

APPROACHES TO INTRA-
AND
INTERGENERATIONAL
EQUITY IN
ENVIRONMENTAL IMPACT
ASSESSMENT (EIA)

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ABSTRACT

Environmental impact assessment (EIA), considered the most practiced environmental management and regulatory tool in the world, is widely used in Canada to assess and manage the effects of proposed projects on the environment. The aim of EIA is to identify and manage the potential impacts of a project on the environment for both the present and future generations, and to guide the decision makers and project developers to achieve sustainability. However, conventional EIA processes have been criticized for considering only the demands of the present generation at the expense of future generations. The reason is that only the preferences of present generations are taken into consideration, while the impacts of environmental actions often affect several generations. Furthermore, there has been limited investigation globally of how intra- and intergenerational equity are understood by project proponents, decision makers and the public, and whether and how this understanding affects project impact predictions or mitigation plans.

The purpose of this research is therefore to explore how intra- and intergenerational equity are integrated into EIA processes, with a specific focus on transportation (roads and highways) infrastructure development in Canada, and to identify what opportunities exist to strengthen EIA practices. To achieve the research purpose, an extensive literature review of peer-reviewed journal articles, federal and provincial legislation, policy documents and other relevant literature was completed, followed by a structured document analysis of Canadian Environmental Impact Statements (EISs). This analysis revealed two key insights: first, intra- and intergenerational equity issues need to be developed, standardized and integrated into EIA; second, EIA practices could be more responsive in addressing the principles of sustainability. This research adds new knowledge about the need to address intra- and intergenerational equity in EIA processes to improve understanding of Canadian EIA in relation to multigenerational equity, thereby contributing to better decision-making in EIA across Canada and elsewhere. This research has laid the groundwork for more detailed research to improve the conventional procedural methods in Canadian EIA, as well as EIA in general, with regard to intra- and intergenerational equity. In summary, this research found that to develop EIA practice both environmentally and socially, the first step is to incorporate intra- and intergenerational equity in all sustainability driven assessment.

Key Words: Environmental Impact Assessment (EIA); Sustainability; Intra-generational Equity; Intergenerational Equity; Transportation (roads and highways) Infrastructure Development Sector.

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DEDICATION

Apu Akbar

“I see you everywhere, in the stars, in the river, to me you’re everything that exists; the reality of everything.” (Virginia Woolf)

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LIST OF ABBREVIATIONS

CEAA	Canadian Environmental Assessment Agency
CEAA	Canadian Environmental Assessment Act 1995
CEAA 2012	Canadian Environmental Assessment Act 2012
CSR	Comprehensive Study Report
DMA	Durban Metropolitan Area
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
HDI	Human Development Index
HIA	Health Impact Assessment
IBA	Impact Benefit Agreement
NEPA	National Environmental Policy Act
NIEO	New International Economic Order
OED	Oxford English Dictionary
RSEA	Regional Strategic Environmental Assessment
SA	Sustainability Assessment
SEA	Strategic Environmental Assessment
SIA	Social Impact Assessment
TEK	Traditional Ecological Knowledge
TK	Traditional Knowledge
UN	United Nations
UNDP	United Nations Development Program
WCED	World Commission on Environment and Development 1987
WHO	World Health Organization

Chapter One

Introduction

1.1 Research Problem

In 1969, environmental impact assessment (EIA) was initiated in the US. Enacted into US law through the National Environmental Policy Act (NEPA), EIA was seen as a primary tool for assessing potential environmental impacts of large-scale development projects (Sheate & Wood, 1995; Cashmore, 2004). The main goal of EIA was to enhance sound environmental management practices through two actions: first, by evaluating the potential present and future impacts of development projects, including large-scale resource mega-projects; and, second, by informing project proponents, decision makers and related stakeholders about development decisions (Cashmore, 2004). EIA is now considered the most practiced environmental management and regulatory tool in the world (Noble, 2015). Core to EIA is predicting the severity of a project's potential impacts on nature and people for both present and future generations, so these impacts can be appropriately avoided, mitigated, or managed (Morris & Therivel, 2001; Glasson & Therivel, 2013).

Over the past 40 years, EIA has evolved, branching off into a number of specialized forms of assessment and management tools (Morgan, 2012). These branches include strategic environmental assessment (SEA), social impact assessment (SIA), health impact assessment (HIA) and regional strategic environmental assessment (RSEA), all with a prevalent aim—sustainability (Sheate, 2010, p. 19). To address sustainability through EIA, intra- and intergenerational equity concerns need to be addressed (Bruhn-Tysk & Eklund, 2002). Thus, according to Bond (2015), intra- and intergenerational equity can be considered key pillars of sustainability. As Gibson et al. (2013) notes, “The need for greater clarity about sustainability requirements are evident in EIA, which has evolved to demand better integrated and more anticipatory decision making” (p. 39). One could argue that this statement could be extended to inter- and intra-generational equity in EIA decisions.

The 1987 report *Our Common Future* promoting ‘sustainable development’ was released by the World Commission on Environment and Development (WCED), in response to the ongoing ecological degradation and pressures on socio-economic limits (WCED, 1987). Although it remains a challenge to find a commonly accepted blueprint of

sustainability because of different ecological settings and economic conditions, equity is featured prominently in the original Brundtland definition of sustainability as “giving assurance to the world’s poor that they get their fair share” to fulfill their essential needs, and “adopting life-styles within the planet's ecological means” to enhance the “environment's ability to meet present and future needs” (World Commission on Environment and Development (WCED), 1987, p. 15, 39, 41). Irrespective of diverse concepts of ‘sustainable development,’ priority has been given to the equity aspects in the Brundtland Report in statements such as “[sustainability is] a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations” (WCED, 1987, p. 43). Gibson et al. (2013), a prominent Canadian scholar in sustainability-focused assessment, explains intergenerational equity as “favour[ing] present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably” (p. 116). Intra-generational equity is described as “ensur[ing] that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and health, security, social recognition, political influence, and so on) between the rich and the poor” (Gibson et al., 2013, p. 116).

There are numerous reasons why equity considerations in EIA and development planning are important and why ensuring equity should be a primary goal of EIA processes and outcomes (Vanclay, 2003, p. 9). For example, according to Maggio (n.d.), it is well-known that environmental benefits and impacts are not equally distributed across and within nations or societies because of socio-economic asymmetry and that much of the world’s population has inadequate access to natural resources, as well as unmet basic needs. As documented in the environmental justice literature, Lara-Valencia et al. (2009) and Deacon and Baxter (2013) reveal inequity and environmental injustice in development projects on the United States–Mexico Border and in Canada, respectively. Lara-Valencia et al. (2009) explore whether there is a relationship between the location of waste generation facilities and the neighborhoods’ socio-economic characteristics in the Mexican border city of Nogales. Their study reveals that in Mexican cities the location of urban and transportation facilities influence the spatial distribution of pollution and hazardous waste generation by manufacturing companies. In similar research, Deacon and Baxter (2013) have voiced concerns about the impact of exposure to pollution on blacks, Hispanics and the poor: those

most likely to experience environmental injustices. The authors argue that environmental injustice occurs when an affected population is denied the opportunity to say ‘no’ to any unwanted project development; they further point out that injustice is also seen in a number of subtle processes and practices that exclude some from participating in EIA processes.

