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Hydroelectricity, Environmental Governance and Anti-Reflexivity: Lessons from Muskrat Falls

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Abstract: Hydroelectric projects are often pursued on the promise of economic development and environmental co-benefits as a source of low-carbon energy. We analyse the case of the Muskrat Falls hydropower mega-project (located in Labrador, Canada) to understand why this project failed to live up to its promised benefits, but instead delivered a double disaster of economic cost and environmental risk. The key concepts of anti-reflexivity and deep stories help us understand why the project assumed an aura of inevitability in political and public discourse until it was too late to change course. Drawing on publicly available data and secondary sources, we identify the constellation of social forces that maintained political anti-reflexivity about the economic and environmental risks of the project and led to a double economic and environmental disaster. Our analysis identifies vital lessons for countering anti-reflexivity and improving environmental governance related to energy mega-projects.

Keywords: governance; hydroelectricity; hydropower; energy; climate change; Canada

Citation: Stoddart, M.C.J.; Atlin, C. Hydroelectricity, Environmental Governance and Anti-Reflexivity: Lessons from Muskrat Falls. *Water* **2022**, *14*, 1992. https://doi.org/10.3390/w14131992

Academic Editor: Mohammad Hossein Niksokhan

Received: 10 May 2022
Accepted: 18 June 2022
Published: 21 June 2022

1. Introduction

Muskrat Falls (the Lower Churchill Project) is a hydroelectric mega-project located on the lower Churchill River in Labrador, Atlantic Canada (see Figure 1). This project promised both economic and environmental benefits for the province of Newfoundland and Labrador. Economic benefits were to include securing reliable affordable power for the province, as well as income from the sale of surplus energy. The project was also promoted on the environmental rationale that renewable hydroelectricity would displace oil as a fuel source for the provincial energy grid, thereby substantially cutting the carbon footprint of the region. However, the notion that hydroelectric development is a key step in creating a decarbonized energy system—a claim often made by decision makers beyond our specific case study—is not so straightforward. Hydropower development often masks a range of potentially negative social, economic, and environmental impacts, and so deserves closer scrutiny as we think about societal pathways towards decarbonization.

Despite the promise of economic and environmental co-benefits, Muskrat Falls evolved into a disaster of ballooning costs and diminished prospects of returns for public investment. Even before the COVID-19 pandemic, the government of Newfoundland and Labrador was facing a fiscal crisis due to unsustainable costs of debt servicing. A strong warning sign came in the spring of 2020, when then-Premier Dwight Ball wrote a letter to Canadian Prime Minister Justin Trudeau "warning that the province had 'run out of time' to find money to fund government operations" [1]. The spiralling costs of the Muskrat Falls project—from an estimated CAD 6 billion when the project was sanctioned to over CAD 13 billion in 2020—are a significant driver of this fiscal crisis. In her analysis of the 2008 global financial crisis, Walby notes the potential for crises to "cascade" from financial and economic crises to political crises for governments, and possibly onwards to systematic democratic crises [2]. The fiscal crisis of Muskrat Falls similarly threatened to cascade into a political crisis for the provincial government.

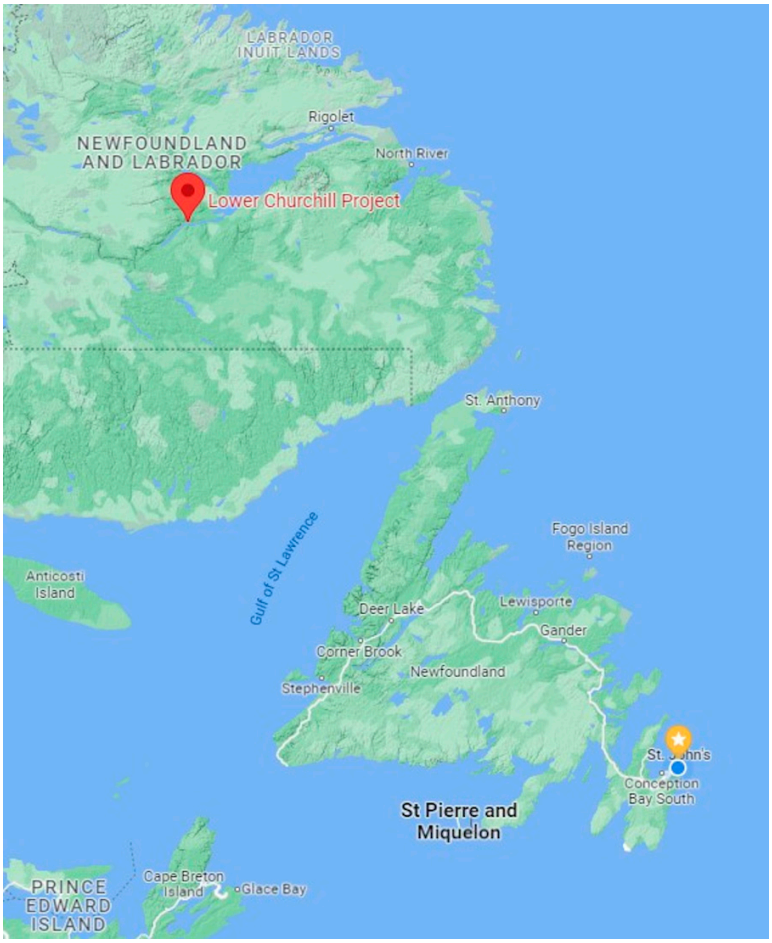

Figure 1. Location of the Muskrat Falls (the Lower Churchill Project). Source: Map data ©2022 Google.

An inquiry was set up to examine the processes that led to the Muskrat Falls "boondoggle" (a widely used term in media reporting), though the scope of the inquiry was not to assess criminal liability or responsibility. The public inquiry concluded that Muskrat Falls was a fundamentally "misguided project" [3]. Academic studies similarly note that Muskrat Falls is central to the ongoing fiscal crisis and risk of provincial insolvency in Newfoundland and Labrador [4]. Despite the public inquiry, individual decision makers and project managers have not been made legally or financially responsible for the negative outcomes of the project.

Muskrat Falls has also become an object of contention over environmental risks and environmental health impacts for downstream—largely Indigenous—communities in Labrador [5–8]. The downstream ecological impacts of the project were considered in depth in the Joint Panel Review, the most robust type of environmental assessment available under the Canadian Environmental Assessment Act 2012. The Panel determined that the proponents had not fully explored alternatives for the project, particularly given the scale of potential ecological impacts, as well as impacts to Indigenous rights. The Panel found "significance findings", meaning impacts that would measurably negatively impact the local and regional ecosystem, related to fish and fish habitat loss, terrestrial habitat loss, riparian habitat loss, and the risk to the threatened Red Wine Mountain caribou herd. Additionally, the Panel findings raised concerns about impacts to Aboriginal rights related to fishing and hunting on Lake Melville and in Goose Bay [9]. However, as we discuss in more detail below, decision makers proceeded with the project despite these early red flags.

