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Climate Change and the Canadian Higher Education System: An Institutional Policy Analysis

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Abstract

Climate change is a pressing concern. Higher education can address the challenge, but systematic analyses of climate change in education policy are sparse. This paper addresses this gap in the literature by reporting on how Canadian postsecondary educational institutions have engaged with climate change through policy actions. We used descriptive quantitative methods to analyze climate change-specific policies from a representative sample of 50 institutions across Canada and found that nearly half had some form of climate policy. Existing policies were then qualitatively analyzed. We found that the most common form of response focused on the built campus environment, with underdeveloped secondary responses focused on research, curriculum, community outreach, and governance policies. We consider the motivations for such institutional action and end with implications for policy makers and future research.

Résumé

Le changement climatique est une préoccupation urgente. L'enseignement supérieur peut relever ce défi mais les analyses systématiques du changement climatique dans l'éducation sont rares. Ce document aborde cette lacune

dans la littérature en signalant comment les établissements d'enseignement postsecondaires canadiens se sont impliqués dans l'analyse du changement climatique grâce à des mesures politiques. Nous avons utilisé des méthodes quantitatives et descriptives pour analyser ces politiques de changement climatique à partir d'un échantillon représentatif de cinquante établissements canadiens et découvert que plus de la moitié possèdent une politique climatique. Nous les avons analysées de manière qualitative et trouvé que la forme de réponse la plus commune était axée sur le milieu bâti du campus avec des réponses secondaires sous-développées axées sur la recherche, le programme, la participation communautaire et la gouvernance. Nous considérons les motivations de ces mesures institutionnelles et finissons par les implications pour les décisionnaires et les recherches futures.

Introduction

Anthropogenic climate change is an emergent and pressing concern, and its impacts will extend into the future (Hansen, 2009; Intergovernmental Panel on Climate Change, 2013). Nation states are beginning to address climate change despite considerable cultural inertia and political resistance (McCright & Dunlap, 2011; Norgaard, 2011; Oreskes & Conway, 2010). As part of these circumstances and responses, educational institutions are adapting to and mitigating, where possible, the present and emerging realities of climate change. This paper examines these processes via a systematic analysis of institutional policies in the Canadian postsecondary education (PSE) system.

Educational institutions have an important role to play in addressing the challenge, for they are charged with preparing students to deal with uncertain present and future socioecological conditions (Curren, 2009; Orr, 2004). They are also significant economic, social, cultural, and ecological actors. How they constitute their physical infrastructure, curriculum, research, and outreach priorities impacts the material and social dynamics of both their local communities and the larger systems within which they interact (Moran, 2010). Changing institutional policy and practice to address climate change has implications on multiple levels, from teaching and student outcomes to tangible material impacts on the ecological and economic conditions of the institution and the surrounding communities and land (Sterling, 2004; Tuck, McKenzie, & McCoy, 2014).

Systematic analyses of climate-focused education policies and practices remain sparse, as mitigating climate change is a relatively recent institutional phenomenon, and educational institutions are only beginning to modify their institutional policies and practices (Colston & Ivey, 2015; Plutzer et al., 2016). In this paper, we document how the Canadian PSE system is evolving to engage new climate realities. In particular, we are interested in how institutions are responding in the following five domains: governance (e.g., institutional priorities, values, and proclamations); education (e.g., curriculum, pedagogy); campus operations (e.g., reducing emissions from campus buildings, transit, etc.); research (i.e., on climate issues and related energy issues); community outreach (e.g., with students, staff, and the off-campus community on climate change). We provide an overview of the types of response to climate change suggested in analyzed policy documents with respect to their relative degrees of attention to these five domains of education policy (Figure 1).

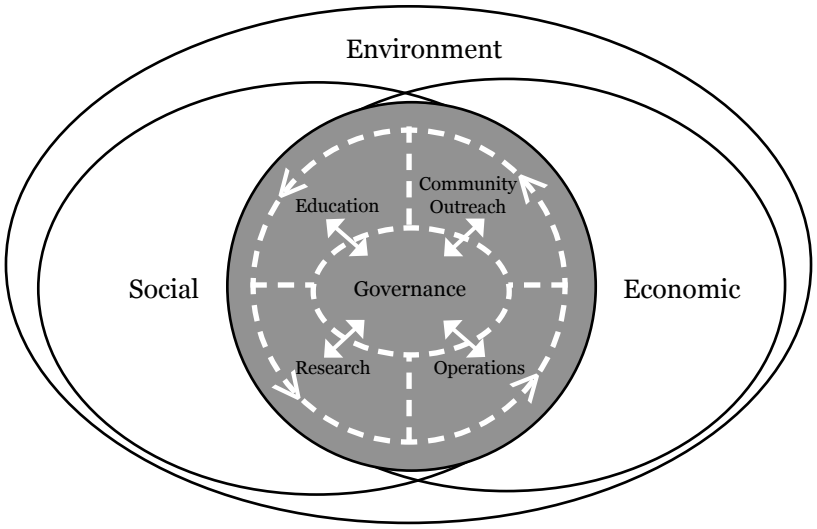

Figure 1. SEPN's working conceptualization of sustainability from Vaughter, McKenzie, Lidstone, and Wright (2016).

This research also contributes to the broader research theme of sustainability in formal education, investigated by the Sustainability and Education Policy Network (SEPN).[1] SEPN was created in 2012 to provide pan-Canadian documentation and analysis of sustainability and climate-related educational policies and practices from early childhood education through to postsecondary education. To date, analyses have been completed of quantitative and qualitative data gathered from all 220 accredited institutions in Canada (e.g., Aikens, McKenzie, & Vaughter, 2016; Beveridge, McKenzie, Vaughter, & Wright, 2015; McKenzie, Bieler, & McNeil, 2015; Vaughter, McKenzie, Lidstone, & Wright, 2016). While existing analyses focus on sustainability more broadly, this paper offers an analysis of climate change-specific policies from a representative sample of 50 Canadian institutions.[2] Climate change-specific policies analyzed include climate action plans, emissions reduction plans, energy consumption plans, subsections of broader sustainability policies, and official administrative proclamations on sustainability and climate change (hereafter referred to collectively as "policies"). We also note where climate change is mentioned in institutions' overall strategic plans or other high-level policy documents by looking for the presence of the terms "climate change" or "greenhouse gas emissions" in the highest-level strategic plan of each institution included in the sample.

In what follows, we begin with a review of existing research on climate policy in Canadian higher education, including in relation to the uptake of sustainability more broadly by Canadian universities, colleges, and cegéps.[3] The focus of this comparative research on the national context is significant because of the highly decentralized character of Canadian higher education policy, the lack of research infrastructure for studying higher education policy at this level, and the dearth of future-oriented planning for the system as a whole (Jones, 2014). Given the national focus of the research project, we also highlight the significance of some national-level developments in climate policy that are a significant backdrop to many of the issues explored in this paper. We then overview our methodological approach and present findings, and we develop an interpretation that includes examining motivations for institutional action. The paper ends with a discussion of implications of the findings for both Canadian and international higher education policy,

suggesting that there is considerable room for growth in both the number of institutions dealing with climate change and how they may address it in the future.

