appalachian Trail, Cultural Resources, National Parks*

J. Morgan Carney
University of Massachusetts Amherst

"A Right to Know": State Level Combined Sewage Overflow Notification Policies in the Northeastern United States

Combined Sewer Systems (CSS) are commonly found in Northeastern cities built prior to 1900. CSS allows for a single pipe to carry stormwater, sanitary sewage, and industrial sewage. In the event that a system's capacity is surpassed due to heavy rainfall or an increase in waste input, it overflows into a spillway pipe that then sends the contents directly into rivers. These events, known as Combined Sewage Overflows (CSO's), are detrimental to human health as well as the local environment, and have become more frequent with continued urban population growth and increasingly extreme weather systems. This survey-based study focused on CSO notification policies in the Northeastern United States, and primarily utilized interviews with state environmental officials. It was designed in-house by Massachusetts Rivers Alliance to offer a means of measuring success, while simultaneously promoting a deeper understanding of implementation requirements, long-term funding needs, and notification system outreach. Such information is potentially instrumental as the State of Massachusetts is in the midst of an effort to create a new CSO notification policy in the Commonwealth (see Bill H.3976). This poster highlights the report's findings – that the State of New York is the lead example of effective CSO notification policy the region: New York State has over 30,000 subscribers who are receiving up-to-date information on active outfalls, has disconnected over 500 CSO outfalls in the last 25 years, and was able to successfully utilize existing public infrastructure to build out an effective CSO alert system at minimal cost. *Keywords: US Northeast, Water Quality, Hazard Notification, Environmental Policy*

Travis Davis
University of Maine at Farmington

Physical Geography and Materials Testing in an Environmental Internship

In Spring 2019 I was hired on as an intern for the quality control (QC) division of Pike Industries for Plant 806 out of Wells, Maine. Through my internship I was taught about the properties of specific materials sold from the plant as well as how they interacted with each other when mixed with asphalt. With this poster I intend to describe my duties as a QC intern for Pike Industries and draw from my experience to identify relationships between the materials I tested and what roles the same materials play in the construction of road and bridge infrastructure throughout the state. This poster will also serve as an example for what is required of intern while working for Pike Industries. I also reflect on how my personal experience as a Geography

and Environmental Planning major prepared me (and didn't prepare me) for this particular form of physical geography internship. *Keywords: Internship, materials testing, physical geography, quality control (QC), quarry, New England, geology*

Brad Dearden
University of Maine at Farmington

Globalized Spaces and the Ocular: Views Oo Uneven Development in Urban Areas of Developing Regions

Relevant literature suggests that still photographs and video recordings convey both literal and nuanced meanings of human activities and place. Importantly, existing literature also suggests that such visual depictions can ascribe new meaning to places and the processes that shape them. Markedly visual forms of advertising from MNCs/TNCs that situate within commercial city-space, for instance, infer an essential 'branding' of places associated with globalized interests. Vestiges of such globalizing endeavors are evident in monetary form and in their visual exemplifications upon the landscape. Such visual artifacts increasingly occupy select spaces in the urban geographies of developing countries, often as part of a trajectory that encourages development under a scenario of expanded markets. As an approach to analyzing these manifestations and the interpretations they evoke, this study contextualizes the author's still photographs and video recordings of Guatemala City, Beijing, and Kathmandu – places exhibiting fundamental differences but imprinted with activities common to globalization and development. Outcomes from this research suggest that visual media forms can be productive as means to identify and examine this global-local phenomenon, namely the expansive, recurrent commercial forms that prosper in the global marketplace amidst local spaces of deprivation and the consequent cultural landscape juxtapositions they elicit. *Keywords: Urban development, globalization, visual media*

Georgienna V. Driver and Marcos Luna
Salem State University

If Trees Could Talk: Can Tree Health be Used as an Indicator to Help Identify Methane Leaks?

Leaks from natural gas pipelines underneath urban communities across the country have recently come to the fore as a potentially significant source of human-caused methane (CH4) emissions. These downstream leaks of methane are often due to aging and corroding pipes as well as accidents. In addition to being a powerful greenhouse gas, methane leaks pose health and safety hazards for nearby residents, and represent economic losses for communities and utilities.

Researchers have proposed many methods to locate and identify pipeline leaks, but none to date have demonstrated efficient and replicable methods of leak detection and verification. One common sign of methane leaks is dying vegetation, specifically stressed trees. This study uses data from a citywide street tree census combined with street level methane measurements to analyze the relationship between ambient methane concentrations and tree health. Understanding this relationship may offer city authorities and utilities another way of identifying methane leaks and provide a way to quantify natural gas leak impacts for communities. This analysis was conducted in the City of Salem, Massachusetts, USA. *Keywords: Methane leaks, underground pipelines, corrosion, tree health, stressed vegetation, leaks, greenhouse gas emissions, economic loss*

Ana Mesquita Emlinger
Salem State University

100% Of Active Student Participation is Possible! (Do These Activities in Your Class…)

Research is solid about active class participation as a way to improve critical and higher level thinking skills and enthusiasm in the classroom. The challenge is how to engage more than the often 2 or 3 talkers that usually dominate our classroom discussions, giving us a false idea of successful class participation. How can we encourage the quieter students to communicate their opinions? Understanding communication as more than verbal language is a key element in effective teaching. Non-verbal communication can be powerful and motivate students with different behavioral and learning styles, diverse backgrounds and life experiences. Communication is the foundation of almost every human interaction, and it has to be understood as more than simply choosing the right words. In this presentation you will get to know two strategies that ensure 100% of class participation in a dynamic and supportive way.