We ask what discursive strategies and elements of political culture worked to support anti-reflexivity and ensure the implementation of Muskrat Falls until it was seen as too

late to change course? The key concepts of anti-reflexivity [10–12] and deep story [13] are particularly useful for understanding this economic and environmental double disaster. We highlight the key forms of anti-reflexivity that can give mega-projects an air of inevitability and reduce space for opposition, thereby offering lessons for improving environmental governance in mega-project planning beyond the Muskrat Falls case study.

2. Theoretical Framework

2.1. Reflexivity and Anti-Reflexivity

The concept of reflexivity refers to the process whereby social actors reflect on their situations based on their values, cultural beliefs, social interactions, and identities and choose a path of action on this basis [14,15]. Reflexivity is seen as increasingly characteristic of contemporary societies, driven by discourses of social progress at the macrosocial level, and of notions of self-improvement at the microsocial level [16,17].

Drawing on Archer's version of reflexivity theory, Davidson elaborates on the concept of reflexivity for environmental social science to focus on how people process their experiences and new information in ways that contribute to pro-environmental changes in beliefs and behaviours [10]. Reflexivity also has an organizational or political dimension as new information on emergent problems provokes social learning and changes to policy or practice. At the organizational level, reflexivity includes "anticipating the possible reactions of the public" and adjusting organizational practices and decisions accordingly [18]. Conversely, anti-reflexivity refers to political strategies, social biases, or dominant discourses that work against cultivating reflexivity or engaging in social change. The concept of anti-reflexivity has been applied to the persistence and political efficacy of climate denial as a barrier to action on climate change [11,12].

Davidson uses reflexivity theory to explore how landowners in Alberta come to question hydraulic fracturing and the dominant economic boosterism about the provincial oil and gas sector [15]. Reflexivity about the impacts of oil and gas development on cherished landscapes is a key part of how some people decide to go against community norms and become activists in a setting where oil and gas extraction are broadly seen as social goods. Similarly, Davidson and Stedman argue that reflexivity about ongoing ecological change, as well as perceptions of likely future environmental impacts, are essential processes for transforming individual action into a "collective ability to confront dilemmas like climate change" and to initiate and follow through on projects for social change [19] (p. 82). Drawing on Canadian survey data, they examine a range of orientations towards climate change and find that those who adhere to "climate catastrophe" views of climate change are most likely to engage in personal and collective climate action. On a macrosocial or societal level, collective processes of reflexivity are important for generating political recognition and action to resolve large-scale crises, including climate change [16,20].

Building on Archer's work [14], Davidson also elaborates on the concept of anti-reflexivity. These are social, political, and discursive techniques used to deflect public attention from critical engagement on environmental issues [10]. The concept of anti-reflexivity has been used to examine how anti-environmental movements impede the environmental reflexivity needed to identify and implement climate change solutions. The U.S. climate denial movement and conservative media outlets have been social forces for anti-reflexivity by promulgating narratives of scientific uncertainty and linking climate scepticism with conservative and Republican political identities, which has reinforced a political culture of "non-decision-making" about climate action [11,21]. Young and Coutinho contribute to the concept of anti-reflexivity in their analysis of Canadian climate change media coverage [22]. They argue that media discourse is a force for anti-reflexivity as it perpetuates public ignorance regarding climate science and climate policy. Here we see how reflexivity or anti-reflexivity can be provoked by organizational actors in the public, political, and media spheres. This leads Dunlap and McCright to define anti-reflexivity as a "rearguard force defending the industrial capitalist system from widespread scientific,

political, and public acknowledgement of the system's unintended and unanticipated consequences, such as climate change" [21] (p. 321).[1]

The other key concept that forms our theoretical framework is Arlie Hochschild's notion of "deep story" [13]. Deep stories are shared narratives about the social world that serve as foundations for (and help legitimize) political views and orientations. Hochschild develops the concept of deep stories through ethnographic research with Tea Party supporters in Louisiana who live in highly polluted areas. She uses the concept to explain why people align with political projects that oppose environmental or workplace policies that seem to be in their interests. She rejects the notion that this segment of conservative Americans are simply dupes of Fox News and right-wing public intellectuals. Instead, Hochschild identifies the "deep story" that has become well aligned with the politics of the Tea Party (as well as the right-wing populism embraced by Donald Trump). Deep stories are not deep in the sense of narrative complexity or layers of detail, but instead refer to narratives that are widely shared and have substantial cultural resonance among social groups. As Hochschild notes, a key characteristic of deep stories is that they *feel* true to their adherents and criticisms are dismissed out of hand. As we show in our analysis, "deep stories" contribute to anti-reflexivity in the Muskrat Falls case.

Norgaard's ethnographic research on climate change in Norway demonstrates why it is useful to link deep stories and anti-reflexivity, though she does not explicitly draw on this conceptual framework [12]. Norgaard notes that Norway is a country that is paradoxically characterized by high levels of public environmental awareness, but also a high degree of dependence on the oil and gas sector for its social wellbeing. Norgaard documents the everyday social narratives that function as deep stories that legitimate climate inaction and contribute to anti-reflexivity, such as that Norway is a small country with a history of underdevelopment prior to the oil boom. Through Norgaard's work, we see that the way anti-reflexivity is inculcated by culturally deep stories does not necessarily rely on the intentions or strategic action of specific political actors. These deep stories shore up anti-reflexivity because they help set the boundaries or direction of eco-political conflict by creating challenges for those who want to provoke greater environmental reflexivity.[2]

We make a connection between deep stories and reflexivity/anti-reflexivity because deep stories are one of the ways in which anti-reflexivity can be maintained in the public and political spheres. Conversely, attempts to provoke environmental reflexivity often need to surmount culturally embedded deep stories. While individual politicians may invoke deep stories to justify their decisions or actions, part of the power of deep stories is that they are diffuse and do not depend on the strategic action of individual political, corporate, or anti-environmental actors.