Although studies have investigated environmental justice, only a few have examined whether or how intra- and or intergenerational equity is addressed in EIA. These studies mainly date from the late 1900s and early 2000s (e.g., Beckerman, 1997; Bruhn-Tysk & Eklund, 2002; Maggio, n.d.; Nagaraj & Chandrakanth, 1997; Padilla, 2002; Rickson & Rickson, 1990; Scott & Oelofse, 2005). An informal scan of the EIA literature reveals that most of this work is conceptual in nature and not necessarily applied in practice in any region. Thus, it remains unknown whether intra- and intergenerational equity issues are commonly addressed via EIA processes or whether such practice conform to early conceptual foundations or current normative standards.

Bruhn-Tysk & Eklund (2002) studied project development in Sweden’s bio-fuel energy sector. In their study, EIA considered only short time horizons; future environmental assessments and concerns were largely excluded, the global effects of environmental resources were overlooked, and aspects of intergenerational equity were ignored (Bruhn-Tysk & Eklund, 2002). Problems also existed at a local level: sustained public influence was inconsequential, and residents had few opportunities to comment during project development. All these omissions indicate that intra-generational equity was not addressed by the Swedish bio-fuel energy plants analyzed in the study (Bruhn-Tysk & Eklund, 2002). In other research, Padilla (2002) examined the shortcomings of prevailing and established economic management and evaluation methods of intergenerational problems. To ensure a much fairer distribution of benefits and rights between generations, Padilla suggests an alternative evaluation process based on different criteria compatible with the sustainability requirement. Padilla (2002) concludes that for future generations to be treated fairly, their rights must be considered and protected so that they receive the same socioeconomic and ecological benefits as do present generations.

Canada is both an urbanized and resource-rich nation (Emery, Kneebone, & Herbert, 2008)s. The new ‘Building Canada Plan’ was introduced in 2014 as the largest federal infrastructure plan in the nation’s history, designed to accelerate job creation, productivity and economic growth (Infrastructure Canada, 2015). Infrastructure projects and buildings, such as those supported in this plan, can create problems for the environment. As a result,

developers often need to apply for an EIA (World Bank, 2005). Canada was one of the early adopter countries to integrate EIA into its national environmental decision-making processes (Dalal-Clayton & Sadler, 2005). A major driver in modern EIA practice is sustainability: in other words, the goal of any assessment is to ensure the proposed project enhances local and/or regional sustainability (Sheate, 2010). According to Bond, Morrison-Saunders and Pope (2012),

The concept of ‘sustainability’ is normative and cannot be defined singularly or categorically. What constitutes sustainability in the context of an individual sustainability assessment needs to be determined on a case-by-case basis as the context differs and, for example, the definition of sustainability is contested and subject to value judgments (p. 55).

The Brundtland report sought ways to integrate sustainability principles into 20th and 21st century global development by ensuring “global justice between different people of the present generation (intra-generational justice), and justice between people of different generations (intergenerational justice)” (WCED, 1987, p. 15). In response, the Canadian Environmental Assessment Agency (CEAA) (established in 1995) committed to sustainability, and the Canadian Environmental Assessment Act (2012) adopted sustainability as a goal (CEAA, 2012, Sections 2 and 4). The Act “encourage[s] federal authorities to take actions that promote sustainable development in order to achieve or maintain a healthy environment and a healthy economy” (CEA Act, 2012, Section 4).

In addition, the Canadian Environmental Assessment Act, 2012 (CEAA, 2012) prominently features Indigenous concerns for environmental impacts – a signal that equity concerns are at the forefront of the evolution of Canadian EIA. (In this thesis, for simplicity, the term ‘Indigenous’ refers to Aboriginal, Inuit, First Nations, Métis, etc.). For example, Section 19 of the Act requires that the EIA process incorporate Indigenous traditional and community knowledge in a designated development project. The Impact Assessment Act was revised in 2019, and the proposed new Impact Assessment Act has yet to receive royal assent and is undergoing review by Parliament (Government of Canada, 2019). However, Noble (2015) reports that, in practice, there are frequent criticisms for not substantively involving all stakeholders, including Aboriginal groups, in all the phases of a proposed project. Participation remains limited to the opportunity to submit written comments. According to Doelle (2012), the new approach of the Canadian Environmental Assessment Act (CEAA) (2012) to reduce public engagement in project-planning or decision making “is

a further step backward in the effort to actively engage members of the public in the planning stage of project development” (p. 15).

Encouragingly, in 2012, the Act provided further support for considering Aboriginal traditional knowledge or Traditional ecological knowledge (TEK), “knowledge of land, animals and the local environment, followed by knowledge of management systems, values, social institutions, and a particular world view” (Noble, 2015, p. 229) during EIA of a designated project. As well, according to the CEAA (2012), cooperation with “Aboriginal peoples with respect to health and socio-economic conditions, physical and cultural heritage, and use of lands and resources for traditional purposes” is required (as cited in Noble, 2015, p. 227). Bruhn-Tysk & Eklund (2002) concur with the need to give people affected by the project a chance to express themselves, arguing that “all minority and majority groups affected by a project should have the opportunity to discuss the project’s development” (p. 132).

EIAs have been criticized because the predicted projects’ impacts on the environment are sometimes wrong: impacts are often more widespread, severe, and long-lasting, and impact mitigation plans are often less effective than anticipated (Wood, Dipper, Markvart, Gandreau & Taylor, 2000). Part of the problem is that little research about intra- or intergenerational equity exists to define what good practice would look like as time goes on after the project is completed, despite evidence that paying close attention to time horizons and follow-up in any assessment are both as important to effective practice as assessing the immediate impacts and physical footprint of the project (Bond et al., 2012). It is not known whether inter- and intra-generational equity are addressed in the process of EIA, either during scoping or impact prediction, or as part of follow-up plans for mitigation, monitoring, or adaptive management. For the EIA to work as a tool for sound environmental management and sustainable development, two changes are required: first greater knowledge of of normative approaches to intra- and intergenerational equity, and second, a better understanding of how these approaches can be successfully integrated into the practice of EIA and decision-making processes. To this end, this research investigates whether and how intra- and intergenerational equity are integrated into Canadian EIA processes and what opportunities exist to strengthen this practice.

1.2 Research Purpose and Objectives

This research is guided by this overarching question: How and to what extent are the approaches to intra- and intergenerational equity in Canadian EIA practice aligned with normative, academic expressions of these concepts? EIA processes examined in this study have a specific focus on transportation (roads and highways) infrastructure development sector in Canada. These projects generally have long life spans and clear implications for inter- and intra-generational equity because, by their nature, they are highly useful to local and regional populations.