Paul B. Frederic
University of Maine at Farmington

New England Clean Energy Connect: Power Transmission Through Rural Maine

I examine a proposed 145mile (234 km) corridor and transmission line through rural economically stressed west central Maine to transport Canadian hydro generated power to markets on the New England electric grid. Massachusetts represents nearly half that market. In 2016 that state enacted legislation to reduce its dependency on fossil fuel produced electrical energy. A plan was developed to purchase renewable non-fossil electricity from hydropower in Québec. Central Maine Power Company (CMP), a Spanish owned enterprise, won a contract to build a

transmission line through Maine. The proposed project, known as the New England Clean Energy Connect (NECEC), is facing substantial opposition from the fossil fuel industry, selected environmental groups and some recreational interests. Proponents are many of the municipalities that benefit from an expanded tax base, labor because of construction jobs, electric rate payers, potential broadband users and people that encourage reduced fossil fuel consumption. In February 2019 Maine Governor Mills and many stakeholders reached agreement to support NECEC. My research methods include monitoring the ongoing permitting process and interviewing leaders in each of host municipalities along the route to determine rational for decisions. NECEC is working its way through the permitting process with a projected timeline of 2019 for all permits and 2022 for all construction. As of September11, 2019 the Maine Public Utilities Commission had issued one of the four permits needed by CMP. However, the next few mouths are critical as the mix of major players to weigh in continues to change. Keywords: New England, western Maine, energy policy, power transmission, rural conflict.

Juliette Gale, Sandie Murray, Cindy Sellers, Nick Geron, and Marc Healy
Clark University

Stewardship Approaches and Communication Networks in the Greening the Gateway Cities Program In Leominster and Pittsfield, Massachusetts

The Greening the Gateway Cities Program (GGCP) in Massachusetts is a tree-planting program facilitated by the Department of Conservation and Recreation (DCR) with the goal of increasing energy efficiency by increasing canopy cover. This research examines how tree stewardship and actor communication within the GGCP network influence the effectiveness of the program. We investigate how these networks influence resident perceptions and discourses surrounding the GGCP. In the summer of 2019, a total of 50 interviews were conducted in Leominster and Pittsfield Massachusetts with tree recipients, organizations, city officials, and DCR staff who participated in the GGCP. Interviews were analyzed in NVivo data analysis software using the Policy Arrangement Approach developed by Park & Youn (2013). Communication throughout the GGCP networks plays critical roles in the stewardship and survivorship of program trees. The analysis found that the DCR's relationships with community partners, the city, and residents were the most prevalent within the GGCP network. Although DCR foresters maintain many trees during the program, concern was emphasized for the future health of the GGCP trees when stewardship would then depend on tree stewards and the city. Among other challenges, actors also addressed communication gaps between rental property owners and underrepresented actors. Overall, the majority of discourses regarding the GGCP from residents and city official were supportive and positive. *Keywords: Greening The Gateway Cities Program, communication networks, tree care, urban tree planting, urban tree stewardship, Policy Arrangement Approach*

Adam Gallaher[a], Marcello Graziano[b], Brian Becker[b], Bin Li[b] and Benjamin Heumann[b]
University of Connecticut[a] and Central Michigan University[b]

Spatial Statistical Analysis of Grid Optimization in Connecticut, Quantifying the Relationship Between Tree-Trimming and Power Outages

Tree-trimming operations (TTOs) are costly, yet widely used grid-management procedures utilized by electric utility companies globally. As diffused generation, electrification of the economy, and climate change pose challenges to utility companies, power grids and their reliability play an increasingly important role for developed and developing regions. Using data from a uniquely detailed dataset of outages and tree-trimming operations from 2009-2015 undergone by Eversource Energy in Connecticut, this study identifies the relationship between tree-trimming operations and power outages from three perspectives: i) number of outages; and ii) number of affected customers for occurred outages; and iii) duration of occurred outages. Methodologically, we employ three sets of models: Panel Fixed-Effect, Spatial–lagged models and a Temporally Spatial Autoregressive models. Areal units are author-specified raster, with a size of 2by2km (preferred), and 4by4km (as a robustness check). This modelling strategy accounts for both spatial and temporal relationships. Our results show that at the 2-km cell size TTO translate to 4.17% fewer tree-associated outages per year. In addition, occurring outages affected 465,187 fewer customers. These results are consistent at a lower resolution. In addition, TTOs have been capable of reducing storm-related effects consistently throughout the period. Our work represents a novel approach in the quality of the grid-level data and the temporal coverage utilized. Our results are particularly relevant to utility companies and policymakers in areas exposed to climate change such as the U.S. Eastern Atlantic Coast, and they support further expansion of expensive, yet effective TTOs in densely forested regions. *Keywords: Spatial Statistics, Tree-Trimming, Grid Resiliency, Reliability*

Timothy J. Garceau
Central Connecticut State University

An Assessment of Traffic Safety in Roundabouts within a New England Municipality

While roundabouts have been shown to provide safety benefits as compared with signalized intersections, they have faced public resistance and therefore been slow to diffuse across the country. One place where roundabouts have gained favor is Keene, New Hampshire which has five roundabouts in operation and another two planned. Building on previous research which identified air quality improvements as a result of Keene's roundabout conversions, this research will assess the impacts on the safety of users within the intersections. As the northeast has

begun transitioning to roundabouts for intersections in our region, this research is particularly timely in contributing to the outreach, design and implementation of roundabout conversions.
Keywords: Urban, Transportation,Traffic Safety

