Improving equity in Canada's low-carbon energy workforce: Learning from the lived experiences of diverse applicants to a grassroots bursary

Arwa Jaradat, Rebecca Black, and Christina E. Hoicka

2026

Faculty of Social Sciences

Faculty Publications

This is a preprint version of the article.

© 2026 the authors.

Downloaded from UVicSpace Research & Learning Repository

dspace.library.uvic.ca

University of Victoria | Libraries

Improving equity in Canada's low-carbon energy workforce: learning from the lived experiences of diverse applicants to a grassroots bursary

Authors
Arwa Jaradat, Trellis Fund, University of Saskatchewan, Canada
Rebecca Black , Trellis Fund, Gardner Bursary Fund, hello@trellis.ca
Christina E. Hoicka, University of Victoria, Canada

Abstract

Transitions to low-carbon energy systems require labour market transformations to support resilience, new technologies and infrastructures across communities. Despite rapid growth, the worldwide low-carbon energy sector remains one of the least diverse industries with persistent inequities. Despite steady job growth in the renewable energy sector, women's overall representation has stagnated since 2019, which indicates the need for new approaches to remove barriers to their entry and retention in the sector. While most existing research on the low-carbon energy workforce relies on structured surveys, aggregate labour market data, or projections, far less is known about the lived experiences and motivations of equity-deserving groups entering the sector. This omission matters because mainstream data often overlooks the qualitative, values-driven perspectives and circumstances that shape career pathways—particularly those of women, newcomers, youth, Indigenous peoples, and LGBTQ+ workers. This study was designed using a co-creation research approach with a grassroots, community-led bursary - Trellis Bursary Fund - to analyze the 119 applications to this fund by an intersectional group of women. These were analysed against a theoretical framework of Alternative Pathways, Strategic Niche Management (SNM), and Feminist and Energy-Justice, to generate insights to improve equity in recruitment and retention in Canada's low-carbon energy workforce. Our study's contribution is to provide deeper insight into how small-scale, grassroots, flexible funding mechanisms developed within the communities that they serve can foster novel, justice-centred contributions that mainstream funding often overlooks. These insights offer a critical qualitative narrative-based counterpoint to workforce projections, showing that interest and ambition are not lacking; rather, systemic barriers are constraining entry and persistence of diversity in Canada's low-carbon energy workforce.

Keywords

Energy justice; intersectionality; workforce; gender diversity; energy transition; Canada

1. Introduction

The transition to low-carbon energy represents not only an environmental necessity but also a transformation of the labour market. Globally, the low-carbon energy workforce is the fastest-growing labour market worldwide, with renewable energy jobs rising from 13.7 million in 2022 to 16.2 million in 2023 across solar PV, bioenergy, hydropower, and wind, with solar PV alone accounting for 4.9 million jobs [1] [2]. Projections suggest that there will be over 30 million renewable energy jobs by 2030, in line with current net-zero policies; however, these opportunities will not be evenly distributed across regions or demographic groups (International Renewable Energy Agency, 2025[3]).

Importantly, skills training, equity, and inclusion must keep pace with the deployment of technologies [1]; hence, a diverse renewable energy workforce contributes to stronger innovation and sustainability outcomes [4][5]. Anticipated roles include wind turbine/solar technicians, smart-grid specialists, storage and EV-battery talent, plus policy–data "bridge" roles (e.g., grid data analysts, community benefits coordinators, participation & Indigenous engagement leads, sustainability compliance), as employers increasingly need digital (data, AI/ML, SCADA, cybersecurity) and social skills (stakeholder engagement, equity/Justice) alongside engineering [6][1][7][8][9]). However, these opportunities are accompanied by pressing skills shortages in engineering, trades, and digital innovation [6] [1]. Without inclusive workforce strategies, the benefits of the transition risk being unevenly distributed, while the transition itself could be slowed or jeopardized if insufficient qualified workers are available to meet growing labour demands [10] [11].

In Canada, more than 500,000 people are expected to be working in low-carbon energy[1] by 2025 with a growing rate of 7% per year, spanning occupations in electricity generation, grid modernization, energy efficiency, and emerging low-carbon technologies such as storage, electric vehicles (EVs), and hydrogen [11, pp. 3–7]. Critical current roles include electricians, engineering technicians, and power line workers who build and maintain renewable energy projects [6]. Looking forward, employment is expected to expand dramatically: under a net-zero scenario, Canadian low-carbon energy jobs are projected to grow from 500,000 in 2025 to 2.7 million by 2050, with significant gains in EVs (1.3 million jobs), low-carbon energy supply (478,700), and energy-efficient buildings (391,000)[11, pp. 3–7].

Despite rapid growth, the worldwide low-carbon energy sector remains one of the least diverse industries with persistent inequities that risk excluding groups whose participation is essential for the sector's innovation and resilience [13][6]. Women account for about 32% of the global renewable energy workforce- a figure that has remained stagnant since 2019 [4, p. 10]; International Renewable Energy Agency & International Labour Organization, [1, pp. 20–21] [3, p. 95], which falls short of the global employment average for women of 43.5% [3]. Their participation is uneven across occupational levels—the majority are concentrated in administrative and non-technical positions (45–58 percent), while representation falls to 28–32 percent in STEM-related technical roles and 17–19 percent in senior management [4, p. 10], [1, pp. 20–21]; [3, p. 97], highlighting persistent structural barriers and the urgency of gender-inclusive transition policies [1] [3].

According to the federal ministry Natural Resources Canada [12], women occupy about 24% of all jobs in Canada's energy sector, which includes oil and gas, pipelines, nuclear, biofuels, and electricity generation and distribution. Within the broader *environmental and clean-technology (ECT) workforce*, which encompasses renewable energy, energy efficiency, and environmental services, women represent approximately 28% of workers, with particularly low representation in trades (7%) and technical roles 9% [14]. They earn, on average, 16.3% less than men [4][14] [6]. In the *electricity sector* specifically, women account for about 27% of the workforce [15], though their participation declines significantly in the *renewable-energy segment*[2] of that sector. In renewables, women represent

[1] The Government of Canada defines *clean energy industries* as a subset of the national energy sector, encompassing renewable and nuclear electricity generation, biofuels production, and carbon capture and storage (Natural Resources Canada, 2024[12]).

[2] "The renewable energy industries refer to the segment of Canada's electricity sector that generates energy from naturally replenished sources, such as wind, solar, hydro, biomass, and geothermal."
(EHRC, 2025, p. 9)

about 11% of workers overall**,** with under 7% in trades**,** 9% in technical or executive positions**,** and around 15% in management roles [6, p. 61]. Leadership gaps are equally stark: women hold fewer than one-third of decision-making positions in the energy sector**,** with even lower representation for black, indigenous and people of colour (BIPOC), newcomers, and LGBTQ+[3] workers [16] [17] due to additional barriers, such as credential recognition and systemic discrimination [18]. These patterns mirror broader trends across the global energy economy, where women's access to leadership, innovation, and decision-making roles remains constrained by structural barriers, including gender bias, limited mentorship, and unequal access to finance and training [19, pp. 12–15] [20, p. 19].

Structural hiring practices reinforce inequities in the low-carbon energy workforce by privileging those with existing networks, credentials, and resources while systematically excluding equity-deserving groups. One example is the so-called *"experience wall"*, where even entry-level jobs demand prior industry experience, effectively excluding youth and newcomers without established networks [21][6]. *Credential recognition* barriers further disadvantage internationally trained professionals, while Indigenous workers continue to face the long-term effects of colonialism through underinvestment in education and infrastructure[18]. Other systemic barriers include *opaque recruitment channels,* where jobs circulate through informal networks that disadvantage women, BIPOC, and newcomers [4] [16] [3], and inflexible work conditions that disproportionately affect caregivers, particularly women [22] [23]. At the same time, *organizational cultures* often reproduce gender stereotypes, harassment, and exclusionary norms, making retention especially difficult for women and LGBTQ+ workers [24] [25]. Finally, gendered assumptions about trades and technical roles continue to steer women toward administrative or support functions while leaving higher-wage technical jobs male-dominated [26][6]. Taken together, these dynamics show that the expansion of low-carbon energy employment will not automatically translate into inclusivity; instead, targeted interventions in education, hiring, and workplace culture are necessary to dismantle structural barriers and ensure a just transition [27]. Without deliberate inclusion strategies and gender-responsive workforce policies, the energy transition risks replicating historical inequities rather than transforming them into opportunities for equitable participation on the horizon. Canada's low-carbon energy workforce is projected to grow five times under a net-zero pathway—from 500,000 jobs in 2025 to 2.7 million by 2050—but unless equity-oriented interventions are embedded in training and hiring, women risk remaining concentrated in support and policy functions while excluded from the fastest-growing technical and leadership pathways [11] [6].

Several strategic initiatives have been launched to expand participation in the low-carbon energy workforce. In Canada, youth-focused recruitment and apprenticeship programs are being promoted to address high vacancy rates in the electricity sector [6]. At the same time, reskilling initiatives are targeting transitioning oil and gas workers to prepare them for emerging clean technology jobs [13]. Beyond filling immediate labour gaps, industry and government initiatives increasingly emphasize workforce diversity—including efforts to attract and retain women, Indigenous peoples, newcomers, and other equity-deserving groups—as a key pillar of a sustainable energy transition [6] [12] [9]. Internationally, global programs emphasize the importance of training and mentorship for women and youth, ensuring that underrepresented groups gain access to technical and leadership pathways [4].

[3] LGBTQ+ An initialism that stands for lesbian, gay, bisexual, transgender, queer, intersex, and additional people who identify as part of a sexual or gender diverse community who may use another term to self-describe. (As adapted from ERHC [6]glossary of terms (see; https://ehrc.ca/toolkits/inclusivity/glossary-of-terms/)

Notwithstanding these efforts, their effectiveness depends on addressing persistent barriers, including financial and credentialing obstacles, inequities in representation, and workplace culture challenges that continue to constrain workforce transformation.

The challenge is not merely the underrepresentation of women and equity-deserving groups, but the structural and cultural dynamics within the low-carbon energy workforce that reproduce exclusion even amid rapid sectoral expansion. To address these challenges, this study asks what we can learn about how to address *employment and workforce gaps and opportunities in Canada's low-carbon energy sector* from the narrative reflections provided by applicants to a grassroots bursary application. Specifically, we examine how the lived experiences shared by women and equity-deserving groups reveal structural, financial, and cultural barriers, the values and aspirations that drive their pursuit of low-carbon energy careers, the intersectional dynamics that shape their opportunities and exclusions, and the ways these insights can inform industry workforce planning to support more inclusive education, hiring, and policy practices for a just energy transition

While most existing research on the low-carbon energy workforce relies on structured surveys, aggregate labour market data, or projections (see, [6][12][18][26]), far less is known about the lived experiences and motivations of equity-deserving groups entering the sector. This omission matters because mainstream data often overlooks the qualitative, values-driven perspectives and circumstances that shape career pathways—particularly those of women, newcomers, youth, Indigenous peoples, and LGBTQ+ workers. By analyzing narratives from applicants to a bursary designed and developed by professional women in grassroots communities and networks, this study contributes unique qualitative evidence that highlights how financial, cultural, and structural barriers intersect with justice-oriented motivations and career aspirations. In doing so, it addresses a critical gap in the literature by showing not only where workforce inequities persist, but also the opportunities to design more inclusive education and hiring practices that respond to both labour shortages and equity imperatives in Canada's low-carbon energy transition. Our study's contribution is to provide greater insight into how small-scale, flexible funding mechanisms can foster novel, justice-centred contributions that mainstream funding often overlooks by illuminating the lived experiences of women and equity-deserving groups.

1.1 The Trellis Fund Bursary Program Grassroots Initiative

The Trellis Fund bursary is designed to address the present and growing shortfall in qualified professionals to support Canada's energy transition. It does so by removing barriers to women, who are non-traditional participants in the low-carbon energy sector. Trellis goals include reducing financial stress, providing access to credentials and conferences, and amplifying the voices of women and other equity-deserving applicants in the energy space. Students in all fields of study that are relevant to the energy workforce can apply for Trellis grants: this includes the trades, college, university, professional up-skilling and micro-credentials to pivot into the low-carbon energy sector. Students of all ages and at all professional career stages are eligible to apply, reflecting the diversity of professional opportunities and skills required to support the growth of the sector. Clean energy is defined by the bursary criteria as low-carbon, resilient energy systems that integrate renewable generation, energy storage, smart planning and energy efficiency. By deliberately keeping the academic criteria, career stage, and definition of clean energy broad, the fund was designed to be inclusive and welcoming to a widely diverse group of students.

Each year, the fund awards $2500 no-strings-attached grants to four recipients. Each grantee is given the opportunity to grow their profile and leadership skills through Trellis programs, including participating on industry panels, speaking at Trellis events, and receiving marketing and communication profiles on Trellis platforms. Trellis also provides mentorship opportunities, with recipients and applicants gaining access to industry events through direct engagement with the women on the Trellis Advisory Committee, as well as curated mentorship opportunities with other energy sector professionals.