Sustainability, Climate Change, and "Third-Wave" Institutional Dynamics

There is a need for more systematic and comparative research on sustainability education policy and practice, including in relation to the Canadian education system (Vaughter, Wright, McKenzie, & Lidstone, 2013). Although a significant part of the push towards sustainability education has occurred within institutions of higher education (Corcoran & Wals, 2004), large-scale, multi-sited, and systemic analyses of what it actually looks like in terms of policy and practice are lacking (Vaughter et al., 2013). This is partially due to the uneven nature of implementing environmental sustainability and climate change concepts across institutional types, but also because educational paradigms (e.g., education for sustainability, education for sustainable development [ESD], sustainability education, climate change education) are emergent and rapidly evolving (Stephens, Hernandez, Román, Graham, & Scholz, 2008). For instance, the approach of Climate Change Education for Sustainable Development recently became a priority at the international level during the second half of the United Nations Decade of Education for Sustainable Development (2005–2014) (Laessøe & Mochizuki, 2015). This approach seems to be associated with a convergence of climate change education and aligned forms of sustainability education, with a recent cross-national policy analysis that found "convergence, rather than divergence, between climate change education and ESD: ESD is seen either as an overarching label that encompasses climate change education or as a separate effort yet interlinked with climate change education" (Laessøe & Mochizuki, 2015, p. 27). This convergence is also evident in Canada, where the term "climate change education" is still fairly uncommon and tends to be addressed in relation to environmental education or education for sustainable development (Blum, Nazir, Breiting, Goh, & Pedretti, 2013).

The Sustainability and Education Policy Network is currently conducting research on how climate change is engaged with and relates to aligned forms of sustainability education at both the K-12 and the postsecondary levels of formal education across Canada. At the K-12 level, an emerging body of research on national and cross-national trends in climate change education lays a significant groundwork for the analysis of Canadian trends (Blum et al., 2013; Laessøe & Mochizuki, 2015; Sung, 2015; Trajber & Mochizuki, 2015). While this body of literature has sometimes included passing reference to the need to also include climate change education in tertiary or higher education (e.g., Vize, 2012), the literature focused explicitly on climate change education in higher education contexts is significantly less plentiful and often manifests as case studies of particular programs (e.g., Dyer & Dyer, 2015) rather than systemic analysis. Research focused more broadly on sustainability in Canadian higher education also lays some groundwork for the analysis of climate change education initiatives in Canadian universities and colleges. For instance, SEPN has conducted research that shows a focus in Canadian higher education policy on sustainability in campus operations at the expense of in curriculum or research (Vaughter et al., 2016). The limited literature on climate change in Canadian higher education thus warrants our approach here, and the present study addresses this gap in the literature.

Although there has been little systematic research on climate change specifically in Canadian higher education policies, smaller studies have focused predominantly on climate change mitigation (i.e., reducing CO_2 emissions) or adaptation of the built campus

environment (i.e., reducing the vulnerability of infrastructure). This research has largely focused on Atlantic Canada, with a sustainability assessment questionnaire of accredited universities in the region showing less than half (48%) of institutions taking action to reduce CO_2 emissions in line with Kyoto targets (Beringer, Wright, & Malone, 2008). More recent research concentrating on one institution in the region, Dalhousie, has focused on the nuances of climate change adaptation planning as it pertains to the built campus environment (Owen, Fisher, & McKenzie, 2013). An exception to this predominant focus on campus operations is a short account of climate change education initiatives put forward by the University of Toronto's Centre for Environment, as part of its Regional Centre of Expertise on Education for Sustainable Development (Stefanovic, 2008). The proposed initiatives were to be coordinated with the City of Toronto's climate change planning efforts and included an online climate change course focused on social issues and lifestyle changes, as well as professional development workshops for social service providers (Stefanovic, 2008). Given the sparse literature on climate change in relation to Canadian higher education policy, we now turn to a discussion of the more expansive literature on sustainability in higher education.

According to the existing literature, the problem of sustainability in higher education can be understood in a variety of ways, ranging from approaches to institutional sustainability that do not explicitly address environmental issues such as climate change at all, to more transformative visions that aim to prioritize environmental sustainability as the raison d'être of all aspects of higher education (Corcoran & Wals, 2004; Sterling, 2013; Wals & Blewitt, 2010). Institutional changes associated with accommodative (i.e., minor), reformative (i.e., significant but limited in scope), or transformative responses to sustainability in higher education are characteristically complex (Bieler & McKenzie, 2017; Sterling, 2013). This reflects the fact that institutional change is a culturally loaded, value-laden, and socially negotiated process (Henderson, 2015; Hoffman, 2014). Yet, transformative approaches are emerging, including so-called "third-wave" approaches that shift away from a partial integration of sustainability practices into particular domains, such as campus operations, and towards a more systemic view of sustainability and the epistemological changes that are needed for sustainability education, research, and community outreach (Wals & Blewitt, 2010). Wals and Blewitt explained how these third-wave approaches aim to "reorient teaching, learning, research and university-community relationships in such a way that sustainability becomes an emergent property of its core activities" (Wals & Blewitt, 2010, pp. 55–56). These "third-wave" approaches follow the so-called first wave of efforts to integrate environmental issues into Western higher education in the 1970s and 1980s, and the more recent second wave of sustainability in higher education in the first decade of the 21st century that has predominantly focused on campus operations (Wals & Blewitt, 2010). Moving beyond the second-wave focus on campus operations, this third wave of sustainability in higher education includes a much stronger focus on teaching and learning, as well as the integration of sustainability across all aspects of institutional activity (Wals & Blewitt, 2010). It remains to be explored through empirical research to what extent such approaches have taken up the challenge of climate change by integrating a response across all five domains of governance, education, campus operations, research, and community outreach. What is the type of response to climate change seen within and across each of these domains?

A useful frame from the broader climate change literature that can be drawn upon in considering responses in the higher education sector is that developed by Nisbet (2014). In a sociological examination of climate change responses, Nisbet (2014) identified three distinct discourse communities—ecological activists, smart growth reformers, and ecomodernists—that have unique motivations for understanding and addressing climate change. First, "ecological activists," such as writer Bill McKibben, who sits on the board of the environmental NGO 350.org, argue "that climate change is a symptom of a capitalist society that in prioritizing economic growth and consumerism has dangerously exceeded the carrying capacity of the planet" (Nisbet, 2014, p. 810). For this community, the necessary response is unlikely to be found in the market or new technology but, rather, in social movement building and protest actions.

Second, there are "smart growth reformers" such as UK economist Nicholas Stern, author of the influential Stern Review on the Economics of Climate Change (2006/2007), who "agree that limits to growth should be respected, but assume that environmental limits can be stretched if the right market-based mechanisms are implemented, enabling 'sustainable' economic growth to continue indefinitely" (Nisbet, 2014, p. 810). This intellectual community frames climate change as an opportunity for both new forms of profit making and international cooperation towards addressing other global risks, such as poverty. Finally, there are "ecomodernists" such as the green entrepreneur and futurist Stewart Brand, or scientist Mike Hulme. As Nisbet has explained, this group argues "for embracing the power of human ingenuity and creativity to manage the risks of climate change, and for recognizing the biases in how we have conventionally approached the problem" (Nisbet, 2014, p. 810). This last group of public intellectuals emphasizes the need not only for ingenuity but also for public investment in "a diverse menu of policies and technologies that lower the cost of action and that protect against climate impacts (Nisbet, 2014, p. 810). Given the significant influence of these disparate intellectual communities in framing the character and limits of much public discourse on climate change (Nisbet, 2014), we wanted to see whether ecological activist, smart growth, or ecomodernist frames were reproduced in higher education policy discourse. To examine how these distinct intellectual responses to climate change manifest within institutional level policies and in relation to the five domains of sustainability in higher education, we conducted a content analysis of institutional level policies. We now turn to a review of the methods deployed in this analysis.

Research Methods

In order to analyze the extent to which Canadian higher education institutions accommodate, reform, or transform their institutional policies in response to climate change, we undertook a content analysis. In what follows, we provide a description of the data collection and analysis methods used in the content analysis.

