A Powerful Landscape:
First Nations Small-Scale Renewable Energy Development in British Columbia

by

Dana Cook
B.Sc., Simon Fraser University, 2011

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We acknowledge with respect the Lekwungen-speaking peoples on whose traditional territory the university stands and the Songhees, Esquimalt and WSÁNEĆ peoples whose historical relationships with the land continue to this day.

Supervisory Committee

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Abstract

Action on climate change will require an increase in renewable energy projects to support electrification in the transition away from burning fossil fuels. Indigenous peoples throughout Canada are developing community-owned small-scale (producing less than one megawatt of power) renewable energy projects and are interested in developing more. Despite Indigenous peoples' involvement and interest, there is a lack of research into the impact of these projects for communities. This thesis explores whether and how small-scale renewable energy projects developed by First Nations communities in British Columbia (BC) might contribute to supporting justice within the energy transition. The research included a province-wide survey (First Nations Clean Energy Survey), and a case study with a remote First Nation with multiple small-scale renewable energy projects in operation—the Village of Skidegate on Haida Gwaii. This research found that small-scale projects are a distinct experience within the renewable energy sector, one that is offering First Nations communities an accessible form of power production that provides myriad benefits. Some benefits were easy to measure, such as cost savings and greenhouse gas reductions, while the majority of benefits were not as easy to quantify, such as increasing connection and engagement with energy, increasing self-sufficiency, providing a vision of a future free of oil and gas reliance, community pride and education. As these benefits indicate, the thesis concludes that small-scale renewable energy developments offer a distinctive and important opportunity that First Nations are using to enforce self-determination and build community resilience.

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Skidegate: Thank you for welcoming me in and trusting me with a part of your story. Kara: Your guidance and support has been unwavering. I am grateful for all you have taught me and will carry it forward to make well thought out change in this world. Judith: Hearing you speak in stories and with passion, has driven me forward. I am so inspired by the work that you do, but more so by the person that you are. W Dusk: Thank you for answering all my questions and letting me work beside you.

Team Gin: We built a culture of care and connection (and ridiculousness) that I wouldn't change for anything. Political Ecologists: The revolution starts underground, and you're all integral to it. My family: I don't think you quite understood this thing that I was doing, and you gave me everything to support me through it anyway.

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Chapter 1 - Introduction

Action on climate change will require an increase in renewable energy projects to support electrification in the transition away from burning fossil fuels (Masson-Delmotte et al. 2018; Rowe, Wild, and Robertson 2017). As British Columbia (BC) moves forward within its energy transition, society must decide which types of renewable energy projects to support. Indigenous peoples throughout Canada are developing renewable energy projects and are interested in developing more (Henderson and Sanders 2017). Renewable energy development is a unique and important opportunity, one with the potential to provide myriad economic, social, political, and environmental benefits (Sayers 2015). As a recent survey conducted by Lumos Clean Energy Advisors found:

> Many Indigenous leaders who responded to the national survey expressed that the most important benefit arising from participation in Canada' clean energy economy was a strengthening of community pride, and an affirmation of Indigenous rights and territory. The abiding view was that clean energy project can materially support holistic community economic and social health (2017, 6).

Indigenous communities have been using renewable energy development not with the sole interest in economic development but as an important method to increase self-sufficiency and self-determination (Rezaei and Dowlatabadi 2016). One way this is achieved is by developing renewable energy projects that directly provide power to community buildings, thus increasing their community's autonomy. Another way, is by creating revenue and jobs within communities (Henderson 2013). In these ways, renewable energy development can contribute both directly and indirectly to increasing self-sufficiency, sustainability and, ultimately, self-determination.

There is a long history of the Canadian government's agenda resulting in the systematic political, economic and social marginalization of Indigenous peoples (Regan 2010; Lowman and Barker 2015; "Truth and Reconciliation" 2017). The Truth and Reconciliation Commission (TRC) of Canada documents the cultural genocide carried out by the government of Canada through the residential school system and other policy instruments in order "to divest itself of legal and financial obligations to Aboriginal people and gain control over their resources" (2015, p.3). The TRC calls on all governments in Canada to implement the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and create "new strategies based on respect for Aboriginal self-determination" (p.137). If the government is to make meaningful action towards reconciliation[1], and adopt call-to-action from the TRC and UNDRIP, supporting First Nations self-determination is an imperative. First Nations renewable energy development could be one way to contribute to this.

First Nations in BC are leading the way in renewable energy development, having implemented 52% of all Indigenous-affiliated renewable energy projects in Canada (Henderson and Sanders 2017). The transition to low carbon energy systems has the potential to benefit First Nations communities throughout BC, who are currently participating in renewable energy generation and are eager to see their participation increase (Cook et al. 2017). As we face a transformation of energy systems, there is an opportunity to shape the energy transition in a way that does not replicate past injustices, and in fact uses energy as a way to support First Nations self-sufficiency and self-

[1] Reconciliation is a contested term in Canada, and means very different things to different people (Gordon, 2018). In this thesis, I mean to use the term as it relates to government and other settler bodies supporting First Nations' self-determination.

determination. A staggering 1,200 projects, nearly 90% of all renewable energy projects across Canada are below 1MW in size (Henderson and Sanders 2017). Projects below this size are usually developed to power specific community buildings or residences, making them a distinctly "small-scale" endeavor. Despite First Nations' involvement and interest, there is a lack of research into the impact of these projects for communities. Could supporting First Nations ownership of small-scale energy projects contribute to justice within the energy transition? This thesis explores just that: how small-scale (below 1MW) renewable energy projects developed by First Nations communities in British Columbia might contribute to supporting justice within the energy transition.

1.1 Energy Development in BC

BC's electricity system is run by BC Hydro, a publicly owned and controlled entity. It follows a centralized energy provision paradigm for electricity, one that relies primarily on large hydroelectric power plants located far from cities where the energy they produce will be consumed ("Electric Utility" 2018). The reservoirs created during the province's hydroelectric dam construction resulted in the loss of First Nations' land and lifeways without their consent (Loo 2007). For example, the largest hydroelectric project in the province, the WAC Bennet dam, created a reservoir that resulted in the displacement of the Tsay Keh Dene Nation's community in the 1960s, and the destruction of their hunting and trapping grounds. It resulted in an estimated 25,000 moose deaths, a key food source for the Nation, and blocked of the migratory path of the now endangered mountain caribou (Harris 1984, 46; Loo 2007). And, while the dam produces clean power for the rest of the province, it was never connected to the community, and the Tsay Dene community's electricity supply still comes from a diesel generator. By destroying their

traditional grounds for harvesting food, and displacing their community to an area they were not familiar with, the dam furthered dependency for energy on the government which displaced them. In addition, energy poverty is a continued problem their community faces, along with many other remote First Nations in the province (Rezaei 2017). The provincial government is replicating these past injustices to this day with the construction of the Site C dam, another dam that will cause significant harm for First Nations. It will flood 5,350 hectares of land, including First Nations' burial grounds, Treaty 8 territory, grade one agricultural land and endangered species habitat (Fawcett 2010). Affected First Nations claim that the project has proceeded without proper consultation and has the possibility to infringe on treaty rights.

These examples illustrate ways that energy development in the province has not served the interests of all people, and especially not First Nations. In particular this is important in remote communities, the majority of whom still rely on diesel generation as their main power source, and face the subsequent environmental, economic and health harms that result (Inglis 2012). Indeed, these developments have directly resulted in loss of remote First Nations' self-determination both materially and politically (Rezaei 2017).

1.2 A Clarification of Terms: Energy Justice and Energy Democracy

While the transition away from burning fossil fuels may be inevitable for the survival of our species, justice within the transition is not. The concept of environmental justice has emerged in recognition of the historical and ongoing harms of energy systems towards marginalized populations (Westra 2008). It points to the importance of paying attention to these historical harms to ensure that past injustices are not repeated and that our society is moving towards remedying them (Schlosberg and Collins 2014). Justice,

however, is constantly in motion and depends on context: on a time and a place and a worldview. What is defined as justice will depend on who you are asking. As culture shifts and changes so too do perceptions of what is just. Fundamentally, however, I would like to follow an approach developed by Maryam Rezaei in her thesis on energy justice in BC. Drawing from the feminist Iris Marion Young, she states, "to invoke the language of justice and injustice is to make a claim, a claim that we together have obligations of certain sorts to one another" (Young 1998, 40; Rezaei 2017). These obligations include getting honest about past wrongs, and taking action to move towards remediating them.

Energy justice scholarship covers a lot of territory. Energy systems are complex, after all, and there are multi-faceted ways the production and consumption of energy impacts relations of justice. There is the phase of extraction of the resource itself (say, fracking for natural gas), or the alteration of landscape to use the resource (for example, flooding for hydroelectric dams) and the significant impact these processes have on local communities. There is also the impact of transporting and processing the energy – oil refineries, for example, and the pollution that results. Once energy is ready to be utilized, there are many questions of the distribution of access and affordability for communities. Jenkins *et al.* define energy justice **"**as a global energy system that fairly distributes both the benefits and burdens of energy services, and one that contributes to more representative and inclusive energy decision-making" (2017, 677). I find this definition useful as it not only points to the distribution of the benefits and burdens of our energy system, it also points to a meaningful route to rectifying them. This thesis explores First Nations community-control and ownership of energy for precisely that reason.

Widespread social movements working to address climate change are advocating for community renewable energy projects (CRE) as an approach to reclaim power within the energy sector (Burke and Stephens, 2018). The definition of what constitutes a CRE is contested, and it can range from full ownership and operation by a community to an industry developed project that is sized to serve a community (Walker and Devine-Wright 2008). For the purposes of this thesis, I will use a definition that was developed by Ison and Hicks (2010) who define CRE projects as they fit into three main categories: environmental, technical and sociopolitical. The environmental dimension refers to decarbonization component or the utilization of renewable energy and low-carbon technologies; the technical dimension refers to decentralization and localization of energy supply; finally, the sociopolitical dimension refers to democratization through community-ownership or participation in project governance. I find this definition useful as it fits the description of First Nations community-owned small-scale renewable energy development. CREs defined in this way potentially represent a way to decentralize and democratize our energy system, moving away from a centralized, extractive source of energy. It is this movement, largely dubbed energy democracy, that recognizes the energy transition has the potential to shift power from corporate and state elite into community hands.

> This approach calls for reclaiming the energy sector and shifting political power to workers, households, communities, and the public, in opposition to a centralized, corporate, utility-scale renewable energy model (Burke and Stephens 2018, 79).

Energy democracy's agenda is connected to energy justice in terms of a power shift towards local communities. Which local communities is the power being shifted back to

is an important question. By itself energy democracy is not enough to achieve energy justice, as the system must work to address past injustices. This involves reconciling the history of injustice related to the procurement of energy towards First Nations in BC. As described above, Indigenous communities have been using renewable energy development as a tool for increasing self-sufficiency and self-determination, an important piece of moving towards energy justice.

Given the history of injustice related the procurement of energy development in BC, not to mention the history colonialism, energy justice is a useful lens to take when thinking about BC's energy system. For the purposes of this thesis, I am focusing on strategies for remediation. First Nations community-owned renewable energy development has been a venture that communities are expressing has provided many different benefits and avenues for building self-determination. I explore here whether supporting a policy landscape that allows for and supports First Nations-owned and controlled renewable energy development might be one potential contribution to Indigenous self-determination, and thus reconciliation.

1.3 Indigenous Renewable Energy Development

Renewable energy development is a unique and important opportunity for Indigenous peoples in Canada, one with the potential to provide myriad economic, social, political, and environmental benefits (Sayers 2015). It has the potential to provide much needed revenue and jobs within communities without destroying their land and resources (Henderson 2013). In remote communities, it has the potential to significantly reduce the cost of energy and the experience of energy poverty, where currently energy use is in

itself a barrier to self-determination, as communities are paying such high rates to barge in diesel (Ecotrust Canada 2016).

Indigenous involvement in renewable energy projects can range from impact benefit agreements to partial equity to full ownership, while projects range in size, technology and application (Cook et al. 2017). Large projects (above 1MW) are likely to be commercial-scale, meaning that they are developed to sell power to the provincial energy grid and generate revenue for the community. Their ownership is often shared with the private sector or government. Small-scale projects (below 1MW) are more frequently developed to power specific community buildings and reduce the cost of energy production for the community. They often have full ownership by the community. The literature on Indigenous renewable energy involvement has largely focused on commercial-scale development, describing its barriers, benefits and development pathways (Sayers 2015; Henderson 2013; Krupa 2012)

Until recently there was no comprehensive overview of First Nations involvement in the sector in BC, not to mention that little of the research has been done engages First Nations communities themselves. If we do not know the degree to which First Nations are involved and would like to be involved, we cannot appropriately support their efforts or see where blockages to justice in the energy transition might be. And, most of the literature to date has focused on commercial-scale development. There is a need to better understand the scope and extent of small-scale renewable energy development by First Nations, what impact these projects might be having on communities, and what potential opportunities they suggest contributing to justice within the energy transition.

1.4 Role of Research

Throughout this research, BC was on the precipice of a major decision. Was the government of BC going to choose to develop the most expensive hydroelectric dam, Site C, at the expense to First Nations and broad opposition across the province? The decision by the provincial government to build Site C was in part supported and allowed by a lack of wide-spread understanding of the implications for Indigenous communities. By choosing to develop the Site C dam, the government has—at least for the near future—shut down commercial-scale options for Indigenous power production. The implication of this for Indigenous communities was not widely known or discussed in the public sphere. In an effort to remedy this, the First Nations Clean Energy Working Group – led by my committee member Kekinusuqs, Judith Sayers – partnered with the University of Victoria to conduct research to show the implications of this decision for Indigenous communities. The aim of this research—which comprises part of the data on which this thesis is based—was to identify the importance of this sector for First Nation communities, how many projects they had developed and were developing, how much had been invested, and the benefits and barriers that exist.

The decision to build Site C dam was in part made with a lack of imagination about what is possible. This thesis is shaped by the opportunities that truly exist within the energy transition. BC has an opportunity to produce new power through a model of energy system development that takes advantage of emerging cost-effective technologies and public ownership at community scale. This could result in a more distributed energy system with benefits of more resilient and empowered communities, a more diverse economy, and a more just energy system.

If society is to use the energy transition to shift our energy system from one that does not serve First Nations well, to one that seeks to remedy past injustices and supports communities, we must explore how current innovations are working: do they offer models that should be supported and enhanced? In order to move towards justice in our energy system, we need to incorporate what First Nations want out of energy development, and understand how they are navigating the current policy landscape. This research seeks to understand the scope and impacts of First Nations-owned renewable energy development. As there is an increasing interest in small-scale projects, and there is little research focused on them, the research focuses on projects that produce less than one megawatt of power. This research utilizes First Nations' experiences and opinions to better understand what impacts these projects are having on communities and seeks to explore what potential these projects might have in supporting justice within the energy transition.

1.5 Research Questions

In this thesis, I sought to explore the following overarching research question: *What role(s) might First Nations community-owned small-scale (below 1MW) energy projects play in supporting justice within the energy transition?* This thesis is a manuscript document and unfolds in two substantive chapters that explore this overarching question at the provincial and the community scale, respectively.

Chapter Two, titled "Below One Megawatt: First Nations' small-scale renewable energy development in BC," is a provincial-scale analysis of First Nations owned small-scale renewable energy projects. This chapter asks two main research questions: (1) *How are First Nations participating in small-scale renewable energy development in BC*; and

(2) *What types of benefits are First Nations experiencing in relation to small-scale renewable energy development?*

Chapter Three, titled "Towards Sustainable Energy Systems in Skidegate" explores the overarching research question at a community-scale with a case study with the First Nations Village of Skidegate on Haida Gwaii. Skidegate has emerged as a leader in remote communities transitioning to renewable sources of energy, with multiple operational small-scale renewable energy initiatives. This chapter sought to outline the details of Skidegate's sustainable energy initiatives, as well as to understand their emergence, the process of development, and the factors that facilitated success. It asks one main research question: (1) *How was Skidegate's renewable energy trajectory sparked and sustained?*

The following sections outlines the role I played as a researcher followed by the main methods used to answer the questions posed above.

1.6 Role of the Researcher

My relationships to Indigenous peoples in the settler colonial context of Canada were limited before I entered this graduate program. As a non-Indigenous woman of British decent, I had no substantial relationships with Indigenous peoples. My parents immigrated to Canada in the 1970s, and started a life in the city of New Westminster, on the unceded territories of the Qayqayt First Nation, and Coast Salish peoples. I have only recently been able to feel gratitude and grief for the peoples who for thousands of years stewarded the land before my family moved to it. Growing up, I received a public-school education that did not include the policies of erasure and violence by the Canadian government towards First Nations. Only through this masters' degree do I feel I have

really learned the devastation colonialism has and continues to wreak. From an environmental science and community organizing background, I began this research as a person who cared deeply about acting on climate change in a way that move society away from culture of consumerism and individualism, and towards cultures that center healthy communities and care towards all beings. This thesis is a result of the ongoing work to learn how I might support and fight for that change.

In Joseph Weiss' ethnographic work, "Shaping the Future on Haida Gwaii" he tells a story that encapsulates what it means to do research within an Indigenous community that you are not a part of:

> At the end of my earliest interviews in Old Massett, "Lauren" and I were leaving the building where we'd spoken "on the record." As we walked out, Lauren turned to me and told me, frankly: "You aren't the first, and you won't be the last. No one else can save us, but we can't really turn people away." Lauren's meaning, elaborated during our interview, was that Haida people should not depend, nor have to depend, on outsiders to be "saved." Researchers come and go, taking advantage of Haida hospitality and generosity, but **rarely do they make concrete contributions to the community.** Worse, they leave and represent what it means to be Haida to the rest of the world, often without further consultations with those whom they are representing. They **effectively wrest control of the terms of Haida culture from Haida people themselves, even if their efforts in so doing are well-meaning.** Lauren's sentiments were echoed by others in Old Massett, often summarized in the question: "What makes you different?" (2018, 21-22; emphasis mine)

The question of "What makes you different?" was asked of me as well. It was asked of me before I entered the community, through the work of *Decolonizing Methodologies: Research and Indigenous Peoples* by Maori scholar Dr. Linda Tuhiwai Smith and the work of *Research is Ceremony* by Opaskwayak Cree scholar Shawn Wilson. These

works informed me about the historical legacy that the academy has perpetrated on Indigenous peoples and asked me to reflect critically on what it means to do research as a white person with Indigenous communities. It was asked of me while I was in the community and was on my mind the whole time. The responsibility that I have in sharing a story that is not mine, in a context that has been fraught with state violence and oppression. As one of my interviewees shared with me:

> We've had so much taken from us in terms of residential schools and loss of culture and language. Then we have similar situations of people coming like you and doing research and taking all kinds of information from us and then we never see it again. There's been a lot of reservations with that kind of information as well.

As a white person, engagement with Indigenous peoples and communities through research, even with the best intentions, is challenging to navigate. How might white settler researchers do better? As Weiss states in response to his quote above, "I do not think I should be able to neatly 'resolve' what it means to be a non-Indigenous scholar working in a First Nations community within the complex context of settler colonial Canada" (Weiss 2018, 22). I have felt the weight of this statement throughout this research, and I have come to believe, through the work of Wilson (2008) and Carolson (2017), and through my own experience, that research with Indigenous communities depends on relationships and context. Trust, reciprocity and clear communication must be central and all of these qualities take time to develop (Carlson 2017). In order to conduct research that serves communities and does not extract knowledge, the time and resources must be spent to allow for this.

In this critical reflection on what it means to be a white scholar in an Indigenous community, I feel it important to be explicit with my audience and with my intentions.

First and foremost, I am writing to those like myself, who care deeply about moving forward in different path than western society currently offers. To give voice to more stories that show there is a different way, and that indeed this different way is possible. To listen to Indigenous peoples and communities about what they see as justice, and attempt to speak to those who will to push government towards meaningful reconciliation through supporting self-determination. I am telling the story of First Nations community-owned small-scale renewable energy projects in hopes of amplifying their and other communities' success.

2. Methods

The research was pursued through a mixed-methods approach. Each approach offered distinct kinds of data that when analyzed in relation to one another offer a clearer understanding of what role these projects might play in supporting justice within the energy transition. The main sources of data were a province-wide survey (First Nations Clean Energy Survey), and the case study with the Village of Skidegate. I will now describe how the different methods informed each of the research questions outlined above.

The first question of Chapter 2—*How are First Nations participating in small-scale energy development in BC*—was answered through a quantitative analysis of the First Nations Clean Energy Survey results. By understanding the extent and scope of current involvement in and future aspirations for renewable energy development, we have a better sense of what these projects might be offering communities. The next question of Chapter 2—*What types of benefits are First Nations experiencing in relation to small-scale renewable energy development*—was answered through the qualitative method of

content analysis of interviews with project leaders and community members from the case study, as well as comments from the survey. The final research question from Chapter 3—*How was Skidegate's renewable energy trajectory sparked and sustained*—was answered through the case study as well. These qualitative methods offer a nuanced understanding of what benefits these projects are providing and how they are being developed from the perspective of project leaders and community members. To situate the findings and assess their potential wider applicability, the findings were discussed in interviews with project managers who work in the industry and a media review. In what follows the methods are explained sequentially.

2.1 First Nations Clean Energy Survey

Although First Nations in British Columbia are active participants in the renewable energy sector, very little research has been conducted to assess the scope and implications of their involvement. We—a small team comprising myself, one other Master's student, a Research Assistant, Dr. Sayers and Dr. Shaw—developed the First Nations Clean Energy Survey to address this knowledge gap. It sought to determine the extent to which First Nations in British Columbia are involved in the renewable energy industry. The research team attempted to contact 203 First Nations across the province from October 2016 to February 2017. In total, we received responses from 102 First Nations and three Tribal Councils. Each Nation decided for themselves who was the most knowledgeable person to complete the survey. The majority of respondents were members of elected chief and council or band office employees and administrators. Two questions the survey explored were: (1) How First Nations are involved in renewable energy development; (2) How

First Nations would like to be involved in renewable energy development. The full survey methods and findings can be found in Appendix A.

My own research used the findings of this survey as they pertained to small-scale (below 1MW) projects; these survey responses were analyzed separately from the overall results. A quantitative descriptive analysis using FluidSurveys built in reporting capabilities was used to determine the details for each project: their technology, whether or not the project was connected to the provincial energy grid, how the power was being utilized, and how the project was funded. Based on survey respondents' comments, a qualitative content analysis was conducted to determine the types of benefits they are receiving or expect to receive.

2.2 Case Study

The second method draws upon a case study of a remote First Nation with multiple small-scale renewable energy projects in operation. A case study approach was chosen to offer a more in-depth understanding of small-scale renewable energy development from the perspective of project leaders[2] and community members than could be provided through the survey. It sought to understand the process of development as well as identify the main outcomes of the projects, exploring both material and immaterial benefits.

The case study was undertaken with in partnership with Skidegate Band Council on Haida Gwaii. Skidegate had recently installed solar panels on two of its largest community buildings (the Haida Heritage Centre and the George Brown Recreation Centre) as well as installed heat pumps in 360 residences. Methods were responsive to the culture of the community, its context, and my position in the community as it

[2] Project leaders are defined as community members who had a role in project planning or implementation.

evolved. Before beginning the research, I spent the month of August in 2017 in the community, focusing on relationship building, developing a research proposal to be approved by Band Council and helping out wherever the community saw fit. Relationship building was of the utmost importance, and I aimed to build relationships around respect and reciprocity. Serendipitously, this month spent in the community involved joining the contractor's team, the Indigenous-owned company W Dusk Energy Group Inc. (W Dusk), and helping with the 100kW solar installation on the Haida Heritage Centre, as well as engaging the community in the project. Being immersed in the community during this time helped to deepen my understanding of what it takes to undertake a project of this size in a remote setting, and greatly informed the development of this research project.

I returned to the community for the month of October and conducted semi-structured interviews of approximately one hour in length with seven community members. Five interviews were with people who work for the band office and were involved in the planning and implementing of renewable energy initiatives; one was involved in installing the Haida Heritage Centre solar project; and one was with a community member with no involvement in the projects. Interview questions were structured to develop an understanding of project origins and motivations, personal involvement, factors that led to project success, and project benefits. These results were coded for emergent themes exploring the myriad benefits participants spoke of.

Following this case study, three subsequent interviews were conducted: two with project managers who work in the renewable energy industry, and one with a project leader from T'Sou-ke First Nation. These interviews were conducted to ground-truth the

understanding I had developed during my time in Skidegate. The research process followed the Tri-Council Statement on Ethics guidelines with approval from the UVic Human Research Ethics Committee (Protocol Number 16-188).

2.3 Media Review

The third method draws upon a qualitative content analysis of media articles discussing Indigenous small-scale projects throughout Canada. It was used to situate the insights from the other two methods. At the time of writing, there is little to no published academic work to draw on as pertains specifically to small-scale projects, however there are media articles. This review used google search engine with the following key word searches: First Nations or Indigenous, with renewable energy, solar, biomass, hydro, and geothermal. Each article was subject to a qualitative content analysis focusing on the benefits of these projects reported in relation to case study transcripts.

Each of these three methods offered distinctive insights into the impacts of small-scale renewable energy developments; bringing them together allowed for triangulation of these findings, allowing me to develop a richer and more nuanced picture of impacts.