The Trellis Fund is built on a foundation of grassroots-level organizing by women in renewable energy in Canada who share the vision of an inclusive and thriving low-carbon energy sector powering a healthy planet. Run by volunteers, Trellis was launched by seven professional women in Canada's energy sector, a group who had previously established themselves as advocates for diversity in the industry in 2015 through their leadership in launching the national non-profit Women in Renewable Energy(WiRE) [28]. In 2022, WiRE[4]co-founder Rebecca Black, a sustainability professional and equity advocate, sought a way to honour her late mother, Veronica Gardner, in a manner that reflected Veronica's care for others and belief in the power of advocacy and love to positively influence the people around her. Rebecca drew upon her enduring relationships with WiRE collaborators, and they formed an Advisory Committee to launch the Trellis Bursary with a $10,000 gift from Veronica's estate. The group leveraged their collective social and professional capital, the grassroots support they had built through years of advocacy, and their existing relationships to secure partnerships with a number of aligned industry partners, a wide range of organizations and networks across Canada, and the media. The grant application form was developed with Student Energy[5], a global youth organization with aligned values and a history of effectively engaging students [29]. Other Trellis industry partners included the Canadian Renewable Energy Association (CanREA) [30][6], and Step Up Breakthrough in Energy Management[7], Solar Alberta [31].

Trellis created awareness within the energy community through outreach and events. The grant application period is launched each year at an International Women's Day (March 8) industry and student networking event. The professional social networking platform LinkedIn is used for outreach communications, alongside a website, and a mailing list to continue to inform both students and

[4] Founded in 2013, WiRE is a Canadian non-profit promoting the participation of women and gender-diverse professionals in clean energy. Through mentorship, networking, and professional development programs, it helps address gender inequities and strengthen women's representation across technical, leadership, and policy roles [28]. https://womeninrenewableenergy.ca/.

[5] Student Energy is a global youth-led non-profit founded in Canada in 2009 that empowers young people to drive the transition to a sustainable energy future. Operating in over 120 countries, it offers training, mentorship, and project funding through chapters and leadership programs, while amplifying youth voices in international energy and climate forums https://studentenergy.org/ [29].

[6] CanREA: s a national industry association that advocates for wind energy, solar energy, and energy storage solutions across Canada. It aims to create favorable conditions for a modern energy system through stakeholder advocacy, public engagement, and industry collaboration [30] https://renewablesassociation.ca/

[7] StepUp in Energy Management is a Canadian service provider specializing in training and professional development for energy efficiency and renewable energy integration. Through workshops, capacity-building programs, and advisory services, StepUp supports individuals, businesses, and institutions in adopting best practices in energy management, helping them reduce costs and emissions while advancing Canada's clean energy transition. https://solaralberta.ca/service-provider/stepup-in-energy-management/ [31]

industry networks of events, news, grant deadlines and awards. Trellis has raised awareness of its mission and bursary by speaking at industry events [32][33] and has been featured in the media, including articles in Canada's most widely read business section to reach the mainstream energy and business sector The Globe and Mail[34], a relevant trade magazine for women in power systems [35], and in a national online climate news source[36]. The grant recipients are announced via LinkedIn, through a media release and to the Trellis Fund mailing list. Through these grassroots and networked outreach efforts, the Trellis Fund received 45 applications in 2024 and 81 applications 2025, totalling 119 submissions in its first two years.

There are other bursaries and scholarships to support women and equity-deserving groups in STEM and energy-related fields such as Electricity Human Resources Canada's Women in Electricity bursary [37] which targets women and non-binary individuals entering trades and technical roles, and the Ontario Energy Network's Women in Energy Scholarship which emphasizes academic excellence among female undergraduates in business and engineering who are focused specifically in the electricity sector [38]. Initiatives such as the Green Jobs Program offer wage subsidies and up to $1,000 in financial assistance to reduce employment barriers for youth aged 18–30 across Canada. Rather than offering purely financial awards, Student Energy combines monetary assistance with leadership training and network access, illustrating a broader approach to capacity building in the low-carbon energy workforce[39].

The Trellis Fund bursary is unique in this landscape. It broadens applicability beyond academic performance or sector-specific training by offering a grassroots, values-driven program. The application considers nuanced, lived experiences of equity-deserving groups by gathering narrative reflections from applicants on their motivations, barriers, and aspirations in the energy sector. This qualitative, story-centred approach captures insights into systemic inequities—such as financial precarity, caregiving responsibilities, and workplace culture—that are often invisible in structured applications or aggregate labour data. In this way, Trellis stands out as both a funding mechanism and a research tool, offering industry and policymakers an alternative lens into the challenges and opportunities shaping a more inclusive low-carbon energy workforce.

2. Background

2.1 Theoretical perspectives on equity and energy justice

Transitioning from fossil fuels to renewable and low-carbon energy is essential to addressing both climate change and energy poverty. Energy systems are not only technical infrastructures; they are embedded within complex social, political, and economic contexts that shape energy provision and access [40]. As socio-technical systems, energy transitions involve more than technological substitution—they require shifts in governance, workplace cultures, and the emergence of new actor networks [41][40].

The concept of energy justice provides a normative foundation for analyzing equity within the low-carbon energy workforce. It comprises three interrelated dimensions: distributional justice—who benefits from and who bears the burdens of energy systems, procedural justice—who participates in decision-making; and recognition justice—whose needs, identities, and experiences are acknowledged [42-44]. Collectively, these tenets reveal how inequalities and power asymmetries are embedded not only in energy production and consumption but also in who participates in the transition itself—

including access to employment, leadership, and decision-making roles. Subsequent scholarship expanded the framework to encompass cosmopolitan justice, emphasizing global interdependence and shared responsibility, and restorative justice, which seeks to address historical harms and repair past exclusions in energy transitions[45] [46]). By emphasizing recognition and participation, the framework underscores that a *just energy transition* is not only about decarbonization and fairly accessing energy services but a normative projects requiring fairness in outcomes, participation, and recognition of who gets to take part in and shape the new energy economy [42] [43][44][47][48]). Recent work has refined the concept of recognition justice, emphasizing that justice requires not only fair distribution and participation but also the acknowledgment of social identities, dignity, and epistemic value within institutional and cultural systems[49]. Within the context of this study, distributional justice concerns who benefits from emerging low-carbon energy jobs and training; procedural justice concerns whose voices and perspectives are included in workforce planning and policy; and recognition justice concerns whose identities, skills, and lived experiences are acknowledged and valued in shaping the transition [47].

Building on this foundation, intersectionality offers a crucial lens for examining the inequalities and practices faced by marginalized groups in workplaces. Coined by Crenshaw [50], intersectionality explains how overlapping identities such as gender, race, class, Indigeneity, immigration status, and age create compounded disadvantages. Within energy research, intersectional and justice-oriented approaches have illuminated how women, Indigenous peoples, racialized communities, and LGBTQ+ individuals experience distinct and overlapping structural barriers that shape their participation in energy systems—barriers often rooted in gender bias, historical exclusion, and institutional inequities [51] [52] [25]. For example, Indigenous women face gender bias combined with legacies of colonial dispossession and geographic isolation, while newcomer women face cultural exclusion alongside systemic challenges of credential recognition [53][18]. Intersectionality thus prevents the flattening of inequities into a single category and foregrounds the complexity of lived experiences within the energy workforce. Without addressing these intersecting barriers to recruitment, retention, and advancement—what scholars call “sticky floors” and “glass ceilings”—women’s participation in the energy transition will remain marginal [53]. This perspective underscores the need to confront structurally embedded workplace inequities, ensuring that the shift toward a just low-carbon energy transition advances sustainability while equitably distributing low-carbon energy jobs and training and extending energy justice beyond environmental goals to encompass labour equity, job quality, and gender inclusion [47]. To achieve a just transition, marginalized communities and underrepresented workers must be actively engaged, and tapping into diverse talent pools must be prioritized [26][47] [54].

Recent scholarship emphasizes that the just transition must be conceptualized as both an employment project - concerned with job creation, reskilling, and labour protections — but also as a system-transformative process that reconfigures the social and institutional structures governing energy production and employment [55][22]). This means that achieving energy transition goals of fairness and inclusivity must be accompanied by transforming power relations, workplace norms, and inclusion in decision-making processes. Although renewable energy and efficiency sectors typically generate more jobs than fossil fuel sectors [56], these gains are unevenly distributed across regions, occupational categories, and demographic groups [3]. For example, job creation often concentrates in urban areas, leaving rural communities at risk [1]. Moreover, most new jobs are in technical and trades fields where women and equity-deserving groups remain underrepresented [4][14][6]. From a youth perspective,

experience-based hiring models and weak intergenerational collaboration further exclude emerging leaders, particularly those from equity-deserving backgrounds [21].

Focusing narrowly on gross job numbers further risks obscuring the quality of work. Many "green jobs" mirror the precarious conditions found in fossil fuel and other sectors, such as contract-based employment, wage gaps, unsafe conditions, and limited career progression [57][58]. Feminist scholars argue that a just transition must integrate care work, social reproduction**,** and work–life balance into transition planning [22] [23][59]). The distribution of unpaid care labour—disproportionately borne by women—directly limits participation in energy education, training, and employment [60][51]). Without structural transformation, job creation risks reproducing "green inequities" in which women and marginalized groups are relegated to low-paid administrative or support roles, while technical and leadership positions remain dominated by men [26][61]. Research also shows that inclusive workplace cultures not only improve employee engagement and retention but also enhance innovation and organizational resilience [62]. Collectively, these studies make it clear that achieving gender equity in the low-carbon energy sector is not only a matter of social justice but also a strategic imperative for building a resilient, inclusive, and sustainable energy future.

To overcome these dynamics, scholars have called for a pluralization of energy justice that goes beyond distributive logics to incorporate feminist, anti-racist, Indigenous, and postcolonial perspectives [27][63]. Energy transitions must confront entrenched power relations in labour markets and the gendered hierarchies embedded in fossil-fuel economies [64] challenge the structures of racial capitalism that underpin global economic and energy systems [65], and address the ongoing settler colonial legacies that shape environmental and climate injustices [66]. Policy incoherence can exacerbate these challenges, as uncoordinated or conflicting measures may lock in exclusionary practices and limit the diffusion of inclusive technologies [67].

The feminist energy systems framework [68]crystallizes this perspective, arguing that equity cannot be achieved simply by "adding women" into existing structures. Instead, it calls for fundamentally reorienting transitions away from profit and growth-driven logics toward democracy, care, and relationality. Its four interrelated dimensions—political (democratizing governance and disrupting male-dominated power structures), economic (valuing care and redistributive justice over accumulation), socio-ecological (emphasizing interdependence, care, and well-being), and technological (ensuring accessibility and decentralization)—highlight the systemic changes required. Mentorship, childcare, bursaries, and flexible work are therefore better understood as essential infrastructures of care [23] [51] rather than optional supports.

Empirical studies show how feminist energy systems can be enacted. Women-led organizations such as Grid Alternatives and Mothers Out Front combine technical deployment with advocacy and training, operationalizing strategies of resistance, reclamation, and restructuring to redistribute power and expand participation [61]. However, policy frameworks at both national and international levels remain largely gender-blind, emphasizing decarbonization and investment flows while neglecting diversity and inclusion [69][70]). Even when gender is mentioned, it is often reduced to token statements without actionable measures [71]. Recent debates around Canada's Green New Deal reinforce this point, advocating for policies that integrate Indigenous rights, labour justice, and gender equity as core pillars of decarbonization [54]. Although the Canadian legal framework is beginning to accommodate these values, it still lacks binding mechanisms to ensure compliance by industry actors [72]. This

underscores the need for institutional frameworks that explicitly tie job creation to equity outcomes through gender targets, diversity reporting, and accountability mechanisms.

Opportunities exist to pursue this integrated approach. Gender-sensitive training, apprenticeships, micro-credentials, and bursary programs can reduce financial and structural barriers [4] [18]. Inclusive hiring practices—such as competency-based recruitment, transparent promotion pathways, mentorship, and flexible work arrangements—are increasingly recognized as essential to equity and retention [61][62]. Justice-oriented frameworks that align energy democracy with distributional, procedural, and recognition justice offer powerful tools to redesign the workforce for inclusivity [42][24]). Finally, youth-led initiatives such as Student Energy and the Youth Climate Corps[8] [73]illustrate the potential of mobilizing younger generations for low-carbon energy leadership, particularly when paired with justice-driven values [21].

Collectively, these perspectives of energy justice, intersectionality, feminist energy systems, and pluralized energy justice suggest that a truly just energy transition is not merely a technical or economic project but a structural transformation of workforce systems. These perspectives highlight that There is a need for research that centers the voices and experiences of those directly affected by workforce inequities and explores how justice-oriented, intersectional approaches can reshape recruitment, training, and employment practices in energy transitions.

Despite the growing body of research on equity and just transitions, what remains underexplored is how lived experiences shape entry, persistence, and advancement in the low-carbon energy workforce—especially for those whose identities intersect across gender identity, race, Indigeneity, age, newcomer status, and sexuality. Little is known about the moral, social, and justice-based motivations that drive individuals to pursue careers in renewable energy. There is a need for research to better understand how infrastructures of care enable participation and retention [23][68]. There is a need for an analysis of how grassroots, women-led initiatives generate data and insights to inform systemic change.

