Powering the Future: Youth Inclusion for an Equitable Energy Transition
by

Bonnie Gao
B.E.S., University of Waterloo, 2021

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We acknowledge and respect the Lək̓ʷəŋən (Songhees and Xʷsepsəm/Esquimalt) Peoples on whose territory the university stands, and the Lək̓ʷəŋən and W̱SÁNEĆ Peoples whose historical relationships with the land continue to this day.

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Supervisory Committee

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Abstract

Anthropogenic climate change is a far-reaching global crisis affecting current and future generations. A transition to renewable energy is needed to meet carbon emissions reduction targets. The energy transition must include considerations of future generations who will inherit the future energy system. To uphold intergenerational equity while addressing the climate crisis, youth voices must be involved in the low-carbon energy transition. There is a limited understanding of the role of youth in the energy transition.

This thesis employs qualitative research and four theoretical frameworks to examine how youth from diverse backgrounds and identities have engaged with the Canadian low-carbon energy transition, highlighting the challenges and opportunities they have encountered. Interviews were conducted with 10 youth, aged 20-35, from diverse backgrounds involved in the Canadian low-carbon energy transition. The findings were interpreted through the frameworks of intergenerational equity, energy justice, energy democracy, and intersectionality, showing that diverse young people contribute new perspectives to the energy transition. Despite their contributions, youth also continue to face barriers in engaging with the energy transition. This research contributes to a better understanding of how youth must be empowered to enable their future success in the energy system and how to best engage with youth in the future.

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Chapter 1: Introduction

1.1 Introduction

This thesis describes research to better understand diverse youth experiences in the Canadian low-carbon energy transition. The introduction chapter provides background on the energy transition to address climate change and the current understanding of youth in the energy sector. This thesis uses intergenerational equity, energy justice, energy democracy, and intersectionality frameworks to understand youth inclusion, or lack thereof, within the energy transition. These frameworks provide the basis for understanding justice and equity concerning the inclusion of diverse young people in the low-carbon energy transition. The importance of this research is outlined, and lastly, the remaining thesis chapters are outlined.

1.2 Climate Change and the Need for Social Transformation

Anthropogenic climate change is a global and far-reaching crisis that affects current and future generations. There has been widespread understanding since the 1980s that greenhouse gas (GHG) emissions are a concern, and action must be taken (Seto et al., 2016; Stoddard et al., 2021). The consumption of energy makes up approximately 60% of all global greenhouse gas emissions (UN SDG 7, n.d.). In Canada, energy production and use make up approximately 80% of the country's GHG emissions (UN SDG 7, n.d.). Globally, Canada is reliant on exports of resources, including oil and gas. These exports contribute to non-domestic greenhouse gas emissions (MacArthur et al., 2020). Although 82% of the electricity generated in Canada was emissions-free in 2019 (Stringer & Joanis, 2022), Canada is the fourth-largest GHG emitter per

capita (OECD, 2021). The transition to renewable energy sources in Canada is therefore essential to mitigating the global climate crisis.

Meeting the challenge of mitigating the existential crises of climate change requires fundamental societal transformation and disruption (Burke & Stephens, 2017; Stoddard et al., 2021). Stoddard et al. (2021) state that global emissions have continued to increase, despite ongoing efforts and calls for emissions reductions. They argue that this transition requires a global technological, social, and economic shift. The low-carbon energy transition provides an opportunity to break down existing power structures; however, it is not guaranteed that the renewable energy transition will not reinforce the same inequities and injustices of the current energy system (Levenda et al., 2021).

The Canadian energy transition can be described in many ways. Energy transitions refer to the systemic shift from one dominant energy source to another. An example is the progression in the United Kingdom from wood to water and wind, and subsequently to coal. For this research, the term specifically refers to the transition toward a sustainable energy system, characterized by the deployment of low-carbon sources (Bridge et al., 2013). In Canada, the low-carbon energy transition has been referenced in the 2030 Emissions Reduction Plan as the movement to decarbonize the economy through low-carbon technologies (Environment and Climate Change Canada, 2022).

To transition to an inclusive low-carbon economy, we must include historically marginalized and underrepresented communities (Baruah & Govindan, 2015; Hoicka, 2023; Pearl-Martinez & Stephens, 2016; Stephens, 2022). The complexity of the energy transition requires diverse perspectives and the inclusion of different actors to adequately address the

climate crisis. The existing global energy system, heavily reliant on fossil fuels, is male-dominated, both within the energy workforce and in the decision-making realms of the energy sector and continues to perpetuate inequalities towards marginalized communities (Pearl-Martinez & Stephens, 2016). The energy transition may further exacerbate negative impacts on historically marginalized communities, including low-income communities and racialized communities (Carley & Konisky, 2020). These communities may face further energy insecurity with limited opportunities for engagement and access to new technologies. Without diverse perspectives and intentional inclusion of marginalized communities, the energy transition may continue to perpetuate the same inequities of the current fossil-fuel-based system (Pearl-Martinez & Stephens, 2016; Stephens, 2022).

Different and diverse actors provide multiple perspectives and new priorities to better support the energy transition (Pearl-Martinez & Stephens, 2016). Diversity reflects the acknowledgment and valuing of everyone's unique identity and lived experience—including factors such as class, gender, racial identity, Indigenous identity, age, and ability, among others (Sharma et al., 2025). In this study, I focused on the diversity characteristics of age, gender, immigration status, ability, racial identity, and Indigenous identity.

The addition of diverse actors in the energy transition must include the voices of young people and consider the future generations who will inherit the future energy system and the Earth. Intergenerational equity refers to the right of future generations to inherit the same natural and cultural resources of past generations, with the ability to access the benefits of those resources (Summers & Smith, 2014). To truly enact intergenerational equity, youth must be included in decisions that shape their futures.

There is limited understanding of the roles and experiences of youth in the energy transition (Jaradat et al., 2024). To understand the role and perspective of youth in Canada, we must first define youth. Many different age groups are often collectively referred to as youth. Based on a global review, Jaradat et al. (2024) found that the term "youth" most often refers to people ages 15-35. In *Canada's First State of the Youth Report,* released by Canadian Heritage (2021), they defined youth as those aged 15 to 29. This range encompasses the ages of adolescence into young adulthood (Canadian Heritage, 2021). Therefore, I decided to invite youth aged 18-35 to participate in my research project. The work done by Jaradat et al. (2024) has revealed the many areas in which youth are engaged within the energy system. Their research is based on the premise that the perspectives of youth are essential in driving sustainable and just energy transitions (Jaradat et al., 2024). Their systematic review highlights how youth are still primarily engaged with education, and the focus tends to be on energy literacy (Jaradat et al., 2024). Jaradat et al. (2024) also found that scholarly work has primarily focused on the perceptions and attitudes of youth, with only 9% of the papers they reviewed examining youth involved in energy governance. They conclude that more work is needed to examine youth as energy actors on the national and international stages (Jaradat et al., 2024).

1.3 Research Frameworks

I utilized four theoretical frameworks in my work, looking at youth in the Canadian low-carbon energy transition. These frameworks, as shown in Table 1, enable broad analysis to support the research objectives in an area where limited research has been conducted.

Table 1
Theoretical Frameworks

Theoretical Frameworks	
Intergenerational Equity	Understand the equity implications between generations.
Energy Justice	Understand access in the energy system.
Energy Democracy	Understand mechanisms to bring about the energy transition.
Intersectionality	Understand overlapping identities concerning youth experiences.

These frameworks established the theoretical foundation from which the research questions emerged and were then applied in analyzing interview data to fulfill the research objectives.

1.4 Research Question and Objectives

Given the minimal research conducted about the impact of youth, especially diverse youth, on the energy transition, my research responds to this gap in the literature. The question that guides my research is, how do we ensure intergenerational equity as we address the climate crisis? To address this question, I have the following research objectives:

1. *To understand how youth with diverse backgrounds and identities have engaged with the low-carbon energy transition in Canada.*
2. *To describe the challenges and opportunities youth with diverse backgrounds and identities face when engaging in the low-carbon energy transition in Canada.*

This research offers a deeper understanding of how youth have been involved in the Canadian energy transition and provides suggestions on how to effectively engage with youth in the future. These research objectives were achieved through an analysis of semi-structured interviews with 10 diverse youth who have had experiences engaging in the Canadian energy transition.

I also employ four frameworks: intergenerational equity, energy democracy, energy justice, and intersectional theory, to document the experiences of youth from diverse backgrounds, providing an outline of the barriers and benefits to inclusive youth participation in the Canadian energy transition.

1.5 Research Significance

This research aims to fill an important gap in the literature, given that there is minimal research available that examines the impact of youth, particularly youth from marginalized communities, on the energy transition. There are at least two key reasons why this research is significant. First, my findings will enable other actors to work with youth in more meaningful ways toward policies that benefit youth and align with their values regarding energy transitions. Second, the findings will benefit youth organizations in understanding their role/potential future role in the energy system, especially related to the inclusion of youth from diverse backgrounds. Without understanding the current state of youth involvement in the Canadian low-carbon energy transition, we cannot ensure that intergenerational equity is met in an issue that is critical to young people's futures. The transition to low-carbon energy sources is an opportunity to create a future that does not perpetuate the harms of the current global energy system. My research provides a foundation for a better understanding of the experiences and perspectives of young people, thereby enabling us to move forward with intention.

1.6 Thesis Outline

This thesis will be organized in the following manner. Chapter 1, the introduction, will provide background into the study and detail the research question and objectives. Chapter 2 is the literature review, providing an overview of the context of the low-carbon energy transition

and background on the theoretical frameworks. Chapter 3 outlines the methodology of the study, showing the process undertaken from sampling to analysis. Chapter 4 shares the findings of the study, as well as a discussion of those findings. Finally, Chapter 5 shares the conclusion, the work's strengths and limitations, and offers recommendations and next steps.

Chapter 2: Literature Review

This literature review provides background for further discussions on young people in Canada and their relationship to the Canadian energy transition. It begins with an overview of the concept of carbon lock-in, an essential concept for our understanding of the climate crisis. Next, a discussion of energy geographies and energy transitions situates humans in the energy system. In section 2.4, I describe the ways in which activism and advocacy can move the energy transition forward. Next, I discuss young people and the current state of their involvement with the energy transition in Canada. Finally, I discuss the theoretical frameworks in greater detail to describe their uses and relevance concerning young people and the Canadian energy transition.

2.1 Carbon Lock-in

Scholars are aware of the necessity of large-scale and rapid change to the global energy system (Seto et al., 2016; Solomon & Krishna, 2011). However, the rate of societal, technological, and economic transformation needed has been limited by carbon lock-in. Carbon lock-in refers to the inertia of physical, economic, and social factors that make it increasingly challenging to shift to a non-emitting system (Seto et al., 2016). The theory of carbon lock-in, first conceptualized in the early 2000s, explains the system-level difficulties in shifting to pathways that lead to a low-carbon society (Unruh, 2000).

Seto et al. (2016), in their annual review, describe three types of carbon lock-in: infrastructural and technological, institutional and behavioural lock-in. These three types of lock-in mutually reinforce each other. Infrastructural and technological lock-in refers to the difficulty in shifting to new infrastructure and technologies. For example, existing fossil fuel

infrastructure can be very long-lived and inhibit the adoption of new renewable energy infrastructure (Seto et al., 2016; Trencher et al., 2020). This type of carbon lock-in manifests as a system that is resistant to change.

The second type of lock-in is institutional lock-in, "associated with governance, institutions, and decision-making that affect energy-related production and consumption" (Seto et al., 2016, p.427). Institutional lock-in exists because those who benefit from the current energy infrastructure will seek to maintain the status quo (Goldstein et al., 2023; Hosli & Dörfler, 2015; Seto et al., 2016). Breaking institutional lock-in requires intentional efforts to shift political and economic power to new actors (Seto et al., 2016). It is difficult to disrupt this path-dependency because a feedback loop exists where actors that benefit from existing energy infrastructure, such as oil and gas, continue to influence institutions to benefit these infrastructures, gaining additional resources and thus able to exert further influence (Seto et al., 2016). However, new policies can be written to provide incentives for pathways that lead to decarbonization (Seto et al., 2016).

The third type of lock-in is behavioural lock-in. Behavioural lock-in looks at the persistence of carbon-intensive behaviours, both through individual actions and social structures. It is crucial to consider the impact of personal actions as well as the structures that influence people's behaviours to perpetuate our current carbon-intensive system (Goldstein et al., 2023; Seto et al., 2016).

These three forms of carbon lock-in provide us with a basic understanding of the areas that must shift to move towards decarbonization, and why it has been so challenging to make these shifts (Goldstein et al., 2023; Seto et al., 2016). Carbon lock-in reveals the feedback loops

that exist and that must be disrupted to move towards a low-carbon economy. Carbon lock-in relies on the lack of action from incumbent actors. Decarbonization efforts that neglect considerations of equity and justice risk 'locking-in' the incumbent energy system that continues to marginalize and exploit vulnerable communities (Healy & Barry, 2017; Unruh, 2000). Part of this shift must include youth, as they will be the ones facing the consequences of continued failed efforts to decarbonize.

2.2 Energy Geographies

The energy transition, as with the energy system, is a geographical process (Bridge et al., 2013). By understanding these concepts from a geographical perspective, we are better able to understand how and why these systems exist in the way that they do, and how an energy transition that upholds intergenerational equity can be achieved.

Understanding the geography of transitions also provides us with the lens to consider how place-based factors influence the transition to a more sustainable future (Köhler, 2019). It is vital to my research to view the energy transition from a geographic lens to better understand the role youth can play. Spatial dimensions shape our energy systems, and the geographical implications of the energy transition must be acknowledged (Bridge et al., 2013). There are geographical limitations that are important to understand because they will shape how we can transition to a renewable, non-emitting energy future. In this section, I consider the impact of location and scale on our understanding of the low-carbon energy transition.

First, we can consider location and how our perception of location impacts the way youth engage with the energy system. Location refers to both an absolute and a relative concept. The absolute location of an object can be described by latitude and longitude, and

relative location, as elements in proximity to each other (Bridge et al., 2013). A key consideration in location is the physical aspect of where infrastructure exists. For example, we can understand how trends such as urbanization and globalization have affected the energy system and are, in turn, affected by the energy system (Araújo, 2014). Increased urbanization has a profound impact on the energy system, as over 75% of fossil fuel CO_2 emissions are contributed directly by urban areas (Seto et al., 2021). Trends like urbanization also impact youth and their ability to access educational opportunities. In contrast, youth in northern and rural areas are less likely to pursue post-secondary education due to limited access to educational opportunities (Hango, Zarifa, Pizarro Milian, et al., 2021). Understanding location, therefore, allows for a better understanding of not only the physical energy system but also key processes that can create barriers for youth.

Another geographic concept that is important to consider is scale. Scale can be conceptualized in terms of both magnitude and extent of phenomena. Scale can be used to understand political structures, from local to regional to national governments (Bridge et al., 2013). The geographical reach of political structures is essential to understanding the scale at which youth engage in the Canadian energy transition (Bridge et al., 2013). The scaling of energy systems is dependent on economic and political decisions. For example, energy policy, when created and examined at a national level, can see decentralized actors as remote and unpredictable (Bridge et al., 2013). Energy decisions in Canada are primarily dictated by provinces and territories, which have constitutional authority over the energy sector, including energy resources (MacArthur et al., 2020). Jurisdictions across Canada have very different energy contexts, both in terms of energy resources and ownership of energy assets (MacArthur

et al., 2020; Potvin et al., 2019). While my research is focused on youth in Canada, it examines the actions of youth at regional and national scales.