3. Context

3.1 First Nations on Turtle Island

Indigenous peoples have lived and maintained a sustainable relationship with the land of turtle island for tens of thousands of years. Prior to contact, First Nations were organized, "into nations with group life-ways that resulted in philosophies, customs, beliefs, and governance systems arising from Native American paradigms." (Little Bear 2015, 1). Practicing a wide diversity in culture, one of the common threads in First Nations' worldviews is based around relationality. The Opaskwayak Cree scholar Shawn Wilson (2008) describes this paradigm in terms of relationality in *Research is ceremony*,

"relationships do not merely shape reality, they are reality." This relationality includes a view of interconnectedness and spirit amongst all beings. As the Potawatomi ecologist Robin Wall Kimmerer (2000) describes:

> For traditional native people, biodiversity encompasses much more than a collection of species and genetic entities. Each species and individual is endowed with personhood. All beings, human and nonhuman alike, possess a unique intelligence, consciousness, and role as a member of the community. Biodiversity encompasses the Lakota concept of "all our relations." The forest sustains our material and spiritual well-being. As sources of knowledge, and as sustainers of life, forests are manifestations of the sacred (8).

Sophisticated and sustainable land practices were born out of this respect and relationship with all living beings and land itself (Turner, Ignace, and Ignace 2000). The term is *Yah-guudang* in Haida and means "respect for all living things". Haida Gwaii is the location for the case study conducted in this thesis. I will now touch on the unique history of the people and land of Haida Gwaii.

Figure 1.3.1: Map of Haida Gwaii (Canadian Geographic 2010)

3.2 Haida Gwaii

The Haida Village of Skidegate is located on the archipelago of Haida Gwaii, 45-60km off the coast of Turtle Island, or the Northwest Coast of BC. Haida Gwaii is made up of over 200 islands, stretching over approximately 300 km. For time immemorial the Haida have been managing and living in relationship with the land and waters of Haida Gwaii. Before European contact, Haida people were spread out over villages throughout the islands of Haida Gwaii. As it states in the Village of Skidegate's Comprehensive Community Plan (CCP) community profile:

> The Haida have lived here since time began; our culture marked on every tree, every rock — this land, this ocean a part of who we are. Our stories, our language, our history entwine with *X̲uuya* (raven), *Taan* (bear), *G̲uud* (eagle), and *Chiina* (salmon). We have been forever changed by first contact with Europeans and the following assault on our way of life ("Gud G̲a Is" 2017, 9)

First contact with Europeans was recorded in 1778. Even more devastating than colonization's social, economic and political impacts, Smallpox reduced the population of Haida Gwaii by 90-96%, from 10,000-15,000 people to, by some estimates, 577 people in 1860s (Takeda 2014). Villages throughout the islands were abandoned during this time, as there were not enough people to sustain communities that once flourished. Haida people moved onto two settler government sanctioned reservations of Skidegate and Old Masset. A research participant explains the history of his culture and their relationship to land:

> [Haida] managed the forest, everything was managed. Everything had an appropriate place, everything was discussed. Someone might get seaweed from this reef, but someone else might have the right to fish around it. Someone might be allowed to cut a certain cedar, but its neighbour might be reserved for another family. Everything like that was discussed at high level.

> The level of management here up until that point was huge. Even after that legacy [of colonization], that sort of management responsibility continued. When you are that close to your land, when you are that close to the place you live it really grows into you know. Especially after 20,000 years it really grows into you. It took generations of us going to residential schools just to reduce that feeling, and even so a large portion of that integrity has survived in the Haida community. It stayed alight despite the hardships of colonization.

This sentiment is one that has had to be defended time and time again on Haida Gwaii. The Council of Haida Nation or *X̲aaydgaG̲a ' Waadlu̲x̲an Naay* in Haida, was formed in 1974. This body was formed to negotiate with colonial governments and reassert sovereignty over Haida Gwaii. The Haida constitution states:

> The Haida Nation is the rightful heir to Haida Gwaii. Our culture is born of respect; and intimacy with the land and sea and the air around us. Like the forests, the roots of our people are intertwined such that the greatest troubles cannot overcome us. We owe our existence to Haida Gwaii. The living generation accepts the responsibility to insure that our heritage is passed on to following generations. On these islands our ancestors lived and died and here too, we will make our homes until called away to join them in the great beyond. ("Haida Nation Constitution", 1)

Over five decades, the Haida have organized, lobbied, and blockaded to gain power and political clout (Dowie 2017). In 2004 the Council of Haida Nation won a precedent-setting Supreme Court of Canada legal case ensuring the province of British Columbia must consult with the Haida before issuing tree farm, or any extractive, licenses (Takeda 2014). The Haida continue to assert their rightful claim to sovereignty over Haida Gwaii. To this day, there is a Provincial Supreme Court case pending to assert themselves as a sovereign nation. The Haida continue to live on and govern their lands and waters, and to rebuild their social and political institutions from the damage caused by colonization.

3.3 Energy in Skidegate

The Village of Skidegate has a population of approximately 900, while the entire Haida Gwaii archipelago has a population of approximately 4,750. Haida Gwaii is not connected to the North American electricity grid. It is serviced by two grids operated by BC Hydro, a north and a south grid. The north grid's electricity is powered 100% by diesel generators. Skidegate is powered by the south grid, which relies primarily on a hydroelectric plant in Mitchell Inlet. The hydroelectric plant provides approximately 80% of the required electricity and diesel generators make up the difference.

By installing 150 kW of solar power on community buildings and 360 heat pumps in homes, Skidegate has emerged as a leader among remote First Nations communities transitioning towards sustainable energy systems, making the community a rich place for a case study on Indigenous-led renewable energy projects.

Chapter 2 –
Below One Megawatt: First Nations Small-Scale Renewable Energy Development in BC.

1. Introduction

Canada is in the midst of an energy transition away from burning fossil fuels and towards low carbon energy production. Energy transitions inevitably reshape society, and this one will have social implications far beyond the technical requirements of lowering greenhouse gas emissions (Shaw 2011). A just and sustainable society requires just and sustainable energy systems. Ownership and control over energy production, for example, offers a range of benefits, including but not exclusively economic ones. Further, energy production can and often does have negative impacts on the environment and the communities that surround that source of production. Thus, ensuring that the distribution of benefits and impacts is fair should be taken into consideration in planning and effecting any energy transition. The concept of energy justice has emerged in recognition of this, offering a way to speak about the historical harms energy systems have caused marginalized populations (Westra 2008). It points to the importance of ensuring that past injustices are not only not repeated in the new systems we are creating but, if possible, that they are remedied (Schlosberg and Collins 2014). This is particularly important in settler-states like British Columbia, where the procurement of energy through large-scale hydroelectric development has destroyed First Nations' land and life ways, furthered dependence on the state, and created energy poverty experienced to this day (Rezaei 2017).

Indeed, the transition to low carbon energy systems has the potential to benefit First Nations communities throughout British Columbia, who are currently participating in renewable energy generation and are eager to see their participation increase (Cook et al.

2017). Renewable energy development is a unique and important opportunity for Indigenous peoples in Canada, one with the potential to provide myriad economic, social, political, and environmental benefits (Sayers 2015). Indigenous peoples throughout Turtle Island are developing renewable energy projects of all sizes and are interested in developing more (Henderson and Sanders 2017). First Nations in British Columbia are leading the way.

There is an opportunity to shape the energy transition in a way that does not replicate past injustices, and in fact uses energy as a way to build First Nations' self-determination and community resilience. Could supporting Indigenous ownership of small-scale energy projects contribute to this goal? This paper explores whether and how small-scale (below 1MW) renewable energy projects developed by First Nations communities in British Columbia might contribute to supporting justice within the energy transition.

1.1 Energy Justice in BC

British Columbia's (BC) energy system is run by BC Hydro, a publicly owned and controlled entity. It follows a centralized energy provision paradigm for electricity, one that relies primarily on large hydroelectric power plants located far from cities where the energy they produce will be consumed ("Electric Utility" 2018). The reservoirs created during the province's hydroelectric dam construction resulted in the loss of First Nations' land and lifeways without their consent (Loo 2007). For example, the largest hydroelectric project in the province, the WAC Bennet dam, created a reservoir that resulted in the displacement of the Tsay Keh Dene Nation's community in the 1960s, and the destruction of their hunting and trapping grounds. It resulted in an estimated 25,000 moose deaths, a key food source for the Nation, and blocked of the migratory path of the

now endangered mountain caribou (Harris 1984, 46; Loo 2007). And, while the dam produces clean power for the rest of the province, it was never connected to the community, and the Tsay Dene community's electricity supply still comes from a diesel generator. By destroying their traditional grounds for harvesting food, and displacing their community to an area they were not familiar with, the dam furthered dependency for energy on the government which displaced them. In addition, energy poverty is a continued problem their community faces, along with many other remote First Nations in the province (Rezaei 2017). The provincial government is replicating these past injustices to this day with the construction of the Site C dam, another dam that will cause significant harm for First Nations. It will flood 5,350 hectares of land, including First Nations burial grounds, Treaty 8 territory, grade one agricultural land and endangered species habitat (Fawcett 2010). The project has proceeded without proper consultation and has the possibility to infringe on Treaty Rights. The report "First Nations and Site C" (2016) argues that issues presented by First Nations warrant pausing the project until lawsuits and Treaty Rights can be resolved.

These examples illustrate ways that energy development in the province has not served the interests of all people, and especially not First Nations. In particular this is important in remote communities, the majority of whom still rely on diesel generation as their main power source, and face the subsequent environmental, economic and health harms that result (Inglis 2012). Indeed, these developments have directly resulted in loss of remote First Nations' self-determination both materially and politically (Rezaei 2017).

1.2 Living Within Limits

Problems with BC's electricity system arguably go beyond issues of justice, and into hindering our ability to live within planetary limits. As power generation is technically and geographically inaccessible, most people are disconnected from the source that powers their lives. This leaves them unaware of how their energy use impacts the natural world, and thus potentially unmotivated to reduce their energy consumption. Walker and others have described this as, "significant spatial and psychological distance between energy generation and use" (2007, 68). This disconnection has resulted in people who are passive consumers of energy in a capitalist system that reinforces insatiable consumption (Harper 2009). Herman Daly (1973) argues that this allows for the ever-increasing consumption that exists in our society and economy and its ideas of unlimited growth. As we move away from burning energy dense fossil fuels and towards low carbon societies that are renewably powered, reducing consumption to achieve social and ecological well-being and sustainability will be necessary. All energy has impacts, renewable energy is less dense and thus impacts can be more widely distributed on the landscape, so reducing not just replacing will be a necessity if society is to move towards sustainability (Dincer 2000). Making people more aware of the impacts of their energy use—creating "feedback loops"—offers one way of motivating these changes. Feedback loops increase the connection to energy source by bringing behaviour and sometimes impacts associated with energy consumption within awareness (Abrahamse et al. 2005).

Lovins has argued that in shifting our relationship to energy, we can achieve important social and environmental aims. He articulates that, "…the energy problem should be not how to expand supplies to meet the postulated extrapolative needs of a dynamic economy, but rather how to accomplish social goals elegantly with a minimum energy

and effort, meanwhile taking care to preserve a social fabric that not only tolerates but encourages diverse values and lifestyles." (1977, 13). Lovins proposed an alternative system, one with the potential to reconnect us to the source that powers our lives. He dubbed this a soft energy pathway: a future of distributed sources of renewable energy that are developed based around local autonomy and community need. The sources of energy he called "soft" technologies and are based on utilizing renewable resources that are matched in scale, geographic distribution and quality to end user needs. He argues that such a future could close the gap in cost and benefit allocation of energy production, and give power back to communities themselves. This creates potential to foster a new relationship between people, their energy use, and their environments and for a community to be transformed from ratepayers to more conscious users of natural resources, in this case energy.

1.3 Indigenous Ownership of Renewable Energy

Throughout Canada, Indigenous peoples are increasingly interested in community-owned renewable energy development (Kimmett 2009; Wohlberg 2014). Indigenous involvement in renewable energy comprises a wide variety of projects and ownership models. Projects range in size, technology and application while involvement ranges from impact benefit agreements to partial equity to full ownership (Cook et al. 2017). Large projects (above 1MW) are likely to be commercial-scale, meaning that they are developed to sell power to the electrical grid and generate revenue for the community. Their ownership is often shared with the private sector or government. Small-scale projects (below 1MW) are more frequently developed to power specific community buildings and thus reduce the cost of energy use. They often have full-ownership by the

community. Existing literature on Indigenous renewable energy involvement has largely focused on larger, commercial-scale developments, describing barriers, benefits and development pathways at those scales (Sayers 2015; Henderson 2013; Krupa 2012).

A recent survey conducted by Lumos Clean Energy Advisors (2017) showed that First Nations in BC are leading the way on renewable energy development, having implemented 52% of all Indigenous affiliated renewable energy projects in Canada. The survey's report focuses on the benefits of renewable energy projects that produce power in excess of 1MW, outlining employment benefits, coal and gas offsets, and investments and returns. It goes on to state:

> Many Indigenous leaders who responded to the national survey expressed that the most important benefit arising from participation in Canada' clean energy economy was a strengthening of community pride, and an affirmation of Indigenous rights and territory. The abiding view was that clean energy project can materially support holistic community economic and social health. (2017, 6).

Rezaei and Dowlatabadi (2016) have argued that for remote First Nations in BC, renewable energy development is pursued not with the sole interest of economic development, but in the interest of achieving material self-sufficiency and political self-determination. They argue that even when renewable energy developments do not provide energy self-sufficiency directly by powering the community, the benefits provided in terms of revenue generated, local employment, or community pride can all contribute to the ultimate goal of self-determination. Rezaei and Dowlatabadi (2016) speak to small-scale projects, explaining how although the project may only provide a fraction of the energy for a community, it still can be considered part of a model of achieving self-sufficiency. They argue, "self-sufficiency as a desired outcome of energy

projects is tied closely to a broader cultural and political understanding of self-determination and is seen as a necessary step in ultimately achieving that goal" (2017, 801).

Nearly 90% of all renewable energy projects across Canada are below 1MW in size, a staggering 1,200 projects (Henderson and Sanders 2017). In BC, a recent survey has shown that there has been an increase in interest in technologies that are smaller in scale, a movement for example away from large hydro development to solar PV (Shaw et al. 2017). However, there is a lack of baseline knowledge of the extent of involvement in small-scale renewable energy development. And, despite First Nations' involvement and interest, there is a lack of research into the impact of these projects for communities. Without the same level of energy production and revenue generation of commercial-scale projects, what benefits are small-scale renewable energy development providing communities? Are they similar or different from commercial-scale projects? What implications might these projects have to contribute to justice within the energy transition? A unique opportunity may exist to both repair the connection with the source of energy and our relationships with each other during the transition.

1.4 Research Case

If we are to use the energy transition that is in process to shift our energy system from one that does not serve First Nations well, to one that seeks to remedy past injustices and supports communities, we must explore how current innovations are working: do they offer models that should be supported and enhanced? In order to move towards justice in our energy system, we need to incorporate what First Nations want out of energy development, and understand how they are navigating the current policy landscape. This

research seeks to understand the scope and impacts of First Nations-owned renewable energy development. As there is an increasing interest in small-scale projects, and there is little research focused on them, the research focuses on projects that produce less than one megawatt of power. It seeks to inform the broader Indigenous renewable energy literature, as well as potential policy development, as it is possible that small-scale projects differ in important ways from larger projects. Through analysis of a province-wide survey and a case study, it utilizes First Nations' experiences and opinions to better understand what impacts these projects are having on communities. It seeks to explore what potential these projects might have in supporting justice within the energy transition, as well as what their limitations might be. It asks the following research questions at the provincial-scale:

(1) How are First Nations participating in small-scale renewable energy development in BC?

(2) What types of benefits are First Nations experiencing in relation to small-scale renewable energy development?

Through answering these two questions, we will gain insight into the overall question of the thesis:

What role(s) might First Nations community-owned small-scale energy projects play in supporting justice within the energy transition?

2. Context

2.1 BC is a Settler-State

There is a long history of Canadian government policies resulting in the systematic political, economic and social marginalization of Indigenous peoples (Regan 2010; Lowman and Barker 2015; "Truth and Reconciliation" 2017). The Truth and

Reconciliation Commission (TRC) of Canada documents the cultural genocide carried out by the government of Canada through the residential school system and other policy instruments in order "to divest itself of legal and financial obligations to Aboriginal people and gain control over their resources" (2015, 3). The TRC calls on all governments in Canada to implement the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and create "new strategies based on respect for Aboriginal self-determination" (137). We are now at a time in BC where our government has committed to implementing the TRC and UNDRIP. When the BC Green Party and the New Democratic Party (NDP) signed a confidence agreement, the foundation upon which BC's current government rests, the following statement was in it:

> A foundational piece of this relationship is that both caucuses support the adoption of the UN Declaration on the Rights of Indigenous Peoples, the Truth and Reconciliation Commission calls to-action and the Tsilhqot'in Supreme Court decision. ("Confidence and Supply Agreement" 2017, 2)

If the government is to make meaningful action towards reconciliation, and adopt call-to-action from the TRC and UNDRIP, supporting First Nations' self-determination is an imperative.

2.2 Haida Gwaii

The Haida Village of Skidegate is located on the archipelago of Haida Gwaii, 45-60km off the coast of Turtle Island, or the Northwest Coast of BC. Haida Gwaii is made up of over 200 islands, stretching over approximately 300 km. For time immemorial the Haida have been managing and living in relationship with the land and waters of Haida Gwaii. As it states in the Village of Skidegate's Comprehensive Community Plan (CCP) community profile:

> The Haida have lived here since time began; our culture marked on every tree, every rock — this land, this ocean a part of who we are. Our stories, our language, our history entwine with *X̲uuya* (raven), *Taan* (bear), *G̲uud* (eagle), and *Chiina* (salmon). We have been forever changed by first contact with Europeans and the following assault on our way of life ("Gud G̲a Is" 2017, 9)

The Council of Haida Nation or *X̲aaydgaG̲a ' Waadlux̲an Naay* in Haida, was formed in 1974. This body was formed to negotiate with colonial governments and reassert sovereignty over Haida Gwaii. Over five decades, the Haida have organized, lobbied, and blockaded to gain power and political clout (Dowie 2017). In 2004 the Council of Haida Nation won a precedent-setting Supreme Court of Canada legal case ensuring the province of British Columbia must consult with the Haida before issuing tree farm, or any extractive, licenses (Takeda 2014). The Haida continue to assert their rightful claim to sovereignty over Haida Gwaii. To this day, there is a Provincial Supreme Court case pending to assert themselves as a sovereign nation. The Haida continue to live on and govern their lands and waters, and to rebuild their social and political institutions from the damage caused by colonization.

2.3 The Village of Skidegate

The Village of Skidegate has a population of approximately 900, while the entire Haida Gwaii archipelago has a population of approximately 4,750. Haida Gwaii is not connected to the North American electricity grid. It is serviced by two grids operated by BC Hydro, a north and a south grid. The north grid's electricity is powered 100% by diesel generators. Skidegate is powered by the south grid, which relies primarily on a hydroelectric plant in Mitchell Inlet. The hydroelectric plant provides approximately 80% of the required electricity and diesel generators make up the difference.

By installing 150 kW of solar power on community buildings (100 kW on the Haida Heritage Centre and 50kW on the George Brown Recreation Centre) and 360 heat pumps in homes, Skidegate has emerged as a leader among remote First Nations communities transitioning towards sustainable energy systems, making the community a rich place for a case study on Indigenous-led renewable energy projects.

3. Methods

The research was pursued through a mixed-method approach. Each method offered distinct kinds of data that when analyzed in relation to one another offer a clearer understanding of what role these projects might play in supporting justice within the energy transition. The main sources of data drew from a province-wide survey (First Nations Clean Energy Survey—Appendix A), and a case study in the Village of Skidegate—a remote community with operational small-scale renewable energy initiatives described above.

The first question—*How are First Nations participating in small-scale energy development in BC*—was answered through a quantitative analysis of the First Nations Clean Energy Survey results. By understanding the extent and scope of current involvement in and future aspirations for renewable energy development, we have a better sense of what these projects might be offering communities. The next question—*What types of benefits are First Nations experiencing in relation to small-scale renewable energy development*—was answered through the qualitative method of content analysis of interviews with project leaders and community members from the case study, as well as comments from the survey. These qualitative methods offer a nuanced understanding of what benefits these projects are providing and how they are being

developed from the perspective of project leaders and community members themselves. To situate the findings and assess their potential wider applicability, I conducted three interviews with project managers who work in the industry and a media review of First Nation small-scale renewable energy initiatives throughout Canada. In what follows the methods are explained sequentially.

3.1 First Nations Clean Energy Survey

The First Nations Clean Energy survey was a province-wide survey seeking to determine the extent of First Nations involvement in the renewable energy sector in BC. It was conducted to address the knowledge gap that, although First Nations are active participants in the renewable energy sector, very little research has been conducted to assess the scope of their overall involvement. It sought to determine the extent of involvement and aspirations towards renewable energy development, as well as barriers experienced by First Nations communities. It provides baseline information for the quantity and type of small-scale projects currently being developed by First Nations in BC.

The survey was conducted online using FluidSurveys (SurveyMonkey, Ottawa, ON). It was divided into four sections: 1) Operational projects 2) Projects in development 3) Projects under consideration, and 4) Capacity building. An initial email invitation to participate was sent to each band in British Columbia; bands whose email addresses could not be located and online contact forms were unavailable were initially contacted over the phone. There were a few who could not be reached over the phone to be invited to participate in the survey. The invitation was followed up by phone and email to encourage participation and provide any assistance necessary to complete the survey. The

survey could be filled out online or over the phone, and took between 5 and 30 minutes depending on the number of projects a band had in operation or development. Each Nation decided for itself who was the most knowledgeable person to complete the survey. The majority of respondents were members of elected chief and council or band office employees and administrators. Each survey response was reviewed for completion and consistency and the respondent was contacted to confirm any details that were unclear or incomplete.

The research team attempted to contact 203 First Nations across the province from October 2016 to February 2017. In total, we received responses from 102 First Nations1 and three Tribal Councils. The survey results presented in this report thus indicate the minimum level of First Nations' involvement in the renewable industry in B.C. at the beginning of 2017.

The responses that pertained to small-scale projects that produced on megawatt of power or less were separated from the overall results to be analyzed. For the purposes to this research, a quantitative descriptive analysis using FluidSurveys built in reporting capabilities was used to determine the details for each project: their technology, whether or not the project was connected to the provincial energy grid, how the power was being utilized, and how the project was funded. Based on survey respondents' comments, a qualitative content analysis was conducted to determine the types of benefits they are receiving or expect to receive.

3.2 Case Study

The second method draws upon a case study of a remote First Nation with multiple small-scale renewable energy projects in operation. A case study was chosen to offer a

more in depth understanding of small-scale renewable energy development from the perspective of project leaders and community members than could be provided through the survey. It sought to understand the process of development as well as identify the main outcomes of the projects, exploring both material and immaterial benefits.

A case study was undertaken in partnership with Skidegate Band Council on Haida Gwaii. Skidegate had recently installed solar panels on two of its largest community buildings (the Haida Heritage Centre and the George Brown Recreation Centre) as well as installed heat pumps in 360 residences. Methods were responsive to the culture of the community, its context, and my position in the community as it evolved. I had the opportunity to help the contractor that was hired to install 100kW of solar power on the Haida Heritage Centre, and engage the community in the project. Being immersed in the community during this time helped to deepen my understanding of what it takes to undertake a project of this size in a remote setting, and informed the development of my research project.

I conducted semi-structured interviews of approximate one hour in length with seven community members: five of whom work for the band office and were involved in the planning and implementing of renewable energy initiatives; one who was hired to help install the Haida Heritage Centre solar project; and one community member with no involvement in the projects. five of whom work for the band office. Interview questions were structured to develop an understanding of project origins and motivations, personal involvement, factors that led to project success, and project benefits. These results were coded for emergent themes exploring the myriad of benefits participants spoke of. Following this case study, I conducted three subsequent interviews, two with project

managers who work in the renewable energy industry, and one with a project leader from T'Sou-ke First Nation. I conducted these interviews to ground-truth the understanding I had developed during my time in Skidegate.

3.3 Media Review

The third method draws upon a qualitative content analysis of media articles discussing Indigenous small-scale projects throughout Canada. It was used to situate the insights from the other two methods. At the time of writing, there is little to no published academic work to draw on as pertains specifically to these projects, however there are media articles. This review used google search engine in February 2018 with the following key word searches: First Nations or Indigenous, with renewable energy, solar, biomass, hydro, and geothermal. Articles were scanned to determine their relevance, and accepted if they came from a non-industry run news site, and if the content related to Indigenous small-scale renewable energy development in Canada. Eleven articles were determined to be relevant. Each article was subject to a qualitative content analysis focusing on the benefits of these projects reported in relation to case study transcripts. A tally was made of how many articles mentioned each of the categorized benefits and quotes relevant to the benefits were abstracted.

The following results section provides an overview of key research findings, organized by the two primary research questions. The first research question—*How are First Nations participating in small-scale energy development in BC* —is answered first below.

3. Results

3.1 How are First Nations Currently Participating in Small-Scale Renewable Energy Development?

3.1.1 Current Development

The survey found a considerable number of small-scale projects being developed by First Nations in BC. Small-scale projects represented just under one third (30%) of all projects reported in the survey. There were 19 operational projects and 21 projects in construction or planning stages for a total of 40 projects. The vast majority of these projects (70%) were solar PV systems, with a smaller percentage of geothermal (12%), biomass (10%), and hydro (8%) reported (Figure 2.3.1).