2.2 Trellis Bursary from niche to mainstream

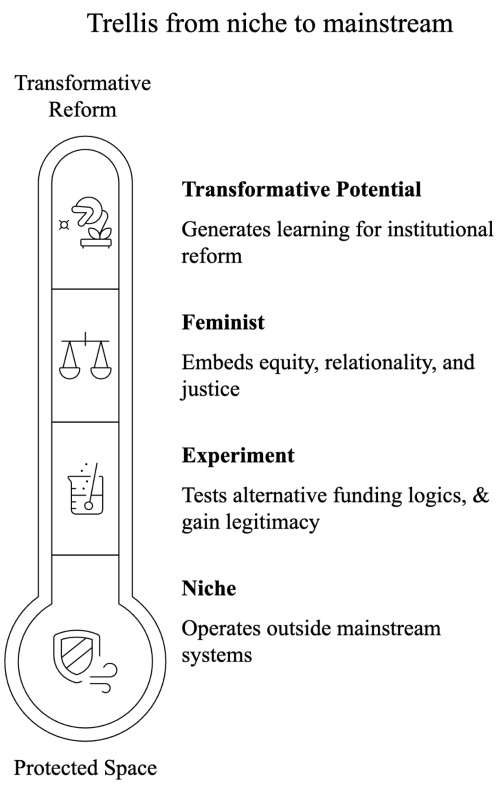
The Trellis Bursary fund can be understood as a grassroots initiative. The integration of three complementary frameworks—Alternative Pathways, Strategic Niche Management (SNM), and Feminist and Energy-Justice — is employed in this study to explain how grassroots micro-scale interventions, such as the Trellis Bursary, can contribute to a more inclusive and transformative low-carbon energy transition.

The Alternative Pathways Framework [74] builds on earlier sustainability-pathways thinking from the STEPS Centre [75] and sociotechnical transitions theory [76]. It conceptualizes transitions as diverse

[8] Youth Climate Corps (YCC) is a Canadian youth-led initiative offering paid climate employment and training in projects that support renewable energy, community resilience, and environmental restoration. Founded in 2020 by the *West Kootenay EcoSociety*, it now operates across several provinces through partnerships with local governments and Indigenous communities to advance a just and inclusive energy transition. See: https://www.youthclimatecorps.ca[73]

and contested, distinguishing *on-stream* (mainstream, incremental), *off-stream* (marginal, niche), and *transformative* (systemic and justice-oriented) trajectories. Within this

framework, the Trellis Bursary functions as an off-stream niche—a micro-scale, grassroots initiative operating beyond conventional policy and industry frameworks, experimenting with alternative norms of inclusion and care in Canada's low-carbon energy workforce.



Strategic Niche Management (SNM) provides the procedural logic connecting micro-level experimentation to macro-level transformation. It posits that protected spaces—such as grassroots innovations—facilitate learning, build networks, and enhance legitimacy, enabling their principles to diffuse into dominant systems over time [76] [77]. Within this framework, the Trellis Bursary operates as a grassroots niche: a micro-scale initiative driven by social rather than market logic, experimenting with alternative norms of equity, inclusion, and care in the low-carbon energy workforce. Through iterative learning and relationship-building, such initiatives can gradually influence institutional practices, thereby contributing to the normalization of justice-oriented, inclusive workforce

Figure 1. Conceptual illustration of Trellis as a feminist niche experiment.

models across the broader energy transition. Finally, Feminist and Energy-Justice perspectives [23][68][43]) ground these structural and procedural mechanisms in normative commitments to recognition, redistribution, and care. They emphasize that equity and participation are not peripheral but foundational to legitimate transitions. Integrating these three perspectives allows the Trellis initiative to be understood as a feminist niche experiment: a micro-scale intervention that embodies off-stream innovation, nurtures collective learning, and prefigures the transformative values required for a just and inclusive low-carbon energy future, as shown in (Figure 1).

Taken together, the contextual, theoretical, and conceptual insights outlined in this section provide the analytical foundation for interpreting the experiences of Trellis applicants. The structural inequities documented in Canada's low-carbon energy workforce in the introduction section establish the broader conditions that shape who can enter, persist, and advance in this sector. Energy-justice, intersectional, and feminist frameworks (Section 2.1) offer the normative and analytical tools needed to understand participation as a question of recognition, care, and procedural fairness—not merely labour-market

supply. Finally, the Alternative Pathways and niche-innovation perspectives (Section 2.2) position small-scale interventions, such as the Trellis Bursary, as potential sites for transformative, off-stream experimentation. Together, these lenses guide the interpretation of the empirical findings that follow, enabling Section 4 to analyze applicants' barriers, motivations, and aspirations not as isolated experiences but as reflections of larger systemic patterns and emerging possibilities for just and inclusive energy transitions, as illustrated in (Figure 2).

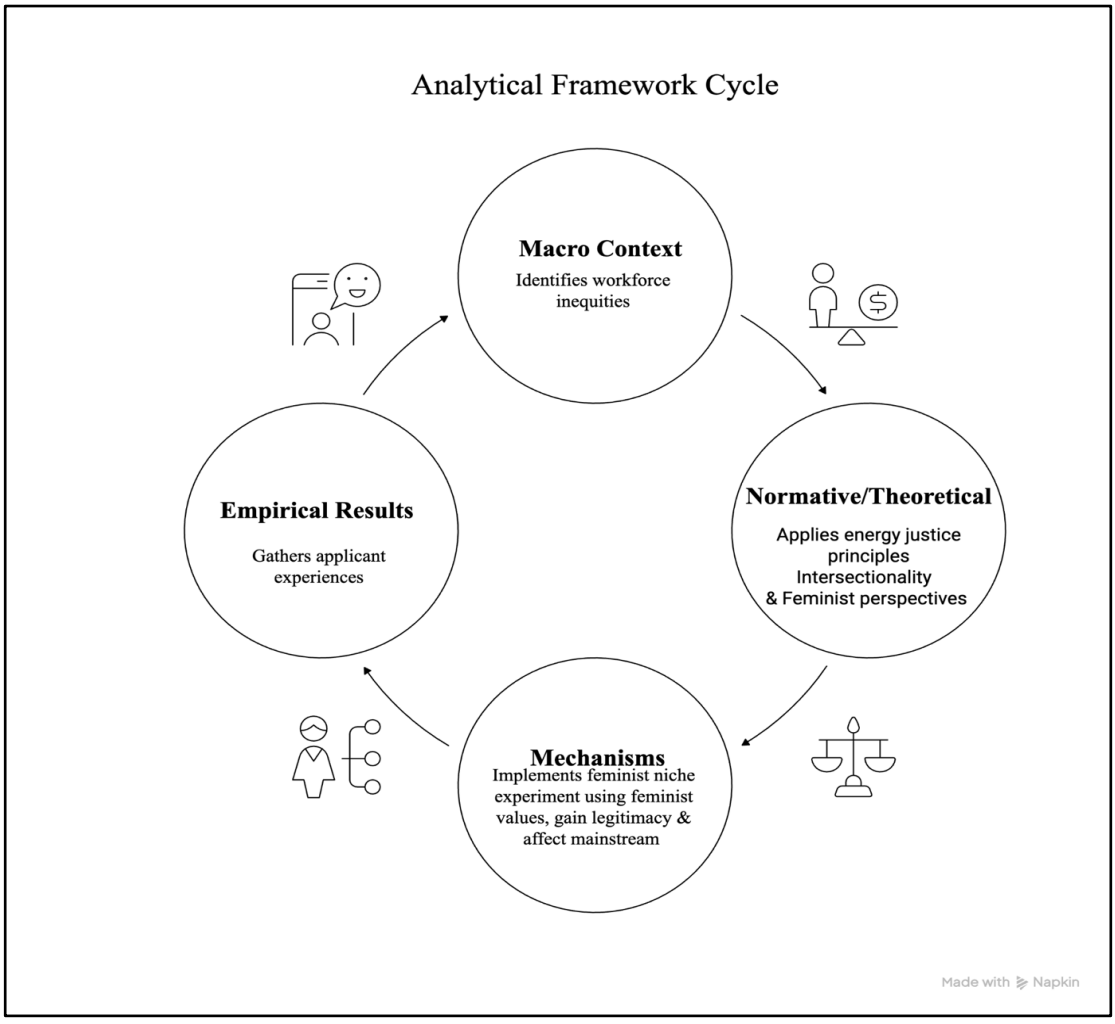


Figure 2. An analytical framework combining context, mechanism and theory.

3. Research approach

This study is grounded in a co-creation research approach, which emphasizes the collaborative production of knowledge between researchers, stakeholders, and equity-deserving groups. Rather than treating participants as passive subjects, co-creation positions them as active contributors who shape the design, implementation, and outcomes of the study [78][79]. Rooted in participatory action

research (PAR), which seeks to democratize knowledge and empower marginalized groups, and in transdisciplinary traditions that integrate academic and non-academic expertise, co-creation is particularly suited to addressing complex, "wicked" challenges such as equity in the low-carbon energy transition [80]. It aligns with what Gibbons et al. (1994) describe as Mode 2 knowledge production—context-driven, problem-focused, reflexive, and socially accountable—compared to traditional Mode 1 research, which is confined to disciplinary silos.

Table 1. The four open-ended questions used in the Trellis application form.

Category	Open-Ended Question
Inspiration for the Educational program	Please share what inspired you to enrol in your chosen program.
Career Goals (reflects career pathway)	Please share your goals upon completion of the program.
Grant Use (reflects barriers and opportunities)	If you were to receive a $2,500 grant, how might you use it?
Motivation clean energy	Why do you want to pursue a future in the clean and renewable energy transition?

In this framing, the lived experiences of communities and practitioners are recognized as legitimate forms of expertise, thereby expanding the boundaries of who counts as a knowledge producer. In this study, the Trellis Bursary Fund initiated the research as a co-creator of the resulting knowledge. Through analysis of the narratives and data provided in the Trellis bursary grant applications, the research identifies barriers and opportunities in the low-carbon energy workforce and also contributes alternative visions of how education and hiring can be redesigned for inclusion.

Recent scholarship highlights that enabling co-creation also depends on how funding systems are structured. Conventional research funding often rewards disciplinary outputs and short-term, low-risk projects, thereby constraining novelty and stakeholder engagement. By contrast, inclusive and flexible funding models can support iterative, transdisciplinary, and justice-oriented approaches that value both *what knowledge is produced* and *how it is produced* [81][82]). Within the field of energy transitions, this orientation has been embraced as a way of making research more responsive to questions of justice, equity, and participation [25][83][27].

Participants' perspectives were gathered through applications to the Trellis Bursary. The application questions were designed by two Trellis committee members who previously developed Awards applications for WiRE, with input from Student Energy to improve the accessibility and clarity of the grant application process. Student Energy has successfully completed many application development and program intake projects, and, applying their experience, they made suggestions that improved the accessibility and clarity of the grant application process. After year 1, several grant recipients provided positive anecdotal feedback that they found the application form user-friendly and unique in its focus on applicants' thoughts and insights, rather than simply checking boxes. The application form included four open-ended questions that invited applicants to reflect on their motivations, career goals, anticipated barriers, and intended use of the bursary. These questions are shown in (Table 1).

Four diversity categories were collected through the application form: BIPOC (Black, Indigenous, and People of Colour), newcomers to Canada (within the last three years), youth under 25, and LGBTQ+. These categories were proposed by the Trellis adjudication committee in order to learn more about the intersectionality of applicants beyond gender. The categories and vocabulary used on the application form was vetted by Student Energy reviewers, who applied their extensive experience with student and youth programming to affirm categories and appropriate terminology.

In total, 119 applications were analyzed out of 126 participants[9] collected across two cycles: 45 in 2024 and 81 in 2025. Applicant narratives were analyzed with prior consent through the Trellis application process[10]. These narratives provide rich qualitative data that capture not only individual aspirations but also broader structural challenges and opportunities within the low-carbon energy workforce. The responses were consolidated into a single Excel file and subsequently imported into NVivo 12 for qualitative analysis. An inductive coding approach was applied, allowing themes to emerge from participants' narratives while being informed by insights from the literature review. The coding process was guided by the principles of energy justice and intersectionality, which helped situate applicants' experiences within broader dynamics of equity and exclusion in the sector. To enrich the description and provide context, the analysis was also informed by statistical data and grey literature reports on workforce gaps and equity trends in Canada's low-carbon energy transition. The analysis was guided by Braun and Clarke's [84] six-phase framework for thematic analysis, which involves familiarizing oneself with the data, generating initial codes, searching for patterns, reviewing themes, defining and naming themes, and constructing a coherent analytic narrative. Coding was initially carried out by the lead researcher, after which the codes and emerging themes were independently reviewed by a second researcher to enhance validity. Following four iterative rounds of coding and refinement, four dominant themes were identified. Analysis of the 119 applicant narratives revealed four dominant themes that structure the findings presented in the next section. Structural barriers capture the financial, cultural, and institutional constraints that limit applicants' ability to enter or remain in low-carbon energy education and employment pathways. Motivations and values reflect the ethical, social, and justice-oriented commitments that drive applicants to pursue careers in the energy transition, including climate responsibility, community representation, and sustainability. Career aspirations and pathways highlight the diverse futures applicants envision—from technical and research roles to governance, community engagement, and entrepreneurship. The intersectional diversity patterns show how applicants' overlapping identities (e.g., BIPOC, LGBTQ+, newcomer, under 25) shape both their opportunities and the challenges they encounter. The fourth theme shows how the Trellis bursary operates as a mechanism of care, redistributing resources to enable applicants to remain in their programs and pursue low-carbon energy career pathways.