2.2. Anti-Reflexivity, Hydroelectric Development, and Anti-Dam Movements

Applications of the concepts of reflexivity and anti-reflexivity to environmental politics most often focus on fossil fuel development and climate change. We extend this theoretical framework to studies of hydroelectric development. In recent years, hydroelectric development has been promoted by policymakers and others as an integral part of decarbonized energy systems. However, hydroelectric mega-projects also "grossly change hydrological regimes and tend to irreversibly alter the ways in which local communities are able to make their livelihoods" and so often provoke opposition [23] (p. 4). Since the introduction of modern impact assessment processes, these mega-projects have been subject to often lengthy processes of environmental assessments and public hearings (as well as occasional legal challenges. However, despite these procedural checks, proposed dam projects are rarely rejected through the impact assessment process [24]. An overview of prior research suggests several themes related to how anti-reflexivity plays out in hydroelectric development and how it might be challenged by anti-dam movements. These themes also find resonance in our analysis of the Muskrat Falls project.

Anti-reflexivity is embedded in hydroelectric development as it is pursued as a nation-building project. The expansion of hydroelectricity across Canada began as a wartime

industrial exercise [25] and continued as an economic driver for both export and heavy industrial activities [26]. As part of this history, legal scholars Scholtz and Polataiko examine the 1970s creation of the James Bay Northern Quebec Agreement (JBNQA) between the Quebec provincial government and northern Inuit and Cree communities, which set the groundwork for hydropower development in the James Bay region [27]. By facilitating hydropower development as part of a nation-building project under the separatist Parti Quebecois, the JBNQA allowed the government of Quebec to enhance its reach and administrative power over the northern region of the province. Narratives of dams as nation-building projects that use technological rationality to meet development objectives is also seen in pro-dam political discourse in diverse contexts such as Brazil [28], Pakistan [29], and the Lower Mekong Basin [30].

Hochschild's notion of deep stories comes into play as decision makers invoke narratives that resonate with the public while limiting reflexivity about the shortcomings of mega-project development. Loo approaches Muskrat Falls from a historian's perspective and emphasizes how the project was framed by the government as much-needed retribution for the perceived injustices of the earlier 1969 Churchill Falls agreement and hydroelectric development on the Upper Churchill River [6]. In the lead up to Muskrat Falls, political leaders drew upon a common understanding of the Churchill Falls agreement as unfairly benefiting Quebec at the cost of Newfoundland and Labrador. The dominant precrisis narrative used Muskrat Falls to link "development and self-determination" as a province [6] (p. 272). As we further explore in our results, this deep story reinforces the notion of hydropower as a nation (or province) building project, while also limiting space for dissent and public critique.

Elsewhere, da Silva and Rothman analyse media coverage of anti-dam protests in Brazil. In this case, dominant media narratives draw on a deep story that equates hydro mega-projects with societal progress [28]. Anti-dam voices are marginalized from media visibility and critical views are discounted in the face of this deep story. Where public protests garner media attention, including the "occupation of dam construction sites and offices" through civil disobedience, media narratives frame these as illegal activities, thereby helping to depoliticise protests and reinforce narratives that see hydro mega-projects as essential for development [28] (p. 751).

Political leadership can also feed into anti-reflexivity. Bakker and Hendriks (2019) analyse the contested basis of knowledge related to the Site C dam in Northern British Columbia [31]. They describe a culture of "pervasive appraisal optimism", a term coined by World Bank evaluator Besant Jones. Pervasive appraisal optimism systematically underestimates the likely social, ecological, and economic risks of the project, often externalizing them from assessment, while it simultaneously overestimates the social benefits. Site C generates risks to treaty rights for regional Indigenous people, environmental problems, limited greenhouse gas reductions, and fewer employment benefits than alternative approaches to power generation. The government reviewed the project multiple times after construction had begun but concluded the project was too far along to be halted. Bakker and Hendriks conclude that Site C is thus a product of "manufactured ignorance" by decision makers.

Prior writing on Muskrat Falls also shows how hydropower conflicts reflect the limited political power for Indigenous and other marginalized communities. Samson notes that creating a Comprehensive Land Claims (CLCs) agreement with the Innu Nation in Labrador was part of creating the "certainty" needed to proceed with Muskrat Falls. As such, the Innu Nation CLC includes promised community benefits from Muskrat Falls, whereby "handing over of Innu lands and waters to Nalcor" is balanced by promises of financial compensation and employment for Innu workers [32] (p. 100). However, many are sceptical that meaningful financial benefits from Muskrat Falls will be seen by the Innu Nation [33]. Furthermore, as the Muskrat Falls project was sanctioned and proceeded, concerns were raised about downstream environmental health risks, as well as concerns about the lack of meaningful consultation with Labrador Indigenous communities in the lead up to the

project [5]. Similar impacts are demonstrated in Norgaard's work with the Karuk Tribe in the Klamath River basin in northern California [34]. By interfering with salmon lifecycles and population health, dams play a pivotal role in disrupting Karuk diets and relationships with the land, with serious long-term impacts on community health. The community health and environmental justice impacts felt by the Karuk tribe over the past few decades are consistent with anxieties described by Labrador Indigenous communities in relation to Muskrat Falls [5].

Elsewhere, Nor-Hisham and Ho examine conflict over Kelau Dam in Malaysia and highlight how local community opposition is constrained by pro-developmental forces [35]. They note that the environmental assessment process for the dam was the main avenue for local communities to express concerns about the substantial livelihood impacts of the dam. However, this forum marginalized community concern in a double sense. Most community members lack " the means, capability and resources" to participate in the environmental assessment process, meaning that the scope of community concern could go unrecognized [35] (p. 1198). For those who were able to participate, the environmental assessment approval was largely symbolic, so that while communities could voice their concerns, these had little efficacy on decision making about whether to proceed with the project. The authors conclude that formal assessment should be strengthened to better provide institutional avenues for marginalized communities to contest the entrenched political and economic interests that treat mega-project development as inevitable.

Hydroelectric development is often imbricated in centre–periphery dynamics between economically and politically powerful urban centres and rural regions that are treated as important resource pools but are politically marginal. A substantial body of research on anti-dam movements in various parts of the world demonstrates that social movements and civil society organizations have a potentially valuable role in provoking political reflexivity and countering anti-reflexivity by skilfully navigating these centre–periphery dynamics.[3] Niazi examines the controversy over the proposed Kalabagh Dam in Pakistan [29]. Despite government support for the project, which is defined as a "temple of progress" supported by economic and technological rationalities, the project remains in stalemate [29] (p. 452).[4] This is due to the successful opposition of coalitions of local communities, environmentalists, and nationalists who draw on a counter-discourse of local ecological knowledge rooted in farming and fishing, as well as a "spiritual attachment to the Indus" that helped bridge these diverse interests [29] (p. 448).