Sample Selection

This paper draws on data and findings from a quantitative census analysis, as well as qualitative policy content analysis. The quantitative census included a review of publicly available evidence of sustainability and climate change-specific policy initiatives undertaken in all 220 Canadian PSE institutions accredited by either Universities Canada or the Association of Canadian Community Colleges as of October 2012 (see Vaughter et al., 2016). A

smaller sample of 50 institutions was selected for qualitative analysis of sustainability-specific and climate change-specific policies. A list of the 50 institutions and their policies that were included in this study, as well as the sampling criteria, can be seen in Tables 1 and 2.

Table 1. Criteria used for institutional site selection. Table reproduced from an SEPN paper by Vaughter, McKenzie, Lidstone, and Wright (2016).

Range of urban/rural settings
Range of size of PSE by student body
Range of size of annual budget
Ratio of universities to colleges/CÉGEPs (2:1)
Range of undergraduate, comprehensive, and medical-doctoral institutions
Some members of U15, some non-members
Included all AASHE STARS-rated institutions
Pre-existing relationships and research access
3 PSE institutions per province, where possible
Include First Nations, Métis, and Inuit institutions
Range of extent to which sustainability initiatives appear to be incorporated into institutional policy

Table 2. Population and postsecondary education (PSE) institutions per province and in content analysis. Table from Vaughter, McKenzie, Lidstone, and Wright (2016).

Province	Population	% of Pop. in Canada	# of PSE Institution	% of PSE Institutions in Canada	# of PSE Institutions in Sample	% of PSE Institutions in Sample
Alberta	3,873,700	11.11	21	9.55	5	10.00
British Columbia	4,622,600	13.25	27	12.27	7	14.00
Manitoba	1,267,000	3.63	9	4.09	4	8.00
New Brunswick	756,000	2.17	7	3.18	3	6.00
Newfoundland and Labrador	512,700	1.47	4	1.82	2	4.00
Northwest Territories	43,300	0.12	1	0.45	1	2.00
Nova Scotia	948,700	2.72	13	5.91	3	6.00
Nunavut	33,700	0.10	1	0.45	1	2.00
Ontario	13,505,900	38.72	59	26.82	9	18.00
Prince Edward Island	146,100	0.42	3	1.36	1	2.00
Québec	8,054,800	23.09	59	26.82	9	18.00
Saskatchewan	1,080,000	3.10	15	6.82	4	8.00
Yukon	36,100	0.10	1	0.45	1	2.00
Total	34,880,600	100.00	220	100.00	50	100.00

Data Collection

To find relevant policy documents, several search methods were used. To identify existing sustainability and climate policies at each of the 50 selected institutions, a Boolean search was conducted on the website search engine of each institution, using the terms "climate change" OR "sustain" OR "environment" OR "ecological" OR "green" OR "Aboriginal," for example (see Vaughter et al., 2016). We conducted parallel searches in French for French institutions' websites and also did follow-up searches on Google using all of the above terms alongside the institutions' website. To make sure we captured all climate change-specific policy, we also reviewed any institutional webpages devoted to climate and/or sustainability. Where policy information was absent on a website, we phoned institutions directly to inquire which institutional policies may have content pertaining to climate change. In particular, phone calls were made to the offices of vice presidents of administration (or the closest equivalent) to determine whether there were any climate change-specific policies. Furthermore, SEPN partner organizations working in the sector of sustainability in higher education were consulted, including the Association for the Advancement of Sustainability in Higher Education and the Sierra Youth Coalition.

Data Analysis

Climate change-related policies analyzed included climate action plans, emissions reduction plans, energy consumption plans, subsections of broader sustainability policies, and official administrative proclamations on sustainability and climate change. Analysis occurred in two phases. The first phase of analysis involved an abductive textual analysis of existing climate change-specific policies, including carbon emission and/or energy policies if they existed (see Appendix A). The abductive data analysis process began by "observing something surprising about a social activity or phenomenon that attracts our attention" (Bajc, 2012, p. 82). Such awareness initiates a process of discovery via the information corpus (Timmermans & Tavory, 2012). Rather than coding every available bit of information at first, we instead tested *etic* hunches against *emic* variations in the data corpus itself to identify the "phenomenon of interest" (Tavory & Timmermans, 2014, p. 131). We quickly noticed that institutional responses focused attention on some domains over others, and we report these dynamics below. Data were then deductively analyzed using the five policy domains (governance, education, campus operations, research, community outreach) to categorize pieces of policy text and to test our findings against variations in the data.

The second phase of analysis involved understanding whether and how climate change was reflected in overall sustainability-specific policies, as climate change-specific policy documents are part of a larger institutional assemblage of post-secondary documents pertaining to sustainability. For the analysis of sustainability policy documents, we used a collaborative thematic coding process informed by MacQueen, McLellan, Kay, & Milstein (1998) that included both the creation of a common codebook and inter-coder reliability checks (for a description of this process, see Vaughter et al., 2016). Using NVivo qualitative research software, codes were developed inductively and in relation to the literature on sustainability in higher education, according to the five previously articulated institutional domains. We then produced frequency counts for all codes, which quantified both the breadth of representation of particular codes across institutions (e.g., emissions) and

the overall frequency with which codes appeared in the dataset. To analyze frequencies pertaining to climate change in relation to particular categories, such as all sustainability policies or all university strategic plans, we sorted data into sets or groups of documents. This allowed for the production of frequency counts of climate change-related codes pertaining to particular categories of policy documents, providing a sense of whether climate change was represented or absent in those document types. It should be noted that our analysis focused on the representation of climate change in climate change-specific policies, sustainability-specific policies, and strategic plans. We did not examine more specialized research plans or other policy documents. Given the decentralization of higher education institutions and associated policy, this focus on a limited set of policy documents is clearly a limitation of the study.

Table 3. List of institutions and climate change-specific policies included in analysis.

Institution Name	Province or Territory	Climate Action Plan	Energy or Emissions Plan	President's Climate Commitment Signatory	CC or GHG Emissions in Sust. Policy/ Plan	CC or GHG Emissions in Strategic Plan
Aurora College	NT					✓
Bishop's University	QC	✓	✓		✓	✓
Capilano University	BC	✓	✓	✓		
Cégep de Matane	QC					
Collège Ahuntsic	QC					✓
College of the North Atlantic (CNA)	NL	✓	✓		✓	
Concordia University	QC				✓	✓
Dalhousie University	NS	✓	✓	✓	✓	✓
Durham College	ON					
First Nations University of Canada	SK					
The King's University	AB			✓	✓	
Lakehead University	ON				✓	
McGill University	QC	✓	✓			✓
Memorial University of Newfoundland	NL					
Mount Allison University	NB	✓			✓	
NorQuest College	AB	✓	✓			
Northern Alberta Institute of Technology	AB			✓		
Nova Scotia Community College (NSCC)	NS		✓			
Nunavut Arctic College	NU	✓				✓