4. Results and discussions

4.1 Participant Characteristics

[9] 7 applications were excluded from the analysis because the applicants self-identified as men.

[10] All applicants consented to the use of their anonymized responses for research purposes through the Trellis Bursary application form. The consent statement specified that data would be securely stored and used solely for the purpose of selecting recipients and generating collective, non-attributed insights. By submitting the application, applicants authorized the Trellis Fund Advisory Committee to access and review their information, with assurance that no personal data would be shared with third parties (Trellis Fund Application Form, 2025).

The intersectionality of participants' identities are illustrated in (Figure 3), which shows the overlap of the four diversity categories. While some participants identified with only one category (about 12.6%), a substantial proportion reported two or more overlapping identities (around 87% - Specifically, 51% reported two intersecting identities, 25% reported three, and nearly 11% reported four or more). This underscores the prevalence of intersectionality among applicants and the compounded barriers they may face in accessing education and employment opportunities in the low-carbon energy sector. For example, 10 participants identified as both BIPOC and under 25, while smaller groups reported three or more intersecting markers. These patterns underscore the importance of analyzing workforce inequities through an intersectional lens, rather than treating gender, race, age, or newcomer status in isolation.

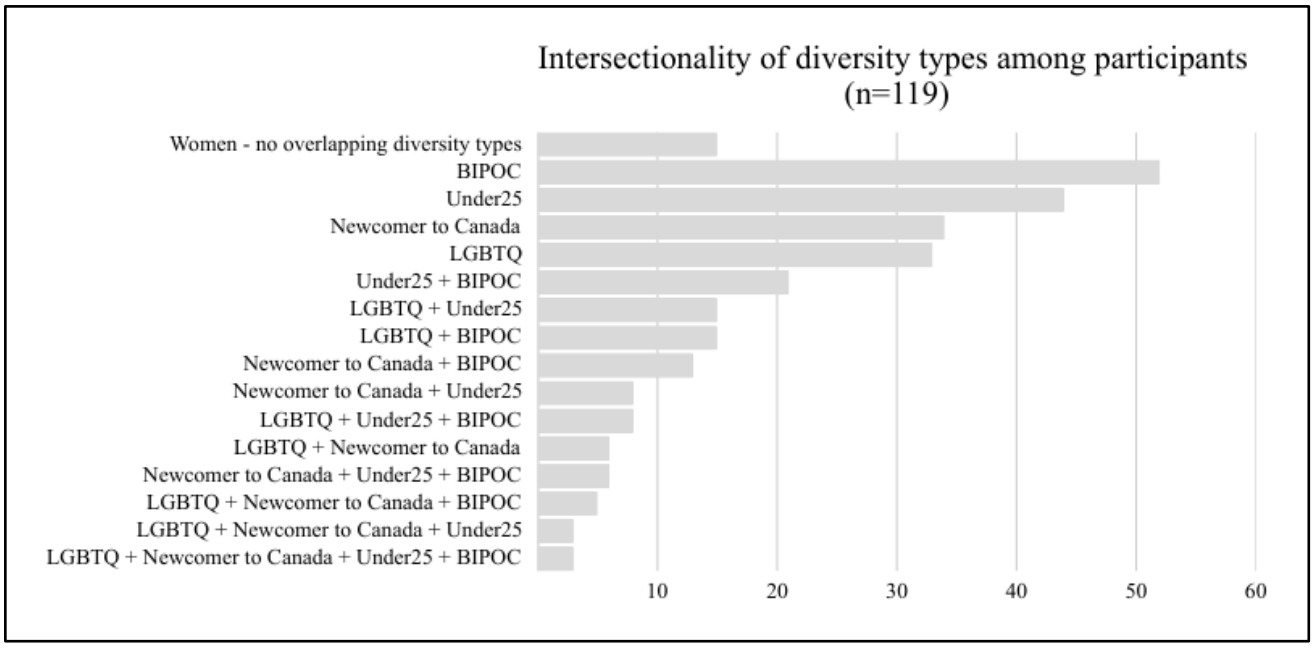


Figure 3. Distribution of single and overlapping diversity types among applicants.

The distribution of fields of study that participants are pursuing (Figure 4) shows that just over half of the applicants (51.3%) are enrolled in science, technology, engineering, and mathematics (STEM) and technical programs, including engineering, applied sciences, renewable energy technologies, and skilled trades. This aligns with the industry's demand for technical expertise. Beyond STEM, participants are spread across policy, social sciences, and law (15.1%), business and management (10.9%),

communications, media, and education (10.1%), and a range of interdisciplinary programs (12.6%) including fields such as environmental studies, sustainability, building science, and sustainable energy development, which integrate technical, social, and policy perspectives. This diversity highlights the variety of pathways through which women are engaging in the low-carbon energy transition, suggesting that workforce development strategies must go beyond a narrow STEM focus to also value contributions from policy, business, education, and interdisciplinary approaches that connect

technology with social and environmental contexts. This analysis interprets applicants' narratives through the integrated framework outlined in the previous Sections. This framework combines structural insights into workforce inequities, normative commitments from energy justice and feminist ethics, and process-oriented mechanisms of grassroots innovation. Together, these perspectives reveal how the Trellis Bursary operates as a feminist niche experiment that bridges individual empowerment and systemic transformation.

4.2. Structural Barriers to Workforce Entry

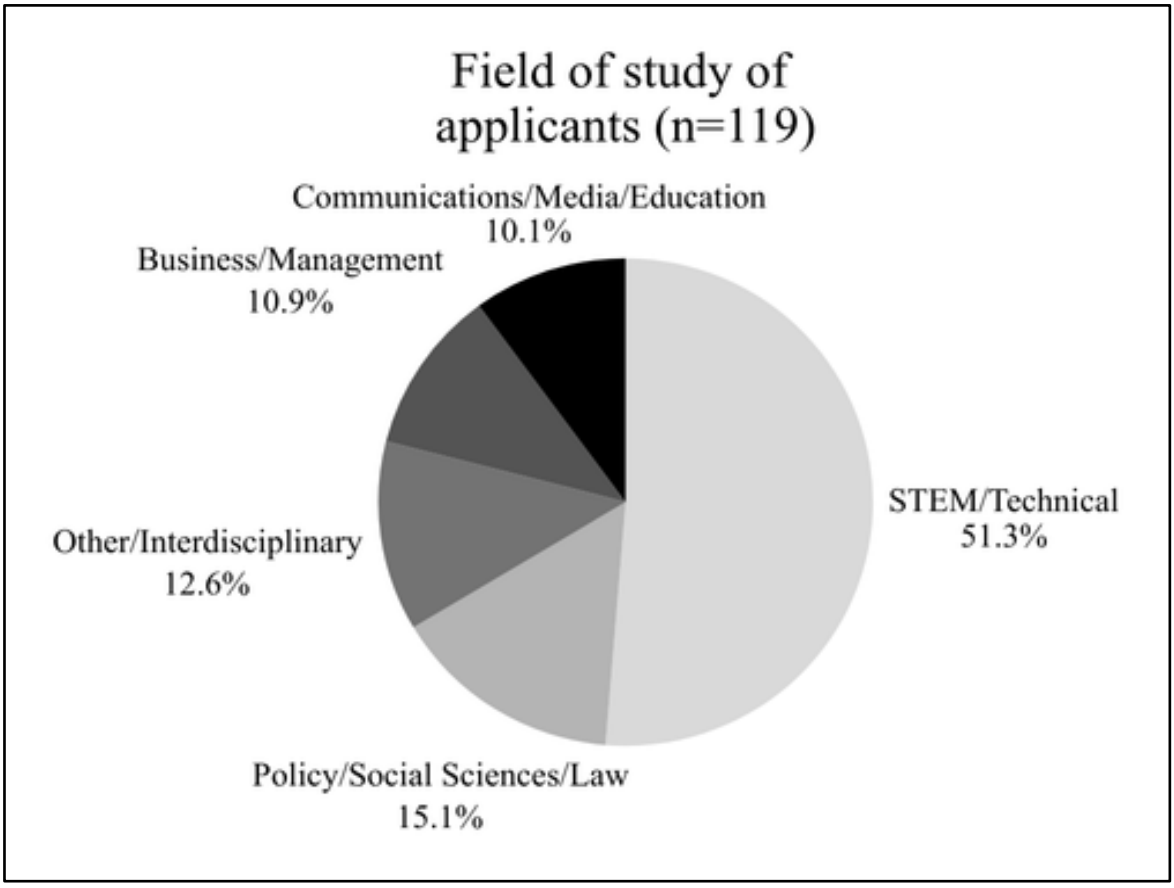


Figure 4. Academic disciplines represented among applicants

Applicants' perspectives reveal that structural inequalities—not individual shortcomings—shape who can realistically participate in Canada's low-carbon energy workforce. The most common barriers concerned financial constraints, credential recognition, and exclusionary workplace cultures, which mirror the systemic workforce gaps documented across Canada's low-carbon energy sector—where women comprise only about 28 % of the workforce overall, with even lower representation in trades, technical, and leadership roles [14] [6]). These findings align with broader patterns of gendered occupational segregation, pay inequities, and informal recruitment networks that restrict entry and advancement [14][1].

Affordability was the most immediate barrier: tuition, fees, and hidden costs (e.g., transportation) often determined whether students could continue in their programs and enter the energy workforce. As one applicant noted, "*The baseline tuition for engineering at the University of Toronto is already high but to pursue minors and certificates is an added cost*," while another hoped "*to save money for my future PhD studies in energy planning, while also alleviating some of the financial stress I feel from tuition payments"* . For many, financial pressures were compounded by caregiving, as one mother explained the bursary would "*help me lift off some of the financial strain of being a full-time student and parent."* These reflections highlight what [61]refer to as the structural gatekeeping role of affordability, where financial precarity restricts the pipeline of women and equity-deserving groups into technical and leadership roles. From an energy justice perspective [42][43]), this represents failures of distributive and recognition justice—opportunities and burdens are unequally shared, and lived hardship remains invisible in workforce strategies.

Beyond costs, cultural exclusions persist in male-dominated energy sector spaces. One applicant asserted, *"This is an important and vital time for female engineers to lead, communicate and enable the transition to be both seamless and effective. I'm excited to get to work,"* yet also admitted, *"I am acutely aware of the underrepresentation of women and LGBTQ+ individuals in the field of engineering."* These tensions mirror literature on sticky floors and glass ceilings [53], where women remain concentrated in support roles while being excluded from technical, engineering and leadership pathways.

A newcomer shared, *"As a newcomer to Canada, recent mother, and a racialized woman, I soon noticed that securing a job in the energy sector in Canada would not be an easy task."* This sentiment reflects institutional barriers to credential recognition that disproportionately affect immigrants and internationally educated professionals [53]. Such practices reproduce structural gatekeeping—labour-market norms that privilege Western credentials and established networks over diverse skill pathways. This also reflects the exclusion of multiple diversities from the workforce, as another participant reflected, *"As an [...] engineer, a woman of colour, and a member of the LGBTQ+ community, I believe I can bring a valuable perspective ...."*, ensuring that cultural exclusion and gender stereotyping against qualified women is further compounded by additional layers of diversity exclusions echoing national findings that women and equity-deserving groups remain clustered in administrative or support roles rather than technical or leadership positions [3][18]). Such accounts embody intersectionality theory (Crenshaw, 1991), illustrating how gender, race, newcomer status, and sexuality combine to produce compounded exclusion. Indigenous participants emphasized that exclusion from the low-carbon energy sector is inextricably linked to broader struggles for sovereignty and justice. As one explained, "*It is my goal to have my work contribute to Indigenous community energy development … I would especially like to see more Métis women involved in the sector"*. Such reflections underscore [85] and [86][87][88]) arguments that energy transitions cannot be disentangled from Indigenous rights and the legacies of colonial exclusion.