Maher looks at anti-dam resistance by Mapuche Indigenous communities in rural Chile and finds evidence of "pragmatic resistance", wherein community members skilfully leveraged the affordances of corporate social responsibility and the social license to operate to shift between cooperation and conflict with energy sector corporations [36]. This led to a dual strategy of navigating corporate benefits if the dam was to proceed, coupled with opposition to the project through public protest, collective action, and aligning with other local stakeholders to preserve the Lake Neltume landscape from hydropower development. Importantly, these results show that processes of reflexivity and anti-reflexivity are not always separate, but the same social groups or political actors may contribute to both as they navigate specific development conflicts.

In their cross-case analysis of Columbia, India, Lesotho, and Spain, Shah et al. identify common factors that contribute to the success of anti-dam movements [37]. They argue that successful anti-dam movements often draw on support from "urban intelligentsia" and external social movement or civil society organizations that serve as brokers between local communities and national and international political areas. These external brokers contribute to political reflexivity by connecting "red" (livelihood) and "green" (environmental) currents of anti-dam resistance.

Thorkildsen analyses the factors that enabled successful anti-dam resistance by the Movement of People Threatened by Dams (MOAB) in Brazil [38]. She similarly identifies the ability of local communities to scale shift the anti-dam conflict as a vital factor for creating political efficacy. Community members de-localized anti-dam conflicts by forming

networks with—and learning from—other communities that were downstream from existing dams. Scale shifting also involved shifting focus from state governments to national and international political spheres and re-framing movement claims around procedural dimensions of justice and energy democracy.

Yong and Grundy-Warr examine conflicts over hydropower development in the Lower Mekong River basin and illustrate how hydropower controversies can reflect different discourses about the meaning of sustainable development [30]. The pro-dam position connects a developmentalist discourse with notions of hydropower as clean and sustainable energy. By contrast, the anti-dam position centres on negative downstream livelihood and biodiversity impacts to wild fisheries and agricultural landscapes. As in other cases, community opposition gains political efficacy by circumventing centre–periphery political dynamics through scaling up to align with national and international actors around the critical discourse of hydropower as unsustainable for local livelihoods and biodiversity values.

The theoretical literature on reflexivity and anti-reflexivity, in combination with prior research on hydroelectric development and anti-dam movements, leads us to our research question: What elements of political culture and discursive strategies worked to maintain anti-reflexivity and ensure the implementation of the Muskrat Falls hydroelectric project until it was seen as too late to change course? Much of the research literature on hydropower controversies focuses on mega-projects and community resistance in the global south. This body of research provides key insight into how mega-hydro projects are legitimated through anti-reflexive discourses that position dams as politically neutral, technologically rational solutions to meeting development objectives. This research also shows how political reflexivity can be provoked as local anti-dam resistance aligns with extra-local social movement and NGO actors, who are important because they help reframe anti-dam discourse in ways that bridge livelihood and ecological issues and shift the conflict to national and international political spheres. Prior research on hydroelectric development highlights several dimensions of anti-reflexivity that we examine further in the Muskrat Falls case, including: hydropower as a nation-building project, deep stories, political leadership, limited political power of Indigenous or marginalized communities, and centre–periphery dynamics.

3. Methodology

We took a case study approach to the Muskrat Falls controversy. Data analysis was primarily based on an archive of secondary sources and written documents, including submissions to the Muskrat Falls Inquiry and the Joint Panel Environmental Assessment on the Lower Churchill, as well as the academic and grey literature related to development on the Churchill River. Additionally, eight expert interviews that focused on context were important data sources. The expert interviews were essential in shaping our understanding of the deep stories and anti-reflexivity processes at play, as well as referring us to important written and audio/video materials.

Document analysis provided the most evidence for our case study. Search pathways for data included database searches, citation tracing in relevant documents, and documents recommended by academic and community research project partners. Document retrieval was also guided by our semi-structured expert interviews. Newfoundland and Labrador is a small jurisdiction with a comparatively limited pool of knowledge holders about the project. As in many small polities, there is significant intersection between the private, public, and academic sectors, which in turn significantly influences public policy [39,40]. These subject experts were identified by our research partners with the Harris Centre—a Memorial University office devoted to public engagement—at the outset of the project. We reached out to 16 people and we were able to arrange conversations with eight people, while four additional people suggested key secondary materials. In other words, 12 of 16 people we contacted provided some form of response that helped inform our data collection and analysis. The eight expert conversations were semi-structured [41] and

were guided by common overarching questions: "What experience did you have with the Muskrat Falls project process?", "Can you tell me the story of Muskrat Falls from your perspective?", and "What additional information should we review to help us understand this project?" Additional questions emerged in response to the flow of conversation. Those that replied by email primarily provided key secondary materials. The four individuals that did not participate replied to indicate they were either unavailable or did not feel that they had sufficient expertise to provide insights (there did not seem to be any other common factors among non-respondents). These conversations focused on explaining why Newfoundland and Labrador made decisions related to Muskrat Falls and where evidence of this deep story could be found in documents and other materials. The interviews were explanatory in nature, where participants explained their understanding of what happened in the province to move Muskrat Falls forward.

This research was undertaken concurrently with the Muskrat Falls Inquiry proceedings, which produced publicly available documents [3]. Documents uploaded to the inquiry as submissions, or cited in those submissions, were also used as sources of evidence. Media and news articles related to the project were additional sources of information. Furthermore, we used random firing—meaning a random trial of search terms in a search engine to find whether any additional hits are returned —to ensure the robustness of our archive of secondary sources. Search terms focused on Muskrat Falls or the Upper Churchill hydroelectric project, plus other terms related to "Impact Assessment", "Indigenous rights", "ecological impact", and so on. Our analysis draws from a rich body of over 100 documents from grey literature, including reports, policy literature, working papers, government documents, speeches, and white papers produced by the Government of Newfoundland, Nalcor Energy, the Muskrat Falls Commission of Inquiry, the Federal Government, university organizations such as the Harris Centre, as well as books and media coverage related to the Muskrat Falls project and the subsequent public inquiry. We also drew from public events, including the public hearings of the Muskrat Falls inquiry held in St. John's and Happy Valley-Goose Bay (Labrador), which were held during the summer of 2019 and were made publicly available online [42]. Sources also included summary notes from the public Muskrat Falls symposium held in the Fall of 2018, which brought together researchers and several of the Labrador Land Protectors for a public forum that was largely critical of the development.