The specific objectives of the proposed research are to:

1. Examine how intra-generational equity is considered in the stages of Canadian EIA processes;
2. Examine how intergenerational equity is considered in the stages of Canadian EIA processes;
3. Determine the extent to which considerations of equity in Canadian EIA documentation align with normative expressions of intra- and intergenerational equity.

1.3 Thesis Organization

This thesis adopts a traditional thesis format. Following this introduction is a literature review (Chapter 2) that describes the current state of research on intra- and intergenerational equity in EIA and identifies research gaps. Next, Chapter 3 presents a detailed description of the research design. The primary method used in this study is document analysis. First, a document analysis of academic literature is conducted, followed by a document analysis of environmental impact statements (EISs). Chapter 4 reports the results of each phase of this research, while Chapter 5 discusses and interprets major findings emerging from the results. The last chapter, Chapter 6, synthesizes broad conclusions arising from this study and presents a list of recommendations about how intra- and intergenerational equity can be better integrated in EIA practice and decision-making processes, particularly for the infrastructure sector in Canada and elsewhere. Additionally, this chapter includes suggested areas for related future studies.

Chapter Two

Literature Review

The literature review will first provide an overview of EIA, including its links to sustainable development and the concepts of inter- and intra-generational equity (Section 2.1). It will continue by taking a broader scan of the relevant research on intra- and intergenerational equity, as defined for sustainable development generally, and then for EIA in particular, including the nature and significance of multigenerational equity both ‘outside’ and ‘inside’ the EIA literature (Section 2.2). The literature review will conclude by identifying the research gaps in academic enquiry on the subjects of inter- and intra-generational equity and the role of this study in attempting to address these gaps.

2.1 Linking EIA to Sustainable Development and Equity

Environmental impact assessment (EIA) predicts and mitigates the nature and severity of proposed projects’ potential impacts on the environment. Widely used in Canada and across the globe, this process is considered the most practiced environmental management and regulatory tool (Noble, 2003; Morrison-Saunders & Retief, 2012). Figure 1 illustrates the basic stages undertaken in a typical EIA process for proposed infrastructure projects: (1) screening, (2) scoping, (3) impact prediction and evaluation, (4) managing project impacts, (5) determining impact significance, (6) follow-up and monitoring, and (7) public participation in EIA (Noble, 2015). Interest in EIA is increasing globally due to its usefulness for promoting sustainable development (Bruhn-Tysk & Eklund, 2002; Noble, 2004). According to the Brundtland Report (World Commission on Environment and Development, 1987), equity is the most significant consideration within the concept of sustainability, i.e., to fulfill the developmental and environmental needs of the present without compromising the needs of future generations (Bruhn-Tysk & Eklund, 2002; Gibson, 2006). The original definition of sustainability emphasizes equity and the common interest of all: “[Sustainable development] is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development; and institutional change are all in

harmony and enhance both current and future potential to meet human needs and aspirations” (World Commission on Environment and Development, 1987, p. 43).

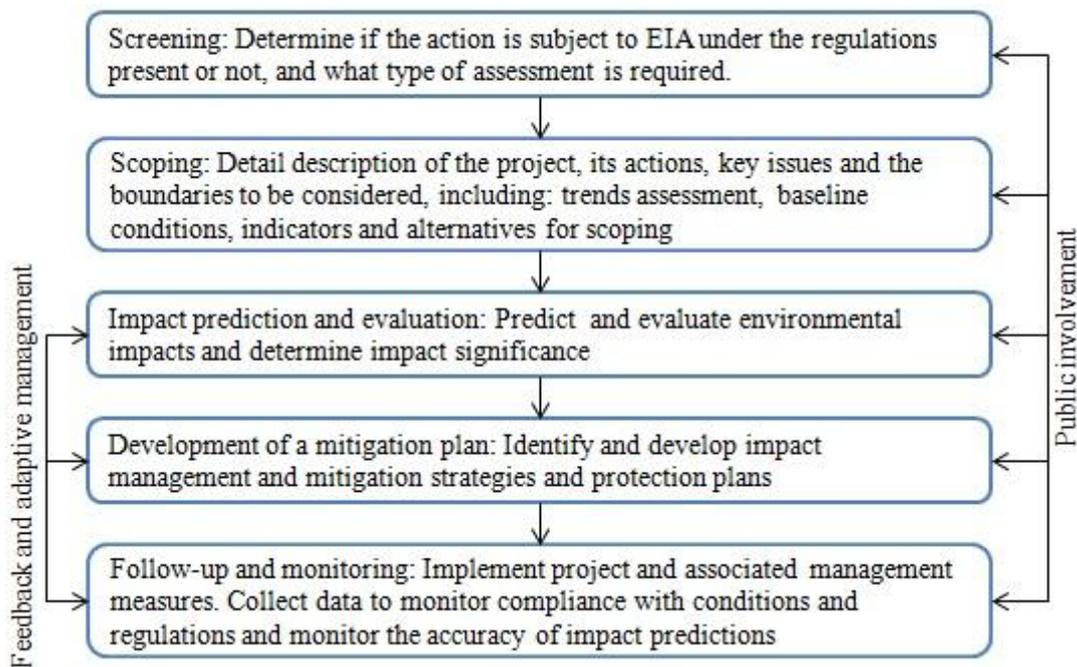


Figure 2.1: The stages of an environmental impact assessment process. Source: (Noble, 2015)

Sustainable development was famously described by the Brundtland Commission in 1987 as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987, p. 43). Many definitions of sustainability present a three-pillar model reflecting equal emphasis on environmental, social, and economic deliberation in decision-making processes (Pope, Annandale, & Morrison-Saunders, 2004). Sometimes a fourth pillar, ‘culture,’ is added (Hawkes, 2001; Vanclay, 2004). The pursuit of sustainability, or sustainable development is both the basis of sustainability-targeted EIA processes and the fundamental goal of all environmental assessment tools, including EIA (Sheate, 2009), in the modern age of environmental management. For this reason, one would expect to see evidence of addressing core sustainability concepts such as inter- and intra-generational equity within any modern EIA in Canada.

Conceptually, sustainability assessment (SA) is the most recently evolved and advanced form of EIA by which the implications of a proposed project or initiative on sustainability are evaluated (Gibson & Hanna, 2009; Pope et al., 2004). Some of the key principles of SA include long-term socio-ecological system integrity, intra-generational

equity, and intergenerational equity (Gibson et al., 2005; Gibson, 2006). The significance of such assessment lies not only in considering equity between generations in the EIA context. Also important are longer time horizons in plans for impact mitigation and management, as well as follow-up and monitoring plans that avoid multi-generational adverse environmental impacts (Bond et al., 2012). The National Research Council of the National Academies supports the need for longer time frames: “The long-term consequences of alternatives should be evaluated in addition to the more immediate consequences (as cited in Bond et al., 2012, p. 60).