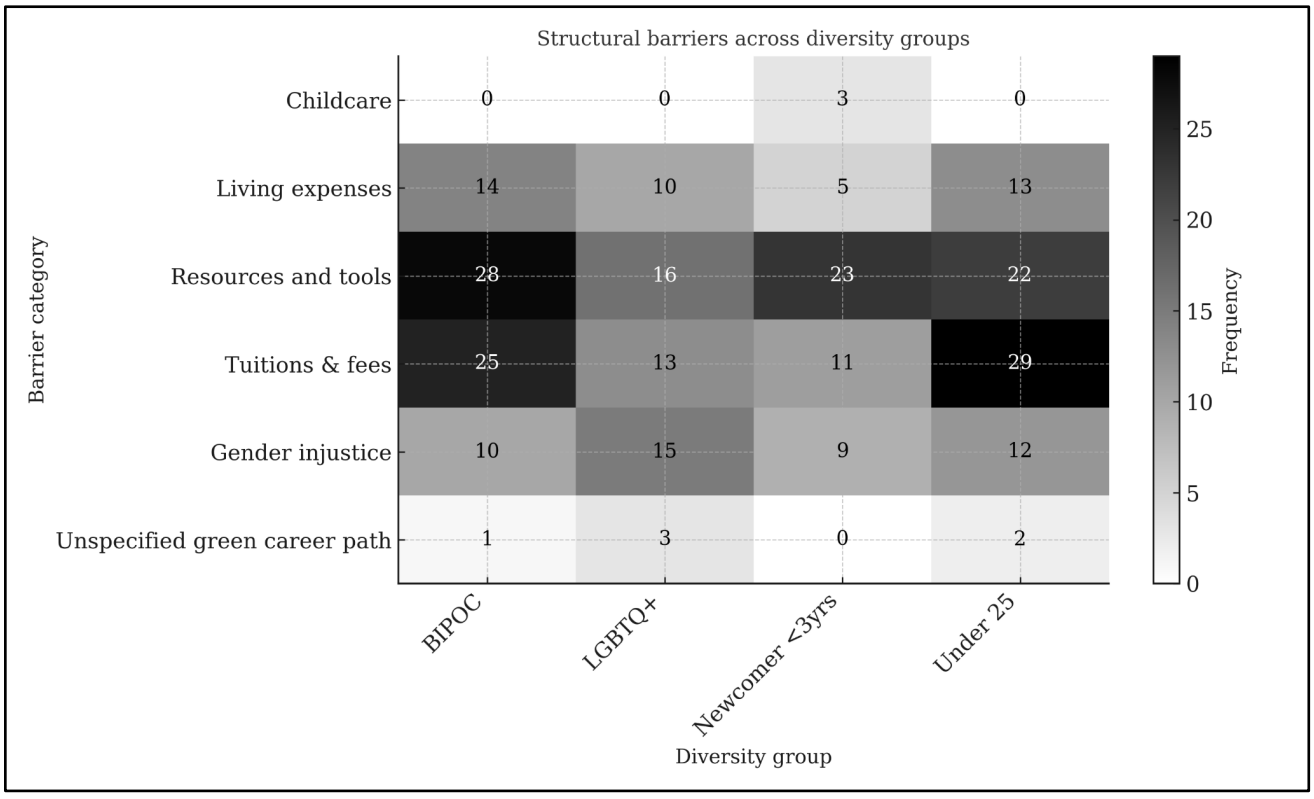


Figure 5. Heatmap of structural barriers experienced by applicants in the four diversity groups

Patterns across groups, illustrated in the heatmap (Figure 5), reinforce these insights: tuition and resources were most flagged by younger and newcomer applicants, while BIPOC and LGBTQ+ participants highlighted cultural exclusion and stereotypes. These findings echo feminist energy systems scholarship [68] which argues that equity cannot be achieved by "adding women" into existing systems. Instead, bursaries, mentorship, and caregiving support must be treated as infrastructures of care [23]. Without systemic reforms in funding, hiring, and workplace culture, the sector risks reproducing what [27] call green inequities—low-carbon futures that remain socially exclusionary.

Participants' accounts confirm that these are systemic, not individual, barriers. They validate the argument that the low-carbon energy transition continues to evolve within institutional frameworks, emphasizing technological and market growth while neglecting inclusion. Consequently, these structural inequities in funding, credentialing, and workplace culture form the backdrop against which interventions like the Trellis Bursary seek to operate. Addressing these requires redistributive reforms that reconfigure the sector's underlying power and participation structures [3][14].

4.2 Motivations, Values, and Representation in Low-Carbon Energy Careers

Applicants consistently framed their decision to pursue low-carbon energy education and careers as more than a matter of jobs or credentials. Their narratives positioned participation in the transition as a moral and social responsibility, rooted in values of climate stewardship, inclusion, and community well-being and justice. *"The renewable energy transition is essential to combatting climate change and can enable a more sustainable and just future,"* one applicant wrote, while another warned, *"this*

transition will exacerbate the same problems of our current system if we are not intentional about who receives the benefits and burdens of our future energy system." These reflections highlight that women and equity-deserving groups are not only aware of climate urgency but also motivated to ensure the transition distributes its benefits fairly . In other words, those who bear the greatest burdens of current energy and economic systems are actively seeking to be part of the solution, using their lived experience as a driver for justice-oriented participation in the transition. Specifically their values directly shape the career pathways they pursue next. Climate responsibility and intergenerational duty were recurring themes. Participants described their careers as responses to the disproportionate burdens of climate change: *"those who are most underprivileged and socioeconomically disadvantaged will bear the brunt of a climate crisis they have contributed least to."* Others insisted that a sustainable world is impossible without low-carbon energy: *"It is impossible ... to discuss a more sustainable world without discussing a clean and renewable energy transition."* Such testimonies underscore that applicants bring ethical and justice-driven orientations that directly address the workforce's need for professionals who can connect technical transitions with public trust and social license — a gap highlighted by [4] in its global skills outlook. This justice-driven motivation also shapes how applicants imagine their future roles in the sector, creating a natural link to the representation and career ambitions discussed in the next section.

Representation and visibility were also central to many career ambitions. One participant explained, *"I aspire to be a catalyst for change ... in the broader context of gender representation in engineering,"* while another stressed, *"I want to be a positive role model and mentor to young, aspiring women in STEM."* These commitments directly counter the sticky floors and glass ceilings [53] that keep women concentrated in low-paying or administrative roles. By actively positioning themselves as leaders and mentors, applicants demonstrate their potential to expand representation in technical and decision-making spaces — addressing one of the most persistent workforce shortages flagged in EHRC's labour market forecasts [6]: the underrepresentation of women and minorities in management and leadership roles.

For Indigenous participants, motivations were inseparable from sovereignty and cultural survival. One Métis applicant reflected on the *"lack of Métis participation in renewable energy projects across Canada"* and her desire to change this. In contrast, another Inuk applicant emphasized *"community-led solutions that prioritize cultural preservation and trust-building."* Others tied participation directly to decolonization: *"Decolonization and environmental justice are inextricably linked; to contribute to the renewable energy transition is to advance decolonization on Turtle Island."* Such expressions illustrate how recognition justice operates as participants not only aiming to access low-carbon energy jobs but also redefining who belongs in the sector. Their voices resonating the arguments of feminist intersectional scholars that equity requires valuing diverse lived experiences as source of knowledge and legitimacy [23][68][18]).These perspectives reinforce Reed et al.'s [85] and MacArthur et [54] arguments that Indigenous rights and community self-determination must be central to transitions. They also address what EHRC [6] and IRENA[4] both identify as a gap: the sector's limited capacity to engage Indigenous and local communities as equal partners in workforce planning.

Innovation and scientific curiosity were also described as more than personal interests; they were framed as contributions to systemic change. One participant explained, *"My desire to pursue a future in the clean and renewable energy transition is driven by a combination of environmental consciousness, passion for innovation, the potential for global impact, and a personal commitment to sustainability."* Another noted, *"the shift toward renewable, clean energy is not just a matter of*

technological advancement, but of environmental stewardship and social responsibility." These accounts echo Sovacool et al. [45], who argue that transitions are not only technical substitutions but normative projects requiring new forms of social innovation. They also respond directly to IRENA's [4] findings that the sector suffers from a shortage of professionals who can combine technical and cross-disciplinary skills to drive innovation at scale.

Personal histories also shaped motivations in significant ways. One applicant cited her father's encouragement as decisive: *"my main inspiration was my dad,"* while another described leaving oil and gas because *"a future with clean and renewable energy is more aligned with my interests and who I am as a person."* A third described herself as the first woman in her family to study STEM abroad, noting that this experience inspired her *"to support and encourage other women and students from non-traditional backgrounds to step into science and clean energy careers."* These stories highlight how non-linear career paths and non-traditional entry points can expand the workforce — precisely the kind of diversification recommended by EHRC [6] to address looming labour shortages.

Finally, advocacy and communication emerged as vital aspirations. Some applicants emphasized bridging the gap between awareness and action, explaining: *"My ambition is to bridge this gap in awareness and action. By cultivating a deep understanding of these challenges and fostering a proactive mindset."* Others sought to influence policy: *"Enabling myself the ability to advocate for and one day contribute to the development of policies and plans that prioritize clean energy adoption and sustainable urban development."* These testimonies highlight the importance of roles beyond the technical workforce — a gap also flagged by IRENA [4], which stresses the need for professionals capable of integrating technical expertise with policy, advocacy, and public engagement.

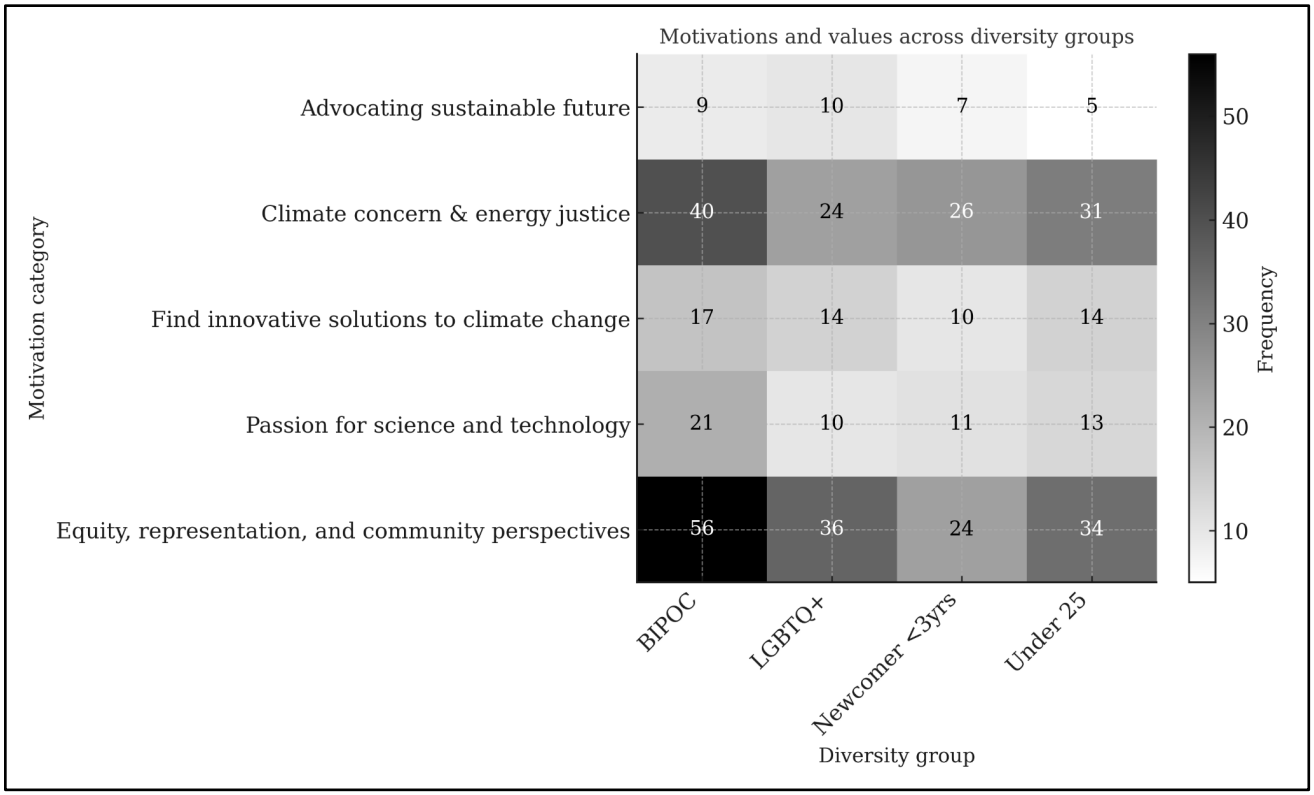


Figure 6. Heatmap of motivations and values expressed across the four diversity groups

Taken together, these narratives show that women and equity-deserving applicants approach the sector as a values-based workforce, motivated by climate responsibility, representation, innovation, and advocacy. The heatmap (Figure 6) confirms that while climate concern and innovation were common across all groups, BIPOC, LGBTQ+, Indigenous, and newcomer applicants were especially likely to frame their motivations in terms of equity, representation, and collective responsibility. Their orientations align closely with the skills gaps identified in sector reports [6][4] — from diversifying leadership and expanding technical capacity to strengthening community legitimacy and embedding social responsibility. In this sense, the very groups historically excluded from energy systems are also those most committed to building the resilient, representative, and justice-oriented workforce that Canada needs for its low-carbon energy future. These findings underscore that justice in participation is not uniform—it varies with positionality, community ties, and histories of exclusion.