As I seek to understand how youth have engaged with the low-carbon energy transition, examining the scale of their engagement is also essential. Looking at the energy transition from a spatial perspective provides us with a lens through which to consider it critically. The use of location and scale specifically allows us to view the barriers youth may face related to their physical location in Canada, and the scale of their engagement within the energy sector. A geographical lens can help to reveal the inequities that exist within the current energy system, and it also identifies potential inequalities that could result as we transition to renewable energy. In the next section, I will discuss further some of these inequalities. Understanding both location and scale is essential when examining how diverse youth have engaged in the low-carbon energy transition in Canada.

2.3 Energy transitions

The low-carbon energy transition has the potential to create a better, sustainable, and more equitable future for everyone (Clark & Harley, 2020). Energy transitions refer to the shift from one energy source to another. An example of an energy transition is the shift from wood to water/wind, and finally to coal, which began in the United Kingdom (Bridge et al., 2013; Solomon & Krishna, 2011). For our understanding within this thesis, energy transitions are specific to the transition towards a sustainable energy system, fuelled by low-carbon sources (Bridge et al., 2013). The transition to low-carbon sources is an opportunity to create a future that does not perpetuate the harms of the current global energy system.

A primary goal of the low-carbon energy transition is to combat climate change, but without conscious intervention, it will not address existing inequalities in the global energy system (Johnson et al., 2020). The current energy system primarily benefits a small group of the global population. The benefits and burdens of energy generation and distribution are not equitable (Baruah & Govindan, 2015; Healy & Barry, 2017). The energy transition requires the increased deployment of renewable energy technologies. These technologies have been shown to have negative implications for those who are already most vulnerable to the effects of climate change (Levenda et al., 2021). The transition to renewable energy may leave those who are most vulnerable worse off or unable to reap the benefits of this transition (Levenda et al., 2021).

The energy transition must include diverse voices, not only increasing opportunities for marginalized individuals but also providing benefits to the entire energy system (Pearl-Martinez & Stephens, 2016). Research has shown the benefits resulting from the increased inclusion of women in the energy sector. For example, companies in all industry sectors with more than one woman on their board are more likely to have increased renewable energy consumption (Atif et al., 2021). Extensive research over the last few decades has also shown that diversity strengthens the performance of organizations, communities and entire sectors (Page, 1999; Pearl-Martinez & Stephens, 2016). Currently, there is a lack of diversity in the energy transition in Canada; young people, women, people with disabilities, racialized people, new immigrants, and Indigenous people in the electricity sector are underrepresented (Electricity Human Resources Canada, 2020b). Jaradat et al. (2024) conclude that for a truly just and sustainable

energy transition, youth must be one of the groups that are included as legitimate energy actors.

2.3.1 Canadian energy transition

Canada has set goals to mitigate climate change, including to achieve net-zero emissions by 2050 (Government of Canada, 2020). To meet this goal, Canada needs to decarbonize the economy, from the electricity sector to transportation, buildings, oil and gas, and more (Environment and Climate Change Canada, 2022). I refer to the low-carbon energy transition specifically, as the Canadian government has frequently used low-carbon to refer to both the energy transition and the future economy, as seen in the 2030 Emissions Reduction Plan (Environment and Climate Change Canada, 2022). This term includes technologies that may not be considered renewable, as renewable energy is defined as energy sources that cannot be depleted (Holloway, 2021). Low-carbon technologies can include nuclear and clean fuels (Environment and Climate Change Canada, 2022). Youth may be involved in a wide range of topics encompassed by the term low-carbon energy transition. Some of this involvement is in activism and advocacy, discussed in the next section.

2.4 Activism and Advocacy

Advocacy and activism are both essential forms of enacting political and social change (Fuller & McCauley, 2016). Activists and advocates seek to leverage the technological shift within the energy transition to reimagine the future energy system (Shelton & Eakin, 2022). Advocacy can further energy transitions, but it can also slow down energy projects if equity is not addressed (Shelton & Eakin, 2022). For example, in California and Australia, it has been shown that without the support from organized labour, energy policies are less likely to move

forward (Hess, 2019; Pearse, 2016; Shelton & Eakin, 2022). To bring about political change related to the energy system, advocacy and activism are both critical, especially for those who are marginalized and historically have had less political influence (Shelton & Eakin, 2022).

Shelton and Eakin (2022) conducted a systematic review of literature studying activism and advocacy related to energy justice and the 'Just Transition', a term that engages with those who benefit from the energy transition. They found 46 types of advocates involved in advocacy and activism related to energy justice and the Just Transition. These included local/affected residents, environmental organizations, unions/labour groups, and local governments, among others. Although they were able to identify a diversity of actors, they found many of the papers did not disaggregate actors and grouped them under terms such as "movements" (Shelton & Eakin, 2022). Further research is needed into who participates in energy justice advocacy and activism, including the involvement of youth.

2.5 Youth Participation

Participation of youth, within institutional processes and decisions that impact young people, comes in various forms and strategies (Checkoway, 2011). Participation in this context refers to the influence and active engagement of young people (Checkoway, 2011). There are many benefits to society and youth when youth are engaged in decision-making (Augsberger et al., 2024; Ho et al., 2015; Powers & Tiffany, 2006). Powers & Tiffany (2006) have shown that youth participation provides skill development opportunities and meaningful roles, and prepares young people to be engaged members of society (Wilson, 2000). Knowledge generated through youth participation is also more accessible to young people, and therefore to a broader audience (Ho et al., 2015; Powers & Tiffany, 2006). Youth participation in decision-

making is how young people can exercise their power and influence outcomes that affect the larger society (Augsberger et al., 2024; Checkoway, 2011). This section explores youth participation in the broader environmental and climate justice movement, then narrows the focus to their involvement in the low-carbon energy transition, before delving deeper into the Canadian context.

2.5.1 Youth Participation in Environmental/Climate Justice

Youth have the ability to impact social transformation related to climate change mitigation (Cocco-Klein & Mauger, 2018). Although there is limited understanding of youth advocacy/activism within the energy transition, a long history of youth activism exists in the broader environmental and climate movement (Sloan Morgan et al., 2023). In the United States, there are many examples of youth climate action that have worked to build electoral influence and have aided in the election of progressive candidates with climate justice policies (Stuart, 2019). There have also been actions taken by students as early as 1969, at the University of Michigan, to raise awareness on environmental issues, including environmental justice issues related to the disproportionate impact of pollution on Black and Brown communities (Conner, 2023). In Canada, the Youth Climate Lab, a non-profit organization dedicated to empowering youth, had engaged with over 1400 youth climate leaders by 2020 to support 47 distinct youth-led climate initiatives (Conner, 2023). These are just a few examples of how young people have been impacting climate change and environmental issues.

Youth have made significant contributions to environmental and social policies (Cocco-Klein & Mauger, 2018; Sultana, 2022). For example, the campaign, iMatterNow, led by youth, has resulted in municipalities across the US and Canada committing to carbon emissions

reductions (Cocco-Klein & Mauger, 2018; Delaney, 2020). Since 2018, global youth climate justice activism has been on the rise, with millions participating in multiple Global Climate Strikes for the Future in 2019. Many have acknowledged Greta Thunberg as a figurehead of this movement; her weekly strikes have inspired youth across the world to join the climate movement (Conner, 2023). The impact of youth has been felt on the global stage in relation to climate action.

Youth have unique narratives which they can employ as young people. They invoke the guilt and shame of adults for failing to protect them, calling out the irony of having to embody a leadership role to call out the climate crisis (Conner, 2023). They also highlight how young people will soon be the ones in power, be voting age and become the next decision-makers (Conner, 2023). Young people have a very compelling narrative when it comes to considerations of the future planet. The impact of these movements has been widespread, leading to changes to international and national climate goals (Conner, 2023).

Despite past successes, there are still limited opportunities for youth to impact local, national, and international climate policies directly (Ritchie, 2021). As described above, youth are involved in climate justice work, often within grassroots organizations, but their work has not always been properly acknowledged by decision-making bodies (Sloan Morgan et al., 2023). As activists like Greta Thunberg have gained global platforms, there are youth who have been excluded from these spheres of influence. There are disparities within the umbrella term of youth, as youth come from many diverse backgrounds. This experience has been especially true for youth from the Global South, Indigenous youth and youth from marginalized communities (Sloan Morgan et al., 2023).

Youth have participated in many local, national, and international conversations, but they report continued experiences of exclusion (Sloan Morgan et al., 2023). Feelings of tokenization at international climate change gatherings like the Conference of Parties were shared by young people (Sloan Morgan et al., 2023; Sultana, 2022; Thew et al., 2020). While youth gained global media attention, policymakers in the decision-making spaces did not agree on policies that met youth ambitions for climate action (Grosse & Mark, 2020).

Ritchie (2021) argues that activism by young people can create transformations in society toward environmental and social justice. Despite the existing structures in place that create barriers for youth, the inclusion of youth perspectives can challenge the existing systems and structures of power in society (Sultana, 2022).

2.5.2 Youth and Energy Transitions

Jaradat et al. (2024) conducted a systematic review examining the role of youth in energy transitions as described globally in the literature. Jaradat et al. (2024) analyzed 4997 results found from the following search string: [TITLE-ABS-KEY (youth OR adolescent OR teenage OR youngster OR “young people” OR “young citizens” AND energy AND “renewable energy” OR solar OR wind OR biofuel OR biomass OR bioenergy OR geothermal OR nuclear OR electricity OR “clean energy” OR “alternative energy” OR “green energy” OR “sustainable energy” OR transition OR future OR scenario]. From there, they limited the results to English-language peer-reviewed articles in the subject areas of social sciences, energy, environmental sciences, and engineering between 2005 and 2022. This left 457 articles, and with further filtering to identify articles with direct relevance to youth and energy, left 91 articles that formed the basis of the analysis described.

The authors found there was a gap in research on youth and energy governance from the national to the international levels. Of the 91 articles reviewed, 57% focused on energy education, and the next largest section, at 41%, was focused on perceptions and attitudes of youth. Energy education literature emphasizes the importance of knowledge and capacity building for youth, while youth attitudes literature focuses on perceptions of energy technologies and options. Even though these areas are important, there is a clear gap in research looking at youth and their role in climate advocacy and energy governance, with 23% and 10%, respectively (Jaradat et al., 2024). The findings from Jaradat et al. (2024) indicate that these two areas, literature related to climate advocacy and energy governance, combined, made up 33% of the papers, or 30 papers of a total of 91.

In the literature review conducted by Jaradat et al. (2024), only two of the papers conducted research in Canada. These examples looked at Alberta and Saskatchewan and discussed energy literacy. Research focusing on youth in energy governance as active citizens is essential to empowering youth and supporting a just and inclusive energy transition (Jaradat et al., 2024).

In Canada, there are a few examples of youth engagement in the low-carbon energy transition that have been studied. One example is the youth-led organization, Student Energy, that has engaged youth through knowledge dissemination and capacity-building activities (Jaradat et al., 2024; Lowan-Trudeau & Fowler, 2022). Canadian Heritage also released its first State of the Youth report in 2021. This report, written by youth, for youth, included topics of climate change and sustainability (Canadian Heritage, 2021). They described the need to address the climate crisis in a way that includes everyone, especially those who have been

historically marginalized (Canadian Heritage, 2021). Research looking at the broader movement of youth climate activism has been limited in Canada (Greaves & Tkachenko, 2023). The existing research looks broadly at climate action and does not adequately address the energy transition. The role of diverse youth in addressing the climate crisis in Canada is critical, and more work must be done exploring their role in the Canadian climate movement, including the energy transition.

2.6 Theoretical Frameworks

I have chosen several foundational frameworks to inform this research: intergenerational equity, energy democracy, energy justice, and intersectionality. Intergenerational equity provides the basis for understanding why youth must be included in the low-carbon energy transition. The energy democracy and energy justice frameworks also provide us with a valuable structure to inform this research and the methodology that will be used. They can both provide us with the tools to understand the injustices youth may have faced, as well as the way they have worked to support the renewable energy transition. In combination, the two frameworks of energy democracy and energy justice help reveal the injustices and provide guidance on how to move forward. Lastly, intersectionality provides a lens to view the interlocking power structures that impact diverse youth and their relationships with the broader energy system.

2.6.1 Intergenerational Equity

Intergenerational equity has long been mentioned in global climate policy (Carley & Konisky, 2020). Since its inception, sustainable development has been defined as "development that meets the needs and aspirations of the present generation without

destroying the resources needed for future generations to meet their needs" (Keeble, 1988, p. 20). The concept of sustainability, as defined in the Brundtland Report, was framed with future generations in mind (Brundtland, 1987).

Intergenerational equity is the foundational concept that highlights the importance of youth inclusion in energy transitions. Caney (2018) recognizes that earlier generations greatly influence future societies. Intergenerational equity is about asserting the rights of future generations to inherit the same natural and cultural resources available to past generations (Summers & Smith, 2014). Intergenerational equity has been discussed briefly in the context of energy justice, described as distributional justice between current and future generations (Motupalli, 2022; Sovacool et al., 2017; Summers & Smith, 2014). Youth movements leverage intergenerational justice in their work, stating they have a right to a healthy and sustainable future (Grosse & Mark, 2020). They frame the climate crisis as a moral issue that must address intergenerational injustices (Bright & Eames, 2022).

2.6.2 Energy Democracy

There is no agreed-upon definition of energy democracy (Szulecki, 2018), but the definition that best aligns with examining youth as an underrepresented group in the energy transition is the definition of energy democracy as described by Burke and Stephens (2017). With this definition, energy democracy is an emerging social movement working to advance the renewable energy transition (Burke & Stephens, 2017; Szulecki, 2018). The movement aims to create opportunities for the energy transition, destabilize existing power structures, achieve social justice goals, and replace the fossil fuel system with a democratic, renewable energy system (Burke & Stephens, 2017). It builds off sociotechnical transition theory and exemplifies a

path forward that challenges the dominant fossil fuel agenda. In addition, it integrates a wide range of policy instruments, from regulatory, financial, and institutional measures to achieve a 100% renewable energy future, with most energy from decentralized systems (Burke & Stephens, 2017). Energy democracy provides an understanding of the different mechanisms that can be used to bring about the energy transition.

Energy democracy includes three broad goals. The first goal is to resist the dominant fossil fuel energy agenda, the second is to reclaim social and public control over the energy sector, and the third is to restructure the energy sector to better support democratic processes, social justice, inclusion and sustainability (Allen et al., 2019; Burke & Stephens, 2017). Table 2 below describes the intended outcomes for each energy democracy goal.