Institution Name	Province or Territory	Climate Action Plan	Energy or Emissions Plan	President's Climate Commitment Signatory	CC or GHG Emissions in Sust. Policy/ Plan	CC or GHG Emissions in Strategic Plan
Okanagan College	BC	✓	✓		✓	
Queen's University	ON			✓	✓	
Red River College	MB	✓	✓		✓	✓
Royal Roads University	BC	✓	✓	✓	✓	
Saint Mary's University	NS		✓			
Saint Thomas University	NB					
Saskatchewan Institute of Applied Science and Technology	SK					
Sheridan College	ON			✓		
Simon Fraser University	BC	✓	✓	✓	✓	
Thompson Rivers University	BC	✓	✓	✓	✓	
Université de Montréal	QC					
Université du Québec à Montréal	QC					
Université du Québec à Rimouski	QC					
Université Laval	QC		✓		✓	
University College of the North	MB					
University of Alberta	AB			✓	✓	✓
University of British Columbia	BC	✓	✓	✓	✓	
University of Calgary	AB	✓		✓	✓	
University of Manitoba	MB			✓	✓	✓
University of New Brunswick	NB					
University of Northern British Columbia	BC	✓		✓	✓	✓
University of Ottawa	ON	✓	✓		✓	
University of Prince Edward Island	PE				✓	✓
University of Regina	SK					✓
University of Saskatchewan	SK	✓	✓	✓	✓	✓
University of Toronto	ON				✓	✓
Western University	ON	✓			✓	
University of Winnipeg	MB	✓	✓	✓	✓	
Wilfred Laurier University	ON	✓	✓		✓	
York University	ON					
Yukon College	YT	✓				

Results

We now offer an overview of some of the key findings from the content analysis of policies from a range of Canadian PSE institutions. We begin with an overview of the climate change-specific policies (i.e., climate action plans and emissions policies), then consider climate change in sustainability policies, in overall strategic plans, and, finally, aspects of policy intertextuality among these documents types. This review of main findings leads into a discussion of various responses to climate change in higher education policy making, which draws on analysis of all of the above policy types.

Climate Change-Specific Policies

In total, 22, or 44%, of PSE institutions within the representative sample of 50 institutions had climate-specific policies or emissions-related policies (Table 3). Eleven of these had official climate change policies of some kind, typically called climate action plans (CAP), and the other 11 institutions addressed climate change via energy consumption or emissions plans only. There was some regional variation in the uptake of climate change-specific policies: all institutions in our sample from British Columbia (100%), Nunavut (100%), and the Yukon (100%), and half of the institutions in Manitoba and Newfoundland/Labrador (50%) had some kind of climate policy. In the case of British Columbia, the high number of climate policies reflects the requirement under the provincial Greenhouse Gas Reductions Act (2007) for PSE institutions to initiate and implement a climate action plan (Vaughter et al., 2016). On the other end of the spectrum, we found fewer climate-focused policies among sampled institutions in Alberta (40%), New Brunswick (33%), Nova Scotia (33%), Ontario (33%), Québec (22%), and Saskatchewan (25%). There were no climate change-specific policies for PSE institutions included in our sample from the Northwest Territories and Prince Edward Island. However, it should be mentioned that the University of Prince Edward Island (2009) aims to reduce greenhouse gas emissions through a general, rather than climate-focused, sustainability policy. In addition, almost two-thirds (63%) of PSE institutions with a climate-focused policy were members of the Association for the Advancement of Sustainability in Higher Education (AASHE), an organization that provides a self-assessment framework for institutions to measure their level of sustainability performance. In sum, more than half of the institutions in our representative subsample did not have climate change-specific policies. The relative absence of such policies is a major finding in our analysis and suggests that there is ample room for growth within the Canadian PSE system.

Climate Change in Sustainability Policies

We also looked at representations of climate change in more broadly focused sustainability policy documents. Of the 50 institutions in the representative sample, 40 had sustainability plans or policies of some kind. These were analyzed in greater depth to understand how climate change was represented within such policies.

In the total representative sample, 26 postsecondary institutions make mention of either greenhouse gas emissions or climate change in a sustainability-specific policy document. The most widespread discussion of climate change is in relation to campus operations, where 23 institutions discuss “emissions” in a total of 25 documents. Of the 40

PSE institutions with a sustainability policy or plan in our sample, only three institutions explicitly reference climate change as significant to the institutional setting of their sustainability policies or plans. That is, climate change is positioned as a catalyst for sustainability action in only 7.5% of institutional sustainability policies in our study.

Climate Change in Strategic Planning Documents

This focus on campus operations in sustainability policies extends also to strategic plans, wherein climate change is generally given scant attention, with only 15 institutions (30%) using the term "climate change" in their general institutional strategic plans. Given the role of strategic plans in planning for higher education futures at the institutional level (Bieler & McKenzie, 2017), this absence of attention to climate futures is disconcerting. Where climate change is represented in strategic plans, it is often used as a framing device for addressing institutional commitments to sustainability more broadly. For instance, Red River College (2012) has described itself as confronting the "global pressure" of climate change by embracing a triple bottom-line approach to sustainability, which includes attention to "people, planet, profits" (p. 3). In addition to mentioning climate change as an umbrella context for institutional approaches to sustainability, the University of Northern British Columbia describes the impacts of climate change on the northern region that it serves.

Policy Intertextuality

To see whether conversations about climate change extended across policy document types, we looked for instances of policy intertextuality, or in other words, instances where one policy addressing climate change referenced another policy that also engaged with climate change. We found that PSE institutions with a CAP often reference it in their sustainability policies in the context of discussing the ways in which the institution aims to reduce greenhouse gas emissions. For instance, the University of British Columbia's sustainability plan includes the ambitious goal of achieving carbon neutrality. Implementation plans include conducting an inventory of greenhouse gas emissions and developing a CAP, which it has succeeded in developing. However, not all sustainability policy documents elaborate plans for the development or implementation of a CAP, since many choose to address this issue within the remit of larger sustainability policies. Nonetheless, more detailed information on climate change tends to be found in the CAPs as opposed to the sustainability policies. Finally, although overall strategic plans sometimes mention institutional declarations, such as the University and College President's Climate Change Statement of Action for Canada, they do not typically mention climate change-specific policy documents.

Looking across all document types, we found a tendency to focus on institutional responses pertaining to campus operations and a lack of attention to responses in areas of governance, education, research, and community outreach. We now turn to an in-depth analysis of the diversity in types of responses.

Leveraging Campus Infrastructure

Across policy types, there is a dominant focus on reforming campus operations to improve energy efficiency and reduce emissions. While seen across all policy document

types, this is given greatest attention within CAPs and emissions policies. Reflecting this focus on facilities or campus operations, the most frequently referenced words in climate change-specific policies (CAPs and emissions plans) are "energy" and "building" (see the word cloud in Figure 2).

Figure 2. Frequently referenced words in climate change-specific policies.

The overarching centrality of operations-focused responses can be seen in greater detail within the energy, emissions-control, and climate-action plans. As discussed above, of the 50 institutions in the sample, 22 had climate-focused policies: 11 had specific energy-consumption and emissions-control policies, and 11 other institutions combined emissions and climate foci under the umbrella of larger CAPs. Interrogating these climate change-specific policies, we direct qualitative attention toward how institutions address climate change through a focus on campus operations, specifically as these relate to energy consumption and emissions control.