Equity is becoming increasingly important to EIA good practice. Lievrouw & Farb (2003) cites the Oxford English Dictionary’s definitions of equality and equity as: “Equality is the quality or state of being equal; the feature or status of having the same rights, social status, etc., whereas equity is demonstrating fair treatment of people within relative circumstances” (as cited in Lievrouw & Farb, 2003, p. 505). The US Environmental Protection Agency emphasizes ‘intergenerational’ equity while considering the adoption of sustainability assessment in the EIA (Bond et al., 2012). Other evidence of the increasing importance of equity in EIA is seen in efforts to involve Aboriginal people in characterizing impacts and ensuring that they are equal beneficiaries of proposed developments, both financially and materially (Noble, 2015). Traditional knowledge has taken on more prominence in recent years. When an environmental assessment of a proposed project incorporates traditional knowledge, communication typically improves among stakeholders, all parties involved benefit, including government bodies, project proponents, and local Indigenous groups, and the process itself is enhanced. (Nadasdy, 1999). To this end, negotiated agreements known as Impact Benefit Agreements (IBAs) are becoming more common in regions with Aboriginal treaty rights (Noble & Fidler, 2012; Noble, 2015). Noble (2015) explains the benefits of these documents: “IBAs are legally binding agreements between a proponent and a community that serve to ensure that communities have the capacity and resources required to maximize the potential positive benefit stemming from project development” (p. 157).

In recent years, many developed countries such as the US, Canada, Australia, as well as some developing countries, have implemented environmental agreements like IBAs to establish mandates that can contribute to Indigenous involvement in environmental management and decision making in impact assessment (Noble, 2015). Negotiated agreements known as Impact Benefit Agreements (IBAs) highlights that there are deep

divisions in Indigenous communities, and not all of them get treated the same. On the contrary, the emergence of such agreements like IBA process is not fair and probably not equitable either (Noble, 2015). There are, however, some concerns about environmental agreements and negotiated IBAs, as these can be attributed in part to “the privatization of environmental governance” (Noble, 2015, p. 158), which is not always seen as a positive development. On the positive side, these agreements can sometimes help to minimize the deficiencies of EIA in negotiating the interests of Indigenous groups, community issues, First Nations’ land and resource rights; they can also foster a collaborative vision for the development of the proposal and impact assessment (Noble, 2015).

The Canadian Environmental Assessment Act of 2012 explicitly privileges Aboriginal peoples within the impact assessment process (Section 4 and Section 105), although some scholars (Doelle, 2012; Noble, 2015) and Aboriginal groups have argued that the involvement invoked by the Act is not sufficient and mostly remains at the discretion of the project proponents (Noble, 2015). Moreover, according to Noble (2015), it is debatable whether Aboriginal groups and communities are given sufficient levels of access to the EIA’s review process or whether the participation primarily involves providing information or negotiating trade-offs. Hence, it is of utmost necessity to ensure greater and substantive participation for affected local people in all the phases of EIA for the betterment of the process (Noble, 2015). According to Morrison-Saunders et al. (2014),

The contribution to sustainability approach evokes an integrated, interdisciplinary and adaptive follow-up approach that would accommodate active stakeholder involvement, long time frames to promote intergenerational equity and consideration of trade-offs. It would be less of a compliance exercise and more of an attempt to understand and collaboratively manage the impacts of development to promote sustainability outcomes. (p. 44)

Hence, understanding and evaluating trade-offs in impact assessment by all groups involved in EIA is another important part of the evaluation of equity (Morrison-Saunders et al., 2014). According to Liu et al. (2014), to acknowledge equity and justice in the assessment and to reduce ethnic tensions, trade-offs among different social groups should be given due diligence when evaluating economic, environmental and social impacts. Despite the significance of understanding and managing trade-offs in an EIA, the issue of trade-offs are seldom addressed (Lamorgese & Geneletti, 2013). In this regard, Retief et al. (2013) report that “ difficulties with dealing with trade-offs stem from the lack of consensual values, and

that finding solutions to dealing with difficult trade-off decisions requires recognition and understanding of the role of values (as cited in Morrison-Saunders et al., 2014, p. 43). At the same time, a number of scholars (e.g., Morrison-Saunders et al., 2014; Morrison-Saunders & Pope, 2013; Retief et al., 2013; Bond et al., 2012; Pope et al., 2004; Sheate et al., 2003; Jenkins et al., 2003; Gibson, 2001) have warned that there is potential for environmental standards to be traded-off against socio-economic factors in EIA processes.

2.2 Intra- and Intergenerational Equity Research

Intra- and intergenerational equity appears as a subject in many fields of study. For example, in the context of environmental law, Weiss (1990) described the concepts of intra- and intergenerational equity as follows:

“In the intragenerational context, planetary obligations and rights exist between members of the present generation. They derive from the intergenerational relationship that each generation shares with those who have come before and those yet to come. Thus, intergenerational obligations to conserve the planet flow from the present generation both to future generations as generations and to members of the present generation, who have the right to use and enjoy the planetary legacy.” (p. 202).

According to Beder (2012), in an environmental management context intra-generational equity can be described as “equity between people of the same generation” whereas, intergenerational equity refers to “equity between present and future generations.” (p. 132). In environmental economics, Kverndokk et al. (2014) characterized intra- and intergenerational equity as “how we should distribute the burdens within a generation, either within the generation living today or within future generations” (p.41).

More specifically, in the field of sustainability assessment, a sub-field of EIA, Gibson (2006) defined intra-generational equity as “ensure[ing] that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and health, security, social recognition, political influence, and so on) between the rich and the poor” (p. 170) and intergenerational equity as “favour[ing] present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably” (p. 182). Gibson (2006) elaborates on intergenerational equity and intra-generational equity respectively further by referring to needs:

Need to return current resource exploitation and other pressures on ecological systems and their functions to levels that are safely within the perpetual capacity of those systems to provide resources and services likely to be needed by future generations.
Need to build the integrity of socio-ecological systems, maintaining the diversity,

accountability, broad engagement and other qualities required for long-term adaptive adjustment. (p. 174)

Need to build sustainable livelihoods for all, including practically available livelihood choices and the power to choose. Need to emphasize less materially- and energy-intensive approaches to personal satisfactions among the advantaged, to permit material and energy sufficiency for all. (p. 174)

More broadly within the field of EIA, intergenerational equity is said to be achieved when future generations are given the same attention with regard to resource distribution as the present generation, even with project developments proceeding (Bruhn-Tysk & Eklund, 2002). Intra-generational equity is broadly understood as a reasonable resource distribution among present generations without privileging or discriminating against the needs of any minority groups (Bruhn-Tysk & Eklund, 2002). According to Bond, Morrison-Saunders, & Howitt (2013), time horizons play a significant role in EIA in relation to intra-generational and intergenerational equity. The authors also indicate that the key time horizon issues that should be considered in an assessment include (1) the length of time horizon for analysis, (2) the cultural value of a resource, (3) the resilience of a resource, and (4) who absorbs cost or benefits from project impacts.