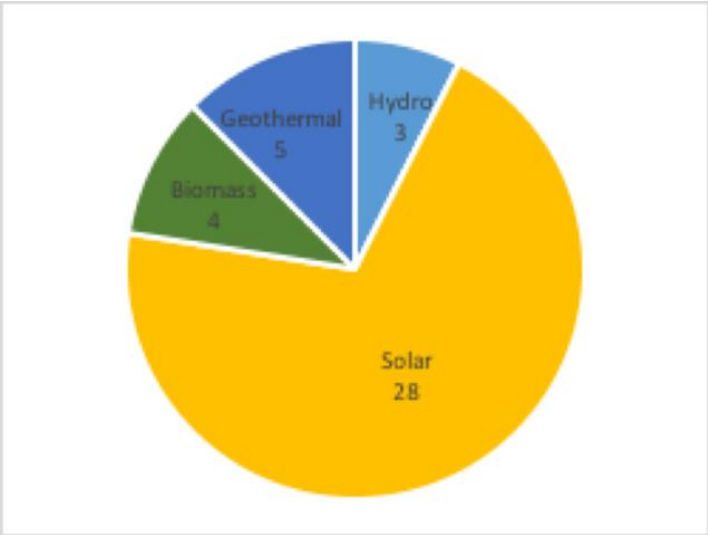

Figure 2.3.1: Technologies of small-scale projects in operation or development

The power from small-scale projects is largely being used to provide electricity for community buildings, as well as for heating and powering residences and remote camps. Out of the small-scale projects reported in the survey, the majority (66%) were not connected to the electricity grid (Figure 2.3.2). Some grid connected projects of under 100kW were part of the net-metering program through BC Hydro. This program is

designed for those who generate electricity for their own use. It allows customers to sell back power when their projects are generating more than being used, and buy power when their projects are producing less than is being used. In comparison, 90% of projects larger than 1MW were connected to the electricity grid. In those cases, the majority of the power produced was sold to BC Hydro through long-term Electricity Purchase Agreements (EPA) and was then controlled and billed by the provincial utility.

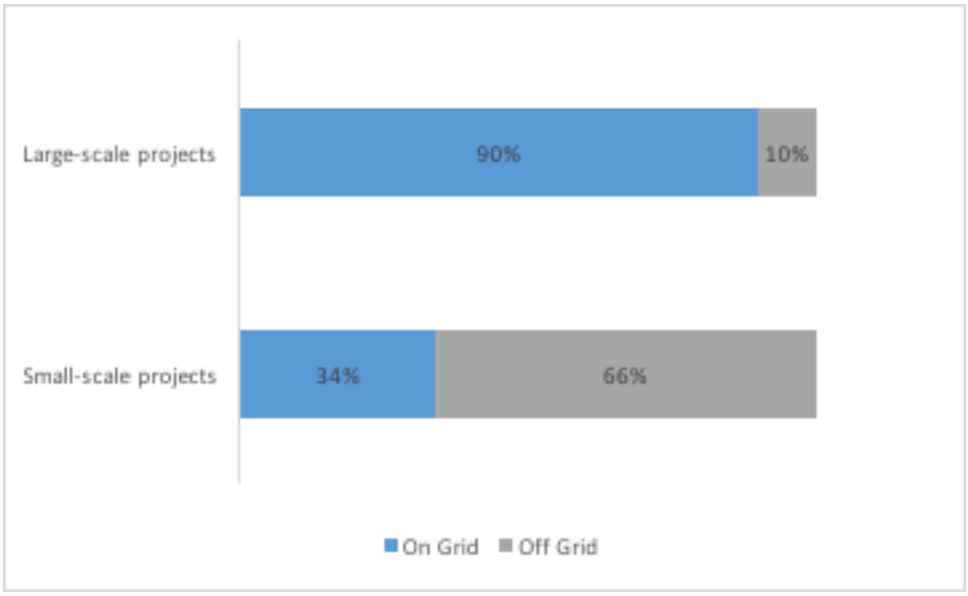

Figure 2.3.2: Small (below 1MW) and large (above 1MW) projects grid connection

Many projects received grants to cover the costs of renewable technology and installation. This shifts costs burden to funding bodies, who provided money to help buy and develop infrastructure, which once up and running reduced payments to provincial utility or costs of diesel generation. In the survey, 63% of projects had received a grant to develop the project. These grants came from a wide variety of source from government, non-government and industry. Skidegate funded their solar projects with grants from the Union of BC Municipalities and First Nations Infrastructure Investment Plan (FNIIP).

3.1.2 Planned and Prospective Projects

A substantial number of projects under consideration were reported to be from technologies that are commonly small-scale. Projects under consideration include projects in the pre-planning phase, without the requisite permits and financing, as well as more developed projects that may have been stalled. Of the approximately 250 projects reported to be under consideration, nearly 150 came from commonly small-scale technologies, or almost 60%. Solar PV made up the vast majority of these with 64 projects, geothermal came in second with 33 projects, with micro-hydro (below 100 kW), biomass and solar thermal also reported (Figure 2.3.3). Survey respondents were not asked to indicate the amount of power produced by projects under consideration, however, so it is not possible to get an exact estimate of how many of these projects are small-scale.

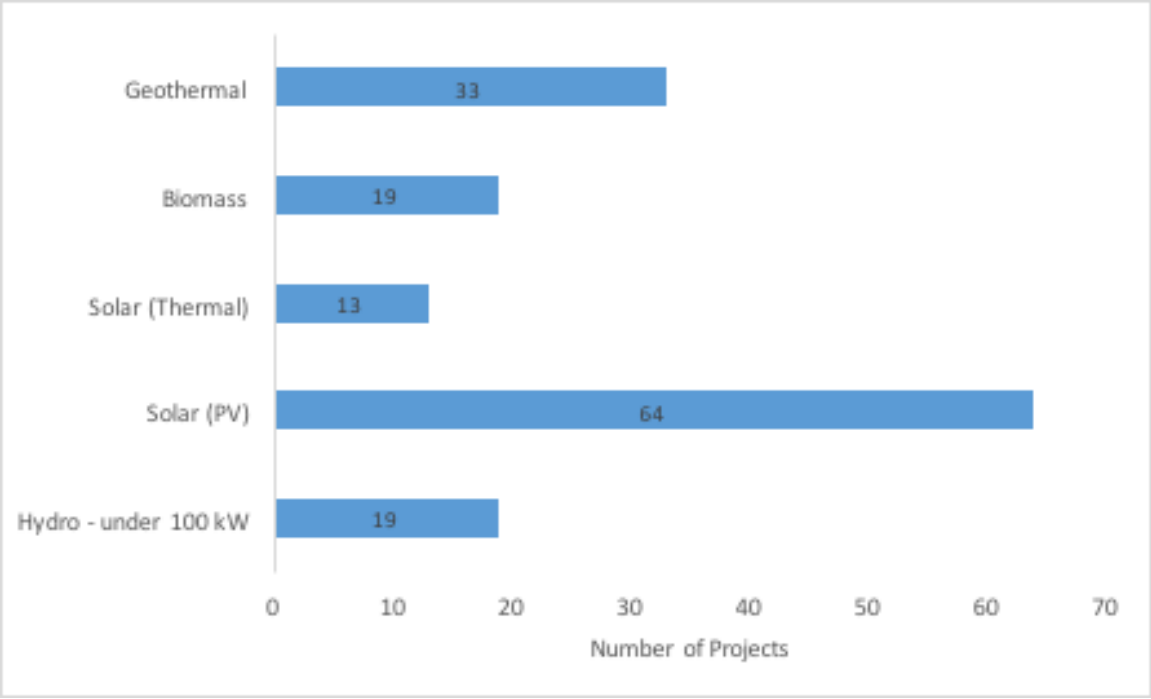

Figure 2.3.3: Technologies of small-scale projects in pre-planning

The survey found a shift in favoured technology between operational projects and projects in development or pre-planning. Operational projects had a larger proportion of projects from traditionally larger-scale technologies, while projects in development or pre-planning were more likely to come from technologies that are commonly small-scale (see Figure 2.3.4). Specifically, there was an increase in percentage of projects coming from solar PV, solar thermal, biomass and micro-hydro.

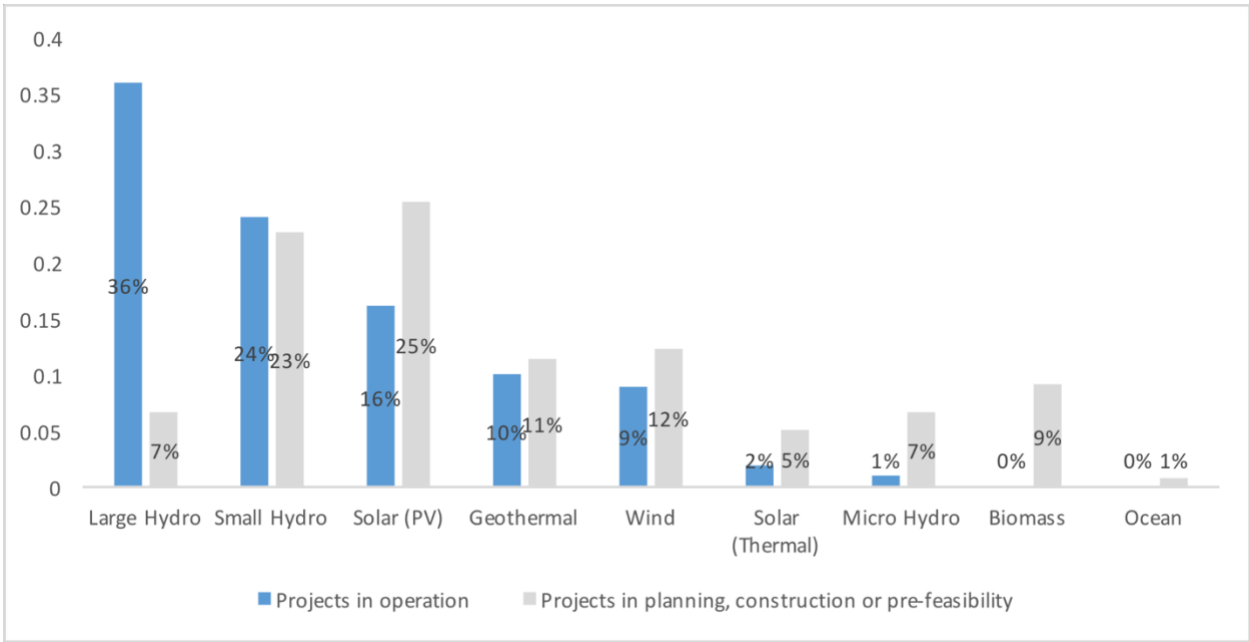

Figure 2.3.4: Technology shift between projects in operation and development or planning

3.2 What Types of Benefits are First Nations Experiencing in Relation to Small-Scale Renewable Energy Development?

The case study and survey revealed a wide variety of benefits from small-scale renewable energy development. Some benefits were easy to measure, such as cost savings and greenhouse gas reductions, while the majority were not as easy to quantify such as increasing self-reliance, energy empowerment, providing oil and gas alternatives, education and project accessibility. There were a wide variety of benefits mentioned in the media, such as connection to culture, and employment/training, however they were not as prominent in interviews and survey comments and thus are not the focus of the

following section. The following section focuses on the previously mentioned benefits, and describes them in turn as they were expressed through case study interviews and survey comments.

3.2.1 Reducing Cost and Carbon Emissions

The main benefit mentioned in interviews and by survey respondents was reduction of cost of energy for the building(s) that the small-scale project is providing power for. This included both reduction (or elimination) of BC Hydro bills or fuel. When projects were providing power for community buildings, these savings are allowing funds to be re-allocated into other programs. One survey respondent relayed that the community was, "now able to build a new pool thanks to the affordable energy." In Skidegate, participants spoke of the importance of alleviating the burden of high energy costs from the Haida Heritage Centre. The Haida Heritage Centre is an important community building, one of cultural, social and economic significance. However, as one participant relayed:

> Well I think the Heritage Centre has really been a disability in our community in terms of economic development. It was costing so much money to keep the place afloat for energy costs that it didn't allow us to do anything else in our community. By helping to solve that issue and turning to a positive where we can use it as an educational tool is the most beneficial part [of the solar project].

One survey respondent relayed that their community's solar project was allowing for a remote camp that would not be possible without the reduced cost of power.

> We believe that renewable energy is an important piece to allowing our Nation to be able to go back to the Traditional Territories and maintain a presence there. If we did not have the solar energy on our remote camp the diesel costs would be prohibitive to maintaining a consistent presence which in turn allows us to exercise our rights and title.

Where projects are providing power for residences, this reduction in cost was critical for community members with limited income, who were previously spending a large portion of it to heat and power their homes. As one research participant explains, this was especially important in Skidegate due to an aging population:

> And we have an aging population and so we don't have the bodies that would go out and collect the firewood. We don't have the bodies that go out and get food off the land, you know our traditional food for our people, and so people are having to spend more money in the store. Spend more money on fuel, spend more money on Hydro. It's in our best interest, in the pocket book, to reduce [energy consumption].

Energy has become a priority for some communities due to poorly built homes on reserve. When asked if energy was a priority for communities that this interviewee works with he responded, "Yes, it is. Particularly with poor housing, people are spending so much money on electricity trying to make up for the poor housing that they have."

The reduction of carbon emissions was reported in the survey and media as an important benefit of these projects. One project leader relayed in the survey that their project, "will reduce the community's footprint from 280 tons to 9 tons." Half of the media articles cited projects that were replacing a fuel heating or diesel power generation with renewable energy. It is not clear the volume of carbon emissions that will be offset directly by the solar projects in Skidegate, however, a key project benefit was seen in their movement away from oil and gas use.

3.2.2 Energy Empowerment

A key benefit of these projects seen by project managers was their ability to spark and inspire an interest in other energy production and conservation initiatives.

> Pretty much every community that I've worked in they will subsequently want to plan other phases of solar development in terms of broadening it out. With the Haida they want to do residential, with [another Nation] 1MW. But quite often it's gets the housing managers to think about energy, it gets everybody starting to think about green homes, efficiencies, it sort of instantly creates—well it's a catalyst of a shift for creating more of a conservation culture. Just understanding energy in a different way.

T'Sou-ke pursued energy efficiency measures and behavioural change workshops for community members following their solar installation. As a project leader described, "It is easy to get seduced by the technology, we too easily jump to saying let's do solar panels, that will solve our problem if only we could afford them. And then you realize that that's not the most important intervention to start with. It's the conservation, saving energy is often a tenth of the price of producing energy." Skidegate has taken on a number of energy conservation and literacy initiatives in tandem with their energy production projects. These included participating in Energy Conservation Assistance Program (ECAP), a program that provides energy efficiency home evaluations and installs energy saving products, from BC Hydro twice, once in 2009 and once in 2017. Skidegate continues to work to upgrade energy efficiency measures for all homes and businesses in the community. To increase energy literacy within the community, Skidegate conducted a workshop that broke down a BC Hydro bill so community members could better understand what they were being charged for. They're also pursuing installing usage monitors into residences so that community members can easily monitor their energy use.

> We're also looking at partnering with [BC] Hydro to have usage monitors put in peoples' homes so that individuals will be able to tell on a day to day basis, so they will be

> able to have an immediate feedback with their homes with how much energy they're using.

As one project leader described, "I think if we could become an energy efficient community [that] is our number one goal."

Following the solar installations in Skidegate, the band council began assessments for residential solar to power every home in the village. This motivation to pursue other projects went beyond band council initiatives, and into community members buying and installing their own solar panels, as one interviewee describes, "It perhaps provides some inspiration or some vision or some impetuous to pursue further projects which we've even seen in some homes around town here."

3.2.3 Self-Sufficiency

Case study participants and survey respondents discussed the benefit of these projects as they related to working towards material self-sufficiency. Project leaders spoke of how small-scale projects were a part of efforts towards energy autonomy and related this to food and economic independence. Reliance on diesel was seen as a major hurdle for communities looking to become self-reliant and self-sufficient. Several case study participants mentioned that this was important, with one describing that, "Because we wouldn't have to depend on the oil, we wouldn't have to depend on anyone. We would be self-sufficient which is major around here because if it storms and we don't get oil we don't have heat right now or anything." This was important for grid connected communities as well, with several case study participants mentioning that this independence was important as it related to their history prior to colonial contact.

> A long, long time ago Haida Gwaii people were very independent and we could sustain ourselves. Obviously we had trading relationships and things like that as well, and I think we will have the same sort of relationships like Hydro. But if we could become self-reliant again is another end goal.

3.2.4 Oil and Gas Alternatives and Education

These projects were seen by the majority of interviewees from Skidegate as providing an alternative to oil and gas use. Case study participants saw this as particularly important due to the Council of Haida Nation, as well as many other groups and individuals from Haida Gwaii, firm stance opposing Enbridge's Northern Gateway pipeline ("A Resounding Voice" 2013).

> We've been on the forefront of protecting our land and waters in stances against Enbridge and yet our energy comes from diesel generated [by BC] Hydro and so, it's hard for us to say we're protecting our land and waters from threats like Enbridge when we're using so much fossil fuels in our own homes.

As another project leader explained, "like I said earlier the position of the Haida people is no oil and gas, well then let's be proactive what are we doing, grab a glove get in the game you know. [laughter] Start chipping in. It's easy to be critical sitting on the sidelines, right?" Some case study participants saw these projects as part of the alternative they were providing to the fossil fuel development Haida Gwaii is largely resisting. As one project leader from industry reflected, "if you're saying no to a certain type of development you need a yes too. You need a solution. Instead of just saying we don't want a pipeline, you can say we want a turbine, we want solar." This alternative was providing a sense of pride that the community was standing by its values. One interviewee said this about the Haida Heritage Centre's solar array, "people come here

from you know everywhere and they see the poles and they'll look up and they'll see you know we're starting to practice what we preach as well too."

The educational component of these projects was discussed by the majority of research participants as a main benefit. This related to youth and community members knowledge and belief in transitioning to a sustainable future powered by renewable energy. As one interviewee reflected, "just seeing the panels it becomes something that's not science fiction." The most beneficial part of the solar installation was seen by one participant as turning the financial burden of the Heritage Centre into an educational tool. TVs were set up in both the Haida Heritage and George Brown Rec Centre, so community members could see how much power the solar panels were producing. Project leaders hoped that by visualizing energy production community members would be more conscious of where their energy is coming from. Many projects covered in the media are installed on schools, with the benefit articulated of educating children and youth about a future powered by renewable energy.

3.2.5 Project Accessibility

The case study revealed that the development pathway of small-scale solar is accessible for communities, both from the planning perspective and community member employment and engagement. As solar has become more affordable, projects can now be financed from one grant, as Skidegate's 50kW project was, and largely their 100kW as well. When asked why he thought so many communities are considering solar a project manager in industry reflected:

> Well I think it comes down to that the price per watt is so competitive. It's the lowest it's ever been, it's one of the cheapest forms of energy anywhere. I think that plays a role but then also the fact that being able to integrate it into the

> built environment essentially wherever you are is very handy. You know not needing to do any meteorological test or any sort of environmental assessment from a distributed side make it very appealing. And then also just the fact that you are able to integrate it into the community right away is very appealing I think for communities.

Several project leaders also expressed that small-scale projects are less cumbersome with less 'political and technical red tape' than larger projects. As one project manager described, if projects are over 100kW, "you have to do massive reports and calculations that would just knock out most [projects]. It probably would have knocked out our project too, we just didn't have the funding to employ consultants to do this early work." This early work can include, for example, hiring engineers for preliminary environmental assessments, geotechnical studies, Ret Screen Analysis and feasibility studies. In Skidegate a project manager describes parts of the development process.

> The solar projects, they came out of—well, our CAO (Chief Administrative Officer) really handled the George Brown one, pretty much herself. Yeah so there was an island wide meeting where all the CAOs some funding became available to do some solar projects, so that one was chosen. There's a fair bit of energy consumed at the George Brown Centre while we're in there. It was in a good location, we could put a fairly decent size project on it. So that was the starting point.

Project leaders expressed the importance of how there is less time required in both planning and constructing projects. "There has to be a direct benefit right now, real time, and continue on down the road, going back to keeping us [going] in the right direction." This related to the incremental progress these projects allow communities.

Solar is a simple technology to install, and interviewees highlighted how accessible it is to be trained and employed in the installation process. As one community member who

was employed on the solar installation in Skidegate expressed, "Yeah, it was pretty straight forward. Like one of the ways that I learned is like just watching and I watched how they were doing and it is pretty straight forward you lay it down, clamp and connect." One project manager expanded upon this:

> I think yeah in terms of the deployability, in terms of the technical requirements, distributed solar, and utility solar to a degree, is much more tangible and accessible for community members. In terms of transferable skills, in terms of being able to on the job train them, obviously when you're dealing with the heights of a turbine and moving parts and the dangers, it's much more specializing and it's not something you can—maybe aside from the contractors and the foundation work you can't really be able to rely on being able to access local labor as much for the actual installation and integration.

4. Discussion

Small-scale projects (that produce less than 1MW of power) are a distinct experience within the renewable energy sector, one that is offering First Nations communities an accessible form of power production that provides myriad environmental, economic and socio-political benefits. With 40 projects' currently in operation or development, and 150 prospective projects, the results reveal that small-scale renewable energy development is prevalent with increasing interest across BC. These findings reveal that small-scale projects have a distinct role to play in supporting justice within the energy transition, one with an opportunity to foster community resiliency.

The current literature on Indigenous renewable energy involvement has largely focused on large-scale development that are commercial in nature, meaning that they are developed to sell power to the provincial energy grid and generate revenue for the community. This literature describes its barriers, benefits and pathways for development (Sayers 2015; Henderson 2013; Krupa 2012). Within this literature, small-scale projects

have been generally ignored or lumped together with large-scale projects. It is true that the material benefits of large-scale projects are typically more substantial, as they can offer a significant revenue stream and jobs in communities with limited other economic options. Small-scale renewable energy development, however, offers distinct benefits, which relate to accessibility and connection to energy. This discussion unfolds as a comparison between small and large-scale renewable energy development, not to show that one is superior to the other, but to note where key differences lie. I begin by outlining the accessible development pathway of small-scale projects in comparison to large-scale projects and how that may help communities overcome common barriers to renewable energy development. I go on to discuss the differences and similarities in benefits between small and large-scale renewable energy projects. Finally, I emphasize the direct way small-scale projects are producing power that can lead to greater connection to energy supply for communities.

4.1 Accessibility

There is no denying that the renewable energy sector is complicated and expensive. It is a daunting form of development to pursue for any community, particularly communities that are smaller in size and thus have limited capacity, as is the case for most remote First Nations communities. Two sources have been developed in Canada to help First Nations through the development process of a renewable energy project: Chris Henderson's *Aboriginal Power* and Judith Sayers' *BC First Nation Clean Energy Toolkit*. Both sources outline pathways to develop a commercially-viable project, and do not explain how a small-scale or solar project is developed or mention how they might be a more accessible option. These sources have understandably focused on large-scale

development, as the process is complex and has the opportunity to provide substantial material benefits. However, it is important for communities to know the range of options they have within the renewable energy sector, and that small-scale projects offer a more accessible form of development. There is significantly more time, expertise and money required to take on large-scale development in comparison to small-scale. It can take years, often decades, for all the forces to line up so a project can be built and come online. Small-scale projects offer an accessible form of power production that requires less time, resources and expertise to develop. I compare the pathway Henderson lays out in Figure 2.4.1 with that of a development pathway of a small-scale solar project. As you can see, there are far fewer steps, these steps are far simpler, and the timeline is much shorter for the small-scale solar project. It is important for communities to understand that small-scale technologies reduce complexity required for involvement in renewable energy development, while still producing a myriad of benefits. One such benefit is that small-scale projects have the potential to build capacity in communities to develop large-scale projects. There is a need for an expansion of the literature around Indigenous involvement in renewable energy to include the experience of developing small-scale projects.

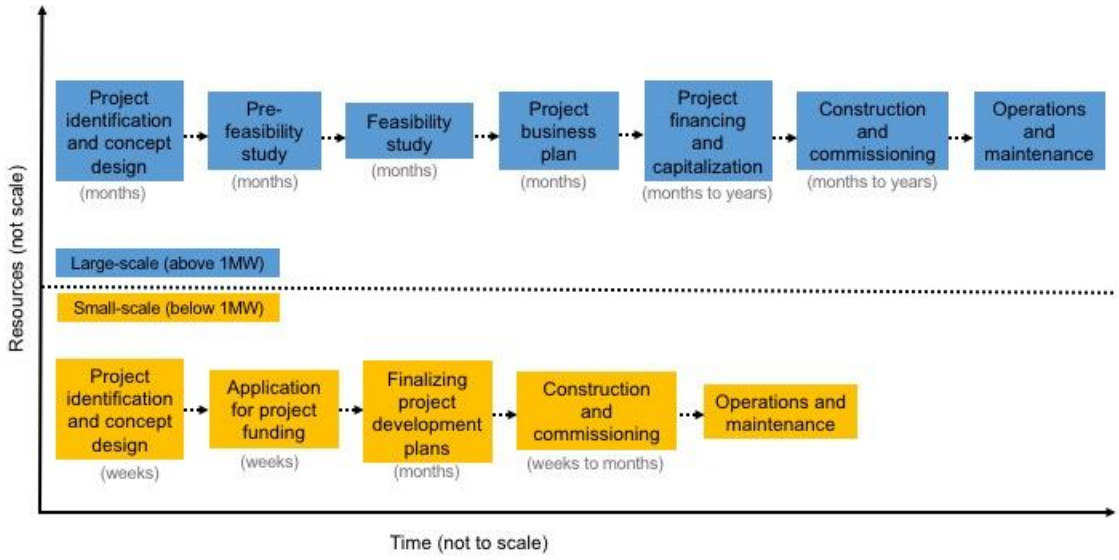

Figure 2.4.1: Development pathway of large-scale renewable energy project vs. small-scale solar project (adapted from Henderson 2013, Figure 3.1)

It is important to note that this is not an either/or situation; communities can pursue both small and large-scale projects, and indeed one may act as a gateway to another. Communities that have developed small-scale projects have built capacity to potentially take on large-scale projects. Communities with a large-scale project may pursue small-scale development.