Michaela Garland
Southern Connecticut State University

Evaluating, Initiating, and Incubating Blue Economy Development – Case of the Long Island Sound Region

Amidst the growing concern for the state of the oceans during the climate emergency, numerous reports have been released highlighting the size and future growth of the ocean economy. Both the National Oceanic and Atmospheric Administration and the Organization for Economic Co-operation and Development have reported that the ocean economy has increased and is expected to continue to grow. Because of the climate emergency and its effects on the ocean as well as the reports regarding the growing ocean economy there has been an increasing need for an integrated approach to ocean management. Within the last few years, the Blue Economy paradigm has gained worldwide attention among government organizations, politicians, academics, and businesses as being a new integrated approach to ocean management that connects environmental, social, and economic sustainability by promoting the improvement of human wellbeing and social equity, while also reducing environmental risks and ecological scarcities. Given this emerging paradigm, it is important to acknowledge the blue economy potential on a local, regional level. Long Island Sound, located between Connecticut and New York, holds high potential for collaboration within the maritime industry surrounding the blue economy concept because of its geographic proximity as being an inland urban sea. Therefore, using Economic National Ocean Watch's county-level data set, this paper's aim is to provide an estimate for the blue economy in Long Island Sound and to highlight the potential significance of a blue economy cluster for sustainable regional economic development in the maritime industry.
Keywords: Blue Economy; Long Island Sound; incubators, regional economic development

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John Hayes
Salem State University

University Pedagogy About Global Climate Change Science and Policy: Perspectives from a Geographer

The prevention of climate change is now a historical footnote. Pedagogy about global climate change now focuses on mitigation of greenhouse gas emissions and climate change impacts, and adaptation to climate change and its resultant sea level rise and coastal flooding, stronger

storm events, more frequent incidences of heat waves and droughts, etc. This is my fourth year of teaching a freshmen-level course titled "Global Climate Change: Causes and Consequences" at Salem State University. My course includes climate change science and policy, natural and human sources of greenhouse gases, the effects of climate change on physical, ecological, and human systems, and what needs to be done to mitigate the potential damage from climate change. The course utilizes a geographic perspective as it explores the physical and human dimensions of climate change. The latter third of the course focuses on solutions, resiliency planning, adaptation planning, climate change activism, and climate change and energy-related legislation by both the federal government and Massachusetts state government. This presentation will offer suggestions and lessons learned about climate change instruction and how we prepare students to navigate a world that is changing before our eyes and how to resolve the climate crisis that we face. *Keywords: Climate change, pedagogy, climate change policy, human-earth interactions*

C. Patrick Heidkamp
Southern Connecticut State University

On Economic Geography, Transdisciplinarity & Critical Pragmatism

On the premise the grand challenges of our time: the all too real threat of climate change, the increasing inequality in terms of livelihood opportunities and the increasingly polarizing discourse in the political arena, I have argued elsewhere (GCEG in Cologne 2018), that if economic geography is to make a significant contribution not only to the discussion of, but also to the implementation of sustainability transitions, it needs to embrace a focus that is distinctly environmental while maintaining a rootedness in not only analyzing but also redressing uneven development. I believe that this is best accomplished by subscribing to a critical pragmatist framework and in a transdisciplinary research setting. This paper outlines how such a research approach might be implemented. *Keywords: Economic Geography, Pragmatism, Transdisciplinarity*

Carlos Hernandez and Nat Trumbull
University of Connecticut

Assessing the carbon footprint of maritime freight routes to the Cape and Islands: Prospects of electrification on Vineyard and Nantucket Sounds

This paper assesses and compares the carbon footprints of several scenarios for providing auto and truck freight to the Cape and islands. Our analysis is based on data provided by the Cape Cod Commission, the Martha's Vineyard Commission, and the Steamship Authority. As a quasi-public entity, the Steamship Authority has been slow to begin to reduce its carbon

footprint. Many of its ferries are older and have lower fuel efficiencies/high carbon emissions. The paper begins with an examination of the institution of the Steamship Authority and its current governing structure as it has been shaped by its 1960 Enabling Act. The paper explores how the Steamship Authority's passenger/auto/freight operations might attain carbon footprint reductions and begin to meet Massachusetts low-carbon targets and policies. Electrification of ferries to Martha's Vineyard and Nantucket is under active public discussion and could be based on technology already in use in Europe and being considered by Washington State Ferries (1, 2). Electrification could significantly reduce, if not eliminate, the Steamship Authority's current carbon footprint. The prospects for ocean wind farm and electricity generation in the larger region of the Steamship Authority's operations provides a logical source of renewable energy for an electrified ferry system. Political discourse over the value of an electrified ferry system may hinge in large part on other potential reductions in transportation-related carbon emissions in Massachusetts and includes consideration of the availability and cost of other renewable electrical energy available to the Commonwealth.

Sungmin Jang
University of Connecticut

Baseball Game Attendance Change and Ballpark Relocation: Will Relocation Boost Attendance?