Emissions

Key institutional policy statements describe various more or less concrete aims to reduce the amount of total carbon-based fuel consumed by the institution. All 22 PSEs with a climate-focused policy include some discussion of "emissions," with wide-ranging statements that recommend at least some consideration of serious emissions reduction aims. Toward this end, institutions have developed energy plans with the goal of reducing overall carbon consumption and subsequent emissions, including a few policies with the eventual goal of achieving "carbon neutrality" or a "net zero" carbon footprint, whereby the

entire campus balances a measured amount of carbon emissions with an equal amount either physically sequestered or offset via another mechanism (i.e., purchasing credits on a carbon market). For instance, Wilfred Laurier University, in Ontario, has an energy management plan that recommends seriously considering the goal of "net zero carbon emissions by 2030," with a five percent per year reduction timeline (2009, p. 16). This kind of policy goal can be implemented in a number of ways: by making campus energy systems more efficient through campus retrofits and the installation of newer, more efficient technologies; but also through altering building dynamics, transportation systems, and the behaviour of individuals within the institution. For example, Dalhousie University (2010) combined all these dimensions into their greenhouse gas reduction strategy and projected emissions into the future relative to a baseline and business-as-usual. Looking ahead from the baseline academic year of 2008–2009, when total greenhouse gas emissions from direct (e.g., heating campus buildings), indirect (e.g., from purchased electricity), and campus transit equalled 109,510 tonnes, the Dalhousie CAP put forward the goals of reducing greenhouse gasses 15% by 2013, 20% by 2016, and 50% by 2020 below the baseline year (p. 3).[4]

Finally, for those institutions with well-developed energy plans, sourcing energy from more renewable (non-carbon-based) and sustainable sources is a primary policy goal. For example, the University of Saskatchewan's *Climate Action Plan 2012* speaks to the desire to replace current energy supply sources, but it remains unclear exactly how this is to occur: "A key component of our strategy to reduce greenhouse gas emissions on campus involves serious consideration of our current energy supply. The first step is the development of a feasibility study on clean energy solutions for the university" (2012, p. 13). Similarly, Simon Fraser University's *Carbon Neutral Action Report* (2011) focuses on renewable energy demonstration projects that illustrate the role of solar technologies, and on feasibility studies for future projects. However, these plans do not address how such initiatives will be implemented, and renewable energy technologies are still a small, albeit rapidly growing, part of North America's overall total energy production profile (Natural Resources Canada, 2015). It is clear from our analysis that for many institutions, the first step toward addressing climate change has been to first identify their emissions and then work toward carbon neutrality in their operations.

Built Infrastructure

In their policy documents, many institutions also highlighted plans regarding energy-efficient buildings and changes to transportation systems. This most often occurred in the context of planning for retrofit changes to heating, ventilation and cooling systems, and lighting, as well as considering energy performance in the construction of new campus buildings and in campus transportation systems.

Our analysis shows that for those institutions with climate policies, the most frequently referenced words (Figure 2) in these plans were "energy" and "building," suggesting a disproportionate focus on saving energy via modifications in the built environment (including transportation systems). Often, such policies referenced two driving motivations: 1) saving money by increasing efficiency, and 2) increasing energy performance in materials and systems for carbon emission reasons. A third motivation, foregrounded by Dalhousie University and Yukon College, is the vulnerability of built infrastructure to flooding and

other climate change-induced risks. For instance, Dalhousie's Climate Change Plan (2010) reflects that "with a changing climate, built infrastructure is also vulnerable to the effects of increased weathering, i.e. more freeze-thaw cycles" (p. 15). These adaptation-focused discussions of the pressures of climate change on built infrastructure were relatively infrequent in comparison to the overarching emphasis on the role of architecture and the built environment in reducing emissions. In an example of the typical mixture of emissions reduction and economic motivations, the University of Calgary's 2010 Greenhouse Gas Emission Reduction Plan features their LEED Platinum Child Development Centre on the cover of the plan. Similar to the aforementioned focus on emission reductions via energy conservation, the institutional focus on the built environment, including transportation system considerations, reflects a desire to mitigate climate change by modifying campus infrastructure. This is a dominant theme across existing climate change-specific policies.

Lack of Attention to Other Institutional Domains

We found a lack of engagement in other domains relative to the infrastructure-focused changes discussed above in the domain of operations. There was significantly less attention devoted to overall governance, education, research, and community outreach than to campus operations. This trend can be seen across policy document types but is especially noticeable in climate change-specific policies. However, a number of institutions that have developed more sophisticated CAPs focus attention on larger issues beyond reductions in carbon consumption and emissions. In this section we consider some case examples of how institutions are beginning to address these other domains. We focus mostly on climate change-specific policies but connect this discussion to sustainability policies and overall strategic plans, which sometimes have more information on these areas.

Governance

Our analysis suggests that overall, the governance of institutional reform in response to climate change has not yet been addressed in most Canadian postsecondary institutions. Climate change is not typically engaged in general high-level governance documents (strategic plans), aside from occasional references to improving energy efficiency, specific research projects, or signing a sustainability declaration. Second, governance is also not a major theme in climate change-specific policies. When governance is mentioned, it is often in the context of developing a planning body capable of assessing overall greenhouse gas consumption and emissions. Such action relates to our previous finding that policies disproportionately focus on managing energy consumption and emissions via infrastructural changes. This typically occurs by rolling emissions reporting responsibilities into preexisting institutional management units (e.g., Red River College) or by creating new units altogether that deal with the new institutional priorities (e.g., Royal Roads University). As a whole, these findings suggest the need for much greater attention to broader governance processes and priorities in order to move forward on climate change on Canadian campuses.

Education

Climate change considerations are not given significant attention in relation to education (i.e., curriculum focused on climate change or sustainability) in any of the policies analyzed. When educational programming is discussed in climate change-specific

policies, it is typically approached through plans regarding staff and student behaviour modification training programs. That is, the focus is on changing the energy consumption behaviours of those individuals operating within the institution, as part of a larger goal and strategy of carbon neutrality. For example, the University of Ottawa's *Action Plan for Reducing Greenhouse Gas Emissions Annual Progress Report* (2004) briefly mentions education (and only toward the end of the report) as it applies to behaviour modification programming in the context of energy consumption:

> The Wise-Use of Utilities Program was developed in 1996 as a social marketing based energy conservation initiative, and continues to be promoted in response to the consistent turnover in students. The program provides information and suggestions for conserving energy. From posters to bookmarks, the Wise-Use of Utilities Program continues to help conserve energy via the dissemination of information. (p. 16)

While this approach may seem relatively simple, other institutions have developed more robust examples of how climate change integrates with the educational experiences of faculty and students on their campus. The *Climate Action Plan* at the University of Saskatchewan (2012), for example, includes the following institutional actions to deal with climate change, focused in the area of education/curriculum:

1. Inventory of Climate-Change-Related Courses, Programs & Research
2. Climate Action Courses & Immersive Experiences
3. Campus Living Lab Program
4. Integration of Climate Change in Curriculum
5. Climate-Change Literacy Assessment
6. Climate Change Library Collections
7. Annual Sustainability Summit (U of S Climate Action Plan, 2012, pp. 10–11)

For those institutions with more holistic and thorough CAPs, education is positioned as a much larger institutional phenomenon and priority beyond merely changing the energy consumption behaviours of students or others on campus. While this stronger attention to education in policy documents is laudable, further research would be needed to analyze developments and action at the level of policy enactment or practice.

Research

We found little discussion of developing research agendas and related capacities in climate change-specific policies but had some interesting findings within higher-level strategic plans. In strategic plans, climate change is sometimes discussed in relation to research goals pertaining to energy and sustainability. In climate change-specific policies, there was some limited but intriguing discussion of interdisciplinary climate change research units.

Representations of climate change research in strategic plans were sometimes connected to energy, and specifically oil sands research. For instance, in a discussion of energy-themed research goals, the University of Alberta (2012) aimed to "continue investment and growth in oil sands research" (p. 86) and employ "new carbon sequestration technologies as part of enhanced oil recovery processes" (p. 69). Although further inquiry is needed to properly assess the impacts of this kind of carbon sequestration and oil sands research in relation to sustainability and higher education, this example gestures to the complexity of climate change-related research, funding, and policy in higher education.

Pessimistically, one might speculate that this type of research gives Canadian PSE institutions the appearance of contributing to a sustainable response to climate change, while furthering the growth of a contentious and especially greenhouse gas emission-intensive form of fossil fuel extraction (see D'Arcy, Black, Weis, & Russell, 2014).