4.3 Career aspirations and employment pathways

Applicants envisioned careers in low-carbon energy not as linear or predetermined but as journeys shaped by values, opportunities, and systemic constraints. Some entered with broad goals, expressing a desire simply to *"find a job in sustainability where I can practice my studies"*. This openness reflects the uncertainty of a rapidly evolving sector, which IRENA [4] describes as characterized by fluid career pathways and shifting skill requirements.

The heatmap (Figure 7) illustrates that aspirations clustered most strongly around community and grassroots engagement, governance of low-carbon energy, and academic/research careers, alongside technical and entrepreneurial roles. These patterns highlight that women and equity-deserving groups imagine careers not only as personal advancement but as platforms for systemic change.

Many applicants targeted technical or sector-specific roles, such as securing *"a job position in a company that is directly related to producing or investing in clean energy"*, or contributing through R&D to *"innovate and create solutions for a greener future"*. Others aspired hands-on roles as solar electricians or wind turbine technicians. Significantly, technical expertise was often linked to social benefit, as in one applicant's aim to apply building science *"in healthcare design and addressing building envelope issues in Indigenous Reservations"*. These ambitions stand in contrast to broader structural patterns in which women and equity-deserving groups remain significantly under-represented in technical and trades occupations—only about 9–11 % of the renewable-energy workforce in Canada holds such roles [6][14]. Thus, those applicants are claiming spaces against the male-dominated culture in the workplace, challenging systematic barriers that limit access to training and stable employment [1][18])

Academic and research careers also emerged prominently in the heatmap. For many, higher education was envisioned as both a site of knowledge production and a platform for leadership. One participant noted: *"Upon completing my PhD in Chemical Engineering, I aim to pursue a career in academia … bridging the gap between fundamental science and real-world applications"*. Another aspired to *"become an Assistant Professor … while shaping the next generation o*f engineers". These aspirations align with[24] call for academia to engage more deeply in participatory governance, as well as EHRC [6], which identifies academia as a critical pipeline for skilled talent.

The heatmap (Figure 7) revealed particularly high aspirations toward governance and leadership, especially among BIPOC and under-25 applicants. Applicants articulated ambitions to influence policy and institutional design: *"I want to work in the development and implementation of policies that prioritize environmental justice, promote renewable energy adoption, and foster community empowerment"*. Others described bridging roles: *"I want to work as a bridge maker between various collaborators and stakeholders in the energy sector"*. These narratives show that applicants are challenging the mainstream patterns of low-carbon energy workforce where leadership and decision-making positions within Canada's energy sector remain relatively male-dominated and non-diverse, with women—especially racialized and Indigenous women—holding fewer than one-third of such roles [6][16]. Applicants emphasis on representation and collaborative governance signaling and aspiration for correcting these entrenched structural inequities. Their goals align with feminist energy-systems theory [68], which underscores that diversifying governance and recognizing care, relational work, and collective decision-making are essential to just transitions. They also directly address EHRC's **[6]** finding that Canada faces shortages not only in technical workers but also in policy and governance professionals.

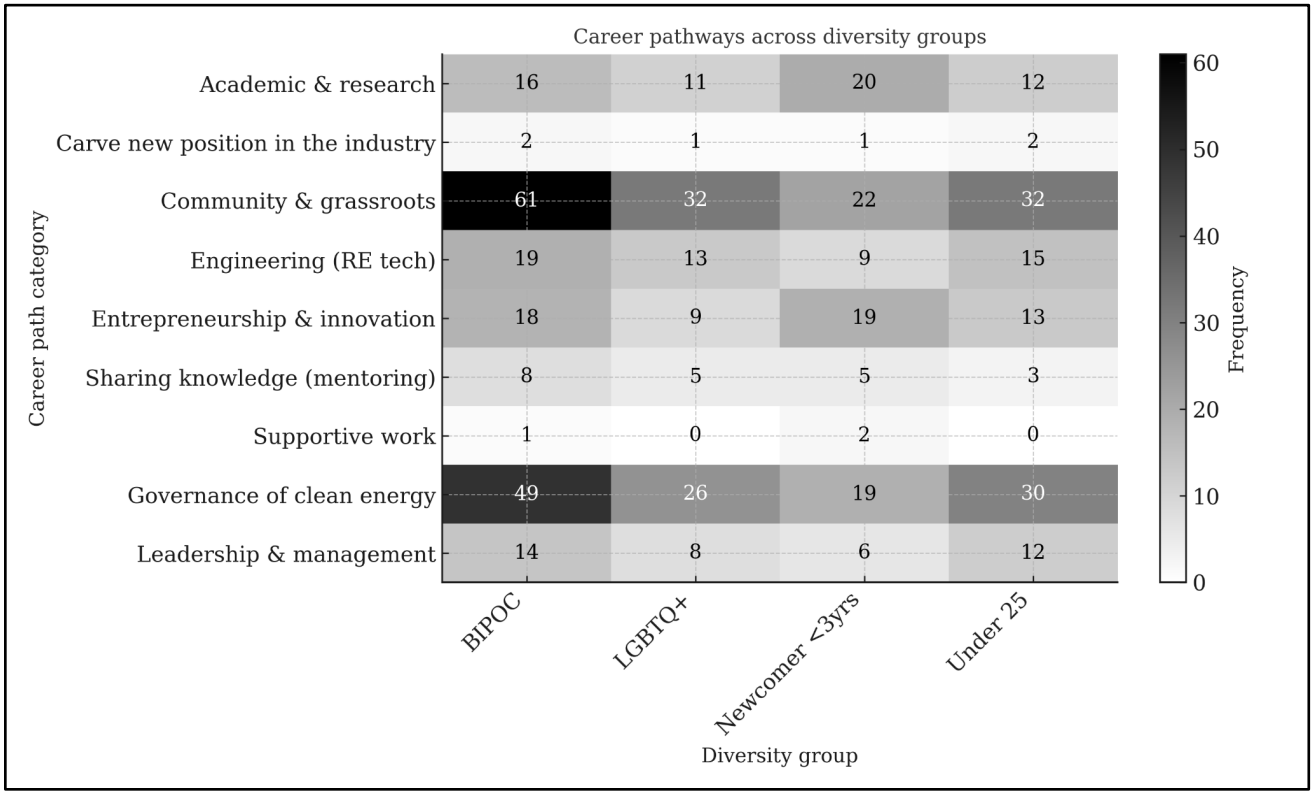


Figure 7. Heatmap of career pathways aspired across the four diversity groups.

Community and grassroots engagement were the strongest aspirations in the heatmap (BIPOC; LGBTQ+; under-25). Applicants described ambitions to drive local change, challenge inequities, and reimagine knowledge systems. One participant envisioned *"creating a lab space and research program that integrates Indigenous ways of knowing with clean energy innovation, challenging the traditional notion of sterile engineering"*. Another highlighted entrepreneurship as a pathway for justice: *"My vision is to establish a social enterprise that empowers rural communities ... This*

enterprise would directly advance SDG 7[11]". By aiming to create new community-based ventures, participants are effectively constructing parallel channels of participation where innovation and entrepreneurship ecosystems remain highly centralized and exclusionary, often dominated by established actors with access to capital, networks, and institutional legitimacy [6][1]. Through these community-rooted, inclusive spaces of innovation, applicants position themselves as agents of *off-stream* transformation—developing what Lieu et al.[74]describe as alternative pathways that operate outside dominant institutional channels.

Entrepreneurship and innovation were also notable among newcomers and BIPOC applicants. One participant aspired to *"start my own business in the renewable energy and sustainability sector,"* linking innovation to systemic change. These visions respond directly to IRENA's [4] call for scaling entrepreneurial capacity to accelerate renewables, particularly in underserved communities, while simultaneously embodying the grassroots innovation logic where small, protected spaces where equity, care, and collective learning can evolve [77][76].

Crucially, mentorship and representation were woven into career visions across all groups. One future engineer noted: *"I aspire to be an engineer creating sustainable energy solutions, but above all, I want to be a positive role model and mentor to young, aspiring women"*. Others imagined careers where success would mean lifting others, not just advancing individually. These reflections resonate with feminist and energy-justice frameworks, which interpret mentoring, reciprocity, and collective empowerment as forms of care infrastructure essential for achieving procedural and recognition justice [23][68]. By centering mentoring and representation, participants reimagine professional success not as individual advancement but as relational transformation—a process of building networks of belonging that redistribute knowledge, confidence, and opportunity. In doing so, they translate the normative ideals of care and justice into everyday practices of inclusion, embodying just transition principles outlined earlier.

These reflections reveal that women and equity-deserving applicants do not see low-carbon energy careers simply as technical jobs. Instead, they envision pathways that combine expertise with governance, advocacy, and care. The heatmap confirms this dual orientation: technical aspirations (engineering, research) are strong, but commitments to governance, grassroots engagement, and mentorship are equally prominent. By linking technical mastery with leadership, community engagement, and mentoring, participants articulate the recognition and procedural justice dimensions discussed in —insisting that inclusion, care, and participation are as vital as decarbonization itself [42][43] [23][68]). These ambitions map directly onto workforce gaps identified by EHRC [6] and IRENA[4]**:** the need for leaders who can integrate technical skills with policy, community engagement, and social innovation. In this sense, applicants' career pathways embody what Sovacool et al. [45] describe as the *normative project of transitions* — building energy futures that are not only low-carbon, but inclusive, participatory, and resilient. At the same time, these aspirations illustrate how micro-scale initiatives such as the Trellis Bursary function as *feminist niche experiments* : protected spaces where

[11] SDG7is the United Nations' Sustainable Development Goal 7, which aims to "Ensure access to affordable, reliable, sustainable and modern energy for all" in 2030. https://www.un.org/sustainabledevelopment/energy/

equity, care, and collective learning are cultivated and can gradually influence mainstream workforce norms.

4.4 Leveraging Bursary and Support Mechanisms

Applicants consistently emphasized that the Trellis bursary functioned as more than financial aid; it operated as a *structural enabler* of persistence, professional growth, and community impact. For many, even modest support directly determined whether they could remain in school or dedicate time to research rather than survival work. As one noted, *"Working two part-time jobs … has been costing me valuable study time and my grades."*

These accounts echo the findings of Baruah & Biskupski-Mujanovic [53] and EHRC [6] that affordability acts as a gatekeeper, disproportionately filtering out women, newcomers, and BIPOC students from STEM and low-carbon energy pathways. This dynamic directly reflects the structural inequities outlined in Section 1—where financial exclusion, precarious employment, and limited access to technical training restrict entry and retention in the low-carbon energy workforce [14].

At the same time, the experiences shared by applicants illustrate the distributional justice dimension of the energy-justice framework [43][42]): without targeted redistribution of resources, marginalized groups remain systematically excluded from the opportunities generated by the low-carbon energy transition. The Trellis Fund bursary addresses this gap by providing not merely financial relief, but a form of infrastructure of care, enabling students to redirect time, attention, and emotional energy toward their studies and community commitments rather than survival labor—echoing feminist analyses of care and social reproduction[23][68].

In this way, the bursary operates as an off-stream feminist nich**e**, as described in Section 2.2: a protected micro-space where recognition, redistribution, and care are enacted materially, providing the conditions under which diverse students can remain in the pipeline and envision future leadership. Far from being peripheral, these supports demonstrate how small, equity-centered interventions can mitigate the systemic gatekeeping identified in Section 1 (the introduction) and model the inclusive, justice-based values essential for a just energy transition.

4.5 Study Limitations

This study offers novel insights into the lived experiences of women and equity-deserving applicants in Canada's low-carbon energy workforce, although limitations should be acknowledged. The use of application-based narratives, rather than semi-structured interviews or longitudinal methods, constrains the depth, nuance, and contextual detail that could be elicited. Some motivations, barriers, or experiences may be only partially captured in the written responses. Recognizing this diversity is essential to avoiding overgeneralization and to supporting more nuanced research in future work.

Conclusion

With today's Canadian energy workforce experiencing a shortfall in qualified workers, and with the sector predicted to grow reliably, it seems a strategic error to exclude 50% of potential participants. This study addresses this persistent shortfall by investigating and highlighting systemic barriers that

stand in the way of women seeking good jobs in the energy economy. With insights into the structural barriers that are holding women back from entering this realm of well-paying, secure jobs, policy-makers and employers alike become more empowered (and challenged) to adapt decisions that attract, train and employ women in support of Canada's low-carbon energy transition.

This study makes three key contributions to the literature and to workforce policy. First**,** it provides new empirical evidence by analyzing 119 narrative-based applications from women and equity-deserving groups—offering a rare qualitative view into the lived experiences, motivations, and systemic constraints shaping entry into low-carbon energy careers. These insights complement and deepen national labour reports that rely primarily on surveys or modelling. Second**,** the study advances theoretical understanding by integrating energy justice, intersectionality, and feminist energy-systems perspectives to show that barriers to participation are embedded not just in labour markets but in broader systems of recognition, care, and institutional design. Using the alternative pathways framework and strategic niche management, we reconceptualized bursaries such as the Trellis fund as a feminist niche experiment: a micro-scale intervention that embodies off-stream innovation, nurtures collective learning, and prefigures the transformative values required for a just and inclusive low-carbon energy future. Third, the findings offer actionable guidance for inclusive workforce planning, identifying concrete opportunities for employers, educators, and policymakers to redesign hiring, training, and support mechanisms in ways that reflect the needs and expertise of equity-deserving groups.