Remote communities in BC continue to struggle to implement community energy projects (Karanasios and Parker 2016). Research has found the main barriers to development to be complexity of infrastructure development required, scattered nature of financing, and community capacity (Kennedy 2018). As this research reveals, small-scale projects potentially offer a response to all three: you do not need as much human capacity; you can fund a project with one or a small number of grants, which lowers the barrier to complexity of funding and reporting; and the infrastructure required to develop a project is much less complex. Although they do not produce as much power as large-

scale projects, in tandem with other efforts small-scale renewable energy development offers an important piece to consider for remote communities looking to reduce or eliminate their reliance on diesel.

4.2 Measurable and Immeasurable Benefits

The research revealed a wide-range of benefits from small-scale renewable energy development that First Nations communities are experiencing in BC. Where the important material benefits of large-scale renewable energy sector for First Nations have been well documented, the benefits of small-scale projects have not. Both Henderson (2013; 2017) and Sayers (2017) have shown that participating in the clean energy industry is one culturally appealing method through which First Nations are able to gain independence through generating revenue as well as affirming their rights and title. Without producing the same amount of power, small-scale projects are allowing communities to increase independence and resiliency through different pathways. Communities largely do not see small-scale development as providing an avenue into the clean economy, as projects do not produce significant sources of revenue. Instead, small-scale projects reduce the cost of energy to operate community buildings and residences through community-ownership of power production, which in turn allows funds to be reallocated within the community or household. This was emphasized as important in the survey and case study, as high costs of fuel or BC Hydro had become a burden. Small-scale projects were seen to be part of a bigger vision which, for Skidegate, was one in which their community was no longer reliant on diesel.

> It's coming at it from both ends. Community members are going to understand that they're going to benefit on an individual level in the fact that they're going to reduce their energy costs. On a larger level, community members are

> going to feel proud to be reducing our reliance on fossil fuels as a community and as a People.

It was important in unexpected ways as well, with one survey comment explaining how their small-scale project was facilitating a remote camp that would have been cost prohibitive to run otherwise.

As Rezaei and Dowlatabadi (2016) have outlined, community renewable energy development for First Nations is not pursued in the sole interest of economic development, but rather self-determination both materially and politically. Although small-scale projects do not provide the same level of material benefit as large-scale, they are increasing self-sufficiency in different ways. Small-scale projects reduce reliance on outside sources of the provincial utility or diesel generation through a community owning and providing power directly to buildings and residences. Small-scale projects also require minimal expertise from outside the community (such as engineers, and financial advisors), and are accessible form of development for communities to develop without relying on outside sources of support. This increase in autonomy can lead to political power, as one project leader relayed when asked about whether the increase in interest in solar by First Nations communities was purely about cost.

> I think it's something more, it's what we call empowerment or Power to the People. First Nations need to get their power back, and one of the ways to do that is creating your own electrical power, literally. If you can become autonomous in power, chances are that you're going to get your political power back too, as we're finding at T'Souke. You don't want to be beholden to utilities, companies or any public or private entity around the energy issue, if you can become autonomous then suddenly you've got all sorts of autonomy that can lead to other areas.

The majority of benefits articulated, in fact, were immeasurable. These benefits include a sense of pride and empowerment within the community through successfully implementing a project that is in line with First Nations cultural values.

> The Lubicon project we did where you know it's only 20.8kW it stands out in the community and everyone is talking about green homes there and it kind of creates this inspiration factor and it's more these qualitative measurements unfortunately, but I think these intangibles that come out of it. That's why I do the work is the intangibles…I mean of course I want to quantitatively demonstrate energy in savings and income for the community, but at the same time it's more so the sense of community pride and how do you quantify that, right?

As Henderson's survey has outlined, there are clear and measurable benefits from large-scale renewable energy development for First Nations communities which include employment benefits, coal and gas offsets and investments and returns (Henderson and Sanders 2017). Although it is not as easy to quantify the benefits of small-scale projects, that does not negate their worth. If we are to realize the full benefits of these projects, there needs to be more attention paid to the immeasurable benefits provided by these projects by funders, governments and most importantly communities themselves. There is a role to be played by government in supplying funding and appropriate support, as determined in collaboration with First Nations communities, for these projects. Governments must understand the importance of these projects for increasing community resiliency and building self-determination.

4.3 A Consequence of Producing Power Differently

Small-scale projects are developed to provide power to community buildings and residences directly (called self-consumption). This can form a new connection to energy, one where there is a stronger relationship to energy source. In this regard, small-scale

projects have the potential to change the relationship to power production and consumption for communities, as Lovins and others have discussed. This connection to energy source cannot be cultivated in the same way with large-scale projects. Where small-scale projects are developed to provide power to community buildings and residences directly, large-scale projects mainly sell power to the provincial utility, maintaining the same relationship to energy the community had prior to the renewable energy installation.

The creation of feedback loops is one method by which communities have become more engaged in and aware of their energy production. There is extensive primary evidence that domestic renewable energy installations increase household energy literacy and implementation of energy saving measures (Berka and Creamer 2018). It is believed that this is accomplished through an energy feedback loop, whereby the increased connection to energy source brings behavior associated with energy consumption within awareness (Abrahamse et al. 2005). This energy feedback loop was created Skidegate through TV monitors installed in the George Brown and Haida Heritage Centre that display how much energy is being produced by the solar panels at each moment. Skidegate was pursuing installing usage monitors into residences so that people monitor their energy use in real time. In this way, communities are increasing awareness and engagement with their energy production and consumption, and they also have information available to help them change behavior to match consumption with production: using solar electricity when it is available rather than relying on a diesel generator—and paying more—when it isn't. More research is required to understand the impacts of community-level self-consumption installations on energy literacy and

behavior. It was beyond the scope of this research project to determine whether or not small-scale renewable energy projects are changing behavior in communities, however it is an important topic for study.

Many studies have identified that low-implementation of energy efficiency measures by the general population, despite the fact that these measures would result in cost savings (Hausman 1979; Granade et al. 2009). The research found a potential correlation between small-scale renewable energy development and uptake of other initiatives to reduce energy consumption and increase efficiency. Multiple communities in the survey had taken on energy efficiency measures and workshops related to energy conservation and literacy following small-scale installations. T'Sou-ke is a prime example of this, as their key learning from their small-scale solar array is that they developed their project backwards; the project leader in T'Sou-ke wishes they had lowered demand using energy efficiency and behavioural changes before installing the solar array. T'Sou-ke installed a larger capacity of solar power than their community buildings required after the energy efficiency retrogrades. T'Sou-ke now holds workshops with other communities where they speak to the importance of energy conservation. A main lesson they share from their project is that saving energy is much cheaper than producing energy and should thus be a priority for communities. T'Sou-ke has created an enterprise out of these workshops, as a project leader explains.

> What came out of all that was the whole area of disseminating the information to not only other First Nations but to the whole of the wider community. We have a fairly major social enterprise that gets this information out across not only this region but across the world. We have you know 2,000 people a year coming in for tours and workshops.

Skidegate has taken on energy efficiency measures in tandem with their energy producing projects as well. Skidegate has participated in BC Hydro's ECAP program twice, with the goal of upgrading every residence in Skidegate to be energy efficient. They have also undergone energy literacy measures, holding workshops where they break down a BC Hydro bill. Both T'Sou-ke and Skidegate, along with other Nations from the survey, are now taking on green housing initiatives including installing tiny homes, and researching energy efficient housing solutions. T'Sou-ke has a three year contract with funding from the Vancouver Foundation to research, design and build three Affordable Net Zero homes on three Reserves in BC with widely different climatic conditions; one at T'Sou-ke, one in the mountain region and one in a coastal Rain Forest. It is put best by a project leader from industry, who explains:

> But it quite often it's gets the housing managers to think about energy, it gets everybody starting to think about green homes, efficiencies, it sort of instantly creates—well it's a catalyst of a shift for creating more of a conservation culture. Just understanding energy in a different way.

Whether or not the solar projects motivate more sustainable solutions related to energy efficiency, or are correlated with them, is not discernable from the research. However, the correlation is itself noteworthy; when communities engage with their energy production, they tend also to pursue other measures of conservation and efficiency.

5. Conclusion

There is sometimes more than meets the eye in a solar installation on a roof or a biomass boiler in a basement. Yes, they are reducing greenhouse gas emissions and saving money in a community with limited resources, but these projects can do more than generate power. They can generate pride in owning a project that is helping a community

regain control of the source that powers their lives, a project that is part of a climate solution. They are an accessible tool that can allow communities to fulfill their own needs in ways they deem culturally appropriate. Small-scale renewable energy development is a tool that is of increasing interest within First Nations communities in BC; it is one method First Nations are using to enforce self-determination and build community resilience. Small-scale projects are able to do this through producing low-carbon energy with emerging cost-effective technologies and ownership at community scale. This has the potential to result in a more distributed energy system that contributes to more resilient and empowered communities and a more just energy system.

Chapter 3 – Towards Sustainable Energy Systems in Skidegate

1. Introduction

There are 27 First Nations remote[3] communities in British Columbia, the majority of which still rely on diesel power generation (Karanasios and Parker 2016). Remote communities face many costs associated with relying on diesel. For one, diesel generation is an expensive form of power production that releases greenhouse gas emissions and contributes to climate change. Communities who rely on diesel power generation also experience adverse health effects, as burning diesel releases pollutants and degrades air quality (Hutter et al. 2015). In coastal regions, the shipping of diesel comes with a risk of an oil spill and the subsequent environmental damage. Relying on diesel generation increases vulnerability and decreases resiliency in remote communities, as communities rely on a volatile fuel to power their lives.

Many First Nations communities are committed to transitioning off diesel. The drive to move towards sustainable forms of power generation can be an imperative for a variety of reasons: social, cultural, economic and environmental. As Indigenous cultures and lifeways are so interwoven with land and place, and as many Indigenous populations are living in regions that are undergoing rapid environmental change due to climate change, the impacts of diesel generation are felt more strongly amongst Indigenous communities. As Cunsolo Willox et al. (2012, 46) explain in their study of the impacts of climate change on an Inuit community's health, "people are not only *from* a particular place, but they are also *of* the place; that is, their identities, well-being, livelihoods, histories, and emotional-spiritual connections are emergent from the lands on which they live." That is,

[3] Remote is defined here as a community which is not connected to the provincial electrical grid.

as the environment rapidly changes due to climate change, there are far reaching and multifaceted impacts for Indigenous peoples: cultural, spiritual, physical and overall general wellbeing within communities. As Neerven (2015, 4) explains in their essay on loss of species in Australia due to climate change and environmental destruction, "Because land and sea are inextricably linked with Indigenous cultural identities, a changing climate threatens ceremony, hunting practices, sacred sites, bush tucker and medicine, which in turn affects law, home, health education livelihood and purpose." In other words, destruction of land is directly linked to destruction of life ways.

The path many Indigenous communities are using to decrease reliance on diesel is through implementing community-scale renewable energy projects. Throughout Canada, Indigenous peoples are increasingly interested in community-owned renewable energy development (Kimmett 2009; Wohlberg 2014). Renewable energy development offers a unique and important opportunity for Indigenous peoples in Canada, one with the potential to provide myriad economic, social, political, and environmental benefits (Sayers 2015). For remote First Nations in BC, Rezaei and Dowlatabadi (2016) found that renewable energy development is pursued in the interest of achieving material self-sufficiency and political self-determination. Put differently, community-owned renewable energy development is one approach Indigenous communities are using to increase their autonomy and resiliency.

For nearly two decades, the provincial and federal governments have been trying to support communities to transition off diesel (Kennedy 2018). Despite provincial and federal goals and resources allocated to support the transition off diesel generation, and communities' commitment and desire, remote communities in BC continue to struggle to

implement community energy projects (Inglis 2012). Recently, the federal and provincial governments have allocated further funding to support communities transition from diesel generation to sustainable sources of power (Lovekin 2018; "B.C. Adds $2.1 M to Support First Nations Clean Energy" 2017). Despite the sustained effort, these programs have thus far largely been unsuccessful. The Remote Community Electrification Program (RCE), for example, was set up in 2007 to electrify 34 remote communities in BC (Hydro 2008). RCE was implemented not for environmental reasons, but to create more reliable source of energy for remote communities and lower the cost of energy provision (Kennedy 2018). RCE was canceled, citing budget cuts, in 2013 after transitioning only five of the 34 communities off of diesel by connecting them to British Columbia's energy grid, and assuming responsibility for five other communities' diesel generating systems (Hydro 2008; Mast 2014). Through interviews with government and community leaders involved in the RCE program, Rezaei and Dowlatabadi (2016) argue program failure was due to the disparity in goals between government and community leaders. Government officials focused on financial and environmental incentives for new project development, whereas community leaders focused on self-sufficiency and political self-determination. One point of contention in the RCE program was ownership, as participating in the program involved transferring over ownership of energy provision and infrastructure to BC Hydro (Rezaei and Dowlatabadi 2016). As the public utility BC Hydro, and indeed the provincial government, has not been able to take community goals into account, the support available has not been effective at helping communities transition off diesel.

Insofar as these programs have neglected to consider communities' own goals from project development, it is no wonder that they have experienced limited success. Despite

this, most research on remote renewable energy development today still focuses on technical and financial aspects of the transition, largely neglecting the experience of communities and what they view as important. It is clear that in order to create any form of effective support for communities in transition to new forms of energy production, programs must take into consideration what communities themselves want.

The scholarship regarding successful remote renewable energy projects is limited. To date studies about remote renewable energy have focused on barriers. This line of research has found that the main barriers to remote renewable energy development are the complexity of infrastructure development, the scattered nature of financing, and community capacity (Inglis 2012). But how are communities that are committed to moving away from diesel navigating the current system? Although the research has not been extensive, what has been done points to community empowerment and resilience as key factors for success. One study by Lawrence Keyte outlines the success factors that led to an 85kW biomass project in a remote First Nations community. Keyte (2015, 5) explains that, "community capacity, adaptability and ability to self-organize and form partnerships all factor into the success of a renewable energy project." When a community is resilient, they are able to find ways to successfully implement clean energy projects. Krupa (2012, 81) has also tackled what leads to successful projects in remote First Nations communities, pointing to the importance of, "project design that reflects community values, incorporates community control, and incentivizes Indigenous ownership." Krupa's research importantly points to the fact that when communities have control over the process of energy development, projects are more likely to move forward.

Comprehensive Community Planning (CCP) is one method First Nations communities in BC are using to increase community resilience (Mannell, Palermo, and Smith 2013). Comprehensive community plans are pursued to, "build a roadmap to sustainability, self-sufficiency and improved governance capacity" (Indigenous Services Canada 2018, 1). The CCP is meant to be a process that is driven by community members using the principles of sustainable development. The planning process can involve deciding what a community needs in terms of managing and maintaining their infrastructure and then applying for funding through Indigenous and Northern Affairs Canada (INAC). More than 80 First Nations bands in British Columbia have completed the process. However, the degree to which they are driven by the community varies greatly. Some plans have been created by consultants with little input from the community, whereas others have been driven fully by the community themselves. Little attention has been paid to the impact of this planning process for First Nations communities: what might this planning process mean for communities looking to successfully implement renewable energy projects and transition off diesel?

Since knowledge about the underpinnings of successful renewable energy development by remote communities is so limited, this project was designed to understand what might be significant about remote small-scale (below 1MW) renewable energy projects for a First Nations community. I conducted a case study with the First Nations community of Skidegate who have multiple community-owned small-scale operational renewable energy projects. By installing 150 kW of solar power on community buildings and 360 heat pumps in homes, the Village of Skidegate has emerged as a leader among remote Indigenous communities transitioning towards sustainable energy systems. The goal of

this project was to identify motivation and success factors of three discrete sustainable energy initiatives that have resulted in Skidegate standing out as a leader in transitioning a remote community off diesel.

What emerged through the research was not specific to any of the three discrete projects. Instead, the findings highlight the essential role of a community-wide initiative to successfully move away from diesel dependence. Skidegate have undertaken a holistic[4] solution to transitioning off diesel that involves taking back control of their community energy system. This wide-ranging approach was accomplished first through holding a series of community-based priority setting and planning meetings (participating in the CCP); followed by increasing energy literacy and installation of energy efficiency measures; and lastly, installation of sustainable energy initiatives. During this research, it became clear that the important question to be pursued was not what factors led to the successful implementation of Skidegate's heat pump, solar PV and energy efficiency projects, but rather, how was Skidegate's renewable energy trajectory sparked and sustained?

This research question was answered through an exploration of the factors contributing to the successful development of residential heat pump and solar PV projects as they relate to Skidegate's creation of a CCP from 2012-2017, an approach designed specifically to allow for community participation in setting priorities and decision making (Babalos and Williams 2013). This research documents that Skidegate was successful at developing renewable energy projects because they were developed as a part of and within the community. This paper argues that small-scale renewable energy initiatives are

[4] By holistic I am referring to both energy consumption and production measures

an accessible tool that Skidegate is using to move towards a broad vision of healthy, livable and sustainable community.

The recent leadership displayed in the Skidegate sustainable energy initiatives was sparked and sustained by a community-driven CCP. The CCP has led to a more holistic process of moving towards energy sustainability beyond the scope of these discrete projects. In what follows, I begin by briefly describing the context of colonialism in BC, and energy development on Haida Gwaii, followed by a section that describes the methods used in the case study with Skidegate band council. The results section is next and begins with a case overview that outlines each sustainable energy initiative community motivations and details of development separately, then provides an overview of factors that contributed to the projects' success. Let's begin with the context we are in.

2. Context

2.1 BC is a Settler-State

There is a long history of Canadian government policies resulting in the systematic political, economic and social marginalization of Indigenous peoples (Regan 2010; Lowman and Barker 2015; "Truth and Reconciliation" 2017). The Truth and Reconciliation Commission (TRC) of Canada documents the cultural genocide carried out by the government of Canada through the residential school system and other policy instruments in order "to divest itself of legal and financial obligations to Aboriginal people and gain control over their resources" (2015, 3). The TRC calls on all governments in Canada to implement the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and create "new strategies based on respect for Aboriginal self-determination" (137). We are now at a time in BC where our government has committed to implementing the TRC and UNDRIP. When the BC Green Party and

the New Democrat Party (NDP) signed a confidence agreement, the foundation upon which BC's current government rests, the following statement was in it:

> A foundational piece of this relationship is that both caucuses support the adoption of the UN Declaration on the Rights of Indigenous Peoples, the Truth and Reconciliation Commission calls to-action and the Tsilhqot'in Supreme Court decision. ("Confidence and Supply Agreement" 2017, 2)

If the government is to make meaningful action towards reconciliation, and adopt call-to-action from the TRC and UNDRIP, supporting First Nations' self-determination is an imperative.

2.2 The Village of Skidegate

The Haida Village of Skidegate is located on the archipelago of Haida Gwaii, 45-60km off the coast of Turtle Island, or the coast of BC. For time immemorial the Haida have been stewarding and living in relationship with the land and waters of Haida Gwaii. After decades of organizing, lobbying and blockading against clear-cut logging on the islands throughout Haida Gwaii, the Haida won a precedent-setting Supreme Court of Canada legal case in 2004, ensuring that the province of British Columbia must consult with them before issuing tree farm, or any extractive, licenses (Dowie 2017). The Haida continue to assert their rightful claim to sovereignty over Haida Gwaii, currently with a legal action in the Provincial Supreme Court pending to assert themselves as a sovereign nation. The Haida continue to live on and govern their lands and waters, and to rebuild their social and political institutions from the damage caused by colonization.

The Village of Skidegate has a population of approximately 900, while the entire Haida Gwaii archipelago has a population of approximately 4,750. Haida Gwaii is not connected to the North American electricity grid. The islands are serviced by two grids,

north and south, which are owned and operated by BC Hydro. The north grid's electricity is powered 100% by diesel generators. Skidegate is connected to the south grid, along with the nearby communities of Sandspit, Queen Charlotte, and Tlell, and is powered by the Sandspit Diesel Generator System (DGS) and the Moresby Lake Hydro Facility on Moresby Island. The hydroelectric plant provides approximately 80% of the required electricity and diesel generators make up the difference (Ozog 2012). The amount of diesel generated for electricity varies by month in Skidegate and is based on the amount of water flowing that produces hydroelectric power for the community. July through September are typically the highest months for consumption of diesel in the community (Ozog 2012). Residents of Haida Gwaii pay a higher electricity rate as a result of the expensive way in which their energy is generated (BC Hydro 2018).

By installing 150 kW of solar power on community buildings and 360 heat pumps in homes, Skidegate has emerged as a leader among remote First Nations communities transitioning towards sustainable energy systems. Prior to the period of study, Skidegate had been thinking about and acting on energy. Skidegate's sustainable energy initiatives began in 2009, when they participated in BC Hydro's Energy Conservation Assistance Program (ECAP), a program that provides energy efficiency home evaluations and installs energy saving products. In the same year, they formed a partnership with T'Sou-ke Nation who provided mentorship in renewable energy development based on their experience developing small-scale solar PV to power their community buildings. In 2012, they obtained a grant from the Fraser Basin Council RCI initiative and installed 6 solar hot water heaters in low-income homes and undertook further energy efficiency

measures. Following the methods section, the case study picks up in the period following these initiatives, when the CCP began in 2012.

3. Methods

This study focuses on a case study of Skidegate, which was chosen because of its successful development of multiple small-scale renewable energy projects. Skidegate had recently installed solar panels on two of its largest community buildings (the Haida Heritage Centre and the George Brown Recreation Centre) as well as installed heat pumps in 360 residences. The case study was undertaken in partnership with Skidegate Band Council. The case study approach was chosen due to its capacity to provide a more in-depth understanding of small-scale renewable energy development from the perspective of project leaders and community members, where project leaders are defined as community members who had a role in project planning or implementation. The research sought to outline the details of Skidegate's sustainable energy initiatives, as well as understand their emergence, the process of development and the factors that facilitated success.

The research involved interviews with those involved in planning, negotiating, and implementing the project as well as community members. Methods were responsive to the culture of the community, its context, and my position in the community as the study evolved. I had the opportunity to help the renewable energy contractor install 100kW of solar power on the Haida Heritage Centre and engage with community members during the process of developing this project. Being immersed in the community during this time helped to provide a deeper understanding of what it takes to undertake a project of this size in a remote setting, and informed the development of my research project. I

conducted semi-structured interviews of one hour in length with seven community members: five of whom work for the band office and were involved in the planning and implementing of renewable energy initiatives; one who was involved in installing the Haida Heritage Centre solar project; and one community member had no involvement in the projects. Interview questions were structured to develop an understanding of project origins and motivations, interviewee's personal involvement, factors that led to project success, and project benefits. Interviews were transcribed and coded for emergent themes. Following community interviews, I conducted three subsequent interviews with two project managers who work in the renewable energy industry and one project leader from T'Sou-ke First Nation. These interviews were conducted to ground-truth the themes that emerged from Skidegate transcripts.

Through the research process it became clear that understanding the success of the projects required locating them within the CCP process, and so this is how the results are presented. Below is an overview of the Comprehensive Community Planning process and some of the community priorities that emerged. These, in turn, provided successful guidance regarding selection, design and installation of the three energy projects, as well as the energy efficiency and literacy measures.

4. Results

4.1 Case Overview

4.1.1 Comprehensive Community Plan

From 2012-2017, Skidegate underwent a process of creating a community-driven Comprehensive Community Plan (CCP), titled *Gud Ga Is*, which translates to Being Together to Talk in Haida ("Gud Ga Is" 2017). The purpose of the plan was, "to give Skidegate the ability to determine for themselves what social, financial and political

priorities are for the community" (2017, 27). The plan was partially funded by British Columbia Capacity Initiative (BCCI). The planning process was established to be by and for the community, and was developed by a planning team that stemmed from the community in collaboration with UBC's School of Community and Regional Planning (SCARP). The planning process involved community meetings where community members determined what their priorities were for the community and created a shared vision as a roadmap to greater self-sufficiency and sustainability. Following four years of plan development, a written document was completed that encompassed the results of the community planning meetings. Skidegate's vision as stated in the written plan is:

> Our unique way of seeing the world is shaped by the traditional lands and waters that we have occupied since time immemorial. The Haida way of life relies on sustaining our natural environment. Through the widespread practice of our culture and language, we are working towards greater community resilience and improving our health and wellness. We place trust in our community leaders who govern openly, helping us to build vibrant local economies, and strengthen pride in Skidegate. (2017, 17)

During this process of creating *Gud Ga Is*, the community identified their desire to undertake more energy sustainability measures due to the high cost of energy and reliance on diesel generation for electricity. A project leader explained that, "These projects were a by-product of the CCP. The CCP is our guide for our community." Similarly, another project leader explained:

> The idea about sustainability and being energy efficient in our community came from our community plan. Where the community members identified that they wanted to protect our land and waters since Haida Gwaii is so pristine. And we looked back in our traditional Haida laws, that everything is connected and everything depends on everything else. It's one of our Haida laws, in Haida its

> *gina 'waadluxan gud ad kwaagid*. That being one of our core Haida values we realize that everything that we do it effects something else. That we need to protect the land that we live on and that we're connected to the land that we live on.