Table 2
Energy Democracy Goals and Intended Outcomes

Goals for Energy Democracy	Intended Outcomes
Resist the dominant energy agenda	• Fossil fuels remain in the ground. • Expansion of fossil fuel infrastructure and development of extreme forms of energy and extraction stop. • Land grabbing for large-scale renewables ceases. • Fossil fuel subsidies end. • Privatization and marketization of the energy sector halt. • Undermining of climate protection stops. • The most dependent on fossil fuel industries are protected, especially labour. • Public resources shift away from fossil fuels. • Public legitimacy of the fossil fuel industry is reduced. • New social alliances are created (e.g., unions, environmental groups, municipalities).

Reclaim the energy sector	• Energy corporations democratize and localize. • Social/public control of energy production and consumption normalizes. • Parts of the energy sector that have been privatized or marketized return to public control. • Principles of public interest within and democratic control over publicly-owned energy companies is restored. • New energy companies, ownership models and financial investment systems under social and public control develop.
Restructure the energy sector	• Energy sector moves away from the profit motive. • Energy access and assets are shared broadly and community wealth-building is supported. • Energy systems are governed as a commons. • Community power and capacity to control energy systems strengthen. • Emphasis shifts from growth to wellbeing, sufficiency and environmental quality. • Economic and political power is decentralized and distributed. • Capacity for energy planning increases. • Geopolitics of energy supports global cooperation and peace over competition and conflict. • Solidarity, inclusion and open, democratic participation advances. • Workers, low-income communities and communities of colour hold central positions within energy systems. • An understanding of the energy sector as interdependent within the natural environment pervades.

Adapted from Burke and Stephens (2017).

These three broad goals will inform the analysis to understand how youth have engaged with the low-carbon energy transition.

2.6.3 Energy Justice

Energy justice has emerged as a critical area of inquiry within the broader field of energy research (Jenkins et al., 2016). The central belief of energy justice is that all people should have access to sustainable, affordable, and reliable energy, and also be able to participate in the decision-making processes related to that energy (Carley & Konisky, 2020). Energy justice seeks to apply justice principles to energy research and recognizes the disproportionate impacts of the current energy system (Bennear, 2022; Jenkins et al., 2016). Renewable energy technologies play a crucial role in promoting broader social equity, and achieving a 'just transition' requires inclusive institutional arrangements that ensure equity throughout the process (Johnson et al., 2020).

It is widely stated that there are three tenets of energy justice: distributional, procedural, and recognition, although others have been described. Distributional justice examines the distribution of benefits and burdens of the energy system to different populations, particularly the impact of the energy system on marginalized groups (Carley & Konisky, 2020). It is concerned with both the physical energy infrastructure and energy services (Jenkins et al., 2016). An example of distributional justice is the physical location of energy infrastructure, such as the placement of wind projects, for which the benefits do not always remain with residents near the production site (Rand & Hoen, 2017). There can be tensions between rural communities and urban environments, as rural communities are on the

frontlines of renewable energy developments. However, many of the benefits are felt by urban residents who consume the resulting energy (Rand & Hoen, 2017).

Energy poverty is also an example of distributional injustice that has been well-documented, focusing on the energy services side of the energy system. Generally, in the literature, energy poverty refers to the disproportionate burden of energy costs faced by households (Bednar & Reames, 2020; Bennear, 2022). This could mean a household spending a greater percentage of its income to meet its energy needs and forgoing other essentials like food and medicine (Bednar & Reames, 2020). Energy poverty is linked to several factors, including gender, age, housing, socio-economic status and race/ethnicity (Bednar & Reames, 2020). There is concern that with increased penetration of renewable energy, energy costs may rise, and lower-income households will spend a greater portion of their income on energy expenses (Bennear, 2022). This is one of many examples of how the energy transition can have impacts on already vulnerable groups.

The second tenet is procedural justice, which focuses on who is involved in the decision-making process (Carley & Konisky, 2020; Jenkins et al., 2016). Specifically, who gets to be involved and how they are engaged during energy procedures, and who is excluded. This tenet heavily informs my research on energy justice as I seek to understand how youth have been involved in the decision-making processes related to the low-carbon energy transition. Procedural justice impacts distributional justice, as it is the decision-making process that affects how benefits and burdens are distributed (Jenkins et al., 2016). An example of this is that many decision-making processes are not inclusive of the communities that will host the energy infrastructure, such as wind turbine siting in Canada (Carley & Konisky, 2020).

The last tenet is recognition justice. Recognition justice is a concept that extends beyond the participation of individuals and instead focuses on the impact those individuals have in the decision-making process (Jenkins et al., 2016). There is some overlap here with procedural justice, but recognition justice acknowledges explicitly the historical and ongoing oppression of specific groups and actively works to counteract them (Carley & Konisky, 2020). Youth are a group that has been largely excluded from critical decision-making processes (Ritchie, 2021). Understanding their role from the perspective of recognition justice is crucial for determining if the inclusion of youth is meaningful.

2.6.4 Intersectional Theory

Intersectionality was first coined in 1989 by Kimberlié W. Crenshaw to describe the way gender and race interact to influence the experiences faced by Black women, building on other work by Black female scholars (Crenshaw, 1989). Intersectionality has its roots in Black feminist scholarship (Nash, 2008). Feminism is a movement that aims to identify and address oppression, sexism, and racism, acknowledging the lack of gender equity and recognizing the need for change (Hooks, 2000; Stephens & Allen, 2021). Intersectionality and feminism are aligned in energy research by aiming to go beyond simply understanding gender inequalities and helping us to interrogate the structures of power that underlie the energy system (Bell et al., 2020).

An intersectional lens offers critique and remedy to frameworks like energy justice, which are based on colonial and masculinist assumptions (Sovacool et al., 2023). Intersectional theory offers a deeper understanding of the complexity of power within energy transitions and the interrelated nature of the socio-technical energy system. It also describes a way of viewing

how people are shaped by overlapping identities, such as race, gender, age, class, sexuality, geography and more, all within the context of the larger system and structures of power (Mejía-Montero et al., 2023). It challenged existing feminist discourses and the myth of a "universal womanhood" (Mollett & Faria, 2018, p.574).

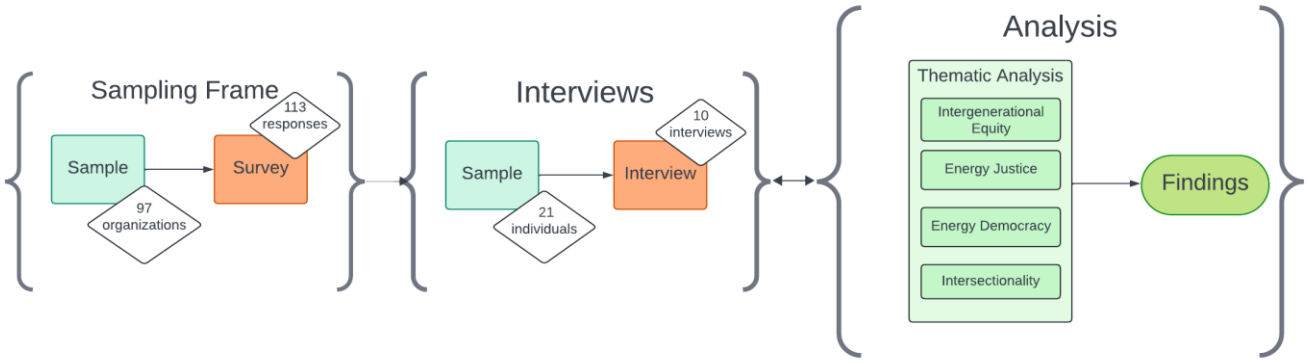
Intersectionality is important here as a valuable tool to develop a more holistic understanding of energy systems and energy justice. The multiplicity of identities and experiences must be considered to move towards a more just energy future (Mejía-Montero et al., 2023). The underlying idea of intersectional theory is to uplift the voices of those who have been marginalized and center those who have been ignored (Nash, 2008).

Intersectionality helps us understand complexity in relation to individuals and the systems of power they live within. It can be a useful theoretical tool for examining the layered identities of individuals and communities, as well as the social outcomes of those identities (Mejía-Montero et al., 2023). It is also used to interrogate larger political and structural inequalities (Cho et al., 2013). Qualitative methodology based on critical intersectionality is key to interrogating the power relations involved (Ryder, 2018). It allows us to examine groups that are sometimes seen as homogeneous, such as youth, through a more nuanced lens (Ryder, 2018). As stated by Rodó-de-Zárate (2019), youth are not only defined by their age. Young people in climate action work are also engaged with ideas of intersectionality (Grosse & Mark, 2020). My research seeks to understand how youth from diverse backgrounds may experience engagement with the low-carbon energy transition in various ways. This includes their simultaneous experiences with both marginalization and privilege within the energy system (Razzante et al., 2021).

Chapter 3: Methodology

I used qualitative methods to achieve my research objectives. Qualitative methods are particularly suitable in the field of human geography to gain an in-depth understanding of people's experiences. (Dunn, 2021; Hay & Cope, 2021). Qualitative methods enable the collection of rich, experiential data, providing deep insight into people's lives (Hay & Cope, 2021). Figure 1 illustrates the process that was undertaken in this research to seek answers to the research question and address my objectives.

Figure 1
Methods Process



As I looked to understand how youth have engaged with the Canadian low-carbon energy transition and any challenges/opportunities they may have encountered, I used the frameworks of intergenerational equity, energy justice, energy democracy, and intersectionality. These frameworks informed my research objectives and methods, from sampling and data collection to thematic analysis and interpretation.

First, I relied on previous work from Canadian Heritage (2021), Jaradat et al. (2024) and Rodó-de-Zárate (2017) to define my research scope and describe the landscape in which youth

operate within the Canadian low-carbon energy transition. Their work helped inform the ages used to define youth and the gap that exists in examining young people in energy systems.

Next, I created a sampling frame of organizations related to youth and the energy transition in Canada. This sample of 97 organizations and their networks was used to recruit youth for semi-structured interviews. A survey was sent to contacts from the 97 organizations and also posted on social media sites, LinkedIn and Instagram, to solicit participants. Based on self-identified relevant experiences and diversity characteristics in the survey, youth were selected for interviews. From the email and social media recruitment, 113 responses were received. At this stage, twenty-one individuals expressed interest in participating in the in-depth interviews; however, in the end, only 10 interviews were undertaken, given non-responses from 11 of the potential participants. Semi-structured interviews were conducted, and the content was coded for relevant themes based on the theoretical frameworks described above.

3.1 Research Scope

The research scope describes how I defined the concept of youth. This term has been used in different ways, within various contexts, so it is essential to define its usage in the context of this thesis clearly.

3.1.1 Youth

Jaradat et al. (2024) found that youth are mainly characterized as those between the ages of 15 and 35. I chose to engage with youth aged 18-35 in this study. Youth are not defined only by their age, but age is an integral part of someone's life experience (Rodó-de-Zárate, 2017). The aim was to reach youth from diverse backgrounds across Canada. I examined youth

aged 18 and older[1] in my research, as the electricity workforce in Canada is highly educated and thus is more likely to be above the age of 18. In 2022, more than 94% of workers in the core electricity occupations[2] had at least some post-secondary education (Electricity Human Resources Canada, 2023). The electricity sector is part of the energy sector, but much of the growth will be in the electricity sector as we transition to renewable energy technologies. The growth of the electricity sector workforce has outpaced that of other sectors in Canada since 2017 (Electricity Human Resources Canada, 2023). Youth aged 18 and older are a relevant group within the electricity workforce.

Other reasons for including youth from ages 30 to 35 were that youth hold multiple identities that may impact the opportunities or barriers encountered. For example, youth in northern and rural areas of Canada experience more difficulty transitioning from high school to postsecondary education, and those who attend take longer to do so (Hango, Zarifa, Pizarro Milian, et al., 2021). The location of residence for youth in northern and rural Canada impacts access to many post-secondary options (Hango, Zarifa, Pizarro Milian, et al., 2021). Northern and rural regions also offer fewer employment opportunities, decreasing the chance for individuals to be employed in fields aligned with their educational background (Hango, Zarifa, & Seward, 2021). Youth who have faced these challenges may be older before they can participate in the energy transition, when compared to those who do not face these barriers. Based on a labour force survey, young people under the age of 25 are present in the electricity

[1] Youth under 18 also require a parental consent form and additional time and resources when involved in research.

[2] These core occupation groups are managers and supervisors, engineers, technicians and technologists, information, and communication technology (ICT) and the trades.

sector at a much lower rate than the national average across all sectors, at 4% instead of 14% (Electricity Human Resources Canada, 2019). However, when looking at those aged 25 to 34, that number jumps to 25% compared to the national average of 21%. Many people working in the electricity sector are between the ages of 25 and 34, and I felt it was important to include them in the sample. This intersectional understanding of age and barriers to opportunities also informs my research.

I started with a sample of youth-oriented organizations involved in the Canadian energy transition. Youth-led organizations provide a space for youth to develop skills and participate in initiatives that impact their communities (Badr & Chebib, 2023). For example, the Sierra Youth Coalition in Canada acts as a network and resource for youth who are interested in environmental and social justice issues (Clarke & Dougherty, 2010). By using relevant organizations as the sampling frame, I was able to reach youth from diverse backgrounds involved in the energy transition more effectively.

3.2 Ethics

Prior to data collection, I submitted a Human Ethics application to the UVic Human Research Ethics Board. The application, 23-0585, was approved on August 16th, 2024. All research was conducted following principles outlined by the UVic Human Research Ethics Board. This includes written informed consent for both the survey and the interview (see Appendix A), as well as ongoing verbal consent obtained during the interviews. As part of the ethics application, I included recruitment materials that explicitly state my positionality in relation to the research. I felt it was essential to be clear about who I am and how that might impact the participants in my ethics application.

3.2.1 Positionality

The inclusion of a positionality statement is important to share how my identity and perspectives may have impacted my interactions with potential interviewees and my interpretation of their stories. It was vital for me to be clear about my position, as I am an active participant in my research, and my identity impacts my relationship with the research participants (Bukamal, 2022). I felt I would be considered an insider among some of the youth, as I am a young, racialized woman. However, as a former federal employee and current university researcher, I thought I could also be considered an outsider in some ways. Understanding these positions and how participants may view them was crucial for how I approach building a rapport with participants (Bukamal, 2022; Njeri, 2021). A version of the statement below was included in my recruitment materials. This allowed for a clearer discussion of the ethical implications of my role as the researcher.

Positionality Statement:

> I am a youth who has experience working in government within the clean energy sector. I decided to return to school and pursue a Master's degree because I was interested in delving deeper into issues of social justice related to the low-carbon energy transition. As a young, racialized woman myself, I understand the importance of diverse youth voices in the Canadian energy sector. To gain a thorough understanding of youth involvement in the energy transition, we must hear from youth with diverse backgrounds and experiences.

This statement was included in all recruitment materials, including emails sent to organizations and individuals to solicit participants.

3.3 Sampling

To recruit interview participants, I developed a sample of 97 youth-oriented organizations with an interest in the energy sector. I adapted the approach employed by Hoicka et al. (2022) by drawing first from their original sample of 40 environmental youth organizations. Hoicka et al. (2022) identified these organizations by drawing on five environmental organization directories: members of the Canada Climate Action Network, the list of environmental organizations in Canada on Wikipedia, members of Environment Funders Canada, Environment and Climate Change Canada funding programs, and the Youth Environment Organizations Database. They acknowledge that these directories may not include all potential environmental youth-led organizations in Canada.