On June 4, 2014, the Mayor of Hartford announced that the city would build a new ballpark to bring a minor league baseball team, the New Britain Rock Cats, to Hartford. The city planned to invest $60 million and the relocation of the baseball team was intended to expand the Central Business District and ultimately to revitalize the inner city of Hartford. How about the impact on the baseball team itself? How would the team be affected by the new surroundings? This paper focuses on the change of the regular season home attendance of Major League Baseball (ten teams: five American League East Division teams and five National League East Division teams) and Minor League Baseball teams (Double-A Level, 12 Eastern League teams), and the extent to which factors affected the nature and size of attendance, such as population and average income, relocation time, ballpark size, and team performance. Compared to the difference between the patterns of Major League and Minor League teams, this paper recognized that Minor League teams' attendance was influenced by locational factors without exception, and especially, relocation of the team's home ballpark, whereas Major League baseball teams had an impact on the local economy. Lastly, the Rock Cats' attendance in the 2016 season when the new ballpark opening was planned was projected based on city population, ballpark size, and average gap before and after ballpark relocation. *Keywords: Sports and geography, stadium relocation, baseball team attendance*

Wenjing Jiang
Clark University

Uncertain and Uneven Transitions: Alternative Agricultures, Produced Nature and Planned Inequality in Rural China

With emerging concerns for environment and equality, we have witnessed increasing efforts globally to re-organize property, production and social relations in the countryside. Yet in practice, the transitions for alternatives often end up with uncertain and uneven outcomes, raising the need to examine the geography and contingency of agrarian transitions. Through an intensive, multi-scalar case study of Chengdu in Southwest China, this paper offers a materialist explanation of why some places have witnessed certain transitions (e.g., transition from grain-based agriculture to agricultural production based on commercial crops) earlier and more successfully than others, and how certain products and modes of agricultural production become dominant in certain places. Comparing the past and present plans and the trajectories of agricultural development of multiple sites in three counties, my research traces the origins, conditions, and contingencies of agricultural specialization in contemporary China at both regional (county level) and micro (village and sub-village levels) scales.
The unevenness of agricultural development, I argue, should not be explained as following the "natural" laws, because local economic and ecological conditions have long been under interventions from state policies, regional and local plans and associated resource allocations in agricultural infrastructure. Rather, policies and plans, by naturalizing the produced nature and constructing the suitable conditions for sustainability, often end up reinforcing the uncertainty and unevenness of rural development. Bringing in socio-ecological perspectives to regional development theories, this paper contributes to a dialectic understanding of continuity and change in agrarian and broader social transformation. *Keywords: Agrarian transitions, unevenness, uncertainty, agricultural specialization, China*

Jeffery Kreeger
Central Connecticut State University

A Variety Of Gis Analyses In Tourism And Hospitality

While GIS use is in its infancy stage for the Tourism industry, GIS analyses has been utilized even less in the Hospitality industry. This presentation demonstrates various spatial analyses. Distances were utilized for analyzing Resort Owner demographics and restaurant cluster analysis was used to analyze restaurant grouping as well as neighborhood population demographics and psychographics. Revenue Management techniques were used to analyze Hotel ADR and Occupancy Percentages based on proximity to sporting venues. Gravity modeling was also dem-

onstrated for retail stores (but could just as easily be used for restaurants or attractions) using Euclidian Distances (as the crows fly) as well as Network Analyst (driving) distances. Comment cards were also analyzed from a national restaurant to determine calendar effects of restaurant efficiencies. Respondent proximity was considered in a study that compares Hotel stays against Airbnb stays. Although this presentation does not dive deeply into any one methodology, it instead endeavors to present a variety of GIS techniques to stimulate use in related areas. The purpose of this presentation is to give a summary of some GIS analyses that are being introduced in the Tourism and Hospitality fields in the hopes of encouraging further exploration in these fields. *Keywords: GIS, Recruitment, Revenue Management, Spatial Analysis*

Roopa Krithivasan
Clark University

Making collective wildlife management work: crop-protection institutions in Himachal Pradesh, India

Forest-agriculture interfaces provide important habitats for protected species. For farmers, however, living alongside wildlife — particularly megafauna that consume and destroy crops — stresses livelihoods and compounds economic and climate pressures. Scholars identify collaborative, participatory crop protection and monitoring as important tools to mitigate crop depredation, safeguard livelihoods, and support conservation goals. Yet few studies evaluate the social and ecological conditions under which communities participate in collective wildlife management. Situating my research in Himachal Pradesh, India — where conflicts between farmers and wildlife including macaques, boar, and antelope are widespread — I leverage the Social-Ecological System (SES) Framework (Ostrom 2007) to investigate why some communities have retained collective crop-protection practices while others have not. While the SES Framework traditionally assumes that resource users are strictly human, I argue for the inclusion of non-human animal actors as participants in the SES whose actions fundamentally shape institutions and landscapes. Drawing from interviews, focus groups, and participatory mapping products representing seven purposively sampled villages, I find that shared dependence on agriculture, perceived fairness of collective choice rules, and spatially clustered agricultural areas are associated with continued collective protection. Because wildlife modify activities to avoid detection, collective institutions are particularly stable when their practices are adaptive. Results contribute to the growing body of work considering animal agency in wildlife management, and suggest that the extended SES framework can offer a diagnostic tool to identify communities with the potential to successfully adopt collective wildlife management. *Keywords: Human-wildlife interactions; institutions; social-ecological systems; animal agency; India*

Laura LaMontagne, Judith Otto, and Niall Stephens
Framingham State University

Panel Discussion: Transdisciplinary Collaboration In Climate Change Pedagogy: A Case Study

This panel discussion is led by three Framingham State faculty members (Communication Arts, Economics, and Geography) who were selected to participate as fellows in the McAuliffe Initiative on Climate Education (MICE) in AY18-19. The charge to the faculty fellows was to create, curate and disseminate best practices in developing the new field of climate change pedagogy by working in trans-disciplinary groups. The three panelists will describe the components of their respective course projects and the connections between them, highlighting both the opportunities and the challenges in operationalizing real-world projects across three disciplines and three courses. Panel attendees will then be invited to participate in a broader discussion about how students best learn about and respond to the challenges of climate change across scales and across disciplines in practical, hands-on projects that can effect change by citizens and government officials. *Keywords: climate change education, transdisciplinarity, environmental economics, media studies*