Through the process creating the CCP, community members were able to articulate immediate concerns, as well as create a shared vision for their community. The energy initiatives that evolved in Skidegate were motivated by immediate financial and environmental concerns within a broader longer-term vision of a sustainable future. The following sections explain the shared visions that were articulated through the plan as they pertain to three sustainable energy and demand-side management initiatives that resulted.

4.1.2 Project Motivations

The shared vision that was developed through the CCP was one where the community is no longer reliant on oil and gas for electricity. One of the pathways of action in the plan includes elimination of diesel dependence, and investment in sustainable local power generation ("Gud Ga Is" 2017, 24). The energy initiatives were part of this vision, as one project leader described:

> It's coming at it from both ends. Community members are going to understand that they're going to benefit on an individual level in the fact that they're going to reduce their energy costs. On a larger level, community members are going to feel proud to be reducing our reliance on fossil fuels as a community and as a People.

An important motivation for energy projects in Skidegate was a tangible step in substantiating their "No" to oil and gas development. In the plan, it states, "We are especially concerned about the threat of an oil spill in our waters, which could threaten our entire way of life. We are committed to defending our land and waters against such

threats" ("Gud G̲as Is" 2017, 24). This was seen by research participants as particularly important due to many groups and individuals from Haida Gwaii, including the Council of Haida Nation, firmly opposing Enbridge's Northern Gateway pipeline ("A Resounding Voice" 2013). As one interviewee relayed:

> We've been on the forefront of protecting our land and waters in stances against Enbridge and yet our energy comes from diesel generated [by BC] Hydro and so, it's hard for us to say we're protecting our land and waters from threats like Enbridge when we're using so much fossil fuels in our own homes.

The energy projects were seen by research participants as an important part of increasing self-reliance, as reliance on diesel was a major hurdle to becoming self-reliant. Several case study participants mentioned that this was important, with one describing that, "we wouldn't have to depend on the oil, we wouldn't have to depend on anyone. We would be self-sufficient which is major around here because if it storms and we don't get oil we don't have heat right now or anything." This motivation for self-reliance was further emphasized as it related to Haida history prior to colonial contact.

> A long, long time ago Haida Gwaii people were very independent and we could sustain ourselves. Obviously, we had trading relationships and things like that as well, and I think we will have the same sort of relationships like Hydro. But if we could become self-reliant again is another end goal.

Motivations for the energy trajectory were able to be articulated through the community planning process. The motivations were connected to both immediate concerns of high energy costs within the community, and a broader vision of a future where Haida Gwaii is not reliant on diesel power generation. In what follows, I will

describe the demand-side management actions and three major sustainable energy initiatives that evolved from the community planning process.

4.1.3 BC Hydro Billing Workshop

One of the early issues impacting community members that was identified in community meetings was the burden of high BC Hydro bills. In the beginning, the planning process was focused on housing policy to remedy this situation, because as one project leader said, "we have so many poorly built homes." The planning team quickly realized that community members could not offer useful insight into how to create better housing policy to alleviate energy costs. However, as one project leader explains, "what community members do understand is where their money's being spent or where things cost them money. The first thing we did was look at a Hydro bill and walked through how to read a Hydro bill and how to understand a Hydro bill." The band council hired a consultant and conducted a workshop that broke down a BC Hydro Bill so community members could better understand how charges were applied, as a project leader expands upon.

> And simplified things and said okay this is where your money is going. Your money is going towards your appliances in your home, so people could understand, oh right I don't have an energy efficient washing machine, or I have an old fridge, or I have electric heat in my home, or I have drafts around my doors and my windows, or you know I don't have the right type of insolation in my ceiling or in my roof. They started learning about how money escaped through their homes, and through their Hydro bills. So that was the beginning process and then we started to get people interested in energy consumption in their homes.

This project leader emphasized the importance of this simple measure of breaking down a BC Hydro bill with community members and increasing their understanding of

what they were being charged for, and how they might reduce those costs: “Literacy levels are not necessarily that high in our community and having someone come in and pull apart as simple as a bill and how to read your bill was really important.” Following this initiative that increased energy literacy within the community, Skidegate undertook a substantial project of installing residential heat pumps in every home in the village. The following sections details this initiative.

4.1.4 Residential Heat Pumps

During planning meetings, elders communicated that they were experiencing a large cost burden from the expense of heating their homes, for both BC Hydro bills and fuel costs. Many elders had previously relied on wood stoves to heat their homes, but were unable to collect firewood as they once could due to their age. They now relied on inefficient floor board heaters or oil furnaces. As one project leader explains, due to this concern, Skidegate decided to purchase new heating devices for the community in the form of heat pumps.

> Well with the heat pumps, it came out really with the CCP we had done. And our elders had identified a desire to try to get away from their high costs of their Hydro bills. And at that point we thought well these heat pumps are the most economical heat source right now, so we’ve been told.

Heat pumps are electric heating and cooling devices that transfer heat from outside to inside homes to provide temperature control. They are more energy efficient than electric or gas heaters, as they have no heating elements to burn energy (Bell 2008).

Heat pumps were installed in 360 homes, the vast majority of residences in Skidegate, between 2015 and 2016. Funding for the heat pumps was through a cost sharing agreement between Skidegate Band Council, Indigenous and Northern Affairs Canada

(INAC), and a BC Hydro rebate program. Negotiations went on for 3-4 months whereby the band council staff negotiated an increase in funding from approximately 40 units to complete the whole village. Through the heat pump project, community members agreed to have their household energy usage monitored by BC Hydro and the band council. This was done to track energy usage to continue to improve energy efficiency.

How much the heat pumps have saved community members varies, and is dependent on the source of heat they have prior (wood vs. fuel vs. baseboard) and their rates of energy consumption. Sarah Ozog, in her 2010 energy baseline analysis conducted in the Village of Skidegate, reported that between residences and band council operated buildings, approximately 175,000 litres of oil and 36,000 litres of propane are used each year for heat (Ozog 2012). The heat pump installations have reduced that consumption to virtually none, and have provided direct greenhouse gas emissions and cost savings as a result. The heat pumps have reduced the cost of energy for community members by providing a more energy efficient heating source.

4.1.5 Solar Installations

Following the completion of the planning process in 2017, Skidegate installed two solar photovoltaic (PV) systems. The solar projects stemmed from alleviating the high energy costs Skidegate Band Council was experiencing to run community buildings, in particular two of the largest buildings in the community the George Brown Recreation Centre (Rec Centre) and the Haida Heritage Centre. In order to address these concerns, one 50kW solar PV system was installed on the roof of the George Brown Recreation Centre and one 100kW solar PV system was installed on the roof of the Haida Heritage Centre.

The panels were connected to the south grid on Haida Gwaii through BC Hydro's net metering program. Net-metering is a program designed for projects that generate electricity for customer's own use. It allows customers to sell back power when installations are generating more than is being used, and access grid-based power when solar panels are producing less power than is being used. Televisions were set up in the Rec and Heritage Centre to allow community members and visitors to see power produced by the solar panels. The following sections outline the development details of each of the solar PV projects at the Rec and Heritage Centre.

4.1.6 George Brown Solar Project

The 50kW solar PV system on the Rec Centre was installed in the spring of 2017. Funding was secured through an island wide grant that the neighbouring community of Port Clements received from the Union of BC Municipalities. This grant provided funding for each community on Haida Gwaii to complete a renewable energy project. The following quote is from a project leader explaining the development process.

> The solar projects, they came out of—well, our CAO really handled the George Brown one, pretty much herself. There was an island wide meeting where all the CAOs—and some funding became available to do some solar projects, so that one was chosen. You know there's a fair bit of energy consumed at the George Brown Centre while we're in there. It was in a good location, we could put a fairly decent size project on it. So that was the starting point. We already had solar hot water in some residential units, that had been working great, so it's like now we're ready to kick it up into gear here and let's try these solar panels out. Those are working well, we're producing power there, we're overproducing power most times. We're probably overproducing today.

The Rec Centre solar PV installation was completed with one island-wide grant and with one project leader managing the contract. Skidegate hired an off-island contractor to

install the panels and the project was completed in a matter of months. Following the installation of the George Brown solar PV project a second array was installed on the roof of the Haida Heritage Centre.

4.1.7 Haida Heritage Centre Solar Project

The 100kW solar system was installed on four roofs on the Heritage Centre in the summer of 2017. The Heritage Centre is an important building in the community for cultural, social and economic reasons. The Heritage Centre houses a museum that contains culturally significant art and artifacts and serves as a tourist attraction for the community. Further, the Heritage Centre serves as a powerful space for community gatherings, and contains a locally run restaurant. The Heritage Centre is a sizable building that consumes a large amount of energy to operate which is of significant cost to Skidegate, as one project leader articulates.

> Well I think the Heritage Centre has really been a disability in our community in terms of economic development. It was costing so much money to keep the place afloat for energy costs that it didn't allow us to do anything else in our community. By helping to solve that issue and turning to a positive where we can use it as an educational tool is the most beneficial part [of the solar project].

Installing solar panels was one way to alleviate the high energy costs of running the Heritage Centre. Further, reducing the cost of operation allowed funds to be reallocated within the community. Skidegate Band Council received a grant from First Nations Infrastructure Investment Plan (FNIIP) which financed the project. The grant application focused on the need to reduce the cost of power from the building, as well as the educational component of the project. The educational component related to the community's desire to transition off diesel generation and move towards sustainable

forms of power production. Skidegate hired a different off-island contractor, the Indigenous-owned renewable energy company W Dusk, to install the panels, and the project was complete fall of 2017. The solar project was named *Jiigawaay Naay Unguu* or "The Sun on Top of the Roof" by elders in S.H.I.P. (Skidegate Haida Immersion Program). During this time, W Dusk provided training for youth about solar installation and renewable energy. This project also included an art installation, named SolArt, completed by the combined effort of local Haida artists (see Figure 3.4.1). SolArt was designed and built by a Haida craftsman to look like a constructed "long house with the roof caved in" and was built with local wood from his mill. This serves as a base for a small solar ground-array of 12 panels, which demonstrates roughly how much power it would take to run a household using solar power. SolArt also includes a piece of art painted by a youth in the community that is showcased in the photo below. This off-shoot project shows how Skidegate was able to make the solar installations their own, and engage and involve the community directly.

Figure 3.4.1 SolArt solar installation in front of the Haida Heritage Centre (W Dusk Energy Group)

At the same time the solar panels were being installed, Skidegate was undergoing an energy conservation initiative that is described in the subsequent section.

4.1.8 Energy Efficiency

In the summer of 2017, Skidegate partnered with BC Hydro in their Energy Conservation Assistance Program (ECAP), a program that provides energy efficiency home evaluations and installs energy saving products, to train four community members to install energy efficiency kits in every home in Skidegate. This was an unusual endeavor for BC Hydro to pursue, as they usually finance homes that fit low-income criteria. However, Skidegate was able to upgrade the entire community, as a participant describes.

> I know that the council is really keen on doing all of the energy efficient stuff. That's why we did the ECAP and we pushed really hard to get the ECAP going which is not a normal thing in a community this large. Normally it's done on house by house basis and it's done by income, so you have to make under $20,000 to be in the ECAP program but with our program we were able to just put the whole community into one as long as [community members] agreed to it.

The process of installing ECAP included taking stock of household appliances with the aim to replace inefficient machines in elders' homes. This process of increasing energy efficiency was important to Skidegate, as one project leader describes, when investing in forms of energy production like solar power, it's important to not let that energy go to waste.

> The other thing that is if you're doing a solar project and you're creating all this energy, if their home isn't energy efficient, you know they're not going to save as much money as if their home was energy efficient, if they had the drafts filled and were using the right appliances and things like that.

This went beyond increasing the efficiency of homes, and into increasing energy awareness and feedback within the community. Skidegate is looking to partner with BC Hydro to pursue the installation of usage monitors into residences, as a project leader describes.

> We're also looking at partnering with [BC] Hydro to have usage monitors put in peoples' homes so that individuals will be able to tell on a day to day basis—so they will be able to have an immediate feedback with their homes with how much energy they're using.

These examples display the breadth to which Skidegate is undertaking holistic energy solutions. They are not only pursuing energy through energy production projects, they are pursuing more holistic solutions for community advancement, and working hard to increase efficiency and literacy within the community.

4.1.9 A Solar Powered Skidegate

The above initiatives have built momentum within the Village of Skidegate to pursue further forms of renewable energy development. The community now has a vision to install solar panels on every home in Skidegate. This idea came about during the Heritage Centre solar installation.

> You can see that visually it's making a difference there and that's where [the idea for residential solar] came out of. It's like okay well solar works around here and when we did the heat pump project a lot of people thought we couldn't do every home. Well why couldn't we do that with solar panels, it's doable. It works. You just gotta have that mission and the drive and establish these partners. We even have more partners than before we had the heat pump project.

The success of the heat pump projects and solar PV installations has led Skidegate to begin planning to pursue a large residential solar project. There is now a study underway

to assess viability. This would be a precedent-setting endeavor for small-scale renewable energy development.

Further, residential solar installations were beginning to be pursued by community members themselves, who personally bought and installed solar panels to power their homes. As one interviewee describes, "It perhaps provides some inspiration or some vision or some impetuous to pursue further projects which we've even seen in some homes around town here."

Now that I have gone over project details, the following section outlines main factors of success as they relate to the initiatives described above.

4.3 Success Factors

There are many factors to point to that contributed to the success of the initiatives described above. As I am focusing on a community-centered approach of a sustainable energy trajectory, I was interested in not only the specifics of how each individual project's development unfolded, but how success was garnered to move forward on all three. In Skidegate, I found that the process of developing a CCP and having the plan in place made the most important contribution. As described above, the CCP allowed the immediate personal concerns of community members to be addressed along with a shared vision to be developed. Below I detail additional factors that contributed to the success of the projects: the community-driven and comprehensive nature of Skidegate's community planning process, success related to other energy projects, effective teams of people coming together, mentorship from T'Sou-ke First Nation, community champions, and the non-profit Swiilawiid Sustainability Society (Swiilawiid). I begin by going into detail

how project success was facilitated by the approach to developing the CCP, the CCP itself, and finally additional prior-mentioned factors of success.

4.3.1 Plan Development

In Skidegate, the process of developing the CCP was community-driven and extensive. Several interviewees described the importance of the method by which the plan was developed by the community. As this process was brought up often in relation to the energy projects, I will now expand on how the plan was developed. The approach taken to developing the CCP was decided by community members themselves, and was driven by local *Nang K̲aadlljuus* (leadership). Skidegate hired community members to coordinate and manage the plan and formed an advisory committee from the community to help guide the process. Development of the plan also followed 11 Haida guiding laws that included *Yahguudang*, (Respect) all acts must be done with respect; *Ginax̲an gudgiigid*, sharing the wealth; and, *Ga taa idG̲an xiila*, the food is our medicine ("Gud G̲a Is" 2017, 4).

The planning team made a substantive effort to have all voices within the community be included in the community plan. In addition to the 23 main plan meetings, they hosted 22 meetings to target specific demographics in the community to seek out and draw in the voices of youth, elders, and mothers with young children. Here is a project leader discussing this part of the communication strategy.

> What you need to do is identify who the people are in your community that you want to reach and then you have to go to where those people are. I like to use the example of, say picking a time at some point in the day, where are all those people going to be at that one point and time. You can identify them and then you can go to all—especially in small towns like this. You can go to the S.H.I.P., you can go to the co-op, you can go to the health centre, you can go

> to the Headstart program, you can go to people's homes. Or if not, you can go to friends of people maybe they're reclusive and they won't come out, but you can get those friends to go to them. Or their family members to go to them.

The approach that was developed fostered attendance and participation by the community. Community meetings were made to be enjoyable, with food provided and prizes available. I heard from research participants that they liked the approach and enjoyed the time spent at the meetings. As one community member expressed, "That's just an effective communication style, especially for this community. People like to be together, people like to eat together. All the relatives can go down there and see one another and be a part of the same project. People like it, it's just a really warm way of approaching communication." Another community member reflected:

> It was really, really good. They feed you really good and then they have a whole bunch of sweet door prizes for community involvement and stuff like that so it's pretty good. With that you have a lot of people coming in with lots of input, different views, points of view and stuff like that. Yeah I think the CCP is a pretty good thing and I think it's a good way to get community input and involvement in situations and events and stuff like that. I think it's good I think we should do more of them.

The planning team worked to develop an effective communication and engagement strategy that worked for their community. This strategy was developed through asking the community how they wanted to be communicated with, and how they wanted to be engaged with. There was an emphasis on communication as a two-way street, whereby community members were heard by the band council as well as the band council having an avenue of communication to community members. One community leader spells out Skidegate's approach to communication throughout the planning process.

> Communication is how you communicate with your community, you know how you get information back and forth between the two, it's a two-way street right not just a one-way street. And number two is how do they—how do community members want to participate, how do you engage them? What's the buy-in? You know, what's the incentive for them to participate? So, two different things that are part of one strategy. And you have to ask you just can't assume.

This communication and engagement strategy is ever evolving and being updated by the community, as one project leader explains.

> And it's always being updated by the community. So like every year when we have our open house we'll keep asking them the same questions. How do you want to be communicated with, you know, what are sort of some incentives that would help you participate that sort of thing.

4.3.2 CCP Facilitates Success

The final priorities that evolved from the CCP process provided a clear mandate from the community for the band council to move ahead with sustainable energy projects. Further, as a participant explains, part of why they obtained funding for the project was that, "We also had the community plan behind us saying that the community wanted to be less reliant on fossil fuels for sustainability." Similarly, another research participant illuminates:

> It was inspiring for them to be able to say what they wanted and have input into our future. It's our guide and INAC, it's [INACs] guide too, their question is it in your CCP and if it is you're have a pretty good chance of getting funding for it.

The CCP played an important role in helping Skidegate obtain the necessary funding for their initiatives.

Through the process of creating the plan, the band council worked hard to create a "two-way street" of communication between the band council and community members,

whereby both parties listened and felt heard. This contributed to broad community support for the projects, with little resistance articulated by community members. A project leader spoke of how the CCP has been an opener for the energy initiatives they have been doing lately, as "the community knows that they have a say so they're willing to come out and go to these events or help just for like the heat pumps, the solar, the—just everything. They just have a say so they feel like it's worth it now." This participant went on to explain that community members were supportive of the policies within the CCP, "because the CCP was written by consultants before and now the CCP is written by the community. It's not written by [the band office], we didn't write it, we just took the information and put it into the book."

4.3.3 Other Success Factors

Beyond the CCP, there were other factors research participants shared that helped facilitate the success of Skidegate's sustainable energy initiatives. Skidegate's history of project success was mentioned as it related to maintaining good relationships to funders, as one project leader describes.

> The history of the band council, going years and years and year back, Skidegate has always had a good success rate with completing projects if we're getting funded for that. People feel good giving us their money, the projects are happening—they see the positive changes to our community, they look good, we look good, it's a win-win thing.

Research participants further talked about the importance of effective teams of people coming together, "because not just one person pulls off any of these projects you know it takes a whole team of people. It takes our staff, it takes the community, it takes our funders, the knowledge keepers that are the experts in these areas." These teams of

people included community champions, related to planning and implementing the energy initiatives and as well as the CCP. They also include band council staff with the capacity to apply for funding initiatives. These key individuals kept the projects moving smoothly and the momentum for sustainable energy building.

Another factor that was mentioned by research participants was Skidegate's mentorship from T'Sou-ke in 2009. Skidegate's partnership T'Sou-ke around energy began because of the communities' common goal of energy autonomy (Ozog 2012). T'Sou-ke has a successful 50kW solar project, and runs workshops on energy efficiency. The partnership was funded with a $15,000 grant from INAC. The communities worked together to conduct an energy baseline analysis in Skidegate (Ozog 2012). As one project leader describes, "T'Sou-ke had a big part of the beginnings of our energy efficiency." Research participants talked about how this was important in getting them started.

Finally, when it comes to talking about factors of success it's important to note that Haida Gwaii is an exceptional place and the Village of Skidegate is an exceptional community (Takeda 2014; Dowie 2017). The context of this place has played a part in the success of each project along with the sustainable energy trajectory. As one research participant relayed:

> Haida have a really strong history of environmentalism here. In broader terms one could argue Haida environmental protection stretches back to the end of the last ice age. We want to protect Haida Gwaii and by extension we want to protect the world. In a large way, project leaders are already dealing with a population that's favourable towards and fairly well-informed about eco systemically beneficial initiatives. That's a big part, you're already starting with a population that favors ecological protection.

This includes the Swiilawiid, a non-profit based on Haida Gwaii that is devoted to helping Haida Gwaii transition off diesel through their 0% diesel project.[5] They had previously successfully obtained funding to implement two solar projects, one on the youth centre in Skidegate and one on the youth centre in Old Massett, and one in the Discovery Camp. As a pamphlet created by Swiilawiid states:

> By reducing our energy consumption and **investing in renewable solutions,** we can meet our own electricity needs on Haida Gwaii. Doing so will ensure our long-term **energy security**, it will create jobs, build **new economic opportunities,** and reduce our environmental impact. Local, renewable power will also be more reliable making Islanders less vulnerable to the power outages we experience on diesel generators. By addressing our own electricity needs, Haida Gwaii can become more independent, a model of **community-owned sustainability,** and be a **leader in the shift to clean energy** ("Swiilawiid" 2016, 4; emphasis as in original).

Although not mentioned explicitly by the research participants, it was obvious from an outside perspective that this organization, both through their presence within the community and through their development of solar projects, has had an influence that has helped drive the sustainable energy trajectory the community has taken.

4.3 Energy as a Priority

Energy takes up a relatively small portion of Skidegate's written Comprehensive Community Plan. Given how Skidegate has moved forward on these energy initiatives, I asked research participants to reflect on whether they thought energy was a priority for their community. In response, participants told me that energy was a priority, but only because it served multiple different personal and community needs. For example,

[5] To learn more, go to their website at http://www.swiilawiid.org/

participants spoke of how energy was a priority because of how much it cost, as one participant said, “I think energy’s a priority but mainly in the fact that it costs us so much money for Hydro and people don’t have a lot of money. And things cost money these days.” Another participant responded in this way:

> And I wonder with so many goals articulated in the CCP do you feel like energy was a priority?
>
> Participant: I feel that there are many priorities in the CCP.
>
> Okay, yeah, and energy you feel is one of them?
>
> Participant: Yup, yup, being comfortable and warm in your home is definitely one of them.

Several research participants mentioned that it was given the communities ambition to transition off fossil fuels, as one project leader articulates.

> I feel like [energy] is [a priority], there’s been lots of people talking about it and like I said earlier, the Haida position against oil and gas. Okay what are we doing to substantiate that? We can have our own solar panels, we can get electric cars, heat pumps, they’re not going to be burning extra diesel, so it’s time to ramp it up a little more on our Haida position. If we really want to slow down the oil and gas production let’s try to reduce our demand as well.

In this way, Skidegate’s small-scale renewable energy development was able to fulfill multiple personal and community needs. The heat pumps were able to reduce cost for community members, and increase comfort in people’s homes. The solar projects reduced costs for the community to be able to reallocate into other programs. Both projects fit into the community vision of moving them off diesel generation and increasing self-reliance.

The energy initiatives were seen by research participants as a series of appropriately-sized steps towards their vision of a sustainable and livable community that does not rely

on fossil fuel generation, as was articulated within their CCP. By simultaneously decreasing individual costs and increasing community self-sufficiency, the energy initiatives were able to implement and actualize the CCP in ways that were felt by the community. The projects were action the community was able to take on its own that saw results in a timeframe that worked for the community, as one project leader articulates.

> If you look around here you'll see things like the solar projects like the heat pumps, the solar hot water, you know those things are making the impact in a positive way right now. Hopefully financially and environmentally so.

Skidegate's energy initiatives have helped the community actualize and reinforce the CCP by creating a multitude of benefits within a short timeframe. This was articulated well by a research participant who, when asked what was important or notable about the projects, said:

> I think it's just important to help our community save money and to help them understand that this is the way we're going now. We're not turning back, we're not going to not be energy efficient anymore because we can't afford to do it, and this is what we need to do to be able to keep this place suitable for us to live, really.

Skidegate development of accessible and viable small-scale renewable energy projects was an important way in which they were able to actualize their community plan.

5. Discussion

Small-scale renewable energy initiatives are an accessible tool that Skidegate is using the move towards a broad vision of healthy and sustainable community. The recent leadership Skidegate has displayed in sustainable energy initiatives was sparked and sustained by a community-driven Comprehensive Community Plan (CCP) that has led to a more holistic process of moving towards energy autonomy beyond the reach of discrete

projects. This case study shows what renewable energy development can look like if a community drives the process: a community successfully implementing renewable energy projects that meet community needs through a more holistic solution to moving off diesel.

When communities have the time and resources to come together and create solutions, positive change happens. The process of creating comprehensive and community-driven plan offers a path for communities to move forward on goals of sustainability and self-sufficiency, creating resiliency and building capacity. I found this planning tool to be a main part of the work of sparking and sustaining Skidegate's sustainable energy trajectory. At the same time, by focusing on implementing energy projects Skidegate was able to see concrete benefits from the planning process. I found there to be a virtuous cycle between community planning and implementation of energy projects, one can potentially support the other. Below I discuss the importance of planning for development of energy projects, and indeed the importance of energy projects to support the plan.