Participants in stakeholder workshops held by Hoicka et al. (2022) also noted that youth-led organizations are dynamic and ephemeral. They indicated growth in this area is exponential and suggested other groups, such as university public interest research groups, local climate councils, university divestment movements, and youth-led policy groups, as well as community organizations such as YMCA and YWCA. They also indicated the database Grant Connect as another area to search for youth-led organizations.

With this understanding, I sought to identify additional youth-oriented organizations that had emerged following the publication of Hoicka et al. (2022). With the learnings from Hoicka et al. (2022), I searched for the organization types listed above and searched the Grant Connect database, in addition to searching the five databases used by Hoicka et al. (2022) to develop my sampling frame. Snowball sampling was also used, as I asked organizations to forward the recruitment email to other relevant organizations or individuals.

My goal was to build a diverse list of organizations in Canada. The development of this initial sampling frame ensured that there were groups not only focused on youth but also youth from diverse and intersecting backgrounds (Roscoe, 2021); with the understanding that there are underrepresented groups, including women, people with disabilities, racialized people, new immigrants, and Indigenous people, in the electricity sector (Electricity Human Resources Canada, 2020b). I also made efforts to continually review the overall sample list of organizations and conduct specific searches for organizations related to particular underrepresented groups in the sector. Some of these searches did not yield any results, for example, youth energy groups specifically run by or geared towards young Black Canadians. Many searches were also not needed, as organizations focused on women and Indigenous youth were found through the initial search.

These organizations were filtered, and only those mentioning youth and low-carbon energy in Canada were included in the sample frame. Youth in this context were defined through publicly available information, as outlined in mission statements and websites. Energy-related meant searching for mentions of activities, goals, and materials related to the energy transition, energy policy, and decarbonization. The final terms are listed in Table 3. Organizations for youth under 18 were removed.

Table 3
Relevant Terms to Filter Sample Organizations

Terms to Filter Sample Organizations	
Energy	Youth
Decarbonization	Young people
Low-carbon economy	Student*
“Just Transition”	
“Net-zero”	

Table 4, adapted from Hoicka et al. (2022), presents the type of website information verified for relevant terms to confirm inclusion in the sample.

Table 4
Website Information to Verify for Relevant Terms

Website information to check
1. About/Vision/Mission section.
2. Our Work/What We Do sections.
3. Hiring/work for us section (for mentions of youth).
4. Publications/news releases section by title scanning for what could connect to youth/energy transition.
5. Engagement pages such as surveys, events, etc.
6. Any other website sections that might provide helpful information.

Adapted from Hoicka et al. (2022).

In summary, 33 of the 40 organizations from the Hoicka et al. (2022) sample of youth organizations were included. The seven that were removed were organizations that did not mention energy but instead were mainly those focused purely on ecosystem conservation/restoration, or that no longer existed. In total, 97 organizations were identified, comprising 33 from Hoicka et al. (2022) and the remaining 64 organizations were found through searches of the five databases outlined above. This sample frame was developed from July to September 2024.

3.4 Recruitment

From this initial sample frame, I gathered contact information of the organizations from publicly available sources and sent a recruitment email with a link to the survey. Through this

process, I learned that some additional organizations were no longer in operation or had no public contact information. Therefore, out of the sample of 97 organizations, a total of 72 organizations were contacted. Multiple emails were sent to different individuals within the organization if their contact information was available. Social media platforms, LinkedIn and Instagram, were also used to solicit participants for the survey. A social media post (see Appendix B) linking to the recruitment survey was posted to both platforms in September 2024 and April 2025. Snowball sampling is useful to identify potential participants from those who are known to fit the inclusion criteria (Hay & Cope, 2021). The snowball sampling was done using the email sent out to organizations to solicit survey participants. The email included a note for individuals to forward it to their networks and a survey link to other relevant individuals.

A separate email was sent to the identified Indigenous organizations. These emails included additional information and an opportunity for continued dialogue in the research process. It also included a more in-depth statement about my positionality as a young, racialized woman concerning the research. All emails contained information about the research objectives and a positionality statement from me, as the researcher in this thesis project.

3.5 Eligibility/Recruitment Survey

An initial eligibility to participate recruitment survey was developed to screen potential interview participants and determine eligibility. It was designed with the theoretical frameworks in mind. Mainly, ideas of intersectionality were used to understand best how to ask individuals about their identity. It provided an additional step that allowed me to gain more information about participants before selecting them for interviews. The survey included

questions related to individual diversity characteristics as well as questions to confirm that interested youth have engaged with the low-carbon energy transition. The survey asked for gender identity, racial identity, Indigenous identity, disability and immigration status. The survey referenced racial and gender categories used by Statistics Canada and used Statistics Canada's definitions for the terms: immigrant and person with a disability. The term immigrant was defined as a person who is, or who has ever been, a landed immigrant or permanent resident. Such a person has been granted the right to live in Canada permanently by immigration authorities. Immigrants who have obtained Canadian citizenship by naturalization are included in this group (Statistics Canada, 2016). Further information is provided in Table 5 below on the racial and gender categories used. A person with a disability is "any person who has a long-term, recurring physical, mental, sensory, psychiatric, or learning impairment and who considers themselves to be disadvantaged in employment by reason of that impairment" (Statistics Canada, 2019).

The recruitment survey started with asking about the two inclusion criteria: whether their age was between 18 and 35, and their past involvement with the Canadian low-carbon energy transition. Then I asked for contact information, willingness to participate in an interview, geographic location and information on diversity according to characteristics of age, gender, Indigenous identity, disability, immigrant status, and racial identity, as seen in Table 5.

Table 5
Diversity Characteristics for Interview Sampling

Diversity Characteristics	**Categories**
Gender	Men, Women, Gender diverse
Indigenous Identity	Inuit, Metis, First Nation
Racial Identity	White, South Asian (e.g., East Indian, Pakistani, Sri Lankan), Chinese, Black, Filipino, Arab, Latin American, Southeast Asian (e.g.,

	Vietnamese, Cambodian, Laotian, Thai), West Asian (e.g., Iranian, Afghan), Korean, Japanese, Other group—specify
Disability	Person with a disability, Person without a disability
Immigration Status	Immigrant, non-immigrant
Age	18-35

The survey was hosted on RedCap software (Harris et al., 2009) through the University of Victoria. A total of 113 responses were received from the email and social media recruitment; 57 of the responses were fully completed, and 21 individuals from this sample expressed willingness to participate in an interview. The final sample of interviews was 10; however, 11 individuals did not respond to participate.

3.6 Interview sample

The youth who participated reflected diversity in a range of different markers. The lens of intersectionality and purposive sampling ensured the sampling of interviewees from diverse backgrounds related to age, province/territory, gender, racial identity, disability and immigration status. Purposive sampling is a form of inclusive sampling, as it can address demographic gaps in the sampling frame (Roscoe, 2021). Specifically, a maximum variation purposive sample as described by Palinkas et al. (2015) was used to ensure the broadest range of data, based on the diversity characteristics, knowing that there are underrepresented groups, including women, gender diverse people, people with disabilities, racialized people, new immigrants, and Indigenous people, in the electricity sector (Electricity Human Resources Canada, 2020b, 2023; Natural Resources Canada, 2023). The goal of maximum variation sampling is to include a high diversity of participants (Hay & Cope, 2021). This allows for analysis of variation from the heterogeneous sample and aligns with the idea of relationality

within intersectionality scholarship (Windsong, 2018). Identity categories, like the ones described above, are systematically related to each other, and examining both privilege and oppression and their interrelated nature is essential to understanding the experiences of diverse individuals (Windsong, 2018).

The sample characteristics of interviewees are shown in Tables 5 and 6. These characteristics were cross-referenced with gender to identify men, women and gender diverse people for each of the other diversity characteristics. In Canada, there are about 100.8K transgender and non-binary people as of 2021; this is around 0.33% of the population in Canada of people aged 15 and older (Statistics Canada, 2022). Therefore, I did not expect gender diverse individuals for each category, but have included this gender category in the matrix. Other diversity characteristics are included, and categories of non-marginalized individuals are included to see both privilege and marginalization as related to intersectionality theory. Table 6 shows gaps that appeared in the sample.

Table 6
Intersectional Identities of Interview Participants

Gender	Diversity Characteristics																							
	Indigenous			Non-racialized	Racialized											Disability		Immigration Status		Age				
	First Nations	Metis	Inuit	White	Black	South Asian	Chinese	Filipino	Arab	Latin American	Southeast Asian	West Asian	Korean	Japanese	Other	Disability	No disability	Immigrant	Born in Canada	18-20	21-23	24-26	27-29	30-32	33-35
Men				2		1											3	1	2		1	1		1	
Women	1			2			3			1							6	1	5	1		1	3		1
Gender Diverse						1									1	1			1				1		

N=10*
*Because individuals can identify with more than one racial category, only numbers in the Disability, Immigration Status, and Age columns will add to 10

As eligible participants were recruited from the survey, they were added to the matrix. If they filled a specific gap, they were included in the interview sample, and an interview request was sent to them. Location was also a consideration. It was not prioritized in the matrix, but if an individual was from a province or region not yet represented, they were included in the sample. This was done for all interview participants.

3.7 Interviews

In total, 10 in-depth interviews were conducted with youth participants who expressed interest in participating and responded to the interview request. The invited participants received an email with the informed consent form and additional information. Indigenous participants (n=1) received a different version of the email containing more details and an invitation for questions before the interview. Interviews allowed for the collection of a diverse range of meanings, opinions, and experiences (Dunn, 2021; Hay & Cope, 2021). The interviews were also a means to gather in-depth knowledge of complex experiences (Hay & Cope, 2021). The interviews were semi-structured with several open-ended questions, which allowed for some guidance from me as the researcher. Still, they provided space for the interviewees to deviate from the interview guide and share insights that were important to them (Hay & Cope, 2021).

The interview guide included questions about youth experiences, challenges, barriers, and actions taken by youth to understand the challenges and opportunities related to engaging with the low-carbon energy transition. The interview guide was, in part, informed by the intersectional interview guide developed by Ryder (2018), who examined power and justice, specifically to understand the procedural justice of unconventional oil and gas development in

Colorado. The interview guide, seen in Appendix B, is also informed by the literature review, specifically the frameworks of intergenerational equity, energy justice, energy democracy, and intersectionality.

Memos were created before each interview to include detailed information from the eligibility to participate recruitment survey (such as the participants' past experiences), which helped guide the interview. These memos were expanded following each interview to summarize key insights and provide an opportunity for self-reflection (Hay & Cope, 2021). They are a space to critically review my role in the research process and begin to make linkages between the interview data and the frameworks. Interviews lasted between 25 minutes and 1 hour and 15 minutes.

Transcripts were generated automatically using Microsoft Teams or Microsoft Word Dictation, depending on whether the interviewees consented to have their video recorded. Each one was verified with the audio file for accuracy and reviewed thoroughly. Interview transcripts were sent back to participants for verification or member checking prior to analysis (Hagens et al., 2009; Rowlands, 2021). Participants verified the accuracy of their transcriptions over email and could choose to withdraw their data at this point.

Interview transcript review (ITR) enables participants to manage their sensitive information (Rowlands, 2021). Although the practice of using ITR has both benefits and concerns (Hagens et al., 2009; Rowlands, 2021), I felt the benefits outweighed any concerns for this work. By allowing interviewees to review their transcripts, they can better exercise their right to remove their data if they so choose (Hagens et al., 2009). Once verified, the transcripts were uploaded to NVivo (14.23.3) and became amalgamated and anonymized. Data withdrawal

was no longer possible at this point; this was communicated to participants multiple times and laid out in the consent process.

3.8 Data Analysis

The literature review highlighted the four frameworks that informed the analysis of the interview data. Energy justice, and the three tenets: distributional, procedural and recognition, described were primarily used to identify the areas in which youth have faced injustices, as well as any injustices they perceived within the Canadian energy transition. The three energy justice tenets were employed as deductive analytic codes when coding interview transcripts. Energy democracy and the three main goals described by Burke and Stephens (2017) were used to understand the actions described by interviewees. These were included as analytic codes in a codebook (Hay & Cope, 2021). Intergenerational equity was used to examine elements of youth inclusion and depict how youth perceived the current representation of their peers. Lastly, intersectionality provided the framework to develop analytic codes related to the different experiences of youth based on their identities. For example, these looked like the types of barriers youth faced and experiences of privilege and/or oppression. An intersectional lens was also used to understand how youth with diverse backgrounds may experience and engage with the low-carbon energy transition in different ways.

Coding was completed using the computer-aided qualitative data analysis software, NVivo (14.23.3), and, although a preliminary codebook was used, open coding was also conducted of the interview data (Braun & Clarke, 2006). Both deductive and inductive approaches were used when coding to draw on the theoretical frameworks of energy justice, energy democracy, intersectionality, and intergenerational equity, while also ensuring analytics

codes did not supersede the participants' description of their own unique experiences and insights (Braun & Clarke, 2006)

The six-phase process described by Braun and Clarke (2006) was used to undergo thematic analysis systematically and clearly. The first phase was to familiarize myself with the data. This was accomplished through the process of creating memos before and after the interviews. I also personally reviewed each transcript. Once uploaded to NVivo (14.23.3), I systematically went through each transcript once to familiarize myself and then began coding sections. The second phase involved generating the initial codes. As stated previously, many codes were developed deductively from the frameworks. However, some themes and ideas were revealed that did not already exist in the codebook. These were added and, through inductive coding, either added onto or amalgamated with an existing code or found not to be useful. The third phase was to identify themes; again, this was done through the frameworks, but additional themes were added based on the data, such as themes related to the motivations of participants to participate in the low-carbon energy transition. The process of coding was iterative, as coding was done on an ongoing basis as interviews were completed. The codebook was continually built upon, and constant reflection was conducted to improve the thematic analysis. A thematic chart, see Table 7, was developed to understand the themes better, how they fit together, and to visualize the data overall (Braun & Clarke, 2006). Phase four consisted of reviewing the themes and finalizing the codebook. The codebook included the themes shown in Table 7. Following several rounds of validation and reliability checks, the

emerging codes were integrated into the codebook and then applied in the interpretation of the data.

Table 7
Codebook Themes and Subthemes

Themes	Subthemes
Intergenerational Equity	Perceptions
	Contributions
	Opportunities
	Youth inclusion
	Barriers
	Intergenerational power relations
Energy Democracy	Resist
	Reclaim
	Restructure
Energy Justice	Distributional
	Procedural
	Recognition
Intersectionality	Oppression
	Privilege
	Benefits
	Relevance of identity
	diversity
Motivations	sense of justice
	interest
	giving back
	enact change
	cultural
	connection to nature
	connection to community
	career
	affected by impact
	climate anxiety

Phase five was completed with thematic charts. This phase consisted of defining and naming the themes. This was done with the thematic charts created from the data, developed based on the process described by Ritchie et al. (2003). These charts were built to summarize the coded phrases from each interview participant for each code. An example of a thematic chart for the theme is shown in Table 8. Table 8 shows the subtheme of opportunities, where I

coded how young people were involved in the energy transition. Working with the thematic charts, I could fully see the spread of data across the themes and identify any gaps or any areas where themes could be divided or amalgamated. It also allowed me to see the most pertinent extracts to use to provide the narrative story of my results and discussion.