Several international studies have examined intra- and intergenerational equity in EIA predictions and mitigation prescriptions. Bruhn-Tysk and Eklund (2002), for example, examined 55 Environmental Impact Statements (EISs) prepared in Sweden for biofuel energy plants from 1995 through 1998. To make their examination, the authors adapted a checklist inspired by Lee and Colley (1990) and the European Commission (1994) that covers areas such as local and global impacts, natural resource management, public participation in project design and development, all of which are imperative in meeting intra- and intergenerational equity. The results show that, in some ways, local impacts are described and compared during the development of a project to facilitate intra-generational equity on a local level. However, most of the cases largely overlooked intra-generational equity, leading to a failure to assess local impacts and the distributional equity of effects (Bruhn-Tysk & Eklund, 2002).

Providing every public group the opportunity to comment in the EIA ensures that some of the goals of sustainable development are met (Bruhn-Tysk & Eklund, 2002). Bruhn-Tysk and Eklund (2002) highlight the importance of these opportunities:

[Public consultation] means that the public groups have a chance to discuss project design and to express their concerns about the project development. By providing this possibility for every public group, including minority groups, the project developer sees

to that a part of the concept of intra-generational equity is met (p. 133).

Bruhn-Tysk and Eklund (2002) also point out that for the biofuel energy sector in Sweden, EIA serves as a tool only for considering short time horizons, while project development, and the absence of assessment of the environmental impacts for future generation leads to an exclusion of future environmental concerns and intergenerational equity.

Lamorgese and Geneletti (2013) reviewed 15 environmental reports (ERs) of urban plans in Italy prepared from 2006 through 2011 by using a series of questions based on Gibson's (2006) various sustainability principles in strategic environmental assessment (SEA) processes. Lamorgese and Geneletti's findings indicate that only 40% of the ERs considered elements of equity in terms of specific actions, such as expanding social housing, increasing services and facilities to address the needs of elderly. The authors also found that only two cases acknowledged addressing issues relating to affected people from different groups by decision making in the assessment process. Their analysis revealed that intra and intergenerational equity diminished over the course of the impact assessment process and that none of the environmental reports explicitly included long-term implications of actions (Lamorgese & Geneletti, 2013).

Lamorgese and Geneletti (2013) drew several conclusions from their research. First, stakeholders had few opportunities to discuss options, alternatives, and repercussions and more attention was paid to "assuring rights of access to information and transparency in procedures" (p. 125). Second, mitigation and compensation measures had a higher priority than attaining and integrating sustainability principles. Third, the imperative metrics of intra- and intergenerational equity were generally disregarded in the ERs they reviewed, including the temporal dimension, distribution of environmental costs and benefits, and the duration of effects.

Alternatives in different future settings were barely considered in the assessment process, thus, limiting the understanding of consequences associated with the long-term effects of proposed actions in the plan generations. According to Noble (2015), although impact significance is notoriously difficult to assess and describe in practice, multiple factors should be explained and considered for each impact prediction: the expected duration of the impact (short, medium, or long term after project completion), the nature of the impact (continuous, delayed, or immediate), the frequency of the impact (repeated impacts or a single impact), and the time it will take for the environment to return to baseline conditions following an impact (i.e. the significance of the impact) (Noble, 2015).

The discrimination against future generations, as well as the need to treat them equitably, has been addressed by several researchers. Padilla (2002) discussed the implied discrimination against the rights to ecological and economic benefits of future generations in the field of economic evaluation and management. According to Padilla (2002), if present actions and use of resources are not bounded within some limits, the legitimacy of the commitment to equity between generations for sustainable development could be questioned. If present actions have few or no boundaries, the problems of inequity could endanger the interests of future generations that sustainability represents. In the context of climate change issues, Azar (1998) and Chapman and Khanna (2000) have criticized the limitations of conventional evaluation and management methods with regard to the intergenerational problems (as cited in Padilla, 2002): “In order to ensure a fair treatment to future generations, we should recognize and protect their right to enjoy at least the same capacity of economic and ecological resources that present generations enjoy. Sustainability would then be assumed as an equity commitment with future generations (p. 81)”

According to Padilla (2002), the most usable and popular definition of sustainability is that of the Brundtland Commission in 1987 (WCED, 1987, p. 43) (see p. 13 of this thesis), although this does not precisely define the needs of the resource distributions and rights of present or future generations. Scott and Oelofse (2005) describe a 1999–2000 case study that helped foster democracy and justice in an environmental assessment for a proposed landfill in the north zone of the Durban Metropolitan Area (DMA) in South Africa. The study was an attempt to help proponents to promote more equitable and participatory processes in environmental assessment (Scott & Oelofse, 2005). According to the authors, to address the needs and protect the rights of marginalized people from the north zone of DMA, these people need to be part of the assessment procedures because they potentially suffer the social and environmental impacts of development. Scott & Oelofse (2005) argue that for environmental wellbeing to be fairly distributed, individuals should be able to express their needs, desires, and aspirations without “unfair, excessive, or irreparable burdens or externalities” being “imposed” by others on them “and their environments, now and in the future” (p. 449).

As Scott and Oelofse’s (2005) research suggests, there needs to be a shift away from the conventional procedural methods in EIA to alternative practices that can be more responsive in addressing the principles of sustainability to minimize social and environmental inequalities. The authors’ case study revealed that marginalized urban dwellers living in

developments surrounding a large general landfill suffer from negative social and environmental impacts on the quality of their lives that trigger environmental injustice concerns. To sum up, Scott and Oelofse (2005) suggested that because the principle of intergenerational equity is more difficult to adopt than procedural or distributional equity, further analysis is needed to determine possible long-term environmental impacts of the development of proposed landfills.

Some researchers have focused on explicitly addressing intra- and intergenerational equity in EIA, suggesting that equity concerns and identifying “suitable indicators for operationalizing intra- and intergenerational equity in decision-making” are important to facilitate sustainable development (Lamorgese & Geneletti, 2013, p. 125). For example, Lamorgese and Geneletti (2013) proposed a series of questions that attempts to combine intra-generational and intergenerational equity metrics that need to be more intensively addressed in EIA and decision making. This series of questions is based on Gibson's (2006) various sustainability principles and includes a number of guidance criteria and 71 review questions addressing key concepts like intra- and intergenerational equity. Bruhn-Tysk and Eklund (2002) recommended that the Swedish Environmental Code should include further guidance and a more comprehensive plan to integrate intra-generational and intergenerational equity issues on the EIA process. Thus, although different aspects of multigenerational equity have been addressed in the literature, there has neither been a review of the state of research on intra- and intergenerational equity practices in EIA, nor an academic review of intra- and intergenerational equity principles. Such information could help to inform practitioners of EIA about how to improve practice and decision-making for sustainability (Bond et al., 2012).

2.3 Research Gap

Overall, research on intra- and intergenerational equity in the field of EIA appear to be relatively scarce (Bond & Morrison-Saunders, 2011; Lamorgese & Geneletti, 2013). While the quest for equity has emerged as one of the core challenges of sustainability driven assessment, issues of intra- and intergenerational equity, ecological justice, and environmental equity are rarely addressed (Lara-Valencia et al., 2009; Lamorgese & Geneletti, 2013). According to Morrison-Saunders et al. (2011) and Bond (2015), to acknowledge intra- and intergeneration equity issues in EIA, the factors that need to be present in EIA are as follows: the incorporation of diverse public and community

involvement within EIA, accounting for broader time horizons, subjective aspects of evaluating and determining trade-offs and a collaborative approach among all stakeholders to manage and attain sustainability outcomes (Morrison-Saunders et al., 2011; Bond, 2015).