5.1 Energy is Something to Rally Behind.

There's something important about the potential of energy initiatives—if accessible and viable—to help build community momentum towards things they care about. Small-scale renewable energy initiatives are an accessible tool that Skidegate is using to move towards a broad vision of healthy and sustainable community. As energy projects are a part of the plan, it's not a shock that they're actualizing the CCP. However, through the direct way energy initiatives are able to increase self-reliance and sustainability, they're going above and beyond and fulfilling some main objectives and visions from the CCP.

Small-scale renewable energy projects offer particularly interesting and potentially important opportunities in this regard due to scale and accessibility. In Skidegate, energy was able to fulfill multiple priorities within the CCP in ways that other initiatives would not have been able to. The energy initiatives carry out the vision of the CCP in visible and tangible ways: in ways that are felt in community members homes by decreasing costs and increasing comfort; in ways that are felt in the broader community by creating pride in moving towards their values of transitioning off diesel. Small-scale projects were one way that they have been able to take back control of energy, and in doing so have increased their resilience and autonomy. In this way, they are actualizing the plan to move towards other things that they care about as well. Energy has been something to rally behind.

5.2 Community-Driven Planning

The majority of remote communities in BC still rely on diesel generation, despite strong motivation and allocation of resources to support the transition towards low-carbon forms of energy production (Karanasios and Parker 2016). Skidegate has developed momentum on a trajectory of moving towards holistic energy solutions to transition off diesel. How have they been successful gaining this momentum? The research found the Comprehensive Community Plan (CCP) to be the main facilitator of sparking and sustaining this work; the success of the three renewable energy initiatives and the holistic approach to energy efficiency and literacy, were linked to the successful efforts of the CCP.

Comprehensive Community Plans have been created in First Nations communities throughout BC, and continue to be implemented to this day. The goal of the CCP is for

communities to engage in, “a holistic process that enables a community to build a roadmap to sustainability, self-sufficiency and improved governance capacity.” (Indigenous Services Canada 2018, iii) Despite many plans being implemented, little research has been done on the impacts of these plans on communities. In fact, the outcomes of community plans are inherently difficult to measure and there is substantial gap in research on their implementation success (Talen 1997). The successful outcomes from Skidegate’s plan for sustainable energy solutions is thus an important contribution to planning literature. This research offers a window into the impact of one CCP for a community. The CCP was cited by research participants for both igniting the projects and facilitating project success. The CCP created a forum for community members to express an immediate need that they were experiencing, as well as come together to articulate a shared vision of what they want for their community in the future. This information allowed the band council to move forward on initiatives that stemmed from the community members themselves, and facilitated the community working together to move towards more energy efficient solutions, that help them move towards getting off diesel in a holistic way. But it also begs the questions, why has this plan been successful in this case and what about this plan might have facilitated the success of energy trajectory and the sustainable solutions?

Mannell, Palermo, and Smith (2013) illuminate how the effectiveness of a plan should be measured based on the degree to which it is community-based and comprehensive. They assert that if we are to create plans that are impactful and transformative within communities, they must adhere to certain qualities. One such quality is having established awareness of the plan itself within the community. A research participant who works in

the band office relayed how in Skidegate having established awareness of the plan now impacts their ability to successfully enact plan measures.

> Participant: If there's any negative feedback I just say this is what the community wanted.
>
> Oh right, and does that help?
>
> Participant: I think it does because we've had so much people at our meetings. It was a good turnout for the last couple years we had a 100, 150, people and so they all had their say and they all looked over the book and they all agreed that this was what they wanted and so I think every—most people are in the know that they don't do stuff like that or they know the rules for what the community wants.

The extent that community events were well attended allowed measures that were enacted afterwards to be effective. Another quality Mannell, Palermo, and Smith assert is that in order to be community-driven the plan must develop capacity within the community. In Skidegate, capacity was built within the community to host meetings that were effective and worked for them. Here is a project leader talking about the process.

> It was good, actually, the community loves it. So we started using that for all of our—whenever we have to do anything like even when I was doing my housing policy we would do the same process because they liked that process. They like it, it just works for them.

Through developing a strong communication strategy with the CCP, the band council increased the effectiveness of communication and engagement in the community. As these two examples begin to display, Skidegate's approach to developing their CCP was community-driven and comprehensive. The extensive approach Skidegate developed has been documented in more detail elsewhere as well, through two reports written by SCARP students following their time working in the community (Babalos and Williams

2013; Iwama and Harding 2014). Babalos and Williams state in their report that, "The Haida Village of Skidegate's CCP process had many strengths; it was community based, culturally appropriate, and two-way capacity driven, with the plan having the underlying goal of creating sustainable development" (2013, 21).

This case study reinforces that a plan being from and of a community is indeed integral to its successful impact within the community. The strength of the process of plan creation directly related to the strength of the measures enacted afterwards. Without an engaged community behind it, the plan would not have had the same weight. Indeed, just as this is an example of a community-driven plan that has positive sustainable outcomes, those outcomes related directly to how much the plan was from and of the community.

There is fraught history of planning within Indigenous communities with colonial governments having used it as a tool to impose their agendas for centuries (Jojola 2008). In light of this, Mannell, Palermo and Smith (2013), along with others, assert that planning within Indigenous communities must be from and of the community. It is imperative to develop plans in such a way that communities have control over the process. Community-driven planning is one method Indigenous communities can use to regain further control of their lives and livelihoods. As energy is such a large part and cost of our everyday lives, it is an important way in which communities can increase self-sufficiency and self-determination.

5.3 Government Support has Failed

The federal and provincial government has largely failed to support communities to transition off diesel (Kennedy 2018). Their failure has been caused by, as Rezaei and Dowlatabadi (2016) have argued, the disparity in goals between government and

community leaders. Government has focused on technical and financial aspects of the transition, ignoring the communities' goals of self-sufficiency and self-determination. If government is to be effective at helping communities transition off diesel they need to pay attention to what communities want from energy development. There is much to be gained in shifting the focus from what governments think communities want, or indeed what consultants or companies tell governments communities want, to listening to what communities wants and needs are, and focusing on community's own priorities and pathways. As government continues to put resources into supporting communities to transition off diesel, and as they have committed to meaningful reconciliation, they must take into consideration what community's own goals are. Working towards meaningful reconciliation involves supporting self-determination, and energy can be one way to do this.

6. Conclusion

This research shows that when a community drives the process and development of renewable energy initiatives they are able to be successful; they have more holistic solutions; and there is a host of other potential benefits through the process of community deciding for itself what it needs. This is a case where a community identified and fulfilled its own needs through small-scale renewable energy and conservation initiatives. Is this really surprising? That a community can determine for itself what it needs and then follow through successfully? No. But government programs continue to be designed that ignore this fact. There is so much more to gain from supporting a community with resources and time to come together, build community and determine for themselves the pathway forward towards greater self-sufficiency and sustainability.

Chapter 4 - Conclusion

1. Research Questions and Claims

This thesis explores how small-scale (below 1MW) renewable energy projects developed by First Nations communities in British Columbia might contribute to supporting justice within the energy transition. My research reveals that these initiatives have a distinct role to play in supporting justice within the energy transition, indeed one that merits attention and support as they offer an opportunity to foster resiliency and increase self-sufficiency. I approached this question on both the provincial and community-scale, which make up the second and third chapters of this thesis; the following section outlines the research questions and claims of these chapters sequentially.

The second chapter of this thesis, Below One Megawatt, explored, through the analysis of a province-wide survey and a case study, a provincial-scale analysis of First Nations community-owned small-scale renewable energy projects. It sought to understand (1) *How are First Nations participating in small-scale renewable energy development* and (2) *What types of benefits are First Nations experiencing in relation to them*. With 40 projects' currently in operation or development, and 150 prospective projects, the results reveal that small-scale renewable energy development is prevalent with increasing interest across BC. This chapter found that small-scale renewable energy development was an accessible method of renewable energy development for First Nations communities. Indeed, the research findings clearly establish that these projects are providing a myriad of social, political, and environmental benefits for communities. Some benefits were easy to measure, such as cost savings and greenhouse gas reductions, while the majority of benefits were not as easy to quantify such as increasing connection

and engagement with energy, self-sufficiency, providing a vision of a future free of oil and gas reliance, community pride and education. Both these immeasurable and measurable benefits add up to make one important method that First Nations are using to enforce self-determination and build community resilience.

The third chapter of this thesis, Toward Sustainable Energy Systems in Skidegate, explored First Nations renewable energy initiatives through a case study with the Village of Skidegate on Haida Gwaii. Skidegate have undertaken a holistic solution to transitioning off diesel that involves taking back control of their community energy system. This chapter's research question was: *how was Skidegate's renewable energy trajectory sparked and sustained?* What emerged through the research was not specific to any one of their discrete projects. Instead, the findings highlight the essential role of a community-wide initiative to successfully move away from diesel dependence. The recent leadership Skidegate has displayed in sustainable energy initiatives was sparked and sustained by a community-driven Comprehensive Community Plan that has led to a more holistic process of moving towards energy sustainability beyond the reach of the discrete projects. I found that small-scale renewable energy initiatives are an accessible tool that Skidegate is using to move towards a broader vision of a healthy and sustainable community.

The threads that weave together the two chapters of such different scales are ownership and control of energy. Both chapters' findings point to small-scale projects as an accessible method of development First Nations are using to enforce self-determination and build community resilience. Small-scale projects allow for this through community ownership of infrastructure and control over the development process. First and foremost,

small-scale projects reduce reliance on outside sources, such as the provincial utility or diesel generation, through a community owning and providing power directly to buildings and residences. This reduces community or household costs of power generation, and offers a way to alleviate the experience of energy poverty for community members. Further, depending on external sources for energy means that resources (to pay for the energy) are leaving the community. Ownership of small-scale projects allows funds to be re-allocated and remain within the community. It also reduces outside reliance for energy which provides communities an opportunity to increase autonomy. Small-scale renewable energy projects are an accessible tool that can allow communities to fulfill their own needs in ways they deem culturally appropriate.

If governments wish to engage in meaningful reconciliation with Indigenous communities by supporting self-determination, appropriately supporting projects of this scale offers one way to do so. Despite the small amount of power these projects produce, they are an important method communities are using to increase resiliency and build self-determination. There is room for governments to support these initiatives by providing funding and developing programs in collaboration with First Nations communities, as long as they are listening and responding to the priorities and pathways of the communities themselves.

2. Contributions of the Research

2.1 Make the Distinction: Small-Scale Projects Accessibility and Benefits

The first major contribution of this thesis is to reveal how the experience of small-scale development is distinct from other scales within the renewable energy sector. These projects are more accessible, and they offer distinctive benefits to communities, such as reducing household or community cost of energy, increasing connection and engagement

with energy, and reducing outside reliance. These research findings suggest a need for Indigenous renewable energy development literature to be more mindful of scale when talking about the barriers, benefits and development pathways of renewable energy projects. The current literature on Indigenous renewable energy involvement has largely focused on large-scale (above 1MW) development that are commercial in nature, meaning that they are developed to sell power to the provincial energy grid and generate revenue for the community (Sayers 2016; Henderson 2013). Within this literature, small-scale projects have been ignored or lumped together with large-scale projects. In comparison to large-scale projects, small-scale renewable energy development is an accessible form of renewable energy development. There is significantly more time, expertise and money required to take on large-scale development in comparison to small-scale. It can take years, often decades, for all the preconditions to line up so a project can be built and come online. Small-scale projects require substantially less time, resources and expertise to develop than commercial-scale (see Figure 2.4.1 in Chapter 2). Additionally, small-scale projects require minimal expertise from outside the community (such as engineers, and financial advisors) and thus can frequently be developed without relying on outside sources of support. It is important for communities to know the range of options they have within the renewable energy sector, and that small-scale projects can offer a more accessible form of development and reduce complexity and resources required for involvement in renewable energy development, while still providing myriad—if distinct—benefits.

Further, small-scale projects are providing fundamentally different types of benefits than large-scale projects, ones that are easy to overlook. The material benefits of large-

scale projects are typically more substantial, as they can offer a significant revenue stream and jobs in communities with limited other economic options. Communities largely do not see small-scale development as providing an avenue into the clean economy, as commercial-scale projects are designed to do, as projects do not produce significant sources of revenue. Instead, small-scale projects reduce the cost of energy to operate community buildings and residences through community-ownership of power production, which in turn allows funds to be reallocated within the community or household. Indeed, the majority of benefits articulated by research participants and through the survey were immeasurable. These benefits can include a sense of pride and empowerment within the community through successfully implementing a project that is in line with First Nations cultural values.

These benefits can also contain a greater connection and awareness of energy within a community, one that leads to an increase in demand-side management measures. Small-scale projects are developed to provide power to community buildings and residences directly (called self-consumption). This forms a new connection to energy, one where there is a stronger relationship to energy source through feedback loops. In this regard, small-scale projects have the potential to change the relationship to power production and consumption for communities, as Lovins and others have discussed (Lovins 1977; Abrahamse et al. 2005). As a project leader from T'Sou-ke Nation described, "It is easy to get seduced by the technology, we too easily jump to saying let's do solar panels, that will solve our problem if only we could afford them. And then you realize that that's not the most important intervention to start with. It's the conservation, saving energy is often a tenth of the price of producing energy." This awareness motivated T'Sou-ke to

take on energy efficiency and behavioural change measures. The accessibility of small-scale renewable projects, both in terms of the development process for project leaders and technology itself for community members, offers an opportunity for a community to be transformed from ratepayers to more conscious users of energy.

Although it is not as easy to quantify the benefits of small-scale projects, that does not negate their worth. If we are to make responsible decisions about trajectories of renewable energy development, funders, governments and most importantly communities themselves must be more attentive to the full range of benefits potentially provided by different kinds of projects.

2.2 Beyond Power Production

Small-scale renewable energy development is one way First Nations communities are taking back control of their energy system and futures. Through the direct way these energy initiatives are able to increase self-reliance, they're able to meet immediate community needs while fitting in with broader goals of sustainability and building self-determination. Small-scale renewable energy projects offer particularly interesting and potentially important opportunities in this regard due to scale and accessibility; these projects are an accessible form of infrastructure for communities to own and operate independently. This increase in autonomy offered by small-scale renewable energy projects can lead to political power, as one project leader relayed when asked about whether the increase in interest in solar by First Nations communities was purely about cost.

> I think it's something more, it's what we call empowerment or Power to the People. First Nations need to get their power back, and one of the ways to do that is creating your own electrical power, literally. If you can become

> autonomous in power, chances are that you're going to get your political power back too, as we're finding at T'Souke. You don't want to be beholden to utilities, companies or any public or private entity around the energy issue, if you can become autonomous then suddenly you've got all sorts of autonomy that can lead to other areas.

This research reinforces what community renewable energy literature more broadly about the potential role of renewable energy projects in in terms of shifting power from corporate and state elite into community hands (Burke and Stephens 2018).

This research found energy has become a priority for some communities' due to poorly built homes on reserve and the experience of energy poverty. When asked if energy was a priority for communities that this interviewee works with he responded, "Yes, it is. Particularly with poor housing, people are spending so much money on electricity trying to make up for the poor housing that they have." Small-scale projects are one way in which First Nations communities can meet their own basic needs for electricity and warmth.

Small-scale renewable energy development provides the opportunity to both meet basic needs and reach broader goals in communities. Communities need to be aware of this accessible tool, and the potential it has to alleviate poverty, increase self-sufficiency, and move towards self-determination. Government also needs to value these small-scale energy projects for the dual purpose that they potentially provide: the alleviation of energy poverty and supporting self-determination. These projects have the potential to be a part of a movement towards greater self-sufficiency through ownership of infrastructure and control of development.

2.3 Underground Work of a Community Energy Project

Part of the work of my thesis is making visible the invisible work that goes into a trajectory of successful renewable energy development. It isn't the actual execution of the project that takes the most work, it's the careful imagining and plotting and planning and patience. The invisible work that a community does—before successful projects take shape that a community is proud of and stands behind and works for them—that is most of the work.

When communities have the time and resources to come together and create solutions, positive change happens. The process of creating a comprehensive and community-driven plan offers a way to can help communities move forward on goals of sustainability and self-sufficiency, creating resiliency and building capacity. I found community driven planning to be a main part of the work of sparking and sustaining Skidegate's sustainable energy trajectory. At the same time, by focusing on implementing energy projects Skidegate was able to see concrete benefits from the planning process, helping build momentum towards the broader vision of their future. I found there to be a virtuous cycle between community planning and implementation of energy projects: one can potentially support the other.

2.4 Moving Forward

This research shows that when a community drives the process and development of renewable energy initiatives they are able to be successful, they have more holistic solutions, and there is a host of other potential benefits through the process of community deciding for itself what it needs. The accessibility of small-scale renewable energy development makes it an important tool that communities are using to build capacity and take ownership of energy production. If government is to be effective at helping

communities transition off diesel, they need to pay attention to what communities want from energy development. There is much to be gained in shifting the focus from what governments think communities want, or indeed what consultants or companies tell governments communities want, to listening to what communities wants and needs are, and focusing on a community's own priorities and pathways. As government continues to put resources into supporting communities to transition off diesel, and as they have committed to working towards meaningful reconciliation, they must take into consideration what communities' own goals are. Working towards meaningful reconciliation involves supporting self-determination, and energy is one way to do this.

3. Research Limitations and Learnings

This research is informed by one case study and a province-wide survey. The findings from these methods were situated and ground-truthed through three interviews with people working in the broader sector of small-scale Indigenous renewable energy development, and a media review. There are limitations with each of the methods I conducted, and I will speak to the ones I feel most are most pertinent to this study. First and foremost, I would like to acknowledge that this research is limited in scope based on my background, and the background of the people who guided me through this research. My own background as a white settler has influenced the way I have conducted this research on all levels: from the questions I asked in interviews, to the way this project has been framed and written. Within the case study, my background as an outsider to the community limits my ability to speak to the emergence and impacts that these projects have on the community.

Further, the case study I conducted was with the Village of Skidegate on Haida Gwaii, which is an exceptional community in many ways (Takeda 2014; Dowie 2017). Indeed, First Nations each face unique challenges and opportunities, and have distinctive strengths, values and visions, and thus it is vital that each community determine its own path forward. Just as Skidegate was helped by T'So-uke's support and collaboration, Skidegate's story has much to offer to others but does not imply a singular pathway forward. Renewable energy development will not be the chosen or best pathway towards self-sufficiency and community resilience for all communities.

Another potential limitation of the research is that for the First Nations Clean Energy Survey, the research team was only able to reach so many communities. Although the response rate for the survey was over 50%, many First Nations with renewable energy experience did not complete the survey. Therefore, it is possible that this survey understates the full scope, scale and implications of First Nations' involvement in the sector. In addition, as with any survey tool, the survey itself was limited by the questions that were asked: it is entirely possible that some of the experiences, activities, goals, and challenges associated with renewable energy projects may not have been captured.

I would like to take this space to reflect on what it means to do research in partnership with an Indigenous community. As many scholars have discussed, given the colonial history of research within Indigenous communities, research conducted with Indigenous communities should be guided by communities themselves, one method of this is through community-engaged research (Wilson 2008). Upon reflection, one of the most important aspects of a community partnership is prior relationships and project conceptualization. Without these two things, there needs to be a specific type of capacity within the

community to guide the researcher through the complex terrain of research and community life. This capacity involves a person who is invested in seeing the research done, and understands what research might do to serve the needs of the community. More important than this, however, is time. There is so much trust that is necessary in any partnership – and trust takes time to develop. I have reflected on this at length, and have outlined thoughts on what I deem the underground work of community-engaged research, and have outlined some thoughts in Figure 4.3.1. This figure outlines the main "above ground" priorities a researcher must fulfill when working within a community, priorities that often do not overlap: for the academy, for funders, and for the communities they are working within. Each one of these priorities is met with different forms of work, many beyond the scope of a research project and often beyond the control of a Masters' student. I wish I understood before entering a community the importance of prior relationships, project conceptualization and time to form a true community partnership that is useful to and respectful of the community you are partnering with.

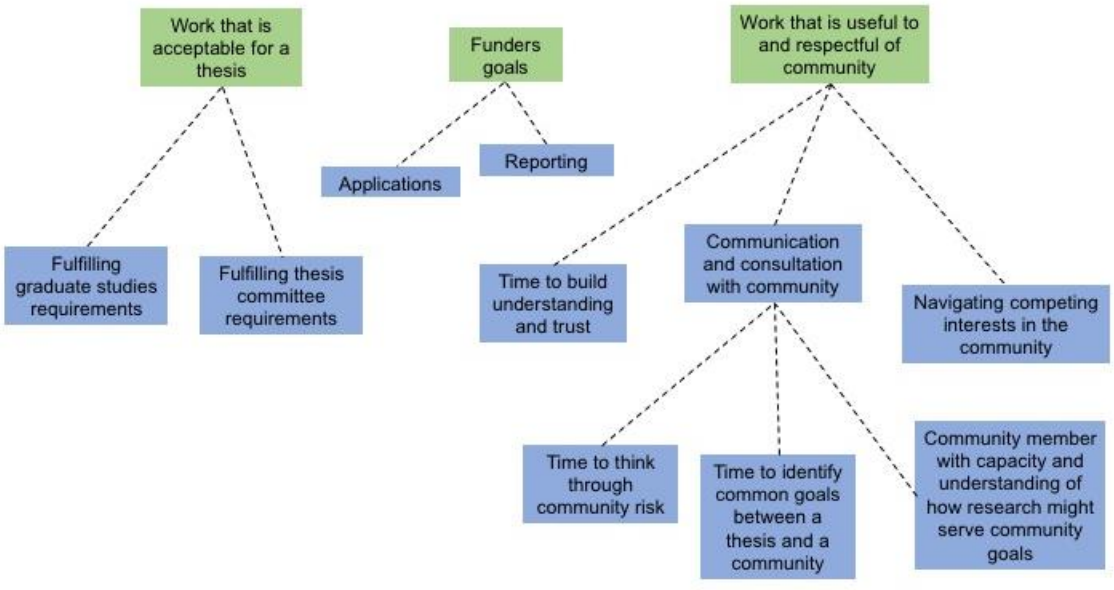

Figure 4.3.1: The Underground Work of a Community Research Partnership

I would not go into a community again to conduct research without prior connections and relationships. My research did not achieve community engagement, although when I entered the community those were my intentions. I did not understand at that time the time and resources it takes to undertake community-engaged research, what it takes to set up research in a way that is a true partnership with mutual benefits and is not extractive. There is an opportunity within academia for research projects to overlap with community priorities and create real change. However, the academy must move forward in different ways than the past, supporting students through the difficult work of research in partnership with communities.

4. Next Steps

4.1 Within Community

Given what I have expressed above, about the importance of doing research in true collaboration with communities, I'd like to bring back what a research participant shared with me:

> We've had so much taken from us in terms of residential schools and loss of culture and language. Then we have similar situations of people coming like you and doing research and taking all kinds of information from us and then we never see it again. There's been a lot of reservations with that kind of information as well.

This was a unique opportunity to voice my reservations and hesitations about the research I was conducting as a non-Indigenous outsider in this Indigenous community. I stumbled through my reply, explaining how researchers are cognizant of this fact, how we are trying to do research in ways that are more respectful and accountable to communities. I had the opportunity to say, "I'm really grateful for everything and I really don't want to

do that and try and find a way not to and I wonder if you have any ideas around that?"

The research participant responded graciously with:

> I think the most important thing is being able to communicate with the people. Number one letting them know what you're doing, why you're doing it, how the information is being used. At the same time, you're paying people obviously for their interviews which is great, but also that you provide a report back to them so they can see what you're saying about what they've said.

I will be consulting and coordinating with Skidegate band council to create an accessible report and infographic to be used as they see fit. I will return to Haida Gwaii in the spring of 2019 to coordinate this, and to complete community presentations of the research findings. I do not believe this is enough to reach true reciprocity for all the community has given me in allowing me to conduct this research project. As with any relationship, however, I have an ongoing opportunity to reciprocate, and this thesis submission does not put the end to that.

4.2 For Research

In terms of next steps for research, this research found a potential correlation between small-scale renewable energy development and uptake of other initiatives to reduce energy consumption and increase efficiency. Multiple communities in the survey had taken on energy efficiency measures and workshops related to energy conservation and literacy following small-scale installations. It would be interesting to see a community that is run on small-scale projects of this nature. Does their relationship to energy change in any way, and if it does, what are the mechanisms behind it?

4.3 For Community Organizers

The questions that naturally stemmed from the work of my thesis for me are not explicitly academic. I identify as and have more strengths associated with community organizing. It is for this reason that my brain ruminates around how to create change in communities given what we already know, and how to actualize and operationalize what I have learned in communities. I believe community-owned small-scale renewable energy projects have the potential to allow communities to meet their own basic needs through owning and controlling their own infrastructure, thus leading them to larger visions of self-sufficiency and community resilience. How might we better listen to communities and create frameworks that allow them to amplify their successes? Or overcome barriers? Perhaps the better question to ask is how we can increase communities' capacity to plan and Come Together To Talk, or *Gud Ga Is* in Haida, and begin to own and control more of their own infrastructure. And how might we push government and other bodies to ensure that these programs be well funded and supported? In other words, how might government give more and more control and ownership into the hands of communities in terms of their own infrastructure, including renewable energy development? And how might organizers working on social and environmental justice push them to do so?