Table 8
Example of a Thematic Chart

Subtheme:	**Academic**	**Organizations**	**Research**	**University Organization**	**Work**
Opportunities					
Participant: 1	There are classes in the departm ent, but nothing is offered to learn about this (energy)	Attended a competition held by the US Department of Energy, where university students compete to build single-family homes, homes for seniors, the most efficient house that uses solar, and a mock-up.	Working in a research lab I am helping with research, which is exciting and enjoyable, but I don't feel like I've made a significant impact Learn more in the research lab that classes don't cover	clubs on campus	As a young person, many internships, externships, and co-ops that allow you to be involved may not be available to mid-career individuals or existed then. Our generation has more opportunities to be involved in this thing (clean energy) Completed an externship with Energy Innovation Capital, a venture capital firm that invests in clean tech

Phase 6, as described by Braun and Clarke (2006), is the production of the final report. Writing was completed in the form of memos and informal notes alongside thematic analysis. As the findings of the research were written, I constantly referred back to the thematic charts

and data to further refine themes and respond to the research objectives. In the next chapter, I will discuss the findings from my thematic analysis.

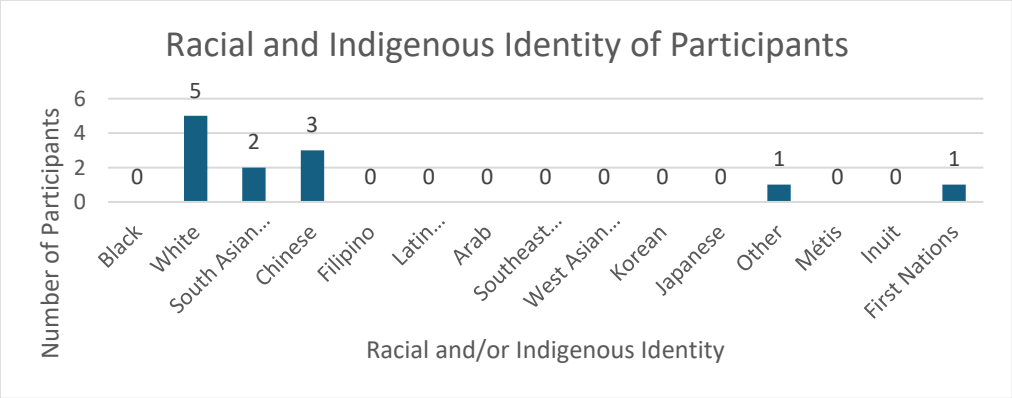
Chapter 4: Findings

This chapter presents the research findings. I begin by sharing the background characteristics of the sample in terms of diversity. The rest of the chapter is organized into four subsections, reflecting four frameworks: Intergenerational Equity, Energy Justice, Energy Democracy, and Intersectionality. In total, there were 10 participants from four different provinces. They ranged from age 20 to 35 (see Table 9). One participant identified as Indigenous, and five identified as racialized, as seen in Figure 2.

Table 9
List of Participants with Gender, Age and Province of Residence

Gender	Age	Province of Residence
man	22	BC
woman	28	BC
man	30	ON
woman	29	BC
man	26	ON
woman	35	MN
woman	20	QC
woman	25	ON
gender diverse	28	ON
woman	28	ON

Figure 2
Racial and Indigenous Identity of Participants



N=10*
*Numbers do not add to 10 as individuals can identify under more than one racial/Indigenous category

However, it is worth noting that this sample reflects some of the difficulties in working with youth organizations, which are inherently ephemeral (Hoicka et al., 2022). Youth organizations are created and disbanded every year, and this makes them difficult to reach out to. The lack of diversity also aligns with existing research on the makeup of the electricity sector, where women, racialized people, Indigenous people, people living with disabilities and newcomers to Canada are underrepresented, apart from the number of women respondents. (Electricity Human Resources Canada, 2023). However, research has shown that women are more likely to be aware of environmental issues and engage in pro-environmental behaviour (Allen et al., 2019; Emmons Allison et al., 2019). This aligns with the responses I received. Among those who disclosed their gender, 65% of respondents identified as women, while 23% identified as men, and 12% as gender diverse. Two of the participants were immigrants to Canada, and one was a person living with a disability. The following sections share the findings derived from interviews with these participants.

4.1 Intergenerational Equity

Intergenerational equity served as an overarching framework across all participants and their data, helping me to respond to the first research objective, better understanding how young people currently operate as actors within the Canadian energy transition. Intergenerational equity is concerned with the right of future generations to benefit from the same resources as past generations (Summers & Smith, 2014). Through the interviews, many themes were identified in relation to this overarching framework. The participants talked about how they have been involved so far, the qualities they have to offer, what barriers they have faced and how they saw future youth inclusion in the energy transition.

4.1.1 Youth Are Involved in a Variety of Spaces in the Energy Transition

The participants shared various opportunities that allowed them to participate in the energy transition, including academic opportunities, research, university organizations, off-campus organizations, and employment. Most participants found themselves first involved through academic settings, and then through work experiences, with fewer engaging through research or other organizations. There is a broad spectrum of ways young people can be involved with the energy transition. Eight of the participants held at least an undergraduate degree, with the remaining two on track to receive one. Although there are many ways to be involved, my findings align with existing data on the highly educated nature of the electricity sector (Electricity Human Resources Canada, 2019).

4.1.2 Youth Bring a New Perspective to the Energy Transition

Through the different opportunities youth have had, they have contributed a lot of knowledge, experience and skills to advancing the energy transition. Young people not only bring practical skills, but they also provide a unique perspective and enthusiasm. Many participants emphasized the enthusiasm they bring as young people. However, enthusiasm is not the only thing they contribute; it can be an important factor in working in the energy transition, a field that can be very pessimistic. One participant illustrated this point well, saying:

> If you're new, you're excited about these opportunities, you want new challenges and you might be able to bring in these new fresh perspectives that different generations, different ages of people might not be able to experience *(Participant, Interviewed November 28th).*

This participant emphasized how, being new, you tend to be excited about the new opportunities available to you. It may allow you to bring in new experiences that are unique to

your life stage. Similarly, others also emphasized how their age allows them, perhaps, to have an open mind and new perspectives. Another participant said:

> I feel like sometimes people are stuck in like the old ways. Like this is the way it is, and this is what it has to be. But our younger generation has a lot of new and fresh ideas, of kind of like challenging the norm and like, challenging the way that things have been for all these years. So, I think their input and knowledge would be really useful to kind of expand and improve what we already have going on *(Participant, Interviewed January 31st).*

This participant underscores the importance of fresh perspectives that youth can bring to contemporary issues, questioning established norms. Research has shown that young people are more adept at breaking away from traditional structures and challenging the status quo (Dougherty & Clarke, 2017). The participants' experiences are supported by broader research; they know that they can examine and critique existing processes because they are young and new to the field. Young people have a unique capacity for innovation, a trait that is important when we consider the level of innovation required to move towards a low-carbon energy transition. When young people are empowered to contribute in meaningful ways, they are better positioned to address global issues, yielding benefits to the larger society (Bastien & Homasote, 2017; Dougherty & Clarke, 2017; Ho et al., 2015).

4.1.3 Youth Continue to Face Barriers When Working in the Energy Transition

Despite these valuable contributions, young people continue to face numerous challenges in their involvement in the Canadian energy transition. The participants discussed a wide range of barriers they faced. These ranged from challenges related to their age, lack of education, to feeling like they are not taken seriously, and to imposter syndrome. This reflects

much of what has been shown in the literature, where young people continue to experience challenges even though they are involved in meaningful work in the climate movement (Grosse & Mark, 2020; Sloan Morgan et al., 2023). One of the main barriers raised by participants was the education required to participate in the energy transition. One participant stated:

> It became very challenging to break into the field…it would have been a career pivot for me at that point… And this is a year ago when I was kind of contemplating whether or not I should leave my job or kind of stay in [my current field], and so my involvement was really limited because I literally couldn't find an avenue to benefit the energy transition and that is why I decided to do the degree, because then I could sort of make some contribution and then hopefully make some contributions as soon as I graduate *(Participant, Interviewed November 12th).*

The lack of ability to enter the workforce without educational qualifications speaks to the nature of the electricity and renewable energy sector. The workforce is highly skilled, and most roles require some form of post-secondary education (Electricity Human Resources Canada, 2019). Post-secondary education is not always accessible to young people. As I have discussed previously, many young people in rural and northern communities face greater challenges in accessing higher education (Hango, Zarifa, & Seward, 2021; Michalski et al., 2017).

Another barrier raised by many of the young people that I interviewed was that they felt they were sometimes not taken seriously. This participant noted the following:

> People are a little bit less willing to listen to me. You know, if I have an idea, then maybe we'll just kind of move past it. But if someone else will repeat the same idea later, that's maybe a bit older or, you know, has a different identity than me, then suddenly they'll still start taking that idea into consideration. That has happened to me quite a few times… So, I'd say that's the biggest thing that I deal with is people just not listening to me as much as they do others *(Participant, Interviewed November 5th).*

This participant raised a point that is echoed often in the literature, where young people are not taken seriously, even when in positions where they have been given some influence or decision-making power. This has been widely discussed in the literature, acknowledging that young people are often used as symbols of the climate movement to demonstrate that organizers have incorporated youth voices. However, they are not included in a meaningful discussion (Sloan Morgan et al., 2023).

4.1.4 Inherent Responsibility of Youth and Climate Anxiety

Despite feelings of exclusion, young people feel compelled to participate in the energy transition. The inherent responsibility of young people was a recurring theme among participants. They talked about how they felt pressure to continue to work to advance the energy transition despite the many barriers they may face, many of them talking about the obligation they felt to support a future for themselves and future generations. One of the participants illustrated this sentiment during an interview, stating:

> I feel pressured to make sure that the work I'm doing right now is actually having an impact and it's going to have a lasting impact and in some ways it can be stressful like sometimes I do get overwhelmed by the extra pressure or feeling like everything that I do needs to be related to addressing a low carbon economy and how to achieve that or low carbon transition, feeling that time, crunch pressure *(Participant, Interviewed February 5th).*

Young people have often used this sense of their responsibility as a narrative tool in discussing the importance of young people's participation in decision-making. Youth have embraced the narrative of carrying a burden that has been unjustly placed upon them (Conner, 2023). This participant also touched on the element of feeling stressed and overwhelmed. As Galway and Field (2023) found in Canada, young people are suffering from high levels of anxiety

related to climate change. They say specifically that it is a result of the failures of adults, decision-makers and institutions, and their lack of action that leads to climate anxiety in young people. Another participant felt that more and more young people will be impacted by climate emotions, saying:

> Climate anxiety's real. I think climate anxiety is something that a lot of people are suffering with and it's going to start impacting more people as the problem becomes worse *(Participant, Interviewed Nov 12th).*

Although climate anxiety is prevalent, there may also be ways that it can motivate individuals and encourage them to seek avenues for young people to manage their emotions. There is growing evidence that feelings of climate anxiety can promote climate action (Bright & Eames, 2022; Galway & Field, 2023). This aligns with the experiences of participants who shared how climate anxiety has motivated them to work towards a low-carbon economy. For instance, one of the participants discussed how they were able to use some of their negative climate emotions as a form of motivation.

> I just try to do what I can… a few years ago, I was a bit depressed because of climate change and everything. So, it also kind of spurred some of the personal struggle, and [I] try to kind of use that [to] propel myself to do more *(Participant, Interviewed, November 27th).*

Participating in climate action can help young people manage difficult climate emotions (Galway & Field, 2023). Bright and Eames (2022) suggest that these emotions can be a catalyst for young people to become empowered to make change. This inherent responsibility that young people feel directly ties into the ideas of intergenerational equity. The participants have expressed feelings on responsibility and anxiety related to the future state of the world. As Galway and Field (2023) have expressed, feelings of climate anxiety can be combatted by

meaningful engagement with young people, mainly when supported by adult allies who acknowledge intergenerational inequities.

4.1.5 Diverse Motivations of Youth Participation

I believe it is essential to understand why young people, particularly those from diverse backgrounds, are drawn to this field. Of the ten participants, only two cited career benefits as a motivation for involvement in this work, and even then, it was not their primary motivation. For these young people from diverse backgrounds, motivation varies. Many of them discussed feeling affected by the impacts of climate change as a motivating factor. At the same time, others raised points about feeling an obligation to their communities or because of a connection to nature itself. For some, it was an interest in the technologies and renewable energy solutions themselves. One of the participants even talked about finding motivation in doing something that contributed positively to their communities, and feeling like their work has an impact, stating:

> Being able to work in the energy space for me is really important because I do believe that, you know, we're at work 8 hours a day…having meaning and impact in the job that I do is really important and so [to] be able to contribute to something where I find that I'm adding value but that there was an impact on the communities that I live in that I work with is really important to me *(Participant, Interviewed November 28th).*

This was not a unique sentiment among the participants. Many of them described feeling motivated by knowing that their work is important and making a difference. One Indigenous participant shared their personal feelings about why the connection to community is linked to their work. They state:

> It's important to me [to do this work] …. I'm an Indigenous person…and you know, they have a lower standard of living than I would say the average non-Indigenous Canadian. I've always been very passionate to try through my work address that inequality and I kind of stumbled into clean energy… [I] realize[d] that that's one of the biggest impacts that I could have through my work…It's just making sure that… everybody in BC, all Indigenous communities, will have reliable, secure energy *(Participant, Interviewed November 5th).*

Indigenous youth are leading discussions on climate that are rooted in connections to land, water, and their communities (Sloan Morgan, 2020). I believe knowing what drives young people from different backgrounds to participate is important. Young people, like others, can feel demoralized when their work is not taken into consideration (Galway & Field, 2023). We must understand how to keep diverse young people engaged, and in the electricity sector in Canada, which needs young workers, especially those from underrepresented groups; young people must be recruited and retained (Electricity Human Resources Canada, 2020a).

4.1.6 Youth Inclusion as We Advance the Low-Carbon Energy Transition

Many of the participants that I interviewed brought up the idea that things are getting better, but we are not quite there yet. They discussed how they have seen many positive changes and movements, but progress has been too slow, and they want to see more innovation and faster changes. Regarding youth inclusion and representation, a participant stated:

> You know, if we're approaching it from, like, who's representing our government, I would say [representation is] probably not [enough]. But I would also say that who's representing our new cohort of engineers and scientists and policymakers and, people working towards it as like the newly educated cohort perhaps [it's] quite high *(Participant, Interviewed November 12th).*

Others echoed this, as young people are getting educated and entering the workforce, they will continue to participate at higher levels. Education is an essential factor in enabling young people to participate in the energy transition.