Devon Lechtenberg
Capitol Regional Council of Governments, Hartford, CT

A Network and Spatial Autocorrelation Analysis of New England Commuting Patterns

The New England commuting network is analyzed from both a network analytical and spatial perspective. Network analysis emphasizes structural elements of connectivity within the network in contrast to spatial analysis that emphasizes attribute variation as a result of location. Combining these two approaches results in an analysis that can aid in our understanding of commuting patterns across large regions. Whereas previous research has sought to explain and predict accessibility using network analytical tools, this study instead seeks to model network connectivity in the form of degree of node using spatial analysis, specifically geographically weighted regression (GWR). It will be shown that outward-bound network links (out-degree of node) can be approximated using predictor variables such as resident working population, density of road network, accessibility, and mean travel time, among others. The results could shed light on how both network and spatial attributes make attractive from a commuting perspective. *Keywords: New England, transportation geography, network analysis*

Mary D. Lemcke-Stampone
University of New Hampshire

Overview: Chapter 18 Northeast, Fourth National Climate Assessment, Vol II – Impacts, Risks, and Adaption in the United States

The Northeast region's diverse climate and landscape is central to the cultural identity, quality of life, and economy of its residents, which makes them vulnerable to the impacts of climate change. The Northeast region is warming faster than the nation as a whole and is projected to reach 2°C above the pre-industrial era by 2035. Additionally, rates of sea level rise and ocean warming are projected to exceed the national average by end of century. This presentation provides an overview of the impacts of climate change on the Northeast region identified in Volume II of the recently released Fourth National Climate Assessment (2018). In order to capture the region's geographic diversity, the chapter spans the urban-rural divide and provides a physiographic cross-section of interconnected natural and socioeconomic systems that are vulnerable to climate change impacts from rising sea levels, changes in seasonality, and increased precipitation. Vulnerability to climate change varies across the region and the impacts faced by rural and urban communities are distinct. In response to present, and to prepare for future climate change impacts, communities across the Northeast are engaged in a variety of adaptation efforts at local, state, and regional scales.
Keywords: Northeast, climate change, National Climate Assessment

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Matt McCourt
University of Maine at Farmington

Maine's CMP Corridor as a "Paracommons": The Spatial Politics of Financialization, Accumulation, and the Maine Woods

Schemes for linking Québec hydropower to electricity users in the northeastern US have produced decades-long controversies that have visited each of the New England states. Maine's Spanish-owned utility monopoly, Central Maine Power (Iberdola/Avangrid), proposed the most recent transmission project, the New England Clean Energy Connect (NECEC), or CMP corridor, a $1 billion 145-mile corridor high voltage line transmitting electricity from Hydro-Québec to Massachusetts through western Maine. Supporters of the CMP Corridor highlight the project's carbon impacts, rate savings, construction jobs, mitigation package, and property tax impacts. But the CMP Corridor has also drawn intense grassroots opposition, as well as astroturf campaigning by Maine-based power generators, for its impacts on fisheries, wildlife, recreational tourism, scenic amenities, and development of domestic renewables. The opposition—and support—has been dismissively characterized as N/YIMBY politics, but witnesses during multiple sessions of public testimony articulated a wide range of perspectives and spatial politics, contesting the financialization at the heart of the Corridor, calling out the project's

susceptibility to rebound, and engaging in a wider critique that can effectively understood as competing claims on the "paracommons" (Lankford) represented by renewables development in and through the Maine Woods. *Keywords: CMP Corridor, paracommons, financialization, Maine*

Ethan Mehlin and Vincent Breslin
Southern Connecticut State University

GIS Color Contour Mapping of the Spatial Trends in Sediment Physical Properties and Metal Contamination in Connecticut Harbors

Students and faculty at the Werth Center for Coastal and Marine Studies have examined the spatial trends in Connecticut harbor sediment metal contamination. Geo-referenced sediment surface grab samples from 14 harbors over 19 years (2001-2019) have been examined for sediment grain size, loss on ignition and heavy metals (copper, zinc, and mercury). The organization and presentation of the harbor data in its current form in spreadsheets is useful for scientific analyses but a less than optimal format for decision-makers. Contour maps using NOAA sediment quality thresholds are highly visual and are useful in identifying areas in harbors where benthic marine organisms may be adversely affected due to contaminated sediment. Sediment metal concentrations and physical properties (grain-size and loss on ignition) were mapped in ArcMap 10.5.1 according to categories defined using sediment quality guidelines and known sediment grain-size categories. These points were analyzed using inverse distance weighting, resulting in maps that were then edited in Arcmap to have the same color scheme and comparable scale categories. Each parameter scale was created with seven or eight categories; the highest range for metals was defined by the Effects Range Median for each respective metal while the lowest category was equal to or less than each metals' respective crustal abundance. These maps can be useful in identifying areas within harbors for shellfish habitat restoration/expansion, identifying areas of concern for dredging projects, inform harbor development activities, and highlight areas of concern for sediment resuspension (storm events).
Keywords: GIS mapping, Sediment contamination, Connecticut, harbors

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Matthew D. Miller
Southern Connecticut State University