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Appendix A
Survey Report: First Nations and Renewable Energy Development in British Columbia

Survey Report:

First Nations and Renewable Energy Development in British Columbia

April 2017

prepared for
B.C. First Nations Clean Energy Working Group

prepared by
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Executive Summary

Although First Nations in British Columbia are active participants in the renewable energy sector, very little research has been conducted to assess the scope and implications of their involvement. Seeking to address this knowledge gap, the B.C. First Nations Clean Energy Working Group (FNCEWG) partnered with researchers at the University of Victoria's School of Environmental Studies to conduct a province-wide survey. Support for the survey was provided by Clean Energy BC and Indigenous and Northern Affairs Canada (INAC).

The research team attempted to contact 203 First Nations across the province from October 2016 to February 2017. In total, we received responses from 102 First Nations[1] and three Tribal Councils. The survey results presented in this report thus indicate the minimum level of First Nations' involvement in the renewable industry in B.C. at the beginning of 2017.

How are First Nations currently involved in renewable energy development?

- First Nations are substantially involved in the renewable energy sector, with 49 respondents indicating that they have operational projects or projects under development in all but one development region of the province.
- Thirty respondents indicated having 78 operational projects, with a total generating capacity of 1,836 MW. Run-of-river hydro made up 61% of these projects.
- Thirty-two respondents indicated 48 projects in planning or construction. Run-of-river hydro made up 36% of projects, solar (PV) made up 25% and geothermal and biomass made up 17% each.
- Of operational projects, 42 were selling power back to the grid through BC Hydro's open call for power program. These projects make up the vast majority (96%) of the generating capacity of operational projects.

How would First Nations like to be involved in renewable energy development?

- First Nations are eager for more involvement. The survey results indicate 98% of respondents are already involved or wish to be involved in the sector.
- Seventy-seven respondents reported having nearly 250 projects under consideration. These include a greater variety of renewable energy technologies than existing projects: 36% run-of-river hydro, 26% solar (PV), 13% biomass, and 12% wind.
- Respondents with no prior involvement in the industry have 61% of projects under consideration.

1. We use the term First Nations throughout the report to refer to First Nation bands as specified by the Indian Act.

What barriers are First Nations experiencing in relation to renewable energy development?

- The majority (75%) of survey respondents indicated that they have projects in mind that they have not yet pursued or been able to pursue.
- Three primary barriers to entry and expansion were identified: lack of opportunity provided by BC Hydro programs (43 respondents), financing (41), and community readiness (40).

What are the potential impacts of a decelerated renewable energy industry?

- First Nations are not only benefitting economically from renewable energy development, but in myriad other ways including increased self-sufficiency, community capacity, and pride.
- If barriers are not addressed, there is a risk of losing momentum and potential for expanding First Nations' involvement in the industry, and its attendant benefits.

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1. Introduction

Although First Nations in British Columbia are active participants in the renewable energy sector, very little research has been conducted to assess the scope and implications of their involvement. Seeking to address this knowledge gap, the B.C. First Nations Clean Energy Working Group (FNCEWG) partnered with researchers at the University of Victoria's School of Environmental Studies to conduct a province-wide survey. Support for the survey was provided by Clean Energy BC and Indigenous and Northern Affairs Canada (INAC).

The survey asked respondents whether they were involved or interested in being involved in the industry, whether they had projects in operation or development, and whether they wished to be further involved. It also asked respondents to identify barriers to involvement and capacity building activities to date.

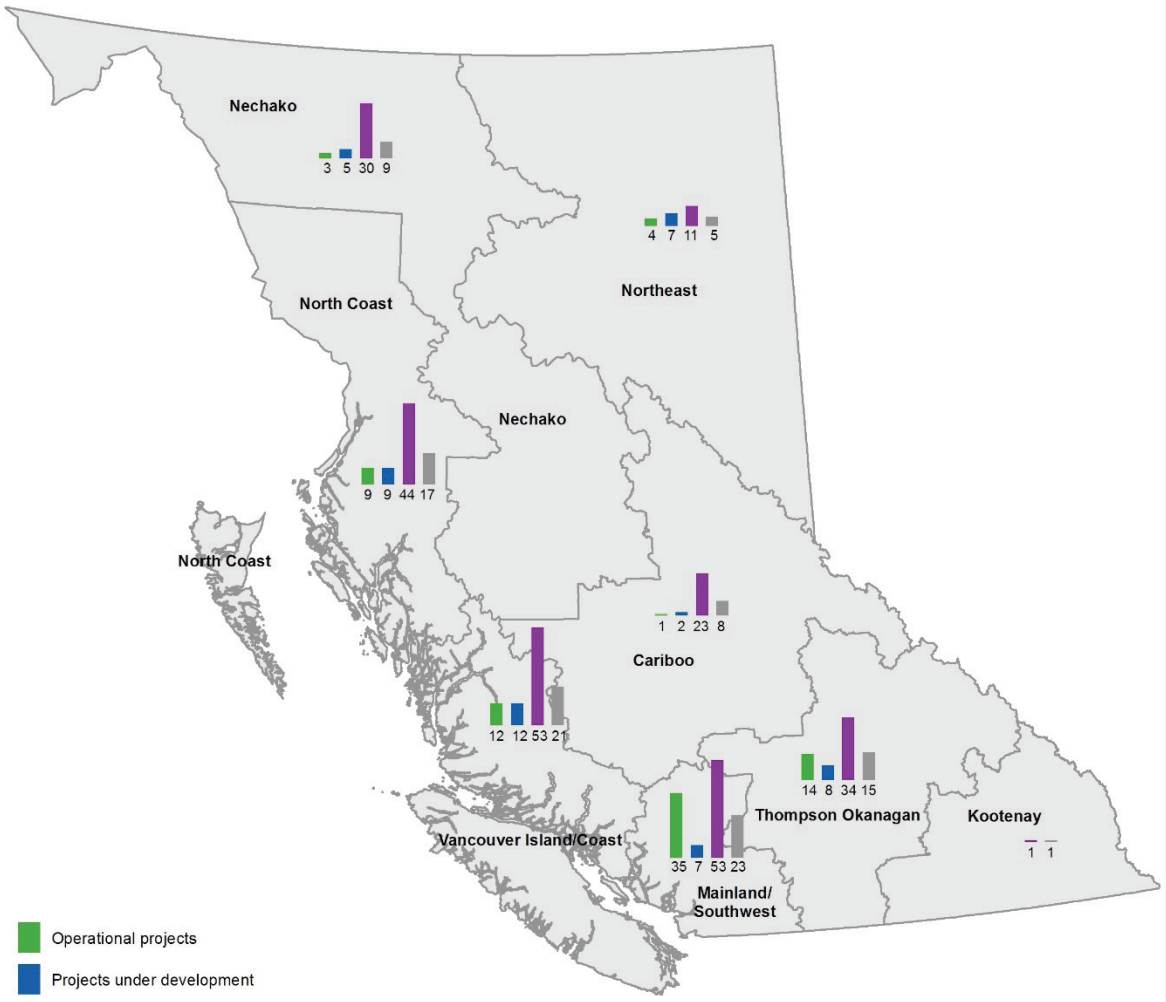
The research team attempted to contact 203 First Nations across the province from October 2016 to February 2017. In total, we received responses from 102 First Nations and three Tribal Councils. The survey results presented in this report thus indicate the minimum level of First Nations' involvement in the renewable industry in B.C. at the beginning of 2017 but do not provide an exhaustive overview. There are First Nations who are involved in the industry who did not complete the survey.

Our findings suggest that there is widespread involvement and interest in renewable energy developments among First Nations in B.C. (figure 1.1). Out of survey respondents, 79% were connected to the provincial energy grid, with the balance being off-grid. The results demonstrate a wide variety of projects, differing in size, technology, and application. Grid-connected communities are eager to develop renewable energy projects to sell power to BC Hydro. These activities and ambitions range from small projects producing less than 100 kW of electricity to large projects generating over 15 MW. Ownership and involvement also vary considerably depending on whether First Nations are the project proponents or joining projects proposed by others.

Despite this multifaceted involvement and interest, 68% of respondents indicated they are experiencing substantial barriers to entry and expansion in renewable energy development. The three most common barriers included lack of opportunity in BC Hydro programs, financing, and community readiness. These barriers are surmountable through the introduction and implementation of appropriate policies and support.

This report proceeds in three sections: in the next section we describe the survey methods and limitations, we follow this with key findings, and conclude with a discussion of wider implications.

Figure 1.1: Involvement by Development Region



2. Survey Methods

The research team invited 203 First Nations and several Tribal Councils to participate in an online survey requiring approximately 15-20 minutes. We recruited respondents in person, by email, phone, and Facebook, as well as through listservs. We sent formal invitations to First Nation Chiefs in October and called band offices to follow-up. We also made presentations at two different conferences: "Generate" hosted by Clean Energy BC in November and "Links to Learning" hosted by INAC in December. For data collection, we used an online tool, FluidSurveys. The survey was divided into four sections: 1 – Operational Projects, 2 – Projects in Development, 3 – Projects under Consideration, and 4 – Capacity Building. In the majority of cases, respondents filled out the survey independently using the link provided by email. In some cases, we conducted the survey with respondents in person and over the phone. The majority of respondents were employees or elected officials, with each First Nation deciding on the most appropriate representative to complete survey. We then reviewed each survey response for completion and consistency and frequently contacted respondents to clarify details of their involvement. In total we received responses from 102 First Nations and three Tribal Councils.

2.1 Survey Limitations

Although the response rate for the survey was over 50%, the research team is aware of many other First Nations with renewable energy experience who did not complete the survey. Therefore, it is possible that this survey understates the full scope, scale and implications of First Nations' involvement in the sector and that some of the activities, goals, and challenges associated with renewable energy projects may not have been captured.

3. Findings

This section provides an overview of the key survey findings, organized by the four primary questions:

- How are First Nations involved in renewable energy development?
- How would First Nations like to be involved in renewable energy development?
- What barriers are First Nations experiencing in relation to renewable energy development?
- What are the potential impacts of a decelerated renewable energy industry?

3.1 How are First Nations currently involved in the renewable energy industry?

Overall, 47% of respondents who completed the survey currently participate in the renewable energy industry in some way. Respondents indicated that impact benefit agreements (IBAs) were signed for 45 projects in operation. The IBAs commonly included provisions regarding royalties, training and/or employment, and equity. In 19 of these projects, the amount of equity will increase over time.

3.1.1 Operational Projects

Of the 105 respondents, 30 indicated that they have at least one project in operation. We calculated 78 renewable energy projects in total, harnessing energy from several sources. The majority of existing projects are run-of-river hydroelectric (hydro), with solar photovoltaic (PV), geothermal, wind, and solar thermal making up the remainder (figure 3.1).

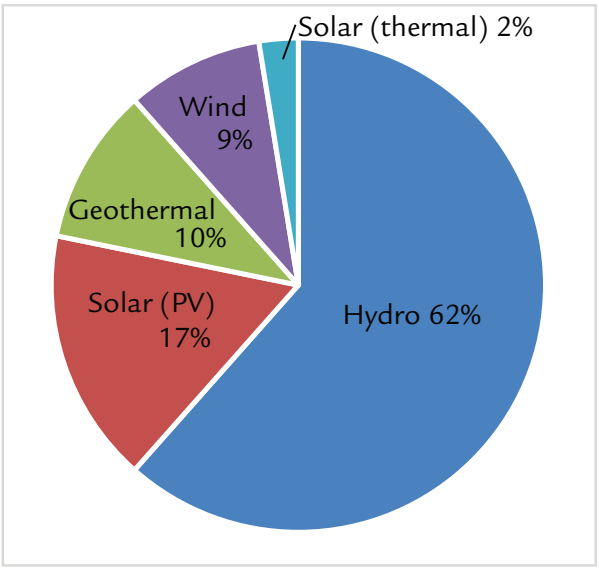


figure 3.1: Technology of Operational Projects by percentage

The total capacity of operational projects listed by respondents is 1,836 MW, which suggests that First Nations are involved in a notable amount of renewable power generation in the province. Among operational projects, we found a wide range of project sizes but large projects (above 15 MW) account for approximately 40% of operational projects (32 projects). The capacities of operational projects are displayed in figure 3.2.

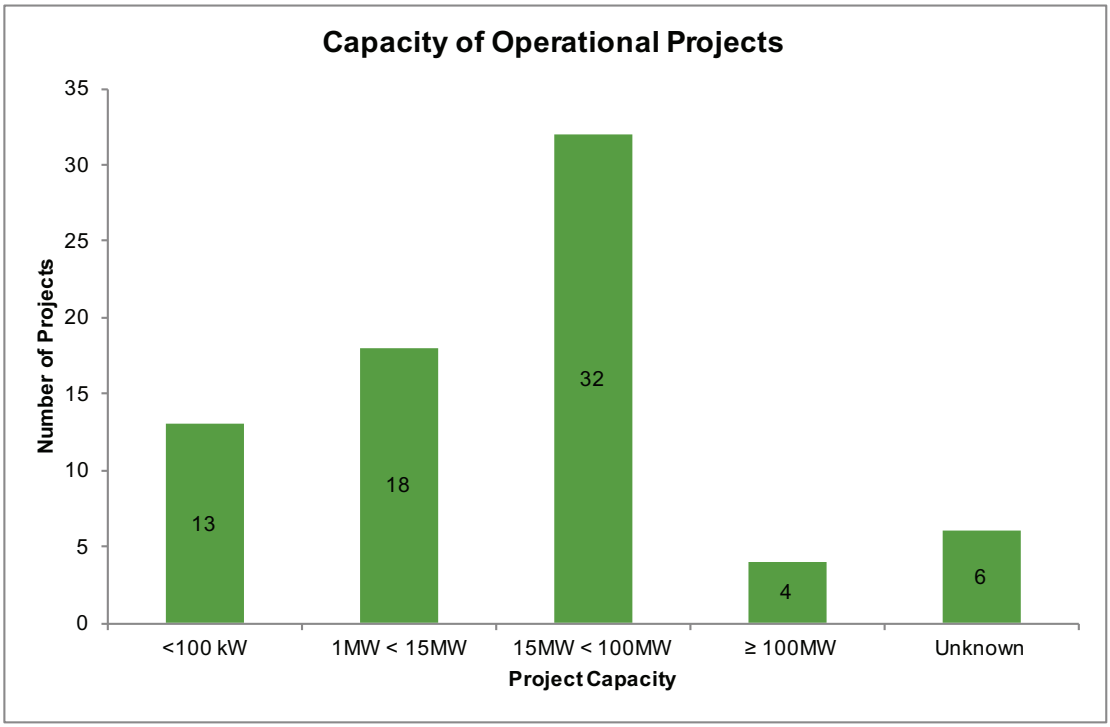


figure 3.2: Capacity of Operational Projects

Of the operational projects reported in the survey, at least 50 are connected to the North American electricity grid. For grid-connected communities, the opportunity to sell power to BC Hydro is key to the commercial viability of a project. BC Hydro has four main distributed generation programs in which First Nations may participate as energy project proponents: 1 – periodic tender calls for power, 2 – the standing offer program, 3 – the micro-standing offer program, and 4 – the net metering program. First, BC Hydro can issue a call for power in which they seek proposals from private power producers to meet a certain acquisition target. The last call for power was in 2008 and no new calls for power are expected. Second, BC Hydro has a standing offer program (SOP) that accepts submissions for small renewable energy projects (over 100kW and up to and including 15 MW). By contrast, the micro standing offer program deliberately targets community groups and First Nations and only accepts project proposals above 100kW and up to and including 1MW. Lastly, the net metering program is designed to purchase energy from BC Hydro's residential and commercial customers with small renewable energy units (under 100kW) in excess of what they use themselves. Aside from these four programs, First Nations have also been able to secure electricity purchase agreements (EPAs) from BC Hydro through bilateral agreements with the provincial government, but these are not well documented. See figure 3.3 for a comparison of operational projects by program.

Of BC Hydro's distributed generation programs, calls for power have historically generated the most opportunity for First Nations who wish to participate in the renewable energy sector. The operational projects were developed under a call for power produce 1,756 MW, or 96% of the power currently produced by survey respondents.

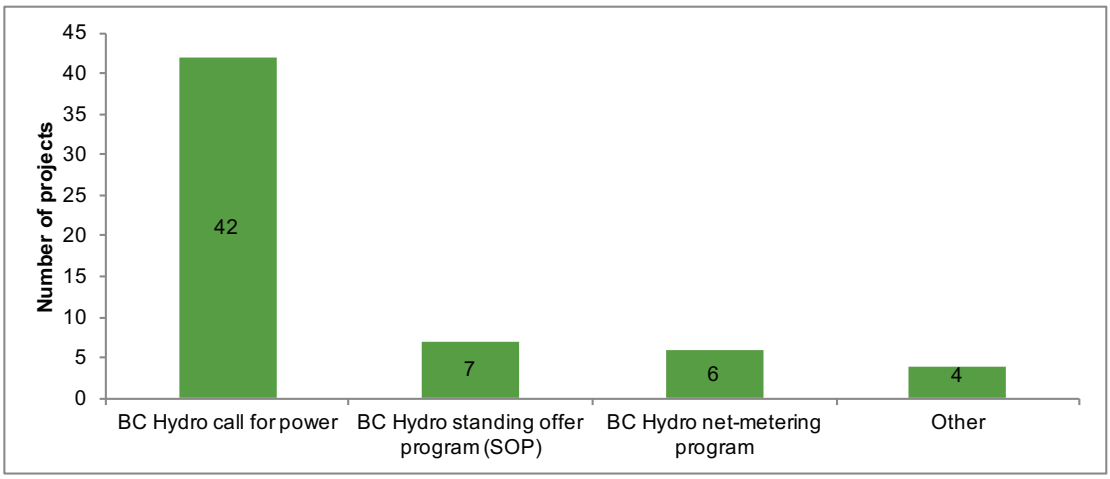


figure 3.3: Operational Projects by BC Hydro Program

First Nations have made substantial financial investments in renewable energy projects. There was a wide range of investment in operational projects, ranging from respondents investing under $100,000 on 17 projects, to greater than $1 million on 16 projects (figure 3.4).

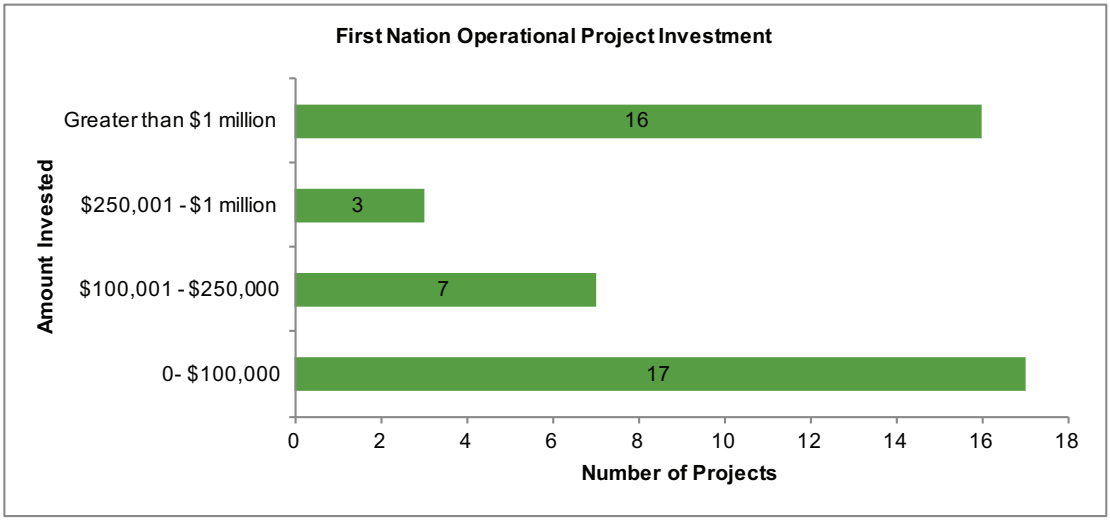


figure 3.4: Investment in Operational Projects

3.1.2 Projects in Development

In addition to operational projects, many First Nations are involved in developing new renewable energy projects. The development phase includes both planning and construction. A total of 32 respondents indicated that they are cur-

rently participating in the planning or building of 48 projects. These projects are well beyond the feasibility stage, with 15 projects already under construction. For some First Nations, this represents their first foray into the sector, while for others, this is the sixth or seventh project on their territory.

The reported projects under development include a range of technologies, as shown in figure 3.5. Compared to the energy sources of operational projects, these findings suggest that First Nations are interested in a greater diversity of renewable energy technologies than previously. For instance, the percentage of hydro projects in development is considerably smaller (35%) than operational hydro projects (61%). Additionally, the mix of technologies now includes biomass (17%) whereas no biomass projects were reported as being in operation.

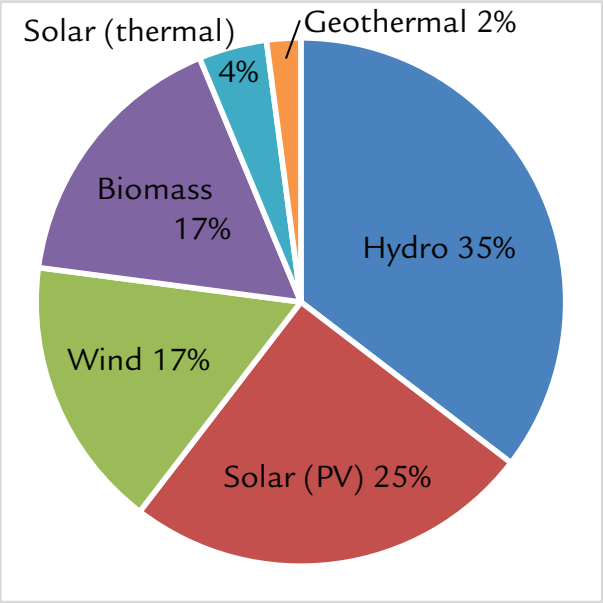


figure 3.5: Technology of Projects in Development by percentage

3.2 How would First Nations like to be involved in the industry?

The survey results indicate a strong interest in the renewable energy industry on the part of First Nations, with 98% of respondents indicating existing involvement or a desire to be involved.

Collectively, 77 respondents reported having nearly 250 projects under consideration. These include projects in the pre-planning phase, without the requisite permits and financing, as well as more developed projects that have been stalled. The survey identified various reasons for project delays (see section 3.5). Importantly, the majority (61%) of undeveloped or stalled projects are being considered by First Nations without prior experience in the renewable energy sector. This finding suggests the potential to significantly expand the number of

First Nations who are benefitting from involvement in renewable energy development (figure 3.6).

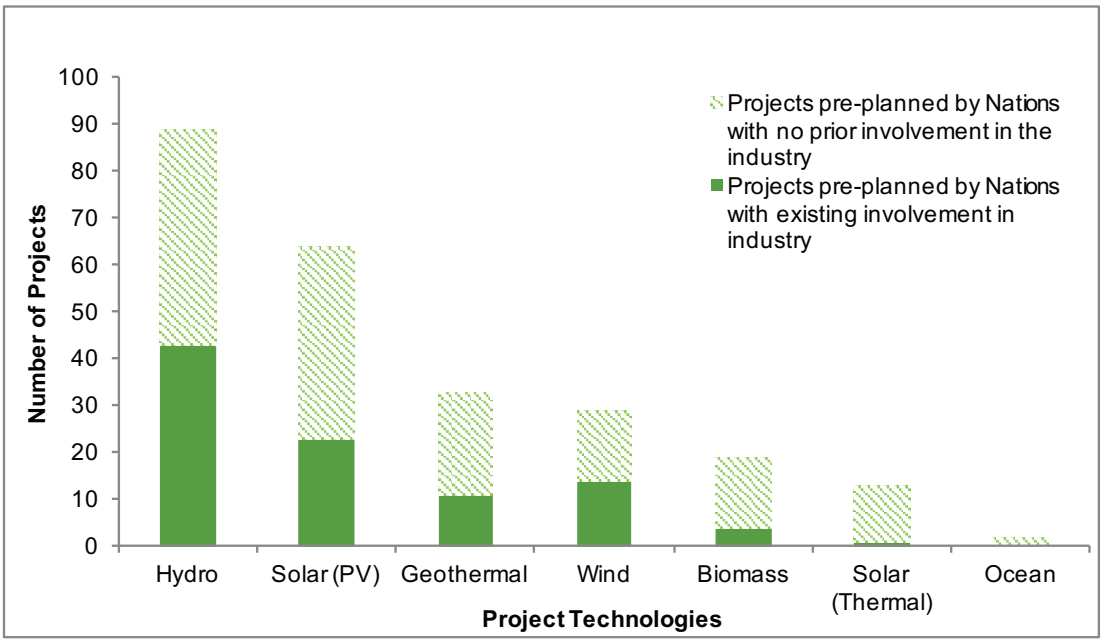


figure 3.6: Projects in Pre-Planning

Much like projects in development, the projects under consideration include a greater variety of renewable energy technologies than existing projects (figure 3.7).