Qualitative data analysis was led by Atlin using a case study approach involving an iterative process of expert interview conversation, document review, and identification of key themes. The conversations with subject experts helped shape the analysis of secondary sources. Through these conversations, we began to understand the deep stories underpinning the Muskrat Falls project, as well as the historic nature of political anti-reflexivity in the province. Several themes in our results initially emerged from these expert conversations and were subsequently supported and elaborated by textual sources. Data were analysed along several dimensions, including: (1) risk, preparedness, prevention, and mitigation; (2) leadership and decision-making units; (3) crisis communication; (4) social learning; (5) key actors and organizations included and excluded from political and media debates; (6) discourses and justifications; (7) legal and policy mechanisms that were employed or eliminated that facilitated the Muskrat Falls project and associated fiscal crisis. The inductive analysis evolved through regular consultation with research collaborators with expertise in economics, community engagement, and regional expertise on Newfoundland and Labrador. Preliminary results were also shared with community partners on the project so they could provide feedback. This dialogical, iterative approach to the case study analysis helped ensure face validity for our results.

4. Analysis: Sources of Anti-Reflexivity

Our case study analysis of the grey literature, reports and media coverage, and expert conversations identifies inter-related sources of anti-reflexivity that fed into the Muskrat

Falls disaster, including well-rooted social dynamics and deep stories, as well as more proximate and shorter-term factors.

4.1. Deep Stories

By positioning Muskrat Falls as an important province-building project, which was supported by a culturally resonant deep story, decision makers helped push the project forward with little scrutiny or reflexivity. Nationalistic narratives often equate hydropower development with progress, as seen in studies of Brazil or Pakistan (da Silva and Rothman, 2011; Niazi, 2019). Here we similarly see an anti-reflexive legitimating discourse of hydropower as a nationalist project. The promotion of Muskrat Falls as a province-building project draws on a deep story that calls back to the prior history of hydroelectric development on the Churchill River [6,43]. The Churchill Falls development was conceptualized in the early 1950s and was completed on the Upper Churchill River in 1974. To finance the project, the provincial government of the day struck a partnership deal with Hydro-Quebec, a Quebec-based crown corporation. The co-financing deal locked in favourable hydroelectric rates for Hydro-Quebec but allowed them to sell power onwards at market rates. As a result, by 1980 the value of the development was estimated at CAD 583 million per year to Quebec [44]. This has been viewed by many in the Newfoundland and Labrador political and public sphere as a bad deal for that province, with claims that it resulted in substantial lost income to the benefit of Quebec. The deal is locked in until 2041 and repeated attempts by the government of Newfoundland and Labrador to have it amended for more favourable terms through legal action have been rejected by the Supreme Court of Canada. However, the history of Churchill Falls has cohered into a powerful deep story—a narrative that is widely shared and culturally resonant—that positions Quebec and the Federal Government as villains who took advantage of Newfoundland and Labrador [6,43,45]. As Feehan and Baker note, "The perceived injustice of the [CF] contract resonates in Newfoundland political culture, being characterized as another case where the province's resources have been exploited by outsiders" [43] (p. 209).

Building from this deep story, part of the incentive for pursuing Muskrat Falls was to balance the scales with Quebec and rectify the historical mistakes of the earlier Churchill Falls project. Decision makers relied heavily on the Churchill Falls deep story in key documents such as the provincial energy plan, Focusing Our Energy, which discussed the urgent need for development of the Lower Churchill in a way that would maximize the benefits to the province [46]. This notion that Muskrat Falls was a province-building project that would redress historical grievances against Quebec and the Canadian government helped justify the project despite early red flags raised by the Joint Federal–Provincial Environmental Assessment Review Panel and Public Utility Board (PUB) reviews [47,48]. The Environmental Assessment Panel raised several early concerns including: the measurement of environmental effects on key indicator species, while bracketing out a broader analysis of valued ecosystem components; the constrained scope of the Panel's ability to collect new information, resulting in an overreliance on requests for information from Nalcor; and limited opportunities to examine alternatives to the project [48]. The PUB review likewise raised concerns about the availability and quality of information from Nalcor, leading the Muskrat Falls Inquiry to conclude that the PUB review did not have sufficient information to meet the objectives of their project assessment [3]. While the project went through independent review through both the Public Utilities Board and the environmental assessment process, the scope of these reviews was limited and the power of both panels to have a meaningful impact on the project was constrained.

As the scale of the Muskrat Falls double disaster became increasingly apparent, the provincial government pivoted in its framing of the project. Once it became apparent that it presented a potential fiscal crisis for the province, Muskrat Falls was re-framed as too far along to reverse course due to sunk costs and contractual commitments. As journalist Drew Brown comments: "We (Newfoundlanders) are obligated to keep throwing good money after bad and to keep the whole wretched enterprise moving because Sunk Cost is the only

guiding principle in the province" [49]. The project was also re-framed as a climate solution and part of the provincial climate change action plan because clean hydroelectric power from Muskrat Falls would displace fossil fuel-based electricity generation, thereby making a substantial contribution to helping meet the province's climate mitigation targets.[5]

4.2. Leadership and Political Culture

Second, and relatedly, anti-reflexivity can be reinforced by political leadership [31]. Much of the work of cultivating anti-reflexivity about the project was conducted by decision makers under the Conservative government of Danny Williams, which enjoyed broad public support for leading the province during the period of economic prosperity based on a boom in the oil sector. Atlantic Canadian historian Jerry Bannister provides a close examination of how the legacy of the upper Churchill Falls was repeatedly invoked in the public sphere by Premier Williams to push the Muskrat Falls development [50]. He notes, "Like most people of his generation, Williams viewed Churchill Falls as the holy grail of provincial politics; development of the Lower Churchill represented not just economic development but cultural redemption. For 40 years, the Lower Churchill has been the ultimate prize in provincial politics" [50] (p. 212).

Much of the work to move forward on Muskrat Falls was carried out under the Williams government, though the final sanctioning of the project happened under his successor, Conservative Premier Kathy Dunderdale who continued to champion the project. Williams was an extremely charismatic political figure who enjoyed widespread public support [51]. He employed populist rhetoric and dramatic flair to challenge the federal Conservative government of Stephen Harper over the terms of the Atlantic Accord, which sets out the division of benefits and responsibilities related to offshore oil. The federal–provincial conflict spilled into an "Anything But Conservative" (ABC) public campaign by the provincial Conservative government against its federal counterparts. These actions bolstered Williams' popularity within the province by invoking the deep story of the province's history as a "have not" region of Canada [52]. Williams was able to translate the positive economic impacts of the oil boom into a public and political discourse of ending Newfoundland and Labrador's status as a have not region and transitioning into a new era of prosperity. The prosperity of the oil boom, combined with a social dynamic that was akin to a cult of personality for Williams, served to maintain a public and political attitude of boosterism about the future of the province that included Muskrat Falls as an important development project. This prevailing political orientation served to maintain anti-reflexivity by constraining public debate and marginalizing critics of the Williams government, including those who challenged the viability of the Muskrat Falls project [51].