The narratives examined here demonstrate that women, newcomers, BIPOC, LGBTQ+, and under-25 applicants are not lacking interest, ambition, or talent. Instead, they face intersecting financial, cultural, and institutional barriers—tuition burdens, cost of living, credential recognition, exclusionary workplace cultures—that systematically constrain participation. Addressing these inequities requires coordinated changes in funding models, education systems, and sector hiring practices. Yet the applicants also articulated deeply values-driven motivations rooted in climate responsibility, equity, community representation, and innovation, revealing a future workforce already aligned with the leadership and social-engagement needs of Canada's energy transition.

Within this landscape, the Trellis Bursary operates as more than financial assistance. As a grassroots feminist niche initiative, it acts as a structural enabler of persistence—redistributing resources, affirming lived experience, and creating protected spaces where applicants can build confidence, reduce survival-labour pressures, and develop the skills and networks necessary for long-term participation. Such interventions cannot replace structural reform, but they demonstrate the transformative potential of micro-scale, justice-oriented supports and provide a replicable model for industry and policymakers.

Ultimately, the low-carbon energy transition will not succeed through technological innovation alone. It requires inclusive workforce strategies that recognize the knowledge, leadership, and aspirations of those historically excluded from the sector. By centering lived experience and demonstrating pathways for recognition, redistribution, and care, this study shows how Canada can build not only a larger low-carbon energy workforce, but a more just, representative, and resilient one.

Declaration of interests

☒ The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

This work was supported by the New Frontiers in Research Fund Global NFRFG-2020-00339 and the Canada Research Chair Secretariat CRC-2020-00055. In memory of Veronica Gardner, in whose honour the Trellis Fund was established, to recognize and celebrate an extraordinary mother and woman of conviction, integrity and action.

Credit Author Statement:

Jaradat: Conceptualization; Development of methodology; Validation, Formal analysis; Investigation; Data Curation; Writing - Original Draft; Visualization

Black: Conceptualization, Methodology, Resources, Data Curation; Writing-original draft, project administration, supervision; Visualization

Hoicka: conceptualization; Resources, writing - original draft, project administration, funding acquisition.

References

[1] International Renewable Energy Agency (IRENA) and International Labour Organization (ILO), *Renewable Energy and Jobs: Annual Review 2023*. Abu Dhabi, United Arab Emirates, and Geneva, Switzerland: IRENA and ILO, 2023. [Online]. https://www.irena.org/Publications/2023/Sep/Renewable-energy-and-jobs-Annual-review-2023

[2] IRENA (2024), Decentralized solar PV: A gender perspective, International Renewable Energy Agency,Abu Dhabi.

[3] IRENA (2025, October), *Renewable energy: A gender perspective (Second Edition).* Abu Dhabi: IRENA. https://www.irena.org/Publications/2025/Oct/Renewable-Energy-A-Gender-Perspective

[4] IRENA (2019), Renewable Energy: A Gender Perspective. IRENA, Abu Dhabi. https://www.irena.org/Publications/2019/Jan/Renewable-Energy-A-Gender-Perspective

[5] M. Feenstra and M. Kottari, "The Energy Transition and Gender Considerations of the Workforce Transformation: A Critical Review of the Dutch Case," in Women and the Energy Sector, N. Rocha Lawton and C. Forson, Eds., Cham: Springer International Publishing, 2024, pp. 125–147. doi: 10.1007/978-3-031-43091-6_6.

[6] Electricity Human Resources Canada, *Winds of Change: Labour Market Dynamics in Renewable Energy*. Ottawa, ON, Canada: Electricity Human Resources Canada (EHRC), Mar. 2025. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://ehrc.ca/wp-content/uploads/2025/03/EHRC-Winds-of-Change-2025.pdf

[7] International Energy Agency (IEA), *World Energy Employment 2024*, 2nd rev. ed. Paris, France: International Energy Agency, Mar. 2025. https://iea.blob.core.windows.net/assets/d2b4b054-4a55-4c6f-893f-fc2c8b77e9a1/WorldEnergyEmployment2024.pdf

[8] Organization for Economic Co-operation and Development OECD, Employment and Skills Policies for the Green Transition: Review of International Good Practices. OECD Publishing, 2025. doi: 10.1787/f0c558fa-en.

[9] M. MacLean, E. Garrod, J. Sousa, J. J. Davis, G. Russell, and E. Ligeti, *CanREA's National Workforce Strategy for the Wind, Solar and Energy Storage Industries*, M. Cote, Ed. Ottawa, ON, Canada: Canadian Renewable Energy Association (CanREA), 2023. [Online]. Available https://renewablesassociation.ca/wp-content/uploads/2025/01/CanREAs-Natl-Workforce-Dev-Strategy-EN-Final.Aug28.2024.pdf

[10] International Energy Agency. (n.d.). World Energy Employment 2023. In *World Energy Employment 2023* (pp. 3–5). https://iea.blob.core.windows.net/assets/8934984a-0d66-444f-a36f-641a4a3ef7de/World_Energy_Employment_2023.pdf.

[11] Clean Energy Canada, *A Pivotal Moment: A Net-Zero 2050 Can Deliver 700,000 More Canadian Energy Jobs Than Exist Today, but Rolling Back Climate Action Would Severely Threaten This Clean Energy Future*. Vancouver, BC, Canada: Clean Energy Canada, Mar. 2023. ISBN: 978-1-989692-10-3.

[12] Natural Resources Canada, *Energy Fact Book 2024–2025*. Ottawa, ON, Canada: Natural Resources Canada, 2024. https://energy-information.canada.ca/sites/default/files/2024-10/energy-factbook-2024-2025.pdf

[13] Clean Energy Canada, *2022 Annual Report*. Vancouver, BC, Canada: Clean Energy Canada, 2022. https://cleanenergycanada.org/wp-content/uploads/2023/02/CEC-AnnualReport-2022-Web.pdf

[14] B. Gueye, *Women in the Environmental and Clean Technology Sector*, Economic and Social Reports, vol. 4, no. 7. Ottawa, ON, Canada: Statistics Canada, Jul. 2024., doi: 10.25318/36280001202400700003-ENG.

[15] Electricity Human Resources Canada, *Electricity in Demand: Labour Market Insights 2023–2028*. Ottawa, ON, Canada: Electricity Human Resources Canada (EHRC), 2023. https://ehrc.ca/wp-content/uploads/2024/05/Electricity-in-Demand-Labour-Market-Insights.pdf

[16] Pembina Institute. How Canada can equip workers for a low-carbon future | (2025, May 28). Press release, Retrieved August 15, 2025, from https://www.pembina.org/media-release/how-canada-can-equip-workers-low-carbon-future?

[17] E. Shirt, J. MacLean, and M. McIntyre, *Women in Energy Transformation: Summary Paper*. Calgary, AB, Canada: Pembina Institute and Women in Renewable Energy (WiRE), 2022. https://www.pembina.org/pub/women-energy-transformation-series-summary-paper

[18] B. Baruah and C. Gaudet, “Creating and Optimizing Employment Opportunities for Women in the Clean Energy Sector in Canada,” J. Can. Stud., vol. 56, no. 2, pp. 240–270, Aug. 2022, doi: 10.3138/jcs.2019-0010.

[19] UN Women and United Nations Industrial Development Organization (UNIDO), *Gender Equality in the Sustainable Energy Transition*. New York, NY, USA, and Vienna, Austria: UN Women and UNIDO, 2023, pp. 12–15. [Online]. www.unwomen.org/sites/default/files/2023-05/Gender-equality-in-the-sustainable-energy-transition-en.pdf

[20] Organization for Economic Co-operation and Development OECD, Assessing and Anticipating Skills for the Green Transition: Unlocking Talent for a Sustainable Future. in Getting Skills Right. OECD Publishing, 2023. doi: 10.1787/28fa0bb5-en.

[21] S. Popescu, “Leading Canada’s Sustainable Energy Transition: Does Gender Matter?,” Master of Arts, Carleton University, Ottawa, Ontario, 2021. doi: 10.22215/etd/2021-14739.

[22] M. A. Caretta and D. Vela-Almeida, “Just energy transition and gender. A systematic review for feminist research,” Energy Res. Soc. Sci., vol. 126, p. 104138, Aug. 2025, doi: 10.1016/j.erss.2025.104138.

[23] S. MacGregor, “A Stranger Silence Still: The Need for Feminist Social Research on Climate Change,” Sociol. Rev., vol. 57, no. 2_suppl, pp. 124–140, Oct. 2009, doi: 10.1111/j.1467-954X.2010.01889.x.

[24] C. E. Hoicka, “How do we practice equity, diversity and inclusion in sustainable energy research? Advice for modern researchers,” Energy Res. Soc. Sci., vol. 97, p. 102964, Mar. 2023, doi: 10.1016/j.erss.2023.102964.

[25] C. E. Hoicka, J. C. Stephens, Y. Zhao, and P. S. Hernandez, “Misalignment or exclusion? Investigating climate and energy philanthropy funding of diversity,” Energy Res. Soc. Sci., vol. 106, p. 103317, Dec. 2023, doi: 10.1016/j.erss.2023.103317.

[26] R. Pearl-Martinez and J. C. Stephens, “Toward a gender diverse workforce in the renewable energy transition,” Sustain. Sci. Pract. Policy, vol. 12, no. 1, pp. 8–15, Apr. 2016, doi: 10.1080/15487733.2016.11908149.

[27] B. K. Sovacool et al., “Pluralizing energy justice: Incorporating feminist, anti-racist, Indigenous, and postcolonial perspectives,” Energy Res. Soc. Sci., vol. 97, p. 102996, Mar. 2023, doi: 10.1016/j.erss.2023.102996.

[28]] Women in Renewable Energy (WiRE). (2025, December 14). *Women in Renewable Energy (WiRE) | Femmes des Énergies Renouvelables (FÉR)*. https://womeninrenewableenergy.ca

[29] Student Energy. (n.d.). *Student Energy: Empowering the next generation of energy leaders.* Retrieved October 19, 2025, from https://studentenergy.org/

[30] Canadian Renewable Energy Association (CanREA). (2024). *Canadian Renewable Energy Association.* https://renewablesassociation.ca/

[31] Solar Alberta. (2025). StepUp in energy management. In *Solar Alberta*. https://solaralberta.ca/service-provider/stepup-in-energy-management/

[32] Black, R., with Trellis. (2025, February). *Trellis: Supporting the next generation of clean energy professionals.* Paper presented at the CanREA Operators and Maintenance Conference, Toronto, ON, Canada. (No recording or link available)

[33] Black, R., Mehrun S., & Jayasekera, D., with Trellis. (2025, October). *Trellis Fund: Filling future gaps in the energy workforce.* Panel discussion at the Electricity Transformation Canada Conference, Toronto, ON, Canada.

[34] Waldie, P. (2025). Pitching in: Scholarships for women in the renewable energy field. *The Globe and Mail*. https://www.theglobeandmail.com/business/article-pitching-in-scholarships-for-women-in-the-renewable-energy-field/

[35] Black, R., Ellis, D., with Trellis Fund. (2024). Interview with Rebecca Black and Debbie Ellis, Trellis Fund. *Women in Power Systems*, 1–13. https://womeninpowersystems.com/interview-with-rebecca-black-and-debbie-ellis-trellis-fund/

[36] Beer, M. (2024, July 4). *New grant program helps women pursue green energy careers. The Energy Mix.* https://www.theenergymix.com/new-grant-program-helps-women-pursue-green-energy-careers/

[37] Electricity Human Resources Canada. (n.d.). Bursaries for women entering the electricity industry. In *Electricity Human Resources Canada*. https://ehrc.ca/programs/bursaries/

[38] Ontario Energy Network. (2019). *OEN Women in Energy Scholarship* [Press release]. https://www.electrofed.com/efc-scholarship/oen-women-in-energy-scholarship/

[39] Student Energy. (2025). Green jobs. In *Student Energy* . https://studentenergy.org/green-jobs/

[40] A. Cherp, V. Vinichenko, J. Jewell, E. Brutschin, and B. Sovacool, “Integrating techno-economic, socio-technical and political perspectives on national energy transitions: A meta-theoretical framework,” Energy Res. Soc. Sci., vol. 37, pp. 175–190, Mar. 2018, doi: 10.1016/j.erss.2017.09.015.

[41] G. Verbong and F. Geels, “The ongoing energy transition: Lessons from a socio-technical, multi-level analysis of the Dutch electricity system (1960–2004),” Energy Policy, vol. 35, no. 2, Art. no. 2, Feb. 2007, doi: 10.1016/j.enpol.2006.02.010.