The Bathymetric Rises and Falls of New Haven Harbor

As part of coastal environments, harbors are subject to an array of forces that impact their bathymetry. Erosional processes, water currents, tectonic uplift, and anthropogenic factors all contribute to the changes in bathymetry coastal areas experience through time. This study examines the bathymetric history of New Haven Harbor through the use of nautical charts

dating from 1846 to 2017 and discusses the forces that have changed the coastline and depths within the harbor. In addition to the natural sediment movement processes in any coastal environment, New Haven Harbor has experienced significant modifications of the harbor floor and coastline by people in order to aid navigation to and within the harbor. These modifications, and their impacts, become evident through the mapping of the shoreline through time and the interpolation of bathymetric layers using the depth measurements from the nautical charts. By using the rates of bathymetric change in the harbor, as calculated through the interpolated bathymetric layers, times to the breaching of the water's surface by the harbor floor are determined. *Keywords: New Haven, harbor, bathymetry, coastal, dredging*

Jesse Minor and Matt McCourt
University of Maine at Farmington

Using Role-Based Assignments For Critical Encounters During Field Trips

Full student engagement on field trips can prove challenging to promote and maintain. We present results of a pilot experience with first-year, mostly first-generation college students on an intensive week-long field trip that occurred before the beginning of their first semester. Our course, titled "Making Change in Maine," was centered around encounters with 20 'changemakers' engaged in creative solutions to rural sustainability in interior and coastal Maine. These changemakers represented a wide range of interests ranging from disruptive philanthropy and community development to local food, public safety, and waste management. Before each encounter, students were assigned formal roles with concrete responsibilities to the group, including acting as spokesperson, photographer, asking big-picture or follow-up questions, being attendant to factual details or setting, and "caring" for the group. Pairs of students rotated through the various role assignments over the course of the trip. Assigned roles allowed division of labor and created teams within which students could strategize about tasks and reflect on the experiences. Pre- and post-trip assessments reveal that students report greater comfort with skills such as teamwork (55%), "caring" for others and innovation (44%), and monitoring/evaluating information (33%). Students report greater capacity in habits such as group speaking (55%), organization (33%), and planning (28%). Students report lower frequencies of skills such as leadership (11%) and decision making, logistics, and implementation (5%) and in habits such as tolerance for uncertainty (5%). Pre- and post-assessment show student growth through the assigned roles, which map onto traits that predict college success and retention. *Keywords: Assessment, experiential education, field-based pedagogy, First Year students, Geography education, retention*

Laura Cristina Abreu Molina
Southern Connecticut State University

Perceptions of Climate Justice Among Southern Connecticut State University Students

It is becoming increasingly clear that we are in a state of climate crisis. Global temperatures are rising, ecosystems are dying, and developing nations are experiencing the impacts at a heavier rate than developed nations. As global climate change calls for action, the climate justice movement aims to address it. The purpose of this study is to better understand university students' knowledge of, and attitudes towards, the climate crisis and climate justice. This research is of particular importance given that the university recently signed a climate emergency declaration. This is an exploratory project which employs quantitative and qualitative approaches, since it has been shown that a mixed methods approach provides depth and breadth of understanding on a given subject. This paper presents initial findings from the study outlining key themes underpinning student understandings towards, perceptions of, and engagements with, the climate crisis and climate justice. This paper concludes with implications for engagement and practical applications for implementing climate actions through triangulating the similarities and differences between students' perceptions towards the climate and climate justice with a university being one of the first in the U.S. to declare a climate emergency. *Keywords:Climate Crisis, Climate Justice, Climate Emergency, Student Engagement*

Josh Nolan
University of Massachusetts Amherst

"A Huge Extension Cord" Deliberations Over The Northern Pass And The Role Of Local Communities In Transmission Infrastructure

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. Interconnecting hydropower generation sites in Québec to the carbon and electricity markets in Massachusetts necessitates the construction of high-voltage transmission lines through Northern New England. This, in turn, requires the permission of authorities along the transmission routes.

The various impacts of power lines on communities along their route had not been the focus of Massachusetts policies, but political opposition has descended from New Hampshire and Maine where Eversource and Central Maine Power have proposed high voltage lines. The Northern Pass transmission project was the center of controversy in New Hampshire. To interconnect to the Québec grid, the Northern Pass was proposed across 190 miles in New Hampshire.

Ultimately, despite Eversource's efforts, the project was defeated in protests, in boardrooms, and finally in the State Supreme Court. The power line's opposition is embedded in historical relationships between places and peoples. Northern New England has unique political geography allowing for populist activism, as well as historical grievances towards southern New England exploiting and despoiling the North's lands and waters. Undeterred, hopeful investors are charting alternative transmission routes from the Canadian border to Massachusetts. There are lessons from the fight over the Northern Pass that inform emerging local struggles in new proposed transmission routes. This has the potential to open opportunities for democratic agency in the transformation of New England's grid. *Keywords: Energy Democracy, Energy Planning, Decarbonization, Hydropower, Northern Pass, Landscape Preservation, Scenic Resources, Outdoor Recreation and Tourism*

John F. Obrycki[a] and Maitreyi Mazumdar[b]
Department of Neurology, Boston Children's Hospital[a] and Harvard T.H. Chan School of Public Health[b]

Multi-study opportunities to explore spatial distributions of water arsenic in Bangladesh