Participants were also asked how youth inclusion should take place in the future. Participants identified the many avenues for effectively involving young people in the energy transition. These ideas spanned increased consultations and dialogue, as well as expanded workplace and educational opportunities. Education was an important factor, raised by six of the participants. For instance, according to one participant:

> I think it's also important in the early stages, elementary school, high school to kind of have opportunities for those kids to know, what careers are out there and what support systems are there for them too. Cause you're kind of siloed then, and it's hard to make a decision when you're 17 years old. Especially if you don't have the support systems or your parents are telling you to do something else *(Participant, Interviewed January 31st).*

Another participant echoed this sentiment, saying in their work:

> That's why I try to get into the schools as much as possible to say I'm not that much older than you and you could have this job *(Participant, Interviewed March 12th).*

Participants emphasized the idea of education, from a young age, as being essential to engaging young people. This is especially important for young women, who often lack exposure to careers in the energy sector through formal outreach like job fairs and career counselling (Baruah & Biskupski-Mujanovic, 2021).

Jaradat et al. (2024) found that most research examining young people as energy actors has focused on education. They emphasized that education must include broader perspectives

and go beyond typical science education that tends to focus on energy technologies. This echoes the sentiments shared by participants in the interviews, with one participant specifically discussing topics related to their work in schools, and another highlighting the need for interdisciplinary conversations. As one participant noted:

> Educating[youth] on whatever other considerations are necessary, kind of putting in that, like the economic and social and technical engineering side, so whatever conversations and ideas they have, they kind of have that context *(Participant, Interviewed January 22nd).*

Education is important for young people, but participants also raised the importance of having dialogue between young people and older generations. Providing the space for young people to influence policy and decision-making was described as important to the participants. One participant highlighted this point well, stating:

> Gathering summits and events where it's both the youth and the older generation, they come together and have a conversation like, hey, this is the problem. Whether it's the youth telling the older [adults]…this is the problem, what are you doing about it and then the response will be interesting that hey we're doing this…And then to see whether the youth is like, is it enough though? …I want [to] see more of those conversations happening where, the youth is concerned and then they're trying to make this current generation responsible for if they're doing it the right way *(Participant, Interviewed December 10th).*

Given that the existence of youth councils and other forms of youth engagement currently does not always lead to direct influence on decision-making (Jaradat et al., 2024; Strzelecki, 2022). Many of the participants envisioned a form of youth inclusion that is accountable and leads to meaningful change.

From what has been discussed, there is still progress to be made in upholding intergenerational equity. The responsibility of equity lies with everyone, and as these diverse young people have revealed in these interviews, they are aware of the many skills and

experiences they bring to the table. It is up to adults to ensure their voices are heard, that they are provided with opportunities, and that they are supported so they can continue to be motivated in solving the complex problem of transitioning to a low-carbon economy in Canada (Galway & Field, 2023).

4.2 Energy Democracy

The energy democracy lens was developed by Burke and Stephens (2017), detailing three goals: resist, restructure and reclaim as a framework of policy tools to achieve energy democracy. I used this framework to code descriptions of the participant's work or work done by others.

4.2.1 No Expansion of Fossil Fuel Infrastructure

The participants mainly discussed the goal of resistance, particularly in relation to the specific goal of stopping the undermining of climate protection and expansion of fossil fuel infrastructure. One participant discussed a particular project, highlighting the importance of preventing the expansion of fossil fuel infrastructure.

> We have these old grain terminals that have been decommissioned for years and we're redoing them. We've got an investor and a builder that wants to revamp them into condos in a public space. The grain terminals were built in like [the] 50s or 60s, so there's no natural gas out to there. It's fully electric as it is now. The developers wanted to bring natural gas out to the facility because they figured condos are going in there, you just need natural gas… It was a member of my team, pushed back and said no, you don't need natural gas out there…We should not be running a gas line out there. It's not there now, so let's not use it again *(Participant, Interviewed March 12th).*

Often, building out fossil fuel infrastructure is the norm, and it requires intentional pushback to move away from the carbon-intensive systems (Seto et al., 2016). Another participant raised a

point that having youth involvement in decision-making may help further some of these energy democracy goals. They stated:

> I would say that if more youth are involved and more consultations with youth are involved, we probably wouldn't see Ontario building new natural gas generators or deciding to rip out wind turbines and stopping projects that have already happened or even with what Alberta's doing right now with their renewable energy investment projects. So, I don't know. I do think that if youth were involved, we'd see more support and greater funding towards and policy to help support you know, renewables and actually having a faster, quicker transition to a low carbon economy and system…. *(Participant, Interviewed February 5th).*

Young people have often been at the forefront of climate action movements (Conner, 2023). Young people are more likely to be against fossil fuel use and supportive of renewable energy technologies like wind and solar (Donald et al., 2022). Unsurprisingly, the participant quoted above believes that the views of young people would push decision makers towards a low-carbon energy transition.

4.2.2 Restructuring the Canadian Energy System

Several of the participants also discussed experiences from their work, related to the goal of restructuring, where the emphasis shifts from growth to wellbeing, sufficiency and environmental quality. According to one participant:

> I don't feel like I've had a very large impact yet in the work that I've done. I don't know, maybe others might have a different opinion, like from the outside looking in like maybe the grass is always greener kind of a thing, but it's the work that I find most impactful right now has been actually working on the ground in community with the front line community,… [a] First Nation[s] and kind of helping advocate and help them build up the capacity so that they can kind of get their jurisdiction and governance back. So that they can get more control over…petrochemical production and slow down extraction in the use of Petro chemicals, especially with plastics and fossil fuel refining, so hopefully I think the work that I do there will have a more lasting

> impact. So, I think that's definitely been the most impactful so far *(Participant, Interviewed February 5th).*

Another participant discussed the need for increased energy planning, another aspect of the goal of restructuring, saying:

> We provide funding to First Nations across the province on various different clean energy projects…. we provide basically very strong support up to whatever the community wants on their clean energy projects through community energy planning, project management… all the way up to support pathfinding…Whatever they need help with, we try to assist with *(Participant, Interviewed November 5th).*

These two participants, along with others, describe how they are actively working in areas to advance the goals of energy democracy.

4.2.3 Reclaiming Public Control of Energy Production

Although to a lesser extent, some of the participants did raise ideas related to the goal of reclaiming, specifically with the outcome of social/public control of energy production. One participant stated:

> Maybe not just coming from a complete like neoliberal [stance]. Thinking about, first of all, like holistic in a sense of like having multiple sources of energy to provide resilience and then also holistic in the sense that it's like not just corporations owning our energy *(Participant, Interviewed November 1st).*

This participant gets at the idea of both the goal of reclaiming and restructuring, expressing a desire for both distributed energy resources and also having control of energy resources relinquished from corporations (Allen et al., 2019).

This provides a preliminary look at how youth actions aligned with the goals of energy democracy. The participants, although not specifically prompted, understood the underlying goals of energy democracy and were working to achieve these goals of

energy democracy through their work. There is an opportunity to examine further how young people of diverse backgrounds have made strides towards energy democracy and how their values align with the core values of the energy democracy movement.

4.3 Energy Justice

Energy justice encompasses three tenets that describe the various aspects of social justice within the energy system (Jenkins et al., 2016). These include distributional, recognition and procedural justice. The participants identified many areas of work and aspects of the energy transition related to energy justice. I found the focus was mainly on distributional justice, while their discussions of their own experiences led to themes being identified related to recognition and procedural justice.

4.3.1 Distributional Justice

Many of the participants identified problems of distributional justice as important to their work. Specifically, eight of the ten participants raised points related to distributional justice in either their work or work they find important. As one of the participants highlighted:

> For me, it was here talking to communities and hearing about the energy inequality between, you know, people on grid and urban areas and remote mostly Indigenous communities and just learning about that and wanting to try and address that inequality through my work as well as just kind of realizing that energy is the background for almost every other initiative that could be taken in communities *(Participant, Interviewed November 5th).*

Participants were highly aware of the distributional injustices that take place in communities within Canada, and how some communities have not received the benefits of the energy system in the same way as others (Jenkins et al., 2016). Existing literature is limited in its discussions of distributional justice in relation to young

people. The work done by Dunlop et al. (2021) shares the experiences of young people with distributional injustice in relation to fracking in England. There is an opportunity to examine further the concept of distributional energy justice in relation to young people in Canada.

4.3.2 Procedural Justice

Participants also talked about experiences related to procedural justice. One participant discussed the importance of having a place at the table, stating:

> Me being at the table helping make decisions is making an impact again. Like if you look at the makeup of the public service, if you look at the makeup of Western governments, it's a slow progression, but then more and more people that come from a diversity of backgrounds that look different, that have different experiences come into it, I think is already a really big thing 'cause even if you don't have all the qualifications you don't have all of the confidence and the capacity to be able to do everything, you just bring your own lived experiences and capacities into these decision making spaces I think is really important *(Participant, Interviewed November 28th).*

Many of the participants interviewed felt that being able to be a part of decision-making is important and key to achieving procedural justice (Jenkins et al., 2016). Young people have often not been given a seat at the table, so it is significant that this participant is seeing that their participation is a step forward in terms of procedural justice.

4.3.3 Recognition Justice

I have shared that some participants feel they are provided with the opportunity to participate, but it does not necessarily mean that their ideas are heard. As noted by another participant:

> It is discouraging and kind of stressful when things don't move as fast and when sometimes your ideas aren't picked up on. Or people see you as a radical, right when it's like, no, this is just what's needed to have a safe environment for us all to live in, right?...just being dismissed a bit in that sense by people who are like, older or different political values…So having to deal with those differences in opinion and getting push back and not seeing the actual decision makers on the federal and provincial levels actually making fast enough changes that they should be doing *(Participant, Interviewed February 5th).*

This perspective, as identified, has been raised repeatedly by participants and in the literature, where young people feel excluded or dismissed from energy or broader climate decision-making (Grosse & Mark, 2020; Sloan Morgan et al., 2023; Strzelecki, 2022). Young people must be provided with procedural and recognition justice to address intergenerational equity.

Energy justice is a framework that allows us to view the different ways diverse youth see and face injustices in the energy system. In some local contexts, for example, in England and in relation to youth perceptions of fracking, Dunlop et al. (2021) have shown that young people are not recognized in decision-making processes and lack opportunities to participate. Therefore, energy justice for young people from diverse backgrounds is key to giving them agency in their futures and to achieving intergenerational equity in the energy transition.

4.4 Intersectionality

An intersectionality lens aid in understanding others' layered identities that lead to varied experiences (Johnson et al., 2020). It also allows us to view the power structures and dynamics of oppression within the energy system. For these interviews specifically, it allowed me to gain a deeper understanding of young people and their relationships with other actors,

particularly with older generations. Intersectionality helped to understand the identities of the participants, their perceptions of their own identities, and how these identities impact their experience in the energy transition. I then coded for experiences of oppression and privilege, gaining further insight into how diverse youth experience the Canadian low-carbon energy transition in different ways.

4.4.1 Intergenerational Relationships

Several of the participants expressed that because many of them work and learn in the energy space, they are already in a community of like-minded individuals. This means the people they interact with are often already on the same page as them, so they are more open-minded and willing to hear what they have to say. As one of the participants described:

> The non-youth actors I've worked with I think have been a very like small subsection of non-youth actors out there, especially [since] I'm in the academic world, I'm only in contact with professors or older grad students who are in the environmental world and they're in the environmental world because they have an interest for it. They are aware of it. They agree that it's a problem, like that's for some people. That's like fundamentally not what they believe that it's not even a problem. So, I'm only in contact with people who are already kind of on the same page as me *(Participant, Interviewed January 22nd).*

This is echoed by another participant who stated:

> Because in academia I've only interacted with professors in the clean energy space. They are very much aware of what's happening and what the problems are, so it's not a question of whether they think climate change is real or not. They know it's real. So, you don't have to even have that conversation. So, in that sense, I've only had good experiences, because now we're on the same page, we're both trying to solve problems, so in academia and research because people are already aware of the problems it's a much easier conversation to have and to get people on board to continue working in different aspects of renewable energy *(Participant, Interviewed December 10th).*

I learned from the interviews that although most of the participants have positive relationships with those who are older in their workplaces or school/research environments, it is not a universal experience by any means. Many of the participants I interviewed expressed uncertainty about what it would be like, expecting it could be worse if they were not working with like-minded individuals.

The participants also indicated that they feel like past generations did not consider the future when making decisions. Although this led to many negative consequences, most participants still stated that they do not blame past generations, but instead focus on the changes that need to happen now, rather than dwelling on the past. However, some participants expressed a much harsher sentiment. According to one participant:

> Well, I think they haven't used resources that well. I mean the continued reliance and push for fossil fuels just tells us that like they haven't been very good with their use of energy and it's very colonial and predatory with how the West and Global North kind of prey on like the Global South and you know, developing countries in order to fund the opulent lifestyles within the Western Global North through greater use of really carbon intense kind of system *(Participant, Interviewed March 12th).*

Other participants focused on how, specifically in Canada, people have not given thought to future energy needs and are now trying to make up for it. As one of the participants stated:

> They took too much of it…. They didn't consider, and they didn't care about their impact on future generations. And now, you know, BC Hydro, they put out a call for power for 300 GW hours, and they're going to put out more calls in the future because they're running out, you know, site C just they turned on the 1st turbine last week. You know, that was a very controversial project that had previous generations maybe had a little bit more foresight in their energy use and consumption, would never have had to happen *(Participant, Interviewed November 5th).*

Though most participants recognized the nuance in this discussion. They were not looking to blame an entire generation, but rather to call out the specific wrongdoing of certain groups that have led us to our current state. One participant stated that:

> So, there's a lot of misinformation around as well. I'll at least like say that fossil fuel companies have been spreading a lot of misinformation for a long time. So, there are a lot of people, even from older generations, that are kind of realising why a low carbon transition is really important. And especially now that their kids and grandkids are being impacted from it. So that intergenerational equity piece is being picked up *(Participant, Interviewed March 12th).*

While others see it as perhaps something inevitable, the growth of the fossil fuel-based energy system was really done to benefit society.

> I don't see it having gone any other way. I think when you're given an abundance of natural resources… and the economy is growing and what not like you'll use them to keep that that prosperity going and it's not necessarily…the wisest decision…because you don't look forward and try to predict what's going to happen, but I don't know. I don't necessarily blame them for having used kind of mindlessly and not very sustainably resources. It's kind of just how things are…*(Participant, Interviewed January 22nd).*

Overall, the participants did not blame past generations, but some questioned how society is moving forward now. Even with all that is known now, many are still not making choices that consider the future.

> When I understand the fact that they didn't have alternatives is when I'm like, OK, so it's not entirely their fault. They just did not have alternatives like solar energy has been so expensive. It's only gotten cheaper over the past decade or 15 years, so they just did not have enough resources and clean alternatives, so they used what they had, but ever since the cost has come down and it's much more affordable for an individual to be producing clean energy, that paired with government incentives, I feel like they're doing their best, I would say, but at the same time, it's important to note that the energy demand has never been this high, like even previously it's been growing, but it's only

> growing exponentially now, given that the rise of AI and there's so much energy required for that *(Participant, Interviewed December 10th).*

Ultimately, these discussions are highly nuanced. The nature of intergenerational partnerships is a crucial consideration as we move forward towards a low-carbon future. Research has been done looking at youth-adult partnerships and how to best foster intergenerational collaboration. This type of collaboration is more likely to lead to meaningful and equitable solutions (Field & Barraclough, 2025). While participants largely reported positive experiences collaborating with older generations, their critical reflections on current approaches to the climate crisis highlight the need for thoughtful attention to intergenerational dynamics. There is an opportunity for youth and adults to engage with the 7Ps framework, as described by Field and Barraclough (2025), a framework designed to enable collaborative and positive youth-adult partnerships.