[42] B. K. Sovacool and M. H. Dworkin, “Energy justice: Conceptual insights and practical applications,” Appl. Energy, vol. 142, pp. 435–444, Mar. 2015, doi: 10.1016/j.apenergy.2015.01.002.

[43] K. Jenkins, D. McCauley, R. Heffron, H. Stephan, and R. Rehner, “Energy justice: A conceptual review,” Energy Res. Soc. Sci., vol. 11, pp. 174–182, Jan. 2016, doi: 10.1016/j.erss.2015.10.004.

[44] R. J. Heffron, “Nuclear new build in the United States 1990–2010: A three state analysis,” Technol. Forecast. Soc. Change, vol. 80, no. 5, pp. 876–892, June 2013, doi: 10.1016/j.techfore.2012.10.023.

[45] B. K. Sovacool, M. Burke, L. Baker, C. K. Kotikalapudi, and H. Wlokas, “New frontiers and conceptual frameworks for energy justice,” Energy Policy, vol. 105, pp. 677–691, June 2017, doi: 10.1016/j.enpol.2017.03.005.

[46] R. J. Heffron and D. McCauley, “What is the ‘Just Transition’?,” Geoforum, vol. 88, pp. 74–77, Jan. 2018, doi: 10.1016/j.geoforum.2017.11.016.

[47] P. García-García, Ó. Carpintero, and L. Buendía, “Just energy transitions to low-carbon economies: A review of the concept and its effects on labour and income,” Energy Res. Soc. Sci., vol. 70, p. 101664, Dec. 2020, doi: 10.1016/j.erss.2020.101664.

[48] S. Fuller and D. McCauley, “Framing energy justice: perspectives from activism and advocacy,” Energy Res. Soc. Sci., vol. 11, pp. 1–8, Jan. 2016, doi: 10.1016/j.erss.2015.08.004.

[49] N. Van Uffelen, “Revisiting recognition in energy justice,” Energy Res. Soc. Sci., vol. 92, p. 102764, Oct. 2022, doi: 10.1016/j.erss.2022.102764.

[50] “Mapping the Margins: Intersectionality, Identity Politics, and Violence against Women of Color,” Stanford Law Rev., vol. 43, 2025.

[51] K. Jenkins, B. K. Sovacool, and D. McCauley, “Humanizing sociotechnical transitions through energy justice: An ethical framework for global transformative change,” Energy Policy, vol. 117, pp. 66–74, June 2018, doi: 10.1016/j.enpol.2018.02.036.

[52] S. Williams and A. Doyon, “Justice in energy transitions,” *Environ. Innov. Soc. Transit.*, vol. 31, pp. 144–153, June 2019, doi: 10.1016/j.eist.2018.12.001.

[53] B. Baruah and S. Biskupski-Mujanovic, “Navigating sticky floors and glass ceilings: Barriers and opportunities for women’s employment in natural resources industries in Canada,” Nat. Resour. Forum, vol. 45, no. 2, pp. 183–205, May 2021, doi: 10.1111/1477-8947.12216.

[54] J. L. MacArthur, C. E. Hoicka, H. Castleden, R. Das, and J. Lieu, “Canada’s Green New Deal: Forging the socio-political foundations of climate resilient infrastructure?,” Energy Res. Soc. Sci., vol. 65, p. 101442, July 2020, doi: 10.1016/j.erss.2020.101442.

[55] D. Stevis and R. Felli, “Planetary just transition? How inclusive and how just?,” Earth Syst. Gov., vol. 6, p. 100065, Dec. 2020, doi: 10.1016/j.esg.2020.100065.

[56] S. Pai, J. Emmerling, L. Drouet, H. Zerriffi, and J. Jewell, “Meeting well-below 2°C target would increase energy sector jobs globally,” One Earth, vol. 4, no. 7, pp. 1026–1036, July 2021, doi: 10.1016/j.oneear.2021.06.005.

[57] R. Pearse and R. Connell, “Gender Norms and the Economy: Insights from Social Research,” Fem. Econ., vol. 22, no. 1, pp. 30–53, Jan. 2016, doi: 10.1080/13545701.2015.1078485.

[58] N. Räthzel and D. Uzzell, “The future ofwork defines the future of humanity and all living species,” Future Work, vol. 9.

[59] M. Ryghaug and T. M. Skjølsvold, Pilot Society and the Energy Transition: The co-shaping of innovation, participation and politics. Cham: Springer International Publishing, 2021. doi: 10.1007/978-3-030-61184-2.

[60] I. Dankelman, “Climate Change and Gender in Rich Countries: Work, Public Policy and Action, [Book review]. In M. G. Cohen (Ed.), *Feminist Economics* vol. 25, no. 2, pp. 199–204, Apr. 2019, doi: 10.1080/13545701.2018.1538562.

[61] E. Allen, H. Lyons, and J. C. Stephens, “Women’s leadership in renewable transformation, energy justice and energy democracy: Redistributing power,” Energy Res. Soc. Sci., vol. 57, p. 101233, Nov. 2019, doi: 10.1016/j.erss.2019.101233.

[62] E. Zirbes, “Driving Innovation Through Inclusion: Rethinking Workplace Culture in the Energy Sector,” 2025.

[63] K. E. H. Jenkins, B. K. Sovacool, N. Mouter, N. Hacking, M.-K. Burns, and D. McCauley, “The methodologies, geographies, and technologies of energy justice: a systematic and comprehensive review,” Environ. Res. Lett., vol. 16, no. 4, p. 043009, Apr. 2021, doi: 10.1088/1748-9326/abd78c.

[64] K. Sanzo, “The Birth of Energy: Fossil Fuels, Thermodynamics, and the Politics of Work by Cara New Daggett,” Vic. Rev., vol. 45, no. 2, pp. 333–336, 2019, doi: 10.1353/vcr.2019.0065.

[65] Fraser, N. (2016). Contradictions of capital and care. *New Left Review, 100*, 99–117.

[66] K. Whyte, “Indigenous Climate Change Studies: Indigenizing Futures, Decolonizing the Anthropocene,” Engl. Lang. Notes, vol. 55, no. 1–2, pp. 153–162, Mar. 2017, doi: 10.1215/00138282-55.1-2.153.

[67] V. Costantini and F. Crespi, “Public policies for a sustainable energy sector: regulation, diversity and fostering of innovation,” J. Evol. Econ., vol. 23, no. 2, pp. 401–429, Apr. 2013, doi: 10.1007/s00191-010-0211-3.

[68] S. E. Bell, C. Daggett, and C. Labuski, “Toward feminist energy systems: Why adding women and solar panels is not enough☆,” Energy Res. Soc. Sci., vol. 68, p. 101557, Oct. 2020, doi: 10.1016/j.erss.2020.101557.

[69] P. Carroll, “Gender Mainstreaming the European Union Energy Transition,” Energies, vol. 15, no. 21, p. 8087, Oct. 2022, doi: 10.3390/en15218087.

[70] M. Feenstra and F. Hanke, “Creating an Enabling Policy Framework for Inclusive Energy Communities: A Gender Perspective,” in Renewable Energy Communities and the Low Carbon Energy Transition in Europe, F. H. J. M. Coenen and T. Hoppe, Eds., Cham: Springer International Publishing, 2021, pp. 205–226. doi: 10.1007/978-3-030-84440-0_9.

[71] L. Oosthuizen, I. H. De Kock, and J. K. Musango, “A Conceptualization for the Integration and Evaluation of Gender Mainstreaming in Energy Project Development,” in 2022 IEEE 28th International Conference on Engineering, Technology and Innovation (ICE/ITMC) & 31st International Association For Management of Technology (IAMOT) Joint Conference, Nancy, France: IEEE, June 2022, pp. 1–8. doi: 10.1109/ICE/ITMC-IAMOT55089.2022.10033255.

[72] S. K. Rad, “« Pursuing a Just Energy Transition in the Canadian Legal System»” (2023). (By University of Toronto, E. M. Iacobucci, University of Toronto, Professor Jutta Brunnée, Professor Mariana Mota Prado, & Professor Andrew Green)(Thesis).

[73] Youth Climate Corps BC, “Climate action,” Youth Climate Corps BC. [Online]. Available: https://www.youthclimatecorps.com. Accessed: Dec. 14, 2025.

[74] J. Lieu, A. H. Sorman, O. W. Johnson, L. D. Virla, and B. P. Resurrección, “Three sides to every story: Gender perspectives in energy transition pathways in Canada, Kenya and Spain,” Energy Res. Soc. Sci., vol. 68, p. 101550, Oct. 2020, doi: 10.1016/j.erss.2020.101550.

[75] M. Leach, I. Scoones, and A. Stirling, *Dynamic Sustainabilities: Technology, Environment, Social Justice*. London, U.K.: Earthscan, 2010.

[76] F. W. Geels and J. Schot, “Typology of sociotechnical transition pathways,” Res. Policy, vol. 36, no. 3, Art. no. 3, Apr. 2007, doi: 10.1016/j.respol.2007.01.003.

[77] G. Seyfang and A. Smith, “Grassroots innovations for sustainable development: Towards a new research and policy agenda,” Environ. Polit., vol. 16, no. 4, Art. no. 4, Aug. 2007, doi: 10.1080/09644010701419121.

[78] O. Fals-Borda, “The Application of Participatory Action-Research in Latin America,” Int. Sociol., vol. 2, no. 4, pp. 329–347, Dec. 1987, doi: 10.1177/026858098700200401.

[79] P. Freire and D. P. Macedo, Pedagogy of the oppressed: 30th Anniversary Edition, 30th anniversary edition. New York: Bloomsbury Publishing, 2014.

[80] M. Gibbons, Ed., The new production of knowledge: the dynamics of science and research in contemporary societies, Reprinted. London: Sage Publ, 2009.

[81] C. F. Leask, M. Sandlund, D. A. Skelton, T. M. Altenburg, G. Cardon, M. J. M. Chinapaw, I. De Bourdeaudhuij, M. Verloigne, and S. F. M. Chastin, “Framework, principles and

recommendations for utilising participatory methodologies in the co-creation and evaluation of public health interventions," *Research Involvement and Engagement*, vol. 5, no. 1, p. 2, 2019, doi: 10.1186/s40900-018-0136-9.

[82] J. Knight, "Methodologies for Research Co-creation in the Social Sciences: Insights and Recommendations From Community-Based Research in Africa," Int. J. Qual. Methods, vol. 24, p. 16094069251356665, July 2025, doi: 10.1177/16094069251356665.

[83] C. E. Hoicka, "Equity, diversity and inclusion in climate and energy philanthropy matters," Nat. Energy, vol. 9, no. 2, pp. 107–108, Dec. 2023, doi: 10.1038/s41560-023-01424-3.

[84] V. Braun and V. Clarke, "Using thematic analysis in psychology," Qual. Res. Psychol., vol. 3, no. 2, pp. 77–101, Jan. 2006, doi: 10.1191/1478088706qp063oa.

[85] G. Reed, A. C. D. Almeida Cardoso, A. Alook, A. Young, L. R. Johnson, and K. Mclay, "Reclaiming Energy Transitions in Canada: Centering Indigenous Peoples, Rights, and Knowledges for Decolonial Climate Solutions," Environ. Soc., vol. 16, no. 1, pp. 130–154, Sept. 2025, doi: 10.3167/ares.2025.160108.

[86] C. E. Hoicka, K. Savic, and A. Campney, "Reconciliation through renewable energy? A survey of Indigenous communities, involvement, and peoples in Canada," Energy Res. Soc. Sci., vol. 74, p. 101897, Apr. 2021, doi: 10.1016/j.erss.2020.101897.

[87] K. Savic and C. E. Hoicka, "Indigenous legal forms and governance structures in renewable energy: Assessing the role and perspectives of First Nations economic development corporations," Energy Res. Soc. Sci., vol. 101, p. 103121, July 2023, doi: 10.1016/j.erss.2023.103121.

[88] C. E. Hoicka, A. Regier, A. L. Berka, S. Chitsaz, and K. Klym, "'Stretch and transform' for energy justice: Indigenous advocacy for institutional transformative change of electricity in British Columbia, Canada," Energy Policy, vol. 202, p. 114615, July 2025, doi: 10.1016/j.enpol.2025.114615.

Section	Application Question
Basic Info	Please provide your first and last name.
Basic Info	What is the best email address to contact you?
Eligibility	Applicants for this bursary must live in Canada or be an international student studying in Canada. Please choose the correct description of your circumstance from the list below.
Diversity	How do you self-identify? (Options: Woman, BIPOC, LGBTQ+, Newcomer <3 years, Under 25, etc.)
Education	Are you enrolled in an education program that builds skills to work in or support the clean energy or the energy transition sector? (All fields of study will be considered.)
Education	What is the name of the program you are enrolled in?
Education	What is the name of the school or education provider that you are enrolled in?
Education	Please share what inspired you to enrol in your chosen program.
Career Goals	Please share your goals upon completion of the program.
Consent	Can you provide proof of enrolment upon request?
Grant Use	If you were to receive a $2,500 grant, how might you use it?
Motivation	Why do you want to pursue a future in the clean and renewable energy transition?
Consent	Keep in the loop: Join the Trellis Bursary mailing list?