The combination of climate change and its associated effects on water quality are of particular concern in Bangladesh. Several decades ago, much of the country shifted from surface water sources to tubewells as a mechanism to avoid water-borne diseases. However, Bangladeshis were exposed to elevated levels of water arsenic that were naturally-occurring in the groundwater. Multiple health effects were documented throughout the country, and the British Geological Survey conducted a widespread sampling of tubewells to evaluate the extent of the water arsenic problem. Water arsenic concentrations are variable even over small distances, making full documentation of the water arsenic problem difficult and pointing to the need for additional water quality testing. This study provides a novel combination of water quality data from three studies with approximately 550 water arsenic tubewell samples collected throughout Bangladesh. These samples were collected as part of National Institutes of Health-funded research projects that investigated health effects of arsenic exposure. The water arsenic concentrations were mapped and compared to the previously collected data from the British Geological Survey to identify regions where spatial variability in water arsenic concentrations may require further testing to protect public health. Multiple areas were identified where small-distance spatial variability could be of concern for developing predictive exposure equations. As available water resources change due to the effects of climate change and potential human migrations, research is needed to ensure that safe water sources are available in Bangladesh. *Keywords: Bangladesh, water arsenic, spatial distribution*

Shannon Reault, Haoyu (Novak) Chen, Benjamin Ryan, Nicholas Geron, and Marc Healy
Clark University

An Analysis of Juvenile Tree Health in Massachusetts' Greening the Gateway Cities Program

The Greening the Gateway Cities Program (GGCP) is a Massachusetts state program aiming to increase urban canopy cover in order to decrease home energy costs in neighborhoods that meet environmental justice criteria. This study presents an analysis of GCCP tree mortality and site conditions that affect growth and vigor in Leominster and Pittsfield. Juvenile tree survivorship and vigor were evaluated in relation to genus, planting location, and tree structure. In June-July 2019, 867 (Leominster) and 926 (Pittsfield) trees were surveyed, via stratified random sample. Results show above average juvenile tree survivorship (Leominster- 90%, Pittsfield 87%) compared to previously surveyed gateway cities (87%). Site type demonstrated a stronger influence on tree health compared to land-use, especially in the site type case of sidewalk cutout. Residential trees planted within five feet of impervious surfaces displayed significantly higher vigor than those planted beyond five feet ($p = 0.0198$). In contrast, non-residential trees did not display a significant trend. Furthermore, significantly more ($p = 0.0012$) street trees are living (94%) in comparison to other maintained areas (87%), which indicates that street trees are not impacted by proximity to impervious surfaces. Low mortality in street trees could be linked to contrasting stewardship practices that occur between street trees and other maintained trees. *Keywords: Greening The Gateway Cities Program, tree vigor, survivorship, land use, site type, distance to impervious surface*

Shaina Rogstad
University of Massachusetts Amherst

A critical perspective on temperature targets as a climate metric: a case study of Antarctica

The goals of the international efforts to combat climate change as set forth in the Paris Agreement are defined based on global mean surface temperature. However, the exclusive focus on temperature as a metric of climate change severity can overshadow consideration of other climate factors. Global climate model simulations of the future impacts of meltwater from the Antarctic Ice Sheet (AIS) show a delay in global mean surface temperature rise, however other impacts of an AIS collapse have wide reaching detrimental effects. AIS collapse will lead to substantial increases in global mean sea level, increases in storm surge and coastal flooding, and changes in sea ice extent which will impact biodiversity. The delay in global mean surface temperature rise caused by an AIS collapse could be interpreted as allowing more time for the temperature threshold to be reached. Yet, the collapse simultaneously exposes island nations to catastrophic sea level rise impacts. In this presentation I use a critical perspective to analyze the

case study of Antarctic meltwater impacts and how they relate to the temperature targets put forth in the Paris Agreement. *Keywords: Climate change, sea level rise, Paris Agreement, climate negotiations*

Allyson Rokita
Plymouth State University

Investigating the Geographic Compnents of Human Trafficking in New Hampshire

Human trafficking is a form of irregular migration characterized by the recruitment of people via force fraud, or coercion for the sake of exploiting them for labor or sex. Despite the nexus between population and economic geography and human trafficking, there is meager literature on the subjects' intersection on a national scale. To stitch these subjects together on a state wide scale, a study using geographic variables, including the location of opioid overdoses, shall be compared to the locations of leads, investigations, and prosecutions of human trafficking cases, throughout New Hampshire as provided by the New Hampshire Human Trafficking Task Force. The data shall be illustrated by ArcGIS. The purpose of this presentation is to discuss possible indicators of modern day slavery and to refine the methodology of this proposed study before the research project is executed. *Keywords: Human Trafficking, New Hampshire, Undergraduate Student, Population Geography*

Aiden Saulnier
University of Maine

Is it really Industrially Compostable?

Industrial Compostables (ICs), which on average produce 68% less Greenhouse Gasses than petroleum-based plastic (Kushner 2019), have rapidly risen in popularity over recent years. ICs present themselves as an environmentally-conscious alternative to standard single-use papers and plastics at a time when the U.S. Recycling Industry is in major disarray. Unfortunately, with less than 300 Industrial Compost facilities in the U.S., many of these products will end up contaminating recyclables and going into the waste stream, where their breakdown is not significantly different from non-compostables.

During a two-week trial period, the breakdown capability following ICs was measured in a partially active compost pile at the Tom Eastler Memorial Compost Site: Polylactic acid/PLA (plant-based plastic) cups, straws, utensils, bags, as well as plant-based paper plates and bowls were among the test-subjects. Although test results were not fully conclusive, it is evident that

among all products tested, PLA bags degraded the fastest, especially when in a shadier, more moist part of the pile.

This study sets guidelines for a future Community Bio-Scrap Drop, which will likely gain major popularity with people who live in apartment buildings, and may not have access to a large enough outdoor space to operate their own home tumbler.