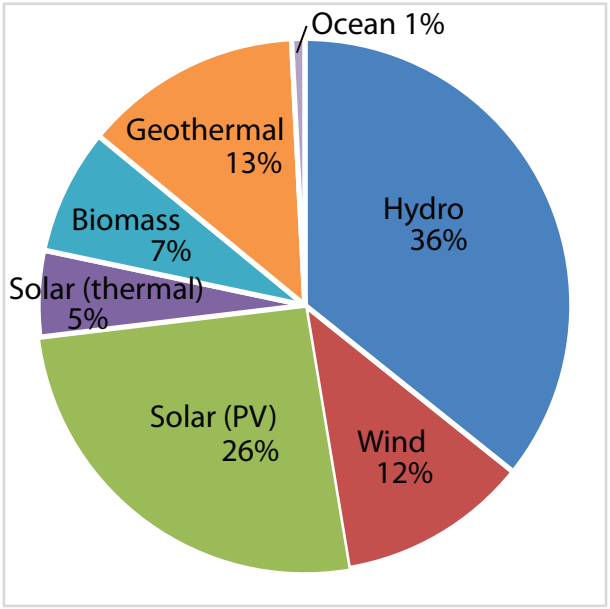


figure 3.7: Technology of Projects in Pre-Planning

Along with the large number of projects under consideration, the high response rate to this question indicates that there is an appetite among respondents for greater involvement in the industry. If offered the potential to sell the power from these projects to the grid, 96% of those who responded to this question said they would. Facilitating opportunities for new and experienced First Nation power producers to sell power to the grid is an essential part of supporting their renewable energy ambitions.

3.3 How have technology choices changed over time?

As mentioned, the survey results indicate shifts in favoured renewable energy technologies among First Nations. In particular, the responses reveal an increase in the percentage of solar PV, solar thermal, biomass and micro-hydro projects under development compared to operational projects (figure 3.8). These increases may be partly due to the growing affordability of certain technologies (especially solar PV), as well as their greater flexibility in terms of location (they are less site constrained than hydro, wind or geothermal). Conversely, the survey results reveal a decline in large hydro from operational projects to projects in development or pre-planning (from 36% to 6%, respectively), which may reflect both financial and siting limitations.

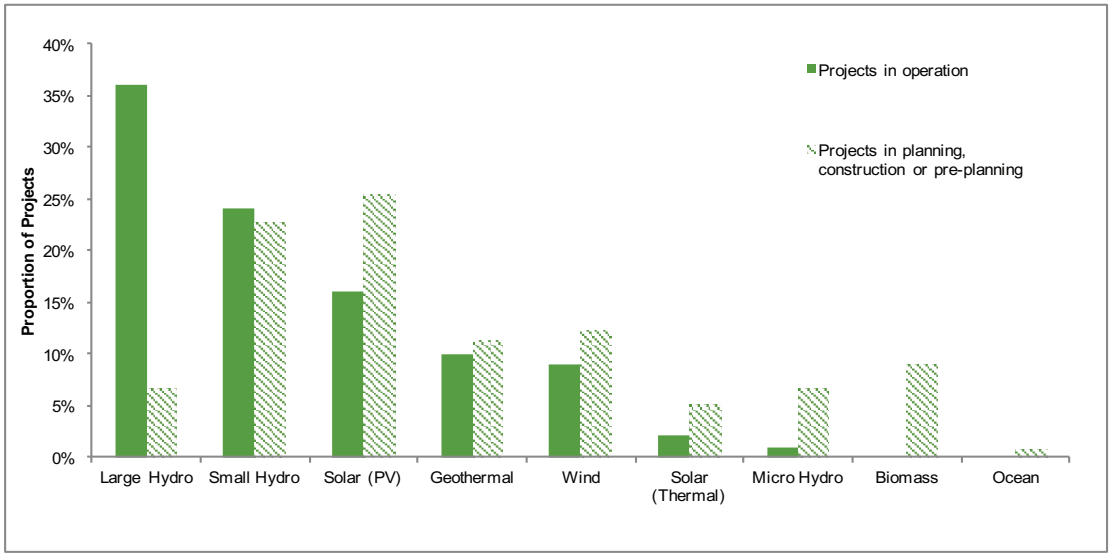


figure 3.8: Comparing Renewable Energy Technologies between Operational Projects and those at Earlier Stages of Development

3.4 How have benefits changed over time?

Survey results revealed that operational projects are delivering benefits to communities in terms of resource royalties, training and employment, and equity involvement. The survey found a slight shift in anticipated benefits for projects under development, however, with a heavier emphasis on training and employment and equity rather than royalties (figure 3.9). This shift could be a function of the technology shift identified in the previous section, with communities anticipating smaller-scale projects with deeper community involvement. However, because these are anticipated benefits, the differences could also reflect the immaturity of the projects under consideration.

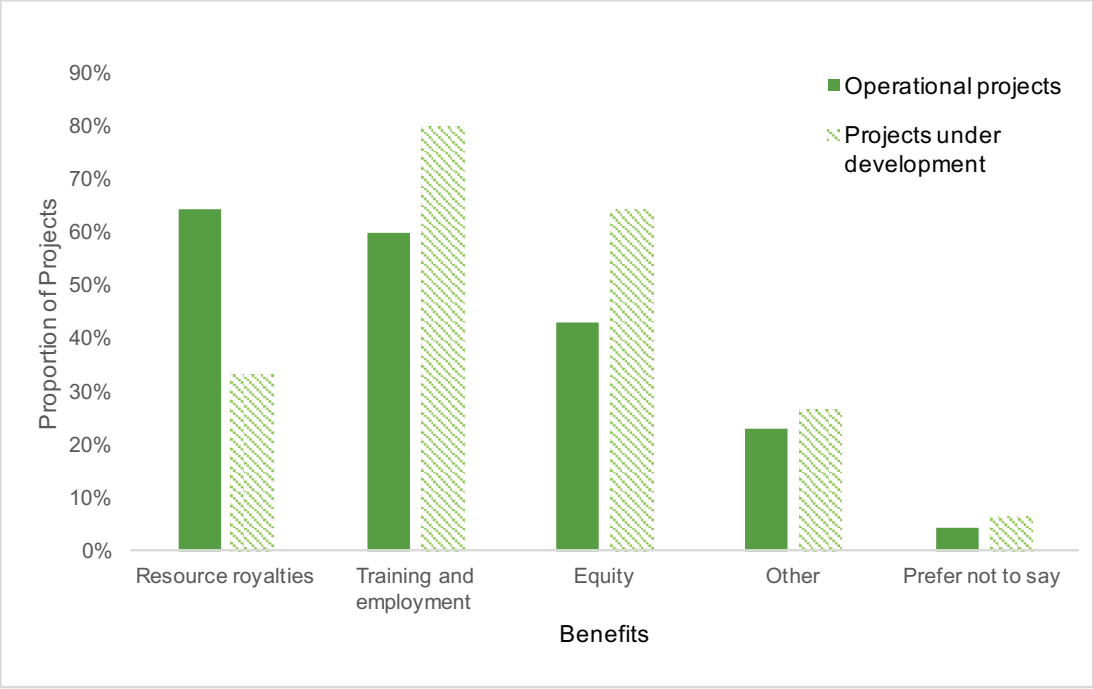


figure 3.9: Benefits of Operational Projects vs. Project in Development

3.5 What barriers are First Nations experiencing in relation to renewable energy developments?

The majority (75%) of survey respondents indicated that they have projects in mind that they have not yet pursued or been able to pursue. They identified three primary barriers to developing projects: lack of opportunity provided by BC Hydro's programs (61%), lack of community readiness (59%), and difficulty securing financing. The financial barriers were expressed as difficulty with soft costs (57%), difficulty with equity (47%), and difficulty with long term financing (44%). Other frequently mentioned barriers included: inability to secure a suitable partner (27%), environmental concerns (20%), and difficulty securing permits (17%). See figure 3.10 for a comparison of barriers. Respondents were also given the opportunity to identify other barriers and one of the most commonly raised issues was the difficulty of connecting to the grid.

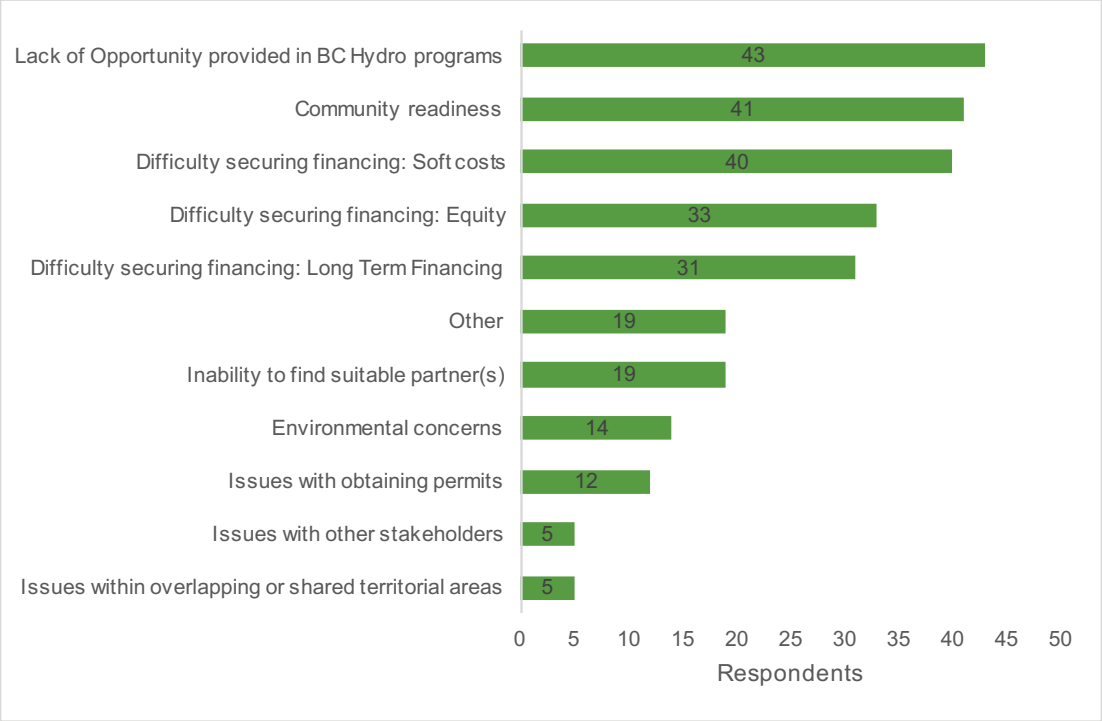


figure 3.10: Barriers to Involvement

With regards to the lack of opportunity in BC Hydro programs, many respondents elaborated in their comments about the difficulty of securing electricity purchase agreements (EPAs) for renewable energy projects. Even small energy projects often require EPAs from BC Hydro to be viable but respondents indicated that there are fewer and fewer ways to obtain them.

The second most commonly cited barrier was community readiness, which was interpreted differently by different respondents. For First Nations who have not yet participated in the industry, knowing where to start and what capacity a community needs was identified as a barrier. Addressing this would require education for community members and employees in renewable energy options and development process. For communities who have already pursued renewable energy projects, community readiness also meant the community's response to a particular project, or that they had not yet consulted the community about a project.

Lastly, respondents indicated several issues in relation to financing renewable energy projects. The majority of respondents (57%) indicated a struggle to fund pre-planning activities. Pre-planning involves investigating the applicable environmental, technical, commercial and permitting aspects of project development. Although there are a few programs available to address this need, survey responses indicated that some First Nations have difficulty accessing limited funding sources and struggle with heavy reporting requirements.

Obtaining long term financing is also a challenge, with 44% of respondents identifying this as a barrier. Long term financing is easier with an EPA from BC Hydro, a guaranteed source of revenue, and a good financial track record. One of the biggest hurdles in obtaining long term financing is experience. If the community has not built a project before, they need to show they have a partner or experienced advisors.

Similarly, 47% of survey respondents listed obtaining equity as a financial barrier to renewable energy developments. There are a few First Nations funds or capital corporations that support equity financing, but these are limited. Industry partnerships have been instrumental to many First Nations who are looking for assistance with equity.

3.6 What are the potential impacts of a decelerated renewable energy industry?

First Nations have been investing in pre-planning, planning, and capacity building activities for renewable energy development within their communities. The survey found a range of financial investment on the part of First Nations with projects in the pre-planning and planning stages (figure 3.11). The majority of respondents (38) declared investments under $10,000 but a handful of respondents (6) reported spending over $250,000. These significant financial investments will likely be lost if the projects do not move ahead.

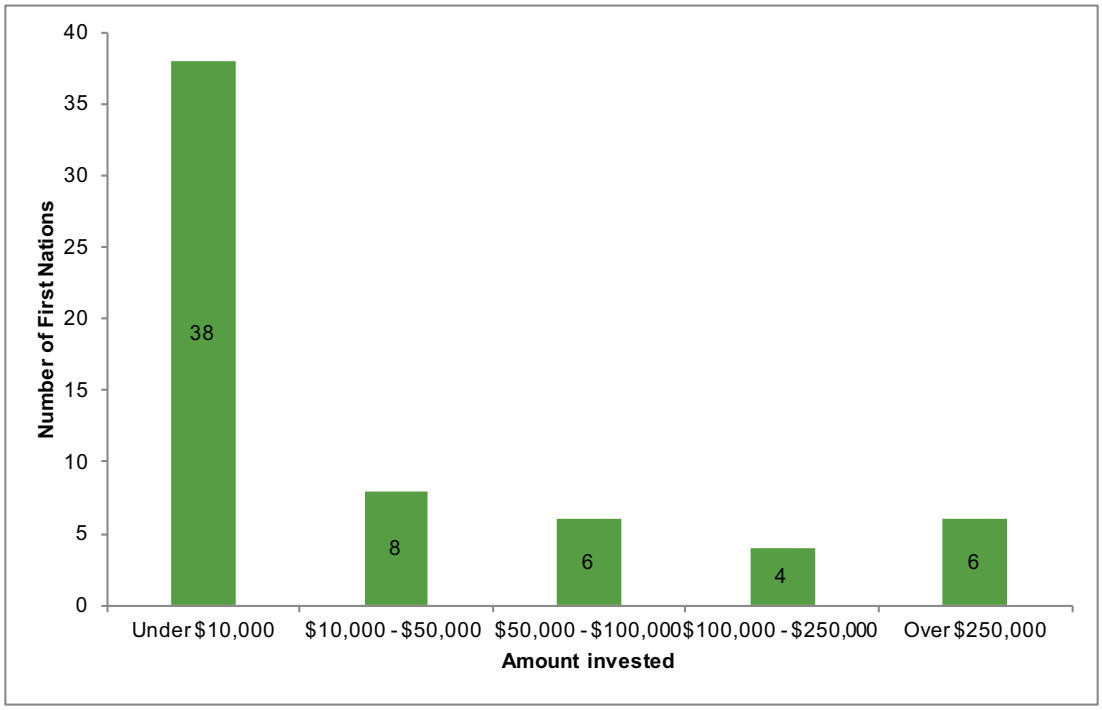


figure 3.11: Financial Investments in Projects in Pre-Planning

Just under half of respondents (47%) indicated that they have been actively building capacity among their members to strengthen participation in the renewable energy industry. Capacity building activities have primarily focused on educating community members about renewable energy, training Chief and Council, and training members in construction. See figure 3.12 for more detail. Capacity building often requires a great deal of time, effort and coordination given the diversity of tasks associated with renewable energy developments. Some activities may prompt the development of transferable of skills and generally contribute to the community's well-being but others are specific to the sector.

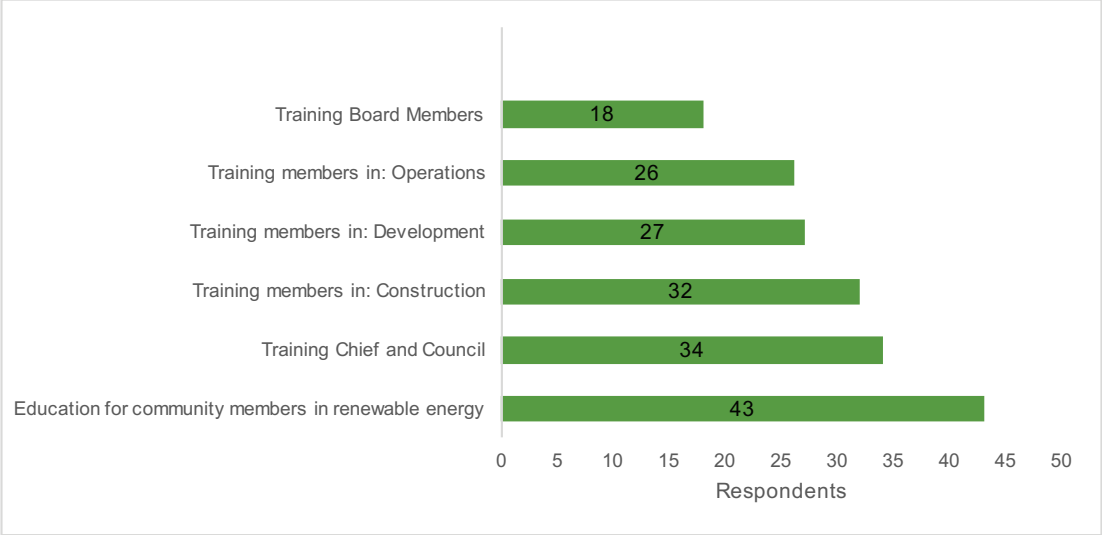


figure 3.12: Capacity Building Activities

When asked how much more it would cost to build the projects they had envisioned, the majority of respondents (31) indicated that it would be under $25 million but a few respondents (8) predicted that it would be greater than $250 million (figure 3.13). These are preliminary calculations mostly based on preplanning efforts and likely underestimate the amount required to operationalize projects. Even as estimates, these figures represent significant potential contributions to regional economies.

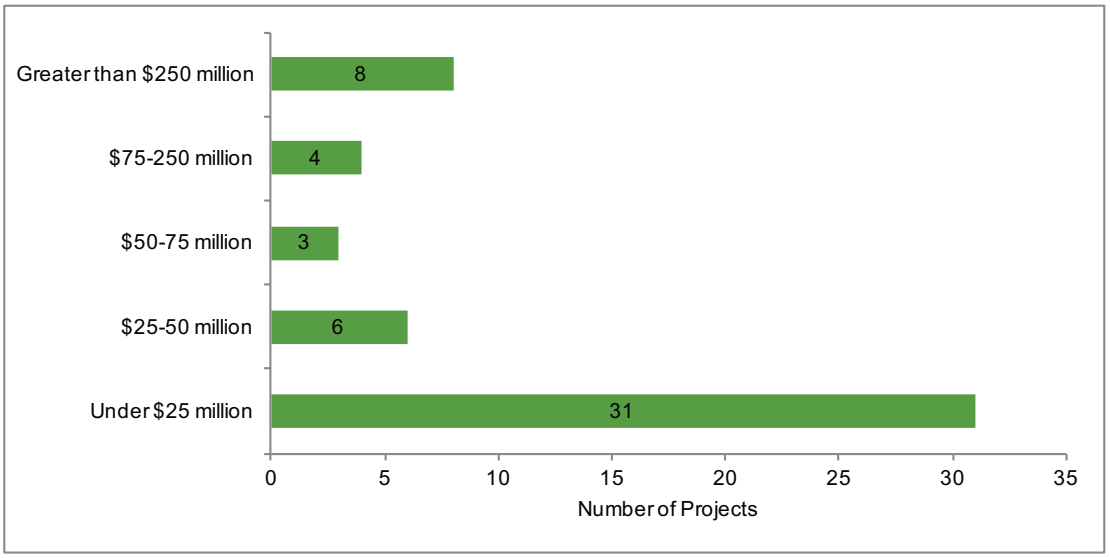


figure 3.13: Predicted Financial Investment Required

3.7 How can capacity-building support First Nations' involvement in renewable energy development?

The survey found that 88% of respondents are eager to develop more capacity in the renewable energy sector. From most to least interest, respondents indicated a desire to focus on the following capacity building activities: planning projects, operations, community energy planning, project management, and board training for members. Taking into account the above mentioned finding that community readiness is a barrier to participation in the industry for almost 60% of respondents, it is important to prioritize capacity building in the ways outlined by respondents if First Nations are to realize their ambitions in the sector.

4. Discussion

The survey results demonstrate that First Nations in B.C. are participating in renewable energy developments in substantial and diverse ways and are eager to expand their involvement. The vast majority of respondents (98%) are involved or interested in being involved in the industry, with nearly 50 respondents reporting new or existing projects on their territory. Projects vary considerably in size, technology, and application. Some projects are intended to provide electricity to community buildings while others are meant to generate revenue through power sales.

First Nations experience a myriad of benefits from these projects, with many respondents declaring renewable energy development as an economic venture that is consistent with their values and priorities. For some, commercial scale projects have the potential to provide much needed revenue and jobs within communities with minimal environmental impacts. For others, project benefits include energy self-sufficiency and reducing their diesel or BC Hydro expenditures.

4.1 Barriers to Participation

Despite growing momentum and interest within the industry, the survey identified three main barriers to entry and expansion within the industry. The barriers indicated include 1 – lack of opportunity provided by BC Hydro programs, 2 – financing, and 3 – community readiness.

The decrease in large hydro projects (over 15 MW) under development and consideration was attributed to lack of opportunities in BC Hydro programs. Existing large hydro projects are generating revenue from selling back to the grid through electricity purchase agreements (EPA) gained through the open calls for power. The open calls for power released a great capacity and potential in the industry. Given that the last call for power was in 2008, it is not surprising that so few large hydro projects are in development. Respondents spoke of projects that are "still viable and feasible and desirable. We want them to proceed [as] we've invested a lot of time and energy in advancing our needs, what we need is BC Hydro to free up the opportunity." The decrease in development of large hydro projects is potentially very problematic when it comes to revenue generation for First Nations. EPAs make them commercially viable; without this possibility their potential benefits are lost.

Respondents also identified transmission line accessibility and capacity as a barrier to their projects. One respondent commented, "In [our] case the relationship with BC Hydro is key to viability. If they are unwilling to negotiate access, then no project will succeed no matter how desirable or feasible."

In addition to the lack of opportunity within BC Hydro programs, survey respondents identified financing as a barrier to involvement in the industry, with one respondent emphasizing that financing involved a: "…huge learning curve. Funding initiatives are not easy to access, and take time to receive responses; [this] creates timeline challenges for planning." Finance challenges extended across the lifespan of projects, from soft costs for pre-planning to obtaining equity.

Community readiness was identified as a third barrier to renewable energy development. One respondent commented, "We don't know how to proceed – what skills and capacity do we need? How do we get them?" with another commenting, "Everyone from leadership to individuals are interested, [we] simply don't know how to start. The band is interested in the different forms for economic development standpoints and from a stewardship standpoint."

Respondents indicated key ways they would like support overcoming capacity barriers to renewable energy development. These included education for community members about renewable energy, training Chief and Council and board members, and training First Nations members in construction, development and operations. One respondent commented: "The type of capacity that we're adding at this point is in planning and community engagement and the community engagement portion is not insignificant. It's not just about organizing a meeting – it's a big project for the community. Where I would like to see more capacity is the technical and construction side...It's a great opportunity for our members to get experience in this area."

4.2 Beyond Economic Development

Commentary from survey respondents clearly suggests that many First Nations view renewable energy projects as a means to achieve multiple social, political and environmental objectives, beyond economic development. Survey respondents expressed the desire to use such projects to become energy self-sufficient, minimize environmental impact, decrease electricity expenditures, and foster pride in their communities. Responses also indicate that several First Nations view renewable energy as much more than industrial development. For example, one respondent noted, "We need to think holistically about energy from an Indigenous perspective. In local languages, the equivalent term for energy has a much deeper meaning and context than simply power production."

Given the diversity of potential benefits, the renewable energy sector offers a unique opportunity, and one that merits the attention and support of policy-makers. The survey was not able to assess the full value (in economic terms or otherwise) of benefits of renewable energy development to communities, but this is an important question for future investigation, with the following comment at its core:

"Our first project is a model of environmental, financial, and community benefit. The social side has been fantastic because it has engendered pride in people who were challenged to be proud given the history of [First Nation] relations with the general population and media in Canada and the ongoing effects of residential school. This refound pride allows for foundational skill development

in those that so dearly need to be lifted, with support and with their own energy, out from the pit in which they exist. The idea that we are working on another larger project that will generate revenues for generations to come is also rippling through our community. Success will engender success."

5. Conclusion

Renewable energy development offers an important opportunity for First Nations, one with the potential to provide myriad economic, social, political, and environmental benefits. Several respondents emphasized that it offers a unique opportunity: "This is the only sector that offers any hope of current and future economic opportunities." Others emphasized the way it complements their values and goals: "We want to see our community empowered and equipped to generate our own energy and to gain the maximum benefit from development in [our] local area."

Without the appropriate policy and support, however, opportunities will be lost. One respondent commented that the "Clean Energy business is dying right now. Opportunities aren't there like they once were," highlighting the need for support to facilitate success in the industry. What this support should look like is not straightforward: one of the key findings from the survey is that First Nations are involved, and want to be involved, in renewable energy development in a variety of ways. Some seek to develop large-scale projects that will deliver substantial revenue benefits; others are primarily focused on self-sufficiency and or energy independence, and are open to smaller-scale technologies that offer maximum community control and benefit. Some Nations have extensive experience in the industry, while others are not sure how to get started. There is no "one size fits all" policy option to support First Nations' involvement in renewable energy generation.

This challenge, however, has a silver lining: there are many opportunities for policy approaches that will facilitate First Nations' ambitions. The key barriers of a lack of opportunities, financing and community readiness can be tackled at a variety of scales, and as the technologies mature, options for community involvement should also increase. The benefits of commercial scale projects, however, cannot be understated. They provide a sustainable source of revenue to communities where economic opportunities do not deplete resources and damage the environment are limited. There is strong momentum from First Nations to build on this potential, and clear benefits both to their communities and beyond if this momentum can be met with an effective and supportive policy framework.