A political culture of anti-reflexivity was evident throughout the lifespan of the project, as was well-documented by the final report from the Commission of Inquiry Respecting the Muskrat Falls Project [3]. Once the project was sanctioned and turned over to Nalcor Corporation to manage, there was limited oversight from government decision makers. Conversely, cost estimates were repeatedly under-reported and downplayed by Nalcor to decision makers. As such, decision makers were presented with unrealistic cost estimates for the project multiple times [3] (p. 3). The spiralling costs of the project have led to economic disaster in terms of government expenditures and debt servicing costs, as well as negative economic impacts for ratepayers. As the final report noted in 2020, "It is noteworthy that ratepayers on the Island of Newfoundland . . . who are responsible for repaying the cost of the Project through electricity rates, face the prospect of greatly increased power bills when the Project comes on-line" [3] (p. 3). In the absence of intervention from the provincial or Canadian government, electricity costs were expected to increase substantially. Under proposed "conservation and demand management" (CDM) strategies for rate mitigation, cost increases would be disproportionately felt by lower-income and more vulnerable groups. The evidence submitted by Nalcor and NL Hydro to the Board of Commissioners of Public Utilities admitted that "lower income households and renters may not be able to take advantage of these [CDM] incentives, thereby shifting the burden of MFP [Muskrat

Falls Project] costs disproportionately to this group of customers [47] (p. 47). This economic disaster has been deferred by the recent intervention of the federal government with a "$5.2-billion bailout for the project, aimed at staving off massive electricity rate hikes that would otherwise be necessary to pay bills that come due when the project is producing at full capacity" [53].

The anti-reflexive influences of political leadership and deep stories that helped legitimate Muskrat Falls are embedded in a broader political culture that has been characterized as having weakly developed democratic participation and public oversight. The term "patriotic correctness" has been used to describe the tendency to avoid dissent and criticism of the government, where dissent is equated with a negative attitude towards the province in general. David Cochrane describes the culture of political correctness as creating "an environment where dissent is seen as nothing short of treason. Where the simple questioning or criticism of the government or the premier is viewed as an unpatriotic assault upon the very fabric of Newfoundland and Labrador" [54] (p. 60). Bannister further elaborates on this concept, stating: "Accompanying this patriotic correctness was an optimistic correctness that viewed public skepticism towards government policy as unhealthy negativity towards the province's future" [50] (p. 218). This political culture reinforces anti-reflexivity by inhibiting public engagement or critical dialogue about public policy.

This social dynamic was at play throughout the Muskrat Falls process and limited the ability of public critics to disrupt the anti-reflexivity that helped move the project forward. From the early days of project planning and sanctioning, public critics of Muskrat Falls used communication venues such as the Uncle Gnarly blog, the Sir Robert Bond papers blog, Muskrat Falls Concerned Citizens Coalition, reports, public talks, and other media interventions for communicating their concerns to the public and decision makers [55–57]. The importance of their work in raising red flags about the project helped create pressure for the Public Utility Board hearings, as well as the later Muskrat Falls inquiry. Their concerns have been borne out by the spiralling costs and the "democratic deficit" that has come to characterize the project [56]. While their critical perspectives on the project were vindicated by the Muskrat Falls inquiry, public critics were villainized by government and project supporters. Public anger can serve as a potent force for public scrutiny of the legitimacy of government decision making during a crisis. However, public protests around Muskrat Falls, which faced the political culture of patriotic correctness, were not widespread and had limited political efficacy in altering the trajectory of the project. Furthermore, an important limitation of public anger and protest mobilization as tools for political reflexivity is that these typically do not appear until after a crisis is apparent. While public anger may provoke change in response to a crisis, it is arguably a necessary condition, but not sufficient in itself, for cultivating a culture of political reflexivity that can prevent or mitigate a crisis early on.

4.3. Centre-Periphery Dynamics and Indigenous Mobilization

As in many other conflicts over hydro development, the Muskrat Falls case intersects with inequalities of political power between Indigenous communities and government decision makers [32,34]. Much of the collective action against Muskrat Falls was led by members of Inuit and NunatuKavut communities concerned with downstream environmental risks [7,8]. Downstream risks to fishing and hunting include increased exposure to methylmercury that is created by rotting forest material and vegetation that is submerged in the reservoir and dam, which can accumulate in fish and wildlife. Methylmercury toxicity can generate nervous system damage in adults and impaired neurological development in infants and children [58]. Fish and wildlife are an important part of the diet for many community members in a region that suffers from food insecurity due to travel and shipping costs to this relatively remote region [59,60]. Concerns from downstream communities also focus on issues of slope stability on the North Spur part of the dam due to previous landslides in the area. There are fears that the North Spur could fail, creating flooding risks for downstream communities [61,62].

The concerns of downstream communities led to protests by the Labrador Land Protectors and allies [5,59]. These largely Indigenous-led protests included hunger strikes, public demonstrations near the worksite in Labrador and at government buildings in Labrador and the provincial capital of St. John's, and non-violent civil disobedience at the worksite. A hunger strike in Ottawa led by Labrador Land Protectors Billy Gauthier, Delilah Saunders, and Jerry Kohlmeister garnered national attention. The protests that took place in 2016 also included a four-day occupation of the Muskrat Falls facility by 50 members of the Labrador Land Protectors. This occupation ended on October 26th after an agreement was reached following an eleven-hour meeting between the leaders of the Indigenous governments and the provincial government. While the actions of the Labrador Land Protectors and their supporters gained public and media visibility, as well as resulting in arrests for civil disobedience and lengthy and costly legal proceedings for several participants, they ultimately had limited political efficacy. Promises by the provincial government to mitigate downstream environmental health risks through additional vegetation clearing of the dam reservoir were not followed through on due to poor communication within the responsible Ministry. As noted in a news report on this episode, "The auditor general's report . . . concludes the deadline was missed because the Department of Municipal Affairs and Environment failed to properly monitor and communicate work timelines. . . . Auditor general Denise Hanrahan says she found no evidence the deadline was intentionally skipped, but she says there were missed opportunities for the government to recognize the urgency highlighted by Indigenous leaders" [63]). However, it is worth noting that no individual decision makers or officials were held accountable for these errors.

The government took a build and compensate approach with downstream communities, rather than making substantial alterations to the project to address the environmental risks and health concerns. This build and compensate approach is consistent with another characteristic of the provincial political culture where the concerns of Indigenous communities have been slow to be recognized [64–66]. Formal agreements that recognize the Indigenous rights of Inuit, Innu, and NunatuKavut have been developed recently compared with many other parts of Canada [32].