Anna Therien
Westfield State University

Focusing Regional Conservation through Local Town-Based Plans

Wildlands and Woodlands (W&W) is a conservation vision for New England that calls for protection of 70% of forests and 7% of farmland. This is a regional goal for New England, but actual success of this vision will depend on decisions and objectives of landowners and communities. I studied these issues in the Pioneer Valley, which is located in the western part of Massachusetts and is made up of three counties; Franklin, Hampden, and Hampshire. In total there are 69 towns and most of them have Open Space and Recreation Plans (OSRPs) which are created from input and feedback from the townspeople. These documents provide a comprehensive explanation of the community, the natural resources they have, community surveys/opinions, goals, objectives, and a seven-year plan to complete the objectives they outline. We collected 63 OSRPs and obtained data from them, mainly focusing on their goals/objectives and their seven-year action plans. These data were combined into an excel sheet with different categories. I then took the text we had collected from the OSRPs and quantified it. By doing this I was able to quantify and analyze town goals. The resulting Excel sheet and maps made from the data are tools that can help inform land trust, planning, and community partners in a developing regional conservation partnership to advance their conservation work in a way that makes sense for different regions and towns.

Jacqueline M. Vadjunec
National Science Foundation, Geography and Spatial Sciences

Writing Effective National Science Foundation (NSF) Proposals in Geography and Related Fields

This outreach session is intended for faculty members, professional geographers, and graduate students who engage in geographic or related spatial scientific research and who wish to learn how to prepare effective proposals for NSF. A Program Director from the Geography and Spatial Sciences (GSS) Program at the National Science Foundation (NSF) will discuss research

grant opportunities at NSF, and will highlight ways to improve the quality and competitiveness of a proposal. The session will include details about the review process, including the intellectual merit and broader impacts review criteria. Ample time for Q&A will be provided. *Keywords: National Science Foundation, grant writing, funding opportunities*

Eve Vogel[a], Josh Nolan[a], Emily Chang[b], and Steve Hayes[c]
University of Massachusetts Amherst[a], Union of Concerned Scientists[b], and Texas A&M[c]

Québec Hydropower For a Green Massachusetts? Tracing the Policies and Politics of Renewable Power as a Socioecological Fix.

To reduce climate change, many advocate large-scale development of renewable power. Yet as critical authors have recently shown, renewable energy development is often as much a product of capital seeking a "spatial fix," new locations for investment and profit. It is also a "socioecological fix," transforming socioenvironments in ways that spatially locate potential political challenges near the site of infrastructure, not necessarily near the sites of decision making. We examine the drive for renewable electricity in Massachusetts; the interrelated drive for large hydropower development in Québec, Canada; and the local and regional decision making around construction of one specific hydropower project in Québec and a transmission line proposed to connect the Québec and Massachusetts grids.

We argue Massachusetts' and Québec's approaches must be understood within the context of their shared, though distinct, history of neoliberal electrical restructuring in the late 1990s, and their equally shared desires to promote economic development with affordable energy. In the Romaine River hydropower project, these forces are playing out with a four-dam project on a recently pristine river, and a bilateral financial settlement with several bands of the Innu nation. Only in New Hampshire, where a major transmission line was proposed, and the material connections between supply and demand could not be missed, did the drive for development and the resistance to landscape change join into an integrated public policy debate.
Our work is built on multi-state, binational media archives, supplemented and triangulated with interviews as well as critical and historical literature. *Keywords: Key Words: Renewable energy, socioecological fix, Hydro-Québec, Massachusetts Global Warming Solutions Act, electric restructuring*

Stephen Young
Salem State University

Bringing Climate Changes Issues to the Public Through Art and Science Exhibitions.

Every day in the science journals there are more and more articles about how our climate is changing as well as articles about the current and future detrimental effects. Yet as a society we continue with our destructive activities. Scientists are now engaging the public in a number of different ways to bring about changes in our societal behavior. One avenue is through public exhibitions. This presentation will discuss the recently launched art & science exhibition: Climate Change: Taking action with modern mapping techniques. This exhibition focuses on the North Shore of Massachusetts and is made up of three components: 1) large format posters mapping sea-level rise, the urban heat island effect and a ranking of the resiliency of land covers on the North Shore, 2) drone imagery (still and video) of the Great Marsh (ground zero for sea-level rise on the North Shore) and 3) conceptual art challenging the viewers about climate change on the North Shore. *Keywords: Climate change, art and science, exhibitions*

Instructions For Contributors to *The Northeastern Geographer*

A typical manuscript should be between 12 and 20 double-spaced pages of text. The journal will consider both shorter and longer pieces depending on their appropriateness. Articles submitted for consideration must be typewritten using Times New Roman 12-point font, double-spaced, 1-inch margins and with a minimum of special formatting. Electronic submission is preferred as a Word document. Do not place any identifying information in your manuscript or your file names to ensure a blind review. This includes names of authors, their affiliations or acknowledgments.

Articles MUST contain the following:

A title page **without** the author's name (to ensure a blind review)
An abstract of no more than 250 words with 4-5 keywords
The body of the paper
Separate pages for notes
Separate pages for references
Separate pages for figures, table and maps
The *Chicago Manual of Style* should be consulted for all style questions. Authors may also use the *Annals of the Association of American Geographers* to help resolve any formatting questions or issues. See: the *Annals* Style Sheet: http://www.aag.org/galleries/publications-files/Annals_of_the_AAG_Style_Sheet.pdf

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