Research was not a major theme in climate policy documents. Nevertheless, some institutions did highlight the need to begin building interdisciplinary research units to address the unique challenges of an issue such as climate change. For example, the University of Calgary (UC) highlights teaching and research developments across a variety of institutional subunits, ranging from environmental design and law to business and STEM-related programs (science, technology, engineering, and mathematics). While UC is a leader in this area, other institutions have narrower research programs that frequently focus on either the natural sciences or the technological dimensions of climate change. Attention to the social sciences and humanities in climate change research is lacking across policy documents, suggesting, similar to the larger educational domain, opportunities for increased development of more holistic research agendas that address the social, cultural, and political dimensions of climate change.

Community Outreach

As in most other domains, community outreach was lacking as a focus across climate change policy documents. For institutions that had more robust CAPs, community outreach was typically discussed as involving the dissemination of novel practices and research findings in an effort to share best practices with interested others. For example, the University of Calgary's (2010) list of "outreach and engagement" actions included, among other things, "shar[ing] similar information with relevant external media focusing on local, provincial, and North American opportunities to highlight leadership and share best practices" (p. 9). The direction of this relationship involves the university sharing its knowledge with external community members. For institutions with a focus on community outreach in their policies, this was common practice. Less common, although present in some cases, was a more collaborative approach to community outreach within the institution in relation to climate change action. The University of Saskatchewan (2012), for example, takes a less unidirectional approach and instead involves a diverse group of stakeholders both within and outside the formal institutional boundaries, such as formally engaging the City of Saskatoon as a partner. However, in many policies, "community" is bound within the parameters and members of the individual institution.

There were also examples of larger-scale inter-institutional and civil society partnerships to address climate change. Institutional strategic plans sometimes mentioned the university's participation as a signatory to the University and College Presidents' Climate Change Statement of Action for Canada (CCSAC). This is a declaration created by institutional leaders that symbolically commits institutions to actions addressing climate change. Globally, the Presidents' Climate Challenge program serves as a major declaration of intent on the part of university and college presidents to address climate change. Of all 220 accredited Canadian PSE institutions, just 23 (slightly more than 10%) have signed the CCSAC. In this paper's representative sample, just seven of the 50, or 14% of the institutions, were signatories (see Table 3). To dig into some of the reasons for institutional participation in declarations and in climate change action more broadly, we now

turn to a final findings section that examines some of the underlying policy orientations (i.e., values and motivations for climate action) identified within climate change policies.

Orientations Toward Climate Change in Policy Language

We found diverse policy orientations to climate change in climate change-specific policies. Using the aforementioned abductive approach, we analyzed the underlying frames or narratives for undertaking institutional action on climate change, including ecological activist, moral, and economic imperatives for climate action. Nisbet's (2014) examination of climate change discourse communities identified three distinct frames—ecological activists, smart growth reformers, and ecomodernists—that each have unique motivations for engaging with climate change. Discursive frames provide the moral warrants used to justify environmental action (Hursh, Henderson, & Greenwood, 2015; Veldman, 2012). We were interested in understanding to what extent these various frames may be evident in the analyzed climate change policy documents.

We found limited evidence of an ecological activism narrative percolating within the analyzed climate change policies. When present, the ecological activism discourse reproduced notions of grassroots awareness raising. For example, this discourse can be seen within the Queen's University (2010) Sustainability Strategic Framework. This policy highlights the need to challenge the underlying cultural assumptions that lead to deleterious ecological conditions and to challenge the educational norms in institutions that are "undermining conditions for healthy living—today and into the future" (2010, p. 3). Responsibility for addressing the needs of future generations was a significant theme amongst institutions that discussed climate change within sustainability and related environmental plans and policies. For instance, Queen's situated climate change as one phenomenon among many threatening the sustainability of the planet and its life forms:

> At its most basic, sustainability refers to the survival of our planet and its life forms. The human community's ability to support itself into the future has become contentious as evidence mounts that many current practices are unsustainable (depleting non-renewable resources and polluting), ecosystems are being degraded (less diverse), natural resources are becoming depleted and the climate is changing, all with the consequences of undermining conditions for healthy living—today and into the future. (2010, p. 3)

This statement positions Queen's as a moral actor, with an ethical duty to actively transition the institution to prepare for the future. Veldman (2012) has suggested that such a moral imagination works to provide justification for action in the face of dire future consequences: "by locating [institutions] within a drama of ultimate concern, the narrative frames their choices as cosmically important, and this feeling of urgency then helps to convert moral deliberation into action" (p. 12). Within such a frame, Queen's policy can be understood as signifying the moral actions of the institution and its affiliated actors.

In terms of the ecomodernist frame, we also found evidence of economic values and motivations for action within climate change policies. This most commonly surfaced in policy language around making fleet vehicles and buildings more energy efficient, coupled with training programs to help prompt institutional actors toward more efficient behaviours, such as turning off lights and computers when not occupying rooms. Often policy

documents included requirements for new buildings to align with established green building protocols, such as LEED, while older buildings were retrofitted for efficiency where possible. These kinds of measures align with the ecomodernist narrative of lowering the cost of action via investment in new technology (Nisbet, 2014).

When economic incentives provided motivation for moving an institution toward action, such messages often co-existed with an entrepreneurial, smart-growth spirit. For example, after articulating the moral and economic cases for taking institutional action on climate change, the University of Winnipeg, in their *Climate Action Plan 2012–2016*, positioned universities as responsible for catalyzing change within the larger society:

> One of the key elements of this process is that of Universities being bold enough to take risks—to be among the first to implement the new technologies, new accounting practices, new levels of transparency, and new management models required to achieve real reductions in greenhouse gas emissions. (2012, p. 10)

The goal of reducing greenhouse gas emissions is also discussed as a net benefit to the university, for along the way they hope to develop new technologies and accounting practices as a model for others. The language of "bold" action, risk taking, and the development of "new" technologies and practices aligns with the ecomodernist focus on the importance of creative innovation in response to climate change. The framing of climate change as an opportunity for risk taking and technological development also gestures to the smart-growth reform frame, but the absence of explicit language on market capitalization makes this frame less pertinent. Such policy language positions the university as an economic incubator, often with the goal of stimulating technological development and market capitalization or so-called smart-growth reform.

Discussion

Based on the above findings, we highlight several key conclusions for further discussion. First, slightly fewer than half, or 44%, of the institutions in our study's representative sample have climate change-specific policies. When such policies do exist, they most commonly approach climate change through actions affiliated with altering their energy consumption and its associated pollution, often in the name of achieving carbon neutrality. Such actions occur via elaborate accounting and management practices, and this is symbolic of the assessment requirements recommended by both the AASHE and the University and College Presidents' Climate Change Statement of Action for Canada initiatives. Often, such mandates are dealt with via policy attention to the infrastructural dimensions of the institution, usually in the form of physical plant modifications or retrofits, and increased efficiencies in transportation and new buildings. These responses align with the ecomodernist focus on lowering the costs of action through investment in efficient technology, but they ignore domains such as education, research, and community outreach, which might be more capable of addressing the need for ingenuity and creative thinking that is also emphasized in this climate discourse. In the reviewed policies, these latter dimensions of institutional practice are frequently neglected, if mentioned at all, in relation to climate change action. Nevertheless, some institutions have more thoroughly developed CAPs (and not merely energy and emissions plans) that attend to the complexity of needed responses to climate change through education.

Such findings are in line with previous policy analyses (Cortese, 2012; Vaughter et al., 2016) that suggest that sustainability policies in higher education tend to highlight changes to physical infrastructure while giving little attention to changes to curricular, research, and outreach agendas. Our analysis of policies in relation to climate change content revealed a similar pattern, with far fewer specifics in the areas of education and research, in particular. If we are going to green our economies or develop a moral response to the challenge of climate change in higher education, we cannot ignore the other core missions of institutions of higher education: teaching, research, and community outreach.