4.4.2 Visible and Invisible Identities

The participants spoke about their identities in many different ways. I prompted them by asking how they identify and what that might mean in their work. Sometimes, with prompts of age, gender, race, and more, if needed. It was interesting that many of them differentiated between invisible and visible identity markers. As one participant eloquently put it:

> I think it does have an impact because the ones that are visible impact how I'm taken at work, how I'm able to contribute, how seriously I'm taken as well as the opportunities that are presented to me or the networks that I'm part of and the ones that are invisible to me impact my work in this space because, you know, when we're talking about things like energy access, when we're talking about, you know, energy actors, you know I think about… growing up [in a] lower middle income [household] my parents being immigrants, like there was no time for I don't. I don't like, nobody in my family care about climate change

> because we were thinking about the next meal *(Participant, Interviewed November 28th).*

This understanding of self relates to identity management, how people manage their identity, both visible and invisible, in different ways within society (Dhanani et al., 2024). It also reminds us that the way identity is viewed is through the context of interactions with others (Razzante et al., 2021). We see this in later quotes below in this section as well, but the way intersecting identities translate into experiences depends on the interactions we have with people and place. Young people can experience both privilege and marginalization when interacting with others in the energy system.

For instance, two of the participants observed how their multiple identities compound and impact how they might be perceived. One stated:

> Discrimination, racism…that can also silence my voice. Being a youth generally like can just silence your voice. Being disabled, I think that affects me more so in terms of…some people can be weird about it, but my capacity to do work because I live with chronic pain is much less than an able-bodied person. So being able to show up in these spaces where usually a lot is required or asked of you can be hard. And that impacts the ways in which I can get involved or contribute. So, I would say that in and of itself can just multiply the effects that I feel otherwise because people will…I don't know what they think, but it just it gets…it can be disheartening... So, it's kind of like an amalgamation of everything. I think, like, I am who I am and they all impact *(Participant, Interviewed March 12th).*

This participant eloquently stated how their multiple identities not only impact how they are perceived but also how they are able to participate. In contrast, others emphasized that one part of their identity was most relevant in their work. One participant stated:

> Because I work in the Indigenous clean energy in space, the identity that's the most relevant is Indigenous. You know, it's something that people can relate to me with. When I talk to them, it lends credibility to what I do say as an Indigenous person, so specifically in my field, being Indigenous is kind of the central aspect of my identity as we work towards an energy transition *(Participant, Interviewed November 5th).*

These participants' comments demonstrate why it is important to have people from diverse backgrounds participating in the energy transition. Although everyone is made up of intersecting identities, some may be more relevant, or "mobilized" in specific contexts (Nash, 2008). As this participant says, being Indigenous is important to their work. This alludes to the point made by Grosse and Mark (2020), where they emphasize the importance of Indigenous youth inclusion. Those who face intersectional exclusion are often the same individuals who are most affected by the climate crisis and possess valuable experiences to inform climate solutions.

4.4.3 Experiences of Oppression

I also had some participants describe experiences of oppression and marginalization as part of their involvement in the energy transition. One participant, a young woman, described the following happening at a networking event stating:

> Someone said to me they were like you don't look very technical. And I was like, OK and then it's at an energy like focused event and somebody was like, do you even know what a kilowatt is? And I was like; do you even know like basic energy? Like, what do you mean? can you really tell by how I look that I'm technical or not like no. That's a little stereotypical *(Participant, Interviewed January 31st).*

These experiences are not unique. Other participants who identified as young women described similar experiences, feeling like they were not taken seriously. This was discussed earlier with feelings of being tokenized. These experiences are often worse for those from

marginalized backgrounds. Many of the participants who identified as racialized women expressed similar sentiments, where their ideas were not heard, they were talked over and not taken as seriously as their male counterparts. In this sector, where the divide is vast between men and women, it is critical to understand how people's experiences differ and how to best mitigate experiences of tokenization.

The electricity and energy sectors continue to be among the worst for the representation of women (Baruah & Govindan, 2015; Pearl-Martinez & Stephens, 2016). It is well known that the lack of mentorship available and the lack of role models to look up to contribute to the departure of young girls and women from fields of science, technology, engineering and math (Pearl-Martinez & Stephens, 2016). Another participant in their interview stated the importance of groups like WIRE (Women in Renewable Energy) for providing mentorship and a space for learning without those same negative encounters. She states:

> Networking with women is just like more casual, it feels like if there's not so much pressure…they just want to get to know you. I guess it's just learning those basic skills in a comforting setting and then being able to apply them in my future career of chatting with people on a regular basis *(Participant, Interviewed January 31st).*

This aligns with research highlighting the importance of women's networking for their careers in the electricity and renewable energy sector (Emmons Allison et al., 2019). Having the opportunity to access these types of spaces, like with this participant, provides women with the opportunity to interact with others who work in the energy sector.

4.4.4 Experiences of Privilege

These experiences of oppression exist in opposition to many of the experiences of privilege described by other participants. Participants were aware of the privilege they had or had gained through education or other means. According to one male participant:

> So, and I'm very, very lucky that I haven't had to do that, whereas like, if you're racialized, you don't get to, like, turn out from your brain off and even go outside. It's like you can't hide those things about yourself so in terms of that, I've never had like faced adversity in this space and anything I have that like would create that I can hide or like turn off right things right, not show. Yeah, which is like extremely privileged. But yeah, like a lot of people don't get to just not put that hat on *(Participant, Interviewed November 1st)*.

Knowing these differences in experience is essential to understanding the experiences of youth. Young people are not only defined by their age, but it was also important to me to gather a diverse sample according to other markers of diversity and social location to gain a thorough understanding of the diverse experiences of young people. These differences in experience underscore the need for tailored support for young people. Both visible and invisible identity factors must be taken into consideration. Gender was an important factor that came up, as most of the women and gender diverse participants shared experiences related to their gender. This was not surprising given that the electricity sector continues to be a male-dominated industry (Electricity Human Resources Canada, 2023). I was surprised that age within the age group of 20-35 did not significantly impact the interviews in the way some other identity factors did.

Young people are not a homogeneous group; therefore, our engagement and work with them must be nuanced and informed by intersectionality. Therefore, acknowledging the

importance of intersectionality seems essential to moving forward towards an inclusive and equitable energy transition.

Chapter 5: Discussion and Conclusion

This chapter provides a discussion and conclusion to the thesis. First, I reiterate the key objectives and findings of this work. I also reflect on the frameworks and methodology employed and discuss the strengths and limitations of the findings. Finally, I outline future directions for this research and suggest how both youth and non-youth actors can utilize these findings to promote intergenerational equity better as we transition to a low-carbon future in Canada.

The overall goal of this thesis was to explore how we can ensure intergenerational equity as we address the climate crisis. The research had two objectives: first, to examine the ways that youth from diverse backgrounds have engaged with the low-carbon energy transition in Canada, and second, to describe the challenges and opportunities youth from diverse backgrounds face when engaging in the low-carbon energy transition in Canada.

Data from a group of diverse youth (n=10 qualitative interviews from four different provinces) served as the basis to explore intergenerational equity, particularly in addressing the climate crisis. This research employs the four frameworks to center equity and justice in the low-carbon energy transition. This research contributed to a gap in the literature on youth and the energy transition in Canada. My work aims to contribute to this area of research, focusing on youth experiences.

5.1 Main Findings and Contributions

The results of this research provide insight into how youth and non-youth actors can work towards meaningful actions in the low-carbon energy transition that benefit youth from

diverse backgrounds and align with their values. The findings also provide a better understanding of youth as energy actors in the Canadian low-carbon energy transition.

Several findings emerged in relation to each framework used in the analysis. For intergenerational equity, this theme applies to various aspects of youth experiences. Young people are engaged through many different avenues, including education, research, work, and more. In these avenues, they contribute knowledge, skills and a fresh perspective from their education, work experiences and lived experiences. Despite these contributions, they face many barriers when engaging with the low-carbon energy transition in Canada. These barriers include a lack of access to educational or work opportunities, imposter syndrome, age, and not being taken seriously by non-youth. These participants are the ones who have been able to participate in some form within the energy transition. Likely, other barriers have entirely prevented young people from ever participating in the energy transition. These participants were still highly motivated to participate. They felt a deep responsibility to do this work, for themselves, their communities and for the world. As reflected in some of their statements in the results chapter, this sense of responsibility can be both motivating and discouraging.

The concept of climate anxiety emerged briefly, but it is a much wider field of research that is important for people to engage with when working with youth. As young people from diverse backgrounds grapple with the climate crisis, how do we better engage them to join the energy transition? Participants engaged with ideas of adult responsibility and the desire for further education, especially with younger people. Beyond education, they also wanted to see more intergenerational learning and engagement.

Energy democracy provided a thematic framework that helped me to describe the actions of young people. I found that most youth were engaged with the goal of resistance. They were looking at how their actions can resist the current fossil fuel-based energy system. It also suggests that young people are conscious of the goals of reclaiming and restructuring, as some of them expressed a desire for community-owned, distributed energy resources.

Energy justice was also used to describe the types of injustices young people engage in and/or face. Many of them were working towards distributional justice, while others expressed instances of facing procedural and recognition injustice. These ideas echo with experiences of oppression and the barriers young people face. When young people are left out of decision-making processes, we can view these experiences as procedural injustice and exclusion.

Lastly, intersectionality provided a deeper understanding of young people's interactions with other non-youth actors. Overall, they experienced positive relationships with non-youth actors, while also acknowledging the disservices that past generations have left them with. Intersectionality also helped me understand the experiences of diverse youth. They identified experiences related to both their visible and invisible identities and how these experiences impact their perception and approach to work. I gained a deeper understanding of the importance of support for those marginalized in the sector. Young women expressed a continued experience of oppression in the male-dominated energy sector. Intersectionality provided deep insights that related across themes. We can see that youth are not a monolith, and these differences require tailored support to better engage with young people.

This work forms a foundation of understanding youth inclusion in Canada within energy research. It also contributes to the growing body of literature on young people with diverse

backgrounds in the climate movements, considering the unique circumstances of the energy system. There was a gap in understanding youth as actors within the Canadian energy transition (Jaradat et al., 2024). The use of these multiple frameworks to gain a deeper understanding of the experiences of an underrepresented group is novel. It provides an example of how theoretical and conceptual frameworks can be used to strengthen research. Multiple frameworks also support one another and minimize the weaknesses of other frameworks. The use of the four frameworks together provides a comprehensive and nuanced understanding of the involvement of young people and the challenges and barriers they face.

I want to highlight that young people have long participated in the energy transition in Canada. Existing literature emphasizes the importance of including young voices, while young people already see the importance of their involvement. The findings from this research serve to provide a broad understanding of the role youth have had in the Canadian low-carbon energy transition.

5.2 Strengths and Limitations

The use of in-depth interviews provided comprehensive insight into the participants' experiences (Dunn, 2021). A key strength of this study lies in the fact that the interviews were conducted by someone who also identifies as a young person, providing this work with unique insight, as participants expressed their comfort and openness in speaking with me. It was important to me that my positionality was shared with participants, as it explains why I am engaged in this type of work and provides an opportunity for participants to understand me better. I believe sharing this part of myself in relation to this work led to more insightful interviews. Participants felt they could share their personal experiences with me, knowing that I

may have had similar experiences. My positionality also informs the work I have done, from interviewing to analysis, and the development of my findings (Holmes & Gary, 2020). My previous experience in the energy sector as a young, racialized woman provided me with context that I may not otherwise have had. I have a better understanding of where youth come from when they discuss the barriers they have faced, and their motivations to participate in the energy transition. My positionality led to a greater, more profound understanding of how to conduct this research and, in turn, informs the findings of this thesis.

Given the nature of interviews, the findings are context-dependent but provide a rich understanding of the participants' experiences (Suchet-Pearson, 2015), offering insight into the broader experiences of young people in the Canadian low-carbon energy transition. Although I was able to gain rich insights from the interviews, further relationship building with participants and follow-ups could have provided additional temporal information. I also recruited young people through a survey shared digitally via email to the sample frame and social media posts on LinkedIn and Instagram. This limited the survey's reach, and there is an opportunity to share it in other ways, such as through post-secondary institutions or workplaces. Therefore, the survey may not have reached young people who are unable to access the internet frequently or lack the capacity to complete a survey. Although I did receive many responses to the survey, I was only able to complete interviews with 10 youth. The addition of more young people, especially from certain racialized and Indigenous groups, would have benefited this research. Although the interviews provided a range of experiences, the addition of more youth from different backgrounds may have provided even more insight into specific experiences. For example, no Black youth were identified as part of the survey and interview process. This is an

important gap to identify as Black communities face unique challenges in the energy system (Bednar et al., 2017).

The ability to share details about the participants' identity is also a limitation given the small sample size. Privacy was important throughout the process of both the survey and the interview. Some participants expressed hesitancy in video recordings. To protect the identities of the participants, identity factors were mostly shared in aggregate. I believe the information shared in aggregate is sufficient to understand the experiences of diverse youth.

5.3 Recommendations

There are several recommendations that I feel are important to highlight regarding youth as the energy transition sector moves forward. First, those in decision-making positions and other positions of power must recognize the experience and knowledge that youth hold, especially youth from diverse backgrounds. They contribute new ideas, fresh perspectives, and other skills and educational experiences. Second, as the sector grows, there is a huge opportunity to welcome young people and ensure their retention in the future low-carbon workforce. It is important to know that young people are motivated by the desire to enact change and feel a responsibility to aid in the climate crisis, especially as youth will be impacted for more years than older populations. Third, they must feel like their work is meaningful and fulfilling if they are to remain engaged in this work. I recommend that non-youth actors engage with the principle of intergenerational equity and how it can be upheld through frameworks like the 7Ps framework for youth-adult partnerships (Field & Barraclough, 2025).

Fourth, the energy sector must also understand that diverse youth are involved in the transition in different ways, and reducing barriers to access is necessary to create an inclusive

energy sector, and therefore an inclusive energy transition. This includes providing young people with educational opportunities to enable them to participate in the low-carbon energy transition.

Ultimately, young people offer valuable knowledge and skills, particularly through the innovative perspectives they bring to the many challenges of the energy transition. There are many ways to get involved in the energy transition, and now is a time of increased engagement by young people. Although there are barriers, there are also supports that exist to empower them in their journeys in the energy transition. The voices of youth from diverse backgrounds must be included in the energy transition.

5.4 Future Research

Future research could further focus on intersectionality as a lens to examine youth experiences. Intersectionality research requires deep and meaningful data collection. Additional time set aside to seek hard-to-reach young people and follow-up interviews would allow for deeper analysis, particularly related to the nuances of identity and identity management of young people in different settings.

Further research could also examine the actions of young people more broadly. I gained insight into individual participants' experiences through semi-structured interviews. However, a more exhaustive, or population-based survey of young people or focus group engagement with youth organizations could lead to greater insights into the advocacy that has been done by youth in Canada.