To date, no systematic study has examined how intra- and intergenerational equity is addressed in Canadian EIA practice. Although there is increased demand for EIA to shift away from conventional practices globally to ensure better equity among generations and help achieve sustainable development, the means by which and to what extent the intra- and intergenerational equity are integrated into Canadian EIA processes remains poorly understood (i.e., and whether these are consciously practiced or not). Further research is also required to better understand how well EIA is actually contributing to sustainability agendas (Morrison-Saunders & Retief, 2012). There has been limited investigation globally of how intra- and intergenerational equity is understood by project proponents, decision makers and the public, and whether and how this affects project impact predictions (Bond et al., 2012). Thus, there is a pressing need to determine how intra- and intergenerational equity can be more readily addressed and considered in EIA for environmentally and socially responsible development.

Overall, the subject of intra- and intergenerational equity is becoming a ‘cornerstone’ of EIA practice in Canada, particularly in light of increased emphasis on the impact of development projects on Aboriginal communities. Yet, as discussed above, research on this topic is in its infancy both nationally and internationally; and there is much work to be done to find out the solutions to daunting challenges: How and to what extent are the approaches to intra- and intergenerational equity in EIA practice aligned with normative, academic expressions of these concepts? Out of this knowledge gap, a number of compelling research questions emerge, such as: What are the empirical expressions of intra-generational equity in the stages of an EIA process? What are the empirical expressions of intergenerational equity in the stages of an environmental impact assessment process? To what extent do such expressions align with normative expressions of intra- and intergenerational equity? This thesis begins to answer a range of interesting questions through an investigation of the notions of intra- and intergenerational equity in literature and practice, with a specific focus on transportation (roads and highways) infrastructure development sector in Canada. This exploratory research can help investigate Canadian EIA practices in relation to considerations of multigenerational equity and determine what opportunities exist to strengthen the practice and process at large.

It is expected that this literature review will identify research gaps in academic enquiry and will also shed some light on what research has already been done by reviewing previous research work within the impact assessment field. However, it is not intended that this literature review will identify any criteria or indicators by which intra- and intergenerational equity might be assessed, as that will be addressed in a later part (chapter 4) of this research. The literature review (Chapter 2) indicates that there is no established framework to use as key indicators to assess intra- and intergenerational equity; as well, since these terms are not well defined in the literature, thus conducting this research was necessary.

Chapter Three

Methodology

3.1 Introduction

This study adopted two standard methods of qualitative inquiry in the social sciences and in EIA: (1) a systematic document review of EIA and related literature to search for definitions of the specific terms that are the subject of this research enquiry (i.e., equity, intra- and intergenerational equity); and (2) a structured content analysis of Canadian environmental impact statements (EISs) (i.e., the proponent's filing, stakeholders' submissions, and the panel's decision document with corresponding recommendations). Given the purpose and objectives of the study, these qualitative methods were appropriate because they provide a way to learn from written records and to discover common perspectives and core concerns (Morse & Richards, 2002). Furthermore, it was expected that through inductive analysis of the empirical data gathered, the key trends would be identified and conclusions for the study ensured (Bryman, 2004; Morse & Richards, 2002). The relationship of the supporting methods to the research objectives are outlined in Figure 3.1. The remainder of this chapter provides an overview of the methods for data collection and approach to data analysis.

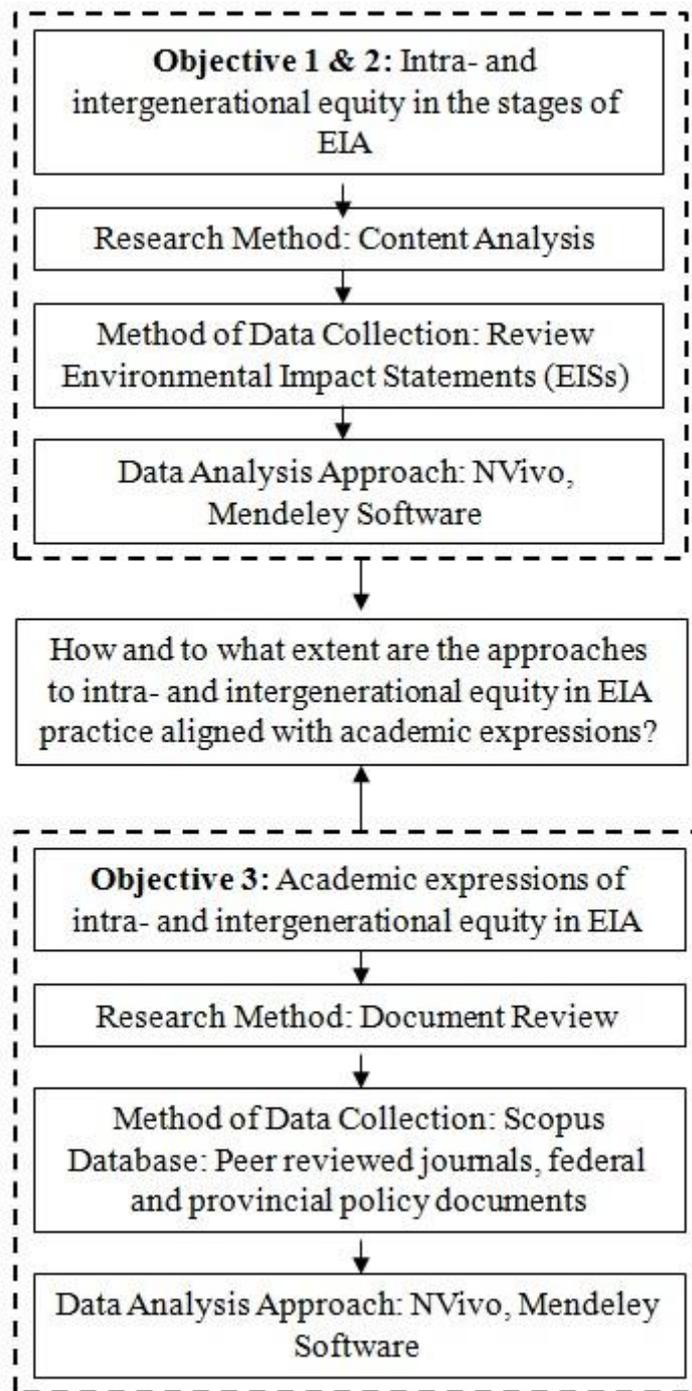


Figure 3.1: The research objectives and supporting research methods

3.2 Research Rationale

The notion of intra- and intergenerational equity is identified as one of the most intractable problems of EIA processes as there is no consensus on appropriate timescales, or how to appropriately consider them in environmental impact predictions or impact mitigation plans (Bond & Morrison-Saunders, 2011; Bond et al., 2012). Bond and Morrison-Saunders

(2011, p. 4) maintain, “Most definitions of sustainability refer to the critical concepts of intra-generational and intergenerational equity.” Despite the national and international recognition given to the importance of EIA, and its significant role in promoting sustainable development, there has been increased dissatisfaction among scholars for not considering intergenerational equity in impact mitigation and decision-making processes (Azar, 1998; Bond et al., 2012; Bruhn-Tysk & Eklund, 2002; Chapman & Khanna, 2000; Lamorgese & Geneletti, 2013; Padilla, 2002). Moreover, little consideration has been given to how EIA could effectively address intra- and intergenerational equity when the impacts of environmental actions are known to affect several generations (Bond & Morrison-Saunders, 2011).