The Climate Change Performance Index ranks Canada 58th, or "very poor," in its climate protection performance, just behind Iran and just ahead of Kazakhstan, based on a synthesis of objective emissions indicators and climate policy initiatives (Burck, Marten, & Bals, 2015). Countries with natural resource-driven economies, such as Canada and Australia, have developed quite sophisticated strategies to avoid modernizing their economies, to make them more efficient, climate friendly, and sustainable in order to protect older and less sustainable forms of industrial modernity (Young & Coutinho, 2013). With many climate research projects either based in or partnered with Canadian postsecondary institutions, the governance of higher education research may be particularly vulnerable to an anti-reflexive politics of climate change denial (McCright & Dunlap, 2010). However, there are also more substantive ways in which Canadian PSE institutions are engaging with climate policy and which are quite divergent from this national-level trend.

PSE institutions with well-developed and holistic CAPs combine all three of the discursive policy orientations to varying degrees. Nisbet (2014) wrote on the need to combine these narratives, for "on the road to managing the threats posed by climate change, grassroots activism and political reforms are important, as is the quest for a more advanced arsenal of technological options, and a reconsideration of our economic goals" (p. 819). From the ecological modernization or economic efficiency improvement of campus operations to moral imperatives to act for future generations, institutions that take a holistic approach to climate change position themselves to address the overall complexity of meeting the magnitude of the challenge.

Conclusion

Our analysis shows that the Canadian post-secondary education system contains the capacity for growth in addressing climate change via institutional policy. Climate change is not going away, and institutions will need to either adapt or face increasingly difficult operating conditions. While some institutions have engaged the issue at a holistic level, the overwhelming response is one of modifying infrastructure and curbing energy consumption and pollution. Although certainly important, significantly less attention has been devoted to overall governance, education, research, and community outreach than to campus operations. "Solutionist thinking" (Speth, 2008, p. 42) comes in many forms, and an overwhelming institutional focus on merely changing infrastructure, for example, risks masking the deeper social and cultural dynamics at play in addressing climate change (Francis, 2015). Moving from second-wave (i.e., operations-focused) to third-wave sustainability in higher education requires serious consideration of these deeper social and cultural dynamics that influence teaching, research, and all aspects of campus life.

Toward the goal of developing holistic institutional policy approaches to climate change, we recommend a few areas for future scholarly inquiry. First, our approach here is limited in some ways to institutionally produced policy documentation. Policy vision and actual, lived implementation are not necessarily connected, and future research might examine whether or not institutions are following their own climate change and sustainability plans. This work could also involve checking the materiality of their discursive plans—that is, how does changing institutional social and cultural dynamics via policy actually impact tangible ecosystem dynamics? Detailed ethnographic studies of institutional change dynamics might help explain how and why (or why not) some institutions develop policies in the first place. Finally, an analysis of other levels of climate change education policy is needed, including the respective roles and responsibilities of the federal granting agencies, Universities Canada, ministries of education, and leadership organizations such as the U15 group of research universities in respectively taking leadership on this urgent issue. Such research might attend to policy levers for catalyzing institutional uptake of climate change education policy, as well as the roles of more top-down as well as bottom-up or grassroots (e.g., the fossil fuel divestment movement) climate change policy actions. Given the urgent current and future challenges that climate change poses for society, we believe that such work is of pressing importance in the policy studies community.

Notes

1. For more information on the project, visit www.sepn.ca.
2. Although we are interested in the wide-ranging discursive constructions of sustainability in higher education policy, we understand "sustainability" as used in this paper to include, at a minimum, a consideration of environmental issues.
3. In Canadian higher education, there is a distinction between: degree-granting universities with a focus on some combination of research, teaching, and service; colleges that are typically more focused on job training and may or may not have the ability to grant degrees; and cegéps, which are publicly funded pre-university colleges in the province of Québec.
4. In subsequent greenhouse gas inventory reports put out by the Dalhousie University Office of Sustainability (2015), the baseline year is updated to 2009 because of more reliable data, and inventories for emissions reductions are outlined as well as specific actions undertaken to reduce emissions, such as insulation of campus buildings, LEED certification of campus buildings, repair of compressed air leakages, and implementation of an employee bus pass program (pp. 1, 27).

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References

Aikens, K., McKenzie, M., & Vaughter, P. (2016). Environmental and sustainability education policy research: A systematic review of methodological and thematic trends. *Environmental Education Research, 22*(3), 333–359. doi:10.1080/13504622.2015.1135418

Bajc, V. (2012). Abductive ethnography of practice in highly uncertain conditions. *The ANNALS of the American Academy of Political and Social Science, 642*(1), 72–85.

Bieler, A., & McKenzie, M. (2017). Strategic planning for sustainability in Canadian higher education. *Sustainability, 9*(161), 1-22.

Beringer, A., Wright, T., & Malone, L. (2008). Sustainability in higher education in Atlantic Canada. *International Journal of Sustainability in Higher Education, 9*(1), 48–67.

Beveridge, D., McKenzie, M., Vaughter, P., & Wright, T. (2015). Sustainability in Canadian post-secondary institutions: The interrelationships among sustainability initiatives and geographic and institutional characteristics. *International Journal of Sustainability in Higher Education, 16*(5), 611–638.

Blum, N., Nazir, J., Breiting, S., Goh, K. C., & Pedretti, E. (2013). Balancing the tensions and meeting the conceptual challenges of education for sustainable development and climate change. *Environmental Education Research, 19*(2), 206–217.

Burck, J., Marten, F., & Bals, C. (2015). *The climate change performance index*. Germanwatch & Climate Action Network Europe. Retrieved from www.germanwatch.org/en/ccpi

Colston, N., & Ivey, T. (2015). (Un)doing the Next Generation Science Standards: Climate change education actor-networks in Oklahoma. *Journal of Education Policy, 30*(6), 1–23.

Corcoran, P., & Wals, A. (2004). The problematics of sustainability in higher education: An introduction. In P. Corcoran & A. E. J. Wals (Eds.), *Higher education and the challenge of sustainability* (pp. 3–6). Alphen aan den Rijn, The Netherlands: Kluwer.

Cortese, A. D. (2012). Promises made and promises lost: A candid assessment of higher education leadership and the sustainability agenda. In J. Martin, J. Samels, & Associates (Eds.), *The sustainable university: Green goals and new challenges for higher education leaders* (pp. 17–31). Baltimore, MD: The Johns Hopkins University Press.

Curren, R. (2009). *Education for sustainable development: A philosophical assessment*. London, UK: Philosophy of Education Society of Great Britain.

Dalhousie University (2010). *Climate Change Plan 2010*. Halifax, NS: Dalhousie University.

Dalhousie University (2012). *Greenhouse Gas (GHG) Inventory Report 2011-2012*. Halifax, NS: Dalhousie University.

Dalhousie University (2015). *Greenhouse Gas (GHG) Inventory Report 2014-2015*. Halifax, NS: Dalhousie University.

D'Arcy, S., Black, T., Weis, T., & Russell, J. (2014). *A line in the tar sands: Struggles for environmental justice*. Oakland: PM Press.

Dyer, G., & Dyer, M. (2015, August 28). Strategic leadership for sustainability by higher education: The American College & University Presidents' Climate Commitment. *Journal of Cleaner Production, online first*, in press. doi:10.1016/j.jclepro.2015.08.077

Francis, P. (2015). *Laudato si: Encyclical letter on care for our common home.* Retrieved from http://w2.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html

Hansen, J. (2009). *Storms of my grandchildren: The truth about the coming climate catastrophe and our last chance to save humanity*. New York, NY: Bloomsbury.