While the principles of Free, Prior and Informed Consent by Indigenous communities for natural resource development on their traditional lands are gaining increasing visibility internationally [67], these principles have been slower to be taken up in the provincial political sphere. Similarly, while Canada is a signatory to the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), the principles of the declaration have not been well integrated into the provincial political culture [5].[6] Given this historical marginalization of Labrador Indigenous communities from the political sphere and social imaginary of the province, it is perhaps unsurprising that collective action did not impede the project or translate into widespread public anger. In other words, collective action may be a necessary condition for provoking reflexivity, but is not by itself a sufficient condition for provoking reflexivity. The lack of meaningful recognition or political action in response to Indigenous community concerns recalls Norgaard's assertion that hydropower development often doubles as a force for colonialism and cultural genocide [34].

Finally, the Muskrat Falls case must be read in relation to the centre–periphery dynamics that are part of many hydro development conflicts [29,30,36,38]. While Newfoundland and Labrador is a single province of Canada, centre–periphery social and political dynamics characterise the relationship between the island of Newfoundland and the mainland Labrador part of the province. Labrador has largely served as a resource hinterland for the province, whether as a site of cod fishing and seal hunting along the coast, or as a mining resource pool in the interior [52,68]. Hydroelectric development along the Churchill River fits this long-term pattern [44]. Labrador has often been peripheral to the social and political imaginary of the province. Likewise, the economic benefits of resource extraction have often flowed outwards from the region and have not been balanced by investments in community infrastructure in this largely rural and relatively remote region. Despite the abundance of mineral and hydroelectric wealth, many Labrador communities continue to

face issues of food security and limited access to high-quality transportation and communications infrastructure that is taken for granted elsewhere [33,64]. Given that Labrador often sits at the margins of the political and social imaginary of the province, it is not surprising that public debate about Muskrat Falls was largely celebratory until spiralling costs and public protests by Indigenous and non-Indigenous Labrador community members created fractures in the optimistic dominant discourse about the project. However, even when downstream environmental and health risks were raised by the Labrador Land Protectors and other project opponents, these did not translate into widespread public concern or opposition to the project based on downstream impacts for local communities.

From this analysis, we see that that not all forms of anti-reflexivity reflect intentional strategies that are actively deployed by specific political actors. It is often the case that deep stories are intentionally invoked as strategies of anti-reflexivity by decision makers and project supporters to constrain public debate or opposition. However, other forms of anti-reflexivity are rooted in long-established elements of political culture that depend less on the intentional actions of political actors.

5. Discussion: How to Challenge Anti-Reflexivity in Hydropower Governance?

Hydroelectric development is often promoted by decision makers as a climate solution because it can shift electrical systems away from fossil fuels. However, the Muskrat Falls hydroelectric mega-project provides an important cautionary tale of the social, economic, and environmental impacts that can be submerged by this low-carbon image. The economic and environmental double disaster of Muskrat Falls was facilitated by several sources of political "anti-reflexivity" [10,21]. This gave the project an aura of inevitability until it was re-framed as too far along to turn back, despite the economic impacts for the province as a whole and the environmental and health risks for downstream communities. Our findings are consistent with Boelens et al.'s argument that dams are too often pursued "as icons of civil engineering, top-down and supply-side water resource development", while issues of ecological change and downstream social impacts receive insufficient attention [23] (p. 5). Furthermore, our results identify specific social and political processes that constitute a politics of anti-reflexivity when it comes to hydropower development. This leads us to ask whether and how anti-reflexivity can be challenged when there is a charismatic leader and a mega-project that seems predetermined? Are there ways to critically counter the "deep stories" [13] that work to marginalize dissenting anti-dam voices?

As we see in cases across the world, anti-dam social movements often work as forces of political reflexivity. Collective action emerged in Chile, Brazil, Pakistan, Malaysia, and elsewhere to bring attention to the livelihood and ecological harms of mega-hydro development, though these movements have had mixed effects in terms of political efficacy and outcomes [28–30,35,36,38]. As our case illustrates, anti-dam mobilization also emerges in places such as Canada, largely through the leadership and actions of downstream Indigenous community members who share similar concerns with the ways in which hydropower development disrupts social–ecological wellbeing and produces environmental injustice through environmental and health risks [5,31].

The rallying cry to "Make Muskrat Right" was a call to pause and revise the project to mitigate downstream risks of structural failure and flooding, as well as to address environmental health concerns from increased methylmercury exposure to fish and wildlife. This counter discourse was positioned against the government's dominant discourse that the project was too far along to stop despite its economic and environmental costs, as well as assertions that the project will be a net environmental benefit because it will displace fossil fuel-based electricity generation. The call to "Make Muskrat Right" was made visible through a variety of tactics including hunger strikes, protest rallies at government buildings in Labrador and in the capital city of St. John's, and protest and non-violent civil disobedience at the work site itself. However, the capacity of the anti-dam movement to serve as a force for provoking political reflexivity was constrained through the policing of protests (including the arrests of those engaged in civil disobedience) and the related

chilling effect of lengthy and costly legal proceedings. Overall, the anti-dam movement did not gain widespread public support or political traction. This is consistent with deeper histories in the province that treat Labrador as a resource hinterland, as well as the political marginalization of Labrador Indigenous communities. As such, our findings suggest that public anger and collective action may be a necessary condition, but not a sufficient condition by itself, for provoking political reflexivity about mega-project development.

If anti-dam movements experience limited success in provoking reflexivity about the costs of hydroelectric development, then how can anti-reflexivity be more successfully challenged? Reflexivity about the deep stories and political culture that enabled the double disaster of Muskrat Falls can be built into the political system through structural reforms that increase transparency and accountability for mega-project planning, sanctioning, and implementation, thereby improving the "collective ability to confront [social-ecological] dilemmas" [19] (p. 82). Initial project oversight was provided through environmental assessment and Public Utility Board processes, but these processes were constrained in their scope as well as in their power to issue binding recommendations on whether and how the project should proceed. To a certain degree, this echoes Nor-Hisham and Ho's research in Malaysia, which found the use of largely symbolic environmental assessment processes worked to legitimate hydropower development and constrained community opposition [35]. Despite the constrained scope of the Muskrat Falls reviews, however, these processes did identify early red flags that were subsequently ignored by decision makers. As such, the Muskrat Falls project is not simply a case of symbolic review processes that rubber stamped a predestined project. Reforms that would strengthen the political efficacy of impact oversight for major projects would help build in greater political reflexivity to help resist the allure of deep stories and charismatic political leadership.