If EIA is to be used as a tool to support better sustainable development choices, there is a need to clarify and determine if its outcomes are equitable for both present and future generations and to ensure that unforeseen environmental effects are not overlooked (George, 1999; Hunsberger et al., 2005). The aspects of equity in EIA and natural resource management for both spatial and temporal scales are not adequately considered, consequently leading to a failure in fully assessing the impacts in an EIA process (Bruhn-Tysk & Eklund, 2002). The distribution of environmental costs and benefits are not included in the review statements of EIA, and this can marginalize future generations during project development (Lamorgese & Geneletti, 2013). Also, the ‘appropriate’ timescale to consider impacts in any impact process, particularly amongst stakeholders, is presently unknown (Bond & Morrison-Saunders, 2011; Bond et al., 2012), and whether multiple time scales would better serve the purpose in impact prediction and design of follow-up programs.

In practice, EIA devotes limited attention to long-term time horizons, as this would include predictions based on both uncertainty (impacts are known but their probabilities are not) and ignorance (neither impacts nor their probabilities are known) (Lees et al., 2016), making impact assessment even more difficult (Bond et al., 2012). Considering that long-term follow-up study of impacts following EIA is not done in many jurisdictions, there is a need to identify suitable time horizons for predictions and mitigation, as well as follow-up plans. Time horizons would help to ensure intra- and intergenerational equity and more effective EIA practice (Bond et al., 2012; Bond & Morrison-Saunders, 2011). Some EIAs may identify time horizons, but this is unclear since there are no known previous studies of EIAs that specifically investigate intra- or intergenerational equity.

For this particular research, the transportation (roads and highways) infrastructure development sector in Canada with a specific focus on road construction was selected. The reason for this choice is that environmental impact statements (EISs) are more available and accessible in transportation than in other fields. (Ball, Noble, & Dubé, 2013). As well, since road projects can be transformative, dramatically altering life and economies for locally and regionally affected communities for decades, their impacts are typically considered from a long-term perspective. In Canada, large investments have been made in highway and road construction, and over the past decade, significant emphasis has been placed on progressive transportation policies (Phillips & Nolan, 2007). In the coming decades, much attention will be given to infrastructure projects, particularly highways and roads, through the Building Canada Plan, which is intended to enhance the quality of life for Canadians (Infrastructure Canada, 2016). According to Infrastructure Canada, an allocation of \$186 billion from the Building Canada Fund 2014 for the Long-term Infrastructure Plan will be provided. These funds will go towards reducing gridlock on highways and roads, connecting Canada with the world and strengthening trade corridors (Infrastructure Canada, 2016). Also, it is estimated that the investment in First Nations infrastructure on-reserve in the provinces will be approximately \$155 million under the First Nations Infrastructure Fund (Infrastructure Canada, 2016).

When a new road is built in a remote region, both local and international impacts can be amplified (Daigle, 2010; Dodd Jr. et al., 2004; Trombulak & Frisell, 2000). Concerns raised about the effects of road and road-related activities on ecology have triggered a number of empirical and rigorous research studies (e.g., Alexander, 1998; Brock & Kelt, 2004; Coffin, 2007; Forman, 2000; Forman & Alexander, 1998; Hawbaker & Radeloff, 2004; Jaeger et al., 2005; Lugo & Gucinski, 2000; Saunders et al., 2001.) Major road projects can have numerous direct and indirect impacts on the physical and chemical environments. First, they generate heat, noise and air pollution, including carbon dioxide emissions that add to global and regional warming trends (Tricker, 2007). Second, they contaminate streams and ponds, cause sediment production and transportation, affect drinking water (Daigle, 2010; World Bank, 2005), and damage wetland and marine areas (Forman & Alexander, 1998), and alter productive agricultural land. Third, they have long-term impacts on wildlife, causing mortality and fragmenting and changing habitat, (Trombulak & Frisell, 2000). Fourth, they can cause population resettlement, demographic changes, and even death from collisions (Daigle, 2010; World Bank, 2005). The World Bank (2005) and Daigle (2010) conclude that

because they have such a substantial impact on the environment, roads and road-related activities should be subject to EIA. The myriad spatial and temporal implications of road projects, as well as their scope and scale, underscore the need to investigate the approaches to intra- and intergenerational equity in EIA in the transportation (roads and highways) infrastructure development sector in Canada.

3.2.1 Document Review of EIA and Related Literature

An in-depth and systematic document review of the literature consisting of peer-reviewed journals in the journal database Scopus was conducted to search for definitions of key terms, general principles and indicators, and to understand the approaches to and principles of intra- and intergenerational equity in EIA. The main focus was on leading impact assessment journals such as *Impact Assessment and Project Appraisal*, *Environmental Impact Assessment Review*, and *the Journal of Environmental Assessment and Policy Management*. The review included journal articles and other works published from 1970 (since the enactment of the US National Environmental Policy Act, NEPA—the origin of legislated IA) to the present. Selected book chapters published during the same period were also used for background or supplemental information.

The document analysis extended beyond the EIA literature to areas outside the field that often discuss equity concepts and issues, i.e., the fields of environmental justice, social impact assessment and sustainability assessment. The literature was searched using both manual and electronic searches of key journals. The search parameters for the document review consisted of the following criteria:

1. The title of the paper must contain the phrase ‘environmental impact assessment(s)’ or ‘EIA’ or ‘impact assessment(s)’ or ‘IA’ or ‘environmental assessment(s)’ or ‘EA’ (in the abstract of the paper or in the ‘author-defined’ keywords); and
2. The word ‘intra’ or ‘intra-generational’ or ‘inter’ or ‘intergenerational’ or a variation of the term, such as ‘multigenerational’, must appear in the title or the abstract or the ‘author-defined’ keywords; and
3. The word ‘equity’ must appear in the title or the abstract of the paper or in the ‘author-defined’ keywords.

If these phrases and words did not appear, then it was assumed that intra- and intergenerational equity were not a focus of the research and, thus, the paper was excluded. Grey literature in the Scopus database was also searched, including published reports

connecting the subjects of EIA and intra- and intergenerational equity, and/or any published work illuminating approaches to (or principles of) intra- and intergenerational equity. The grey literature provided additional details and perspectives beyond those in the peer-reviewed sources mentioned above. Non-peer-reviewed sources could still be authentic to research, and often they were more comprehensive (Bryman et al. 2009).