Henderson, J. (2015). "Not for everyone, but kind of amazing": Institutional friction and the nature of sustainability education. *Environmental Education Research, 21*(2), 295–296.

Hoffman, A. (2014). *How culture shapes the climate change debate*. Stanford, CA: Stanford University Press.

Hursh, D., Henderson, J., & Greenwood, D. (2015). Environmental education in a neoliberal climate. *Environmental Education Research, 21*(3), 299–318.

Intergovernmental Panel on Climate Change. (2013). *Climate change 2013: The physical science basis*. Retrieved from www.ipcc.ch/report/ar5/wg1/#.UuK5QGQo7-Y

Jones, Glen A. (2014). An introduction to higher education in Canada. In K. M. Joshi & S. Paivandi (Eds.), *Higher education across nations* (vol. 1, pp. 1–38). Delhi, India: B. R. Publishing.

Laessøe, J., & Mochizuki, Y. (2015). Recent trends in national policy on education for sustainable development and climate change education. *Journal of Education for Sustainable Development, 9*(1), 27–43.

MacQueen, K. M., McLellan, E., Kay, K., & Milstein, B. (1998). Codebook development for team-based qualitative analysis. *Cultural Anthropology Methods, 10*(2), 31–36.

McCright, A. M., & Dunlap, R. E. (2010). Anti-reflexivity: The American conservative movement's success in undermining climate science and policy. *Theory, Culture & Society, 27*(2–3), 100–133.

McCright, A. M., & Dunlap, R. E. (2011). Cool dudes: The denial of climate change among conservative white males in the United States. *Global Environmental Change, 21*(4), 1163–1172.

McKenzie, M., Bieler, A., & McNeil, R. (2015). Education policy mobility: Reimagining sustainability in neoliberal times. *Environmental Education Research, 21*(3), 319–337.

Moran, E. (2010). *Environmental social science: Human–environment interactions and sustainability*. New York, NY: Wiley-Blackwell.

Natural Resources Canada. (2015). *Energy fact book 2015–2016*. (Cat. No. M136-1E-PDF (Online)). Retrieved from https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/energy/files/pdf/EnergyFactBook2015-Eng_Web.pdf

Nisbet, M. (2014). Disruptive ideas: Public intellectuals and their arguments for action on climate change. *Wiley Interdisciplinary Reviews: Climate Change, 5*(6), 809–823.

Norgaard, K. (2011). *Living in denial: Climate change, emotions, and everyday life*. Cambridge, MA: MIT Press.

Oreskes, N., & Conway, E. (2010). *Merchants of doubt: How a handful of scientists obscured the truth on issues from tobacco smoke to global warming*. New York, NY: Bloomsbury.

Orr, D. W. (2004). *Earth in mind: On education, environment, and the human prospect (10th anniversary edition)*. Washington, DC: Island Press.

Owen, R., Fisher, E., & McKenzie, K. (2013). Beyond reduction: Climate change adaptation planning for universities and colleges. *International Journal of Sustainability in Higher Education, 14*(2), 146–159.

Plutzer, E., McCaffrey, M., Hannah, A. L., Rosenau, J., Berbeco, M., & Reid, A. H. (2016). Climate confusion among US teachers. *Science, 351*(6274), 664–665.

Queen's University (2010). *Sustainability Strategic Framework*. Kingston, ON: Queen's University

Simon Fraser University (2011). *Carbon Neutral Action Report*. Burnaby, BC: Simon Fraser University.

Speth, J. G. (2008). *The bridge at the edge of the world: Capitalism, the environment, and crossing from crisis to sustainability*. New Haven, CT: Yale.

Stefanovic, I. L. (2008). Educational alliance for a sustainable Toronto. *International Journal of Sustainability in Higher Education, 9*(4), 416–427.

Stephens, J. C., Hernandez, M. E., Román, M., Graham, A. C., & Scholz, R. W. (2008). Higher education as a change agent for sustainability in different cultures and contexts. *International Journal of Sustainability in Higher Education, 9*(3), 317–338.

Sterling, S. (2004). Higher education, sustainability, and the role of systemic learning. In P. Corcoran & A. E. J. Wals (Eds.), *Higher education and the challenge of sustainability: Problematics, promise, and practice* (pp. 49–70). Alphen aan den Rijn, The Netherlands: Kluwer.

Sterling, S. (2013). The sustainable university: Challenge and response. In S. Sterling, L. Maxey, & H. Luna (Eds.), *The sustainable university* (pp. 51–70). New York, NY: Routledge.

Sterling, S., & Huckle, J. (2014). *Education for sustainability*. New York, NY: Routledge.

Stern, N. (2006/2007). *The economics of climate change: The Stern review*. Cambridge, UK: Cambridge University Press.

Sung, J. (2015). Climate change education and education for sustainable development in the Republic of Korea: A status report. *Journal of Education for Sustainable Development, 9*(1), 78–89.

Tavory, I., & Timmermans, S. (2014). *Abductive analysis: Theorizing qualitative research*. Chicago, IL: The University of Chicago Press.

Timmermans, S., & Tavory, I. (2012). Theory construction in qualitative research: From grounded theory to abductive analysis. *Sociological Theory, 30*, 167–186.

Trajber, R., & Mochizuki, Y. (2015). Climate change education for sustainability in Brazil: A status report. *Journal of Education for Sustainable Development, 9*(1), 44–61.

Tuck, E., McKenzie, M., & McCoy, K. (2014). Land education: Indigenous, post-colonial, and decolonizing perspectives on place and environmental education research. *Environmental Education Research, 20*(1), 1–23.

University of Alberta (2012). *Comprehensive Institutional Plan*. Edmonton, AB: University of Alberta.

University of Calgary (2010). *Climate Action Plan*. Calgary, AB: University of Calgary.
University of Ottawa (2004). *An Action Plan for Reducing Greenhouse Gas Emissions Annual Progress Report*. Ottawa, ON: University of Ottawa.

University of Saskatchewan (2012). *Climate Action Plan*. Saskatoon, SK: University of Saskatchewan.

University of Winnipeg (2012). *Climate Action Plan 2012–2016*. Winnipeg, MB: University of Winnipeg.

Vaughter, P., McKenzie, M., Lidstone, L., & Wright, T. (2016). Campus sustainability governance in Canada: A content analysis of post-secondary institutions' sustainability policies. *International Journal of Sustainability in Higher Education, 17*(1), 16–39. doi:10.1108/IJSHE-05-2014-0075

Vaughter, P., Wright, T., McKenzie, M., & Lidstone, L. (2013). Greening the ivory tower: A review of educational research on sustainability in post-secondary education. *Sustainability, 5*(5), 2252–2271.

Veldman, R. G. (2012). Narrating the environmental apocalypse: How imagining the end facilitates moral reasoning among environmental activists. *Ethics and the Environment, 17*(1), 1–23.

Vize, S. (2012). Using education to bring climate change adaptation to Pacific communities. *Journal of Education for Sustainable Development, 6*(2), 219–235.

Wals, A. E., & Blewitt, J. (2010). Third-wave sustainability in higher education: Some (inter)national trends and developments. In P. Jones, D. Selby, & S. Sterling (Eds.), *Sustainability education: Perspectives and practices across higher education* (pp. 55–74). New York, NY: Earthscan.

Wilfred Laurier University (2009). *Energy Management Plan*. Waterloo, ON: Wilfred Laurier University

Young, N., & Coutinho, A. (2013). Government, anti-reflexivity, and the construction of public ignorance about climate change: Australia and Canada compared. *Global Environmental Politics, 13*(2), 89–108.

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