Furthermore, some of the conflict around the project might have been prevented through stronger recognition for the principles of FPIC (Free, Prior and Informed Consent) and UNDRIP (United Nations Declaration on the Rights of Indigenous Peoples) in the provincial political sphere [5]. Given the central role of Inuit, Innu, and NunatuKavut Indigenous communities in Labrador, stronger recognition and implementation of FPIC and UNDRIP principles would help rectify the historic marginalization of Labradorian interests in the public and political spheres of the province. However, the uneven outcomes of modern land claims agreements—including the Innu Nation Comprehensive Land Claim agreement in Labrador—and varied interpretations of the duty to consult Indigenous communities on extractive resource projects might temper our expectations in this regard [32,69].

6. Conclusions

The Muskrat Falls hydropower project, located on the Churchill River in Labrador, was promoted as an economic boon for the province of Newfoundland and Labrador, as well as a tool for helping the province meet its obligations for climate action. Instead, the project evolved into a "boondoggle", or a double disaster of spiralling economic costs, as well as environmental and health risks for downstream communities [3–8]. Through the Muskrat Falls case study, we show how the theoretical concepts of anti-reflexivity [10,21] and deep stories [13] are useful for understanding the multiple forces that led to economic and environmental disaster. To date, these concepts have been applied to studying anti-environmentalism or right-wing politics, such as the climate sceptic movement or the Tea Party wing of the Republican Party [10,11,13,21,22]. However, these concepts are also useful for understanding how the normal politics of mega-project development gives projects an aura of inevitability until after they reach a crisis point.

Relying primarily on public anger or collective mobilization to serve as forces of political reflexivity can have limited and uneven results [28–30,35–38]. As this literature and our own results suggest, public anger may be a necessary condition, but is not a sufficient condition for halting mega-project development. Instead, we argue that structural fixes that increase mega-project scrutiny and accountability, for example, through strengthening

assessment processes and the implementation of FPIC and UNDRIP principles related to Indigenous communities, are needed to ensure that environmental reflexivity is built into the political process of mega-project design, sanctioning, and implementation. This echoes Nor-Hisham and Ho's argument, based on their analysis of anti-dam conflict in Malaysia, that strengthening impact assessment processes is important for ensuring institutionalized avenues for local or marginalized communities to resist the momentum of entrenched economic and political interests that treat mega-project development as inevitable [35].

Much of the literature on anti-dam movements and resistance has focused on the global south [28–30,35–38]. Hydroelectric mega-projects can also have significant negative economic and environmental impacts in global north countries such as Canada. Furthermore, similar forms of anti-reflexivity may help secure mega-projects in both global north and global south contexts. This includes promoting dams as nation-building (or province-building) projects; the role of political leadership in limiting public debate; political cultures with weakly developed participation and oversight; power inequalities between Indigenous communities and government decision makers; and centre–periphery political dynamics. We are cautious about overstating the similarities between hydropower development controversies in the global north and global south, as specific political cultures and institutional contexts offer different political opportunities for anti-dam movements and opponents [37]. Additional comparative research on hydropower development and anti-dam movements across global south and global north cases is an important line of inquiry for better understanding how forms of anti-reflexivity are mobilized and contested in hydropower development. Part of this program for further research is to examine the dynamic interplay of the processes of reflexivity and anti-reflexivity to better understand how the same political actors or civil society organizations might contribute to both processes as they navigate the political challenges and opportunities that surround specific hydroelectric mega-projects.

Of course, not all hydroelectric or energy projects become contentious. Where impact assessment or legal procedures work as they should to ensure transparency and accountability, many projects proceed with little overt community opposition. As McAdam and Boudet note in their examination of energy development in the US, widespread community opposition or social movement mobilization is the exception rather than the rule [70]. However, much of the research literature on the social dimensions of energy development focuses on contentious cases, including the case we examine here. Further research would benefit from greater comparison of contentious and non-contentious cases of hydroelectric development to better understand the factors that lead to governance failures, public anger, and mobilization.

Notes:

1. Of course, there are multiple competing interests within capitalist societies regarding environmental policy and action. While fossil fuel interests have often worked to obstruct or slow climate policy [71], other business interests help drive renewable energy development [72]. There is also an increasing focus on climate finance and market-based solutions to climate change, as was reflected in the recent Glasgow Climate Pact that came out of COP26.
2. For the current analysis, our interest in Norgaard's work is primarily conceptual, rather than related to the Norwegian case per se. Similarly, Røttereng has written about the eco-political "two-level game", whereby Norway projects a pro-environmental image on the global stage while remaining highly dependent on fossil fuel extraction [73]. However, others position Norway as a positive model of responsible oil development that uses its oil wealth to advance social and environmental goals [74–76]. For an overview of the tensions between energy development, economic sustainability, and environmental politics in Norway see [77–80].
3. Impact assessment processes and legal forums allow local communities—who are often most directly impacted by development and have the most at stake—to voice their concerns with development. Where these procedures work well, development

projects can proceed with little opposition. However, if the perceived larger public interest in development outweighs considerations for local community concerns, then social movements may emerge or mobilize in response to perceived procedural failures and injustices. Social movements are widely considered legitimate and important political actors [81,82].

4. The language of mega-dams as "modern temples" of India traces back to Prime Minister Jawaharlal Nehru, the first post-independence Prime Minister of India (1947–1964) [83].
5. http://muskratfalls.nalcorenergy.com/ (accessed on 6 April 2022).
6. The contentious nature of Indigenous politics in Canada—especially related to natural resource development—means that the implementation of UNDRIP has been contested and uneven across the country, not only in Newfoundland and Labrador. However, Manuel argues that UNDRIP and the international political sphere are the most promising avenues for asserting Indigenous rights against settler colonial social structures and the Canadian government [69]. A full analysis of UNDRIP in Canada is beyond the scope of this paper.

Author Contributions: Conceptualization, M.C.J.S.; investigation, C.A.; methodology, C.A.; supervision, M.C.J.S.; writing—original draft, M.C.J.S.; writing—review and editing, C.A. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by Social Sciences and Humanities Research Council grant number 890-2017-0115 and Seed, Bridge and Multidisciplinary Fund, Memorial University grant number 214136 40123 2000. The APC was funded by the Seed, Bridge and Multidisciplinary Fund, Memorial University grant number 214136 40123 2000.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Ethics Committee of Memorial University (Approval # 20210019, 5 May 2020).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Acknowledgments: Research funding was provided by the Social Sciences and Humanities Research Council of Canada (SSHRC), grant number 890-2017-0115, through the Sustainable Island Futures Project Partnership Development Grant (PI: James Randall); the Office of Public Engagement and the Harris Centre, Memorial University of Newfoundland, Canada; and the Seed, Bridge and Multidisciplinary Fund, Memorial University of Newfoundland.

Conflicts of Interest: The authors declare no conflict of interest.

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