Although my research focused on young people engaged in the energy transition, further work could be done examining individuals aged 13-18 and the factors that lead to their

involvement in the energy sector. Additionally, it may be particularly worthwhile to look at young girls, who at these ages often leave STEM-focused courses (Pearl-Martinez & Stephens, 2016). This field is rife with opportunities to examine the implications of intergenerational equity and the energy transition.

Lastly, my research focused on young people who have been previously involved with the Canadian low-carbon energy transition. There may be youth who have been prevented from participating due to unknown barriers or challenges. There is an opportunity to examine the perspectives of young people who have not yet entered the field related to the energy transition.

I am grateful for the opportunity to learn directly from young people. The participants in these interviews provided me with many valuable insights, and I am grateful for the time they spent with me and their openness in sharing their stories. This experience has affirmed my belief in the importance of hearing from those who are underrepresented. Their unique perspectives have enriched my understanding of young people in the energy transition, and I hope they will for others as well.

Young people will be the ones to inherit our future energy system, and they are already contributing in many ways towards a more just and sustainable future. Decision-makers must acknowledge the necessity of integrating youth voices to address humanity's most profound crisis.

Appendix A: Consent Forms

University of Victoria

Department of Geography

Survey Participant Consent Form

Youth Influencing Decision-Making for an Equitable Energy Transition

You are invited to participate in this project, "Powering the Future: Youth Inclusion for an Equitable Energy Transition" that is being conducted by Bonnie Gao, under the supervision of Dr. Christina Hoicka, Canada Research Chair in Urban Planning for Climate Change, Associate Professor, Department of Geography, Department of Civil Engineering, University of Victoria.

This study will be conducted by Bonnie Gao, a master's graduate student in the Department of Geography at the University of Victoria. Bonnie Gao can be contacted by e-mail at bonnieg@uvic.ca. As a graduate student, I am conducting research as part of the requirements for a master's degree in Geography. Research is being conducted under the supervision of Dr. Christina Hoicka, who can be reached at cehoicka@uvic.ca.

Funding: This project is funded by a New Frontiers in Research Fund (NFRF) Global grant, the University of Victoria Graduate Award and the Canada Graduate Scholarship-Master's.

What is the purpose of this study?

This study aims to better understand the experiences of diverse youth in the Canadian low-carbon energy transition. With this survey we hope to identify a wide range of diverse youth from across Canada to be interviewed. By understanding youth experiences, I hope to enable other actors to work with youth in meaningful ways towards energy policies that benefit youth and align with their values. Overall, your participation will help us provide a better understanding of how we can uphold intergenerational equity as we transition to a low-carbon economy.

You have been invited to participate in this study because you have had experience as a youth, working towards the renewable energy transition in Canada. Your participation is essential to gaining a thorough understanding of the experience's youth have had in the energy transition.

It's your choice whether or not you want to take part in this study.
Your participation is voluntary.

If I choose take part in this study, what will I do?

If you take part in this study, you will:

- Fill in an online survey that will take approximately 10 mins.
- The purpose of the survey is to identify individuals for interviews.
- You will be asked questions about your age, geographic location, gender, Indigenous identity, disability, immigrant status and racial identity.

Data Collection:

Survey responses will be saved in a secure UVic server, accessed through password protected devices. Contact information will be asked for the purposes of interview participation.

You do not have to answer any questions that make you feel uncomfortable.

How long will this take?

This will take up to 15 minutes of your time.

What are the possible harms and discomforts?

There are no known risks associated with taking part in this study.

What are the possible benefits of taking part in this study?

Participants may not receive any direct benefit from their participation in this study. However, this project will seek to gain a better understanding of diverse youth experiences related to decision-making in the Canadian Energy Transition and enable future youth participation the energy system. Results of the study will be disseminated with youth organizations and shared widely to other relevant stakeholders. A published open-access paper will also be published for dissemination to wider audiences. The findings will support a more inclusive low-carbon energy transition in Canada.

Who will see my information?

Survey data will include demographic data and contact information. Survey responses will only be used to solicit participants for interviews for this study and will be anonymized after the interview has been conducted.

Survey data will be stored within UVic servers and accessed only by the research team through password-protected devices. Raw survey data will only be stored until publication in peer-reviewed journals 2028. Complied data will be stored until the completion of the thesis paper and any published articles (estimated for 2028 at the very latest)

How will the study results be shared?

The results of this study will be shared in a final master's thesis and published journal articles.

- Presentations at conferences
- Social media (e.g., Linkedin, Instagram)
- Directly to participants and/or groups involved
- On the Colab website, see here: https://www.socialexergy.com/about
- Other media (news, radio etc.)

Please note:

You may exit the survey at any time.

You may change your mind and withdraw from this study at any time. There is no need to explain why you have changed your mind.

If you withdraw from the study your data will be removed. It will not be possible to remove your survey data once it is anonymized. Data will be anonymized once interviews are completed.

If you have any questions or if you would like to discuss this study further, please contact the researcher, Bonnie Gao at bonnieg@uvic.ca.

You can also contact the Human Research Ethics Office at the University of Victoria at 250-472-4545 or ethics@uvic.ca, to check the ethical approval of this study, or to raise any concerns you might have.

Please remember that participation in this study is voluntary.

Please use the link to provide your consent online where required. Your online responses indicates that you understand the conditions of participation in this study, that you have had the opportunity to have your questions answered by the researchers, and that you consent to participate in this research project. After you complete the online consent form, a system-generated copy will be provided to you and the researcher.

University of Victoria

Department of Geography

Interview Participant Consent Form

Youth Influencing Decision-Making for an Equitable Energy Transition

You are invited to participate in this study project "Powering the Future: Youth Inclusion for an Equitable Energy Transition" that is being conducted by Bonnie Gao, under the supervision of Dr. Christina Hoicka, Canada Research Chair in Urban Planning for Climate Change, Associate Professor, Department of Geography, Department of Civil Engineering, University of Victoria.

This study will be conducted by Bonnie Gao a master's graduate student in the Department of Geography at the University of Victoria. Bonnie Gao can be contacted by e-mail at bonnieg@uvic.ca

As a graduate student, I am conducting research as part of the requirements for a master's degree in Geography. Research is being conducted under the supervision of Dr. Christina Hoicka who can be reached at cehoicka@uvic.ca.

Funding: This project is funded by a New Frontiers in Research Fund (NFRF) Global grant, the University of Victoria Graduate Award and the Canada Graduate Scholarship-Master's.

What is the purpose of this study?

The overall purpose of this project is to better understand the experiences of diverse youth in the low-carbon energy transition. The role of youth is essential to an equitable and inclusive energy transition. I will interview youth from the ages of 18-35 to better understand their experiences in this space. By understanding youth experiences, I hope to enable other actors to work with youth in meaningful ways towards energy policies that benefit youth and align with their values. Overall, your participation will help us provide a better understanding of how we can uphold intergenerational equity as we transition to a low-carbon economy.
You have been invited to participate in this study because you have had experience as a youth, working towards the low-carbon energy transition in Canada. Hearing from youth is essential to gaining a thorough understanding of the experience's youth have had in the low-carbon energy transition.

It's your choice whether or not you want to take part in this study.
Your participation is voluntary.

If I choose take part in this study, what will I do?

If you take part in this study, you will:

- Attend an online or in-person semi-structured interview.
- You will be asked questions about your experience working towards a low-carbon energy transition, including potentially sensitive questions related to your personal experiences.

Data Collection:
The interview may be recorded using ZOOM and saved in a secure UVic server, accessed through password protected devices. This recording will be used to generate a transcript for data analysis. The transcript will be sent to you for verification, once this is completed the recording will be deleted. You may elect to not have your interview recorded, in which case notes will be taken instead. These notes will also be saved in a secure UVic server, accessed through password protected devices.

You do not have to answer any questions that make you feel uncomfortable.

How long will this take?

This will take about one hour of your time, on ZOOM.

What are the possible harms and discomforts?

You may experience some discomfort when answering personal questions related to your identity and experience. A list of mental health resources will be sent to you prior to the start of the interview.

What are the possible benefits of taking part in this study?

Participants may not receive any direct benefit from their participation in this study. However, this project will seek to gain a better understanding of diverse youth experiences related to their inclusion in the Canadian Energy Transition and enable future youth participation the energy system. Results of the study will be disseminated with youth organizations and shared widely to other relevant stakeholders. An open-access paper will also be published for dissemination to wider audiences. The findings will support a more inclusive low-carbon energy transition in Canada.

Who will see my information?

Interview audio/video recordings, transcripts and/or notes will be stored on a computer hard drive that is password protected and on a UVic password-protected website, and only accessible by the UVic research team. You will be given a pseudonym unless you consent to the use of your name. All compiled data will be stored on a password-protected computer hard drive and on a UVic password-protected website.
Audio recordings and interview notes will be stored until transcript verification with the participant and then destroyed. Video recordings will be stored until results dissemination, 2028 at the latest.

Complied data will be stored until the completion of the thesis paper and any published articles (estimated for 2028 at the very latest).

How will the study results be shared?

The results of this study will be shared in a final master's thesis and published journal articles. Analysis of interview data will be included in these results and may be shared across all platforms listed. Any video recordings may be used for additional knowledge dissemination on social media, presentations at conferences, other media and on the Colab website.

- Presentations at conferences
- Social media (e.g., Linkedin, Instagram)
- Directly to participants and/or groups involved
- On the Colab website see here: https://www.socialexergy.com/about
- Other media (news, radio etc.)

Use of your Name: PLEASE INITIAL STATEMENT only if you consent:

I consent to be identified by name/credited in the results of the study: _____

I consent to have my responses attributed to me by name in the results: _____

I consent to have my responses attributed to the organizations I am a part of (if applicable): _____

I consent to having my interview audio recorded. _____

Video recording: Participant to provide initials, only if you consent:

Videos may be taken of me for: Dissemination* _____

*Even if no names are used, you may be recognizable if visual images are shown in the results.

Please note:

You may end the interview at any time.

You may change your mind and withdraw from this study at any time. There is no need to explain why you have changed your mind.

If you withdraw from the study, you will be asked permission to use your contribution in the analysis and final report of this study. You may agree or refuse this request without explanation. However, it may not be possible to remove your contribution from analysis once your data has been anonymized. It is not guaranteed that video recordings can be removed once they have been made public.

Each time you complete a research activity and meet with Bonnie Gao you will be reminded that your participation in the study is voluntary, and asked if you wish to continue to take part.

If you have any questions or if you would like to discuss this study further, please contact the researcher by email at bonnieg@uvic.ca

You can also contact the Human Research Ethics Office at the University of Victoria at 250-472-4545 or ethics@uvic.ca, to check the ethical approval of this study, or to raise any concerns you might have.

Please remember that participation in this study is voluntary.

Consent:

I have read this consent letter……..yes…….no

I have had the opportunity to ask questions……..yes…….no

I understand that my participation in this study is voluntary .....yes……no

I understand that I can withdraw my consent at any time……yes…….no

I agree to take part in the study……..yes…….no

I agree to have my interview audio/video recorded yes…….no

Name of Participant	*Signature*	*Date*

A copy of this consent letter will be left with you and the researcher will take a copy.

Appendix B: Interview Guide

Hello! Thank you for agreeing to this interview for the research project "Powering the Future: Youth Inclusion for an Equitable Energy Transition". My name is Bonnie, and I am a master's student at the University of Victoria, with the Reimagining Social Energy Transitions CoLab. You were selected based on your experience with [organization] and the Canadian low-carbon energy transition. I appreciate the time you are taking out of your day to participate in this interview.

This project aims to better understand the experiences of diverse youth in the Canadian low-carbon energy transition. With this interview, I hope to gain an in-depth understanding of how youth have been included in the transition. By understanding youth experiences, I hope to enable other actors to work with youth in meaningful ways towards energy policies that benefit youth and align with their values. Your participation will help us provide a better understanding of how we can uphold intergenerational equity as we transition to a low-carbon economy.

I am a youth who has experience working in government within the clean energy sector. I decided to return to school and pursue a master's degree because I was interested in delving deeper into the social justice issues related to the low-carbon energy transition. As a young, racialized women myself, I understand the importance of diverse youth voices in the Canadian energy sector. To gain a thorough understanding of youth involvement in the energy transition, it is essential we hear from youth with diverse backgrounds and experiences.
Your ongoing participation in this interview indicates consent to be interviewed. Prior to this interview you have submitted a signed consent form to the researcher. You may choose to not answer any question or stop the interview at any time. You can request for your data to be destroyed up to the point where data is anonymized.

Do you consent to have your interview audio recorded? Do you consent to have your interview video recorded?

Now we will start the interview, again you may choose to not answer any question or stop the interview at any time. Do you have any questions before we get started? Are you ready to begin?

Now that you know a little about me, can you quickly introduce yourself?

Themes to capture:

Intergenerational Equity

- Youth perception of intergenerational equity
- Are youth voices heard, and meaningfully incorporated.
- Why is youth inclusion important

Energy Democracy

- What have youth done for the energy transition?
- What areas are they involved/interested in?

Energy Justice

- If they feel the benefits and burdens of the energy transition are equitable
- distribution between generations equitable
- Are youth involved in decision-making? Is there any impact on final decisions, outcomes?
- How many opportunities do youth have?
- Importance of youth compared to other actors.
- Is inclusion meaningful?
- Who's being included?

Intersectionality

- What are the power dynamics like between youth and other actors?
- How have experiences differed based on identity?

Questions:

Experience

1. How have you been involved in the energy transition?
2. What led you to get involved in the Canadian low-carbon energy transition? Why energy?
3. Why was it important for you to do this work?
4. What knowledge, values and experiences do you bring to the low-carbon energy transition?
5. Does being a youth impact how you approach your work?
6. What has it been like to work with other, non-youth actors?
7. What is the most fulfilling part of being involved in the energy transition? Least fulfilling part?
8. Do you feel you have made an impact? What do you believe is the most impactful action you've taken?
9. ***What avenues have been made available for you to meaningfully participate in the energy transition?

Perceptions

10. Do you think the current representation of youth in the Canadian energy transition is fair or not?
11. Do you think it's important for youth to be involved in an energy transition? Why? Or why not?
12. What impact do you think involving youth in energy transitions would have?
13. How would you like to see youth participation in the Canadian's energy transition?
14. How do you feel about how previous generations have used energy resources?
15. How do you feel the energy transition in Canada has developed so far?
16. In your opinion, what part of the energy transition requires the most attention right now?

Identity

17. How do you identify yourself [think about gender, racial identity, Indigenous identity, disability, age, geographic location, immigration status etc.] and what does that mean for you in this space? How does [gender, racial identity, Indigenous identity, disability, age, geographic location, immigration status etc.] of your identity influence your experience in and why?
18. In the survey you included mentioned that you were a [young, Indigenous woman etc.] working at [organization focused on First Nations in BC etc.], what has that experience been like?
19. ***What aspect of your identity is most relevant, or is it difficult to think of these as separate identities?
20. Is there anything else you would like to add?
21. Do you have any questions for me?

Thank you for your participation in this interview. If you have any questions or want to follow up you can email myself, Bonnie Gao at bonnieg@uvic.ca or contact Dr. Christina Hoicka who is supervising the project at cehoicka@uvic.ca.

A copy of the transcript will be sent to you in the next few weeks for your verification. I haven't misrepresented anything you've said, and you can make sure you are comfortable with content of the transcript

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