In the document review, a thematic approach that captured key perspectives was adopted for coding and analyzing data, using NVivo to classify and manage qualitative information. All of the documents identified via the Scopus search were imported in their entirety and organized with the assistance of NVivo, a software broadly used in the social sciences to code large data sets (Bazeley, 2010; Johnston, 2006). Mendeley software was used to store and manage the references throughout the process. Articles were categorized and grouped based on the degree to which inter- and intra-generation equity was a key focus of the document. Triangulation procedures during data analysis were employed to give validity to the research (Creswell & Miller 2000); i.e., themes of importance were identified by their appearance in many documents, rather than in just one.

By being categorized into codes, data could be sorted by categories and sources, so a detailed and rigorous assessment of the relationships observed among codes could be conducted (Bazeley, 2010). Over a series of iterations, similar key terms and concepts were then grouped and regrouped into larger meta-concepts (Corbin & Strauss, 2008). Through this coding procedure, significant patterns among the data emerged, and interpretation of results became possible. Results of the document review were then used to guide the document analysis of Canadian EISs.

A total number of 148 journal articles were secured for document review of EIA and relevant literature; then an in-depth review was done for 23 articles from Environmental Impact Assessment, Sustainability Assessment, Social Impact Assessment, Environmental Justice and other relevant literature. This decision was made based on the relevance of the discussions of the selected terms ‘equity’, ‘intergenerational equity,’ and ‘intra-generational equity’ in those articles drawn from Scopus search.

3.2.2 Content Analysis of Environmental Impact Statements (EISs)

Once the core tenets of intra- and intergenerational equity were established via the document review, these provided a guide to structured content analysis of select environmental impact statements (EISs), i.e., 14 Canadian EISs prepared for comprehensive

study: EIAs of transportation (roads and highways) infrastructure development projects in the transportation sector (e.g., for roads and highways). The EISs were selected using the following criteria: (1) that they represent different scales of government, i.e., federal, provincial and municipal; (2) that they specifically focus on roads and highways (other infrastructure projects, such as, sewage, water and electric systems are not included in this study); and (3) that the EISs and related documents are accessible via the Web. The selection criteria are outlined in Table 3.1.

Table 3.1 List of selection criteria for road construction projects

No.	Selection Criteria
1	Represent different scales of government, i.e., federal, provincial and municipal
2	Focus on roads and highways (other infrastructure projects, such as, sewage, water and electric systems are not included in this study)
3	Accessibility of EISs and related documents via the Web

The EISs reviewed were primarily sourced from the Canadian Environmental Assessment Registry. All the selected road construction EISs were prepared between 1995 (introduction of cumulative effects assessment into the Canadian Environmental Assessment Act, CEAA 1995), and 2016. The list of road construction EISs subject to content analysis is outlined in Table 3.2.

Table 3.2 List of selected road construction EISs

No.	Project Title
1	Greenville to Kincolith Road
2	Local Access Road - Highway 58, Fox Lake and Garden River
3	Athabasca Seasonal Road
4	Wollaston Lake Road
5	Lake Winnipeg East Side Road Project
6	St. Theresa Point/Wasagamack Airstrip & Connecting Road
7	Waskaganish Permanent Road
8	407 East Transportation Corridor Project
9	Completion of Highway 35 between St-Jean-sur-Richelieu & US Border
10	New Route to Trans Canada Highway Perth-Andover to Woodstock
11	Trans Labrador Highway Project (Phase III)
12	Highway 69 Four-laning from north of Magnetawan River to north of Highway 607 (Project4)
13	Inuvik to Tuktoyaktuk Highway Project
14	Trans-Canada Highway Realignment through New Haven-Bonshaw, Queen's County, PEI

NVivo was used to sort, compare and analyze data for the 14 selected road construction EISs. A typology technique (Bryman 2006) was employed in the content analysis of the EISs, whereby classification of data on intra- and intergenerational equity was done through pattern-making and theme identification. The focus was on identifying and characterizing approaches to intra- and intergenerational equity within the context of EIA in major transportation (roads and highways) infrastructure development projects in each assessment. Data collected were organized into categories related to the central purpose and objectives of the research (Bowen 2009), and key concepts identified through the document review. To facilitate pattern recognition in the documents, with emerging themes becoming categories for thematic analysis, focused reading and re-reading of documents was performed, as recommended by Bowen (2009). Direct quotations from the documents were identified to support the results and discussion featured in Chapters 4 and 5.

3.2 Research Ethics and Researcher's Bias

Although a qualitative research approach faces challenges with scientific reliability issues, this research method was the appropriate choice for this particular research. According to Strauss and Corbin (1990), qualitative research is defined as “any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification” (Strauss & Corbin, 1990, p. 17). However, the qualitative methods used in this study are often criticized for lacking scientific rigour (May & Pope 1995). To lend rigour and credibility to the study and to attain defensible research results, a triangulation procedure was used in the document review and content analysis. Through the formation of categories or themes, triangulation allows the researcher to find convergence among sources and therefore to address reliability (Creswell & Miller 2000). Themes generated qualitatively were reported in a quantitative manner by counting the number of times they occurred in the literature to ensure the unbiased nature and meaningfulness of the research (Creswell, 2009). According to Mathison (1988), “Triangulation has arisen as an important methodological issue in the evaluation literature as well. In particular, naturalistic and qualitative approaches to evaluation have demanded attention to controlling bias and establishing valid propositions because traditional scientific techniques are incompatible with these alternate epistemologies” (p. 13).

To ensure rigour, strengthen the reliability in data analysis and interpretation, and validate the study, shell scripting was used for cross-checking the results found from NVivo

search terms. In this way, multiple methods of data analysis were applied in this study, allowing for a triangulation procedure in qualitative research to improve reliability and validity or “evaluation of findings” (Golafshani, 2003, p. 603). Shell scripting programs are designed for file manipulation and program execution and which basically consists of a set of commands for the shell (Kochan & Wood, 2003). The advantage of using shell scripts in a qualitative research approach is that they can be easily viewed because they appear as text files (Kochan & Wood, 2003).

There are other potential issues associated with qualitative research techniques that relate to the validity, accuracy and credibility of the research process, such as the researcher’s subjectivity and bias (Collier & Mahoney 1996). According to Bryman et al. (2009), biases may influence the research design and method of data collection because the selection and interpretation of data analysis depend on the researcher and may vary from one investigator to another. Bryman et al (2009) also maintain that it is not possible to eliminate research bias entirely in qualitative research as the knowledge, values and perceptions of the researcher often influence the data analysis and discussion. For this study, strategies to reduce the researcher bias to the barest possible minimum were used. For example, to ensure the unbiased nature of the study, multiple sources of data were used. Bias is often reduced and understanding and applicability increased when convergent data are gathered and integrated from varied sources (Bowen, 2009). Additionally, for the document review of EIA and related literature, not all the materials extracted through the Scopus search were explicitly associated with the scope of the study, despite having a predefined set of phrases relevant to the research. However, interferences were made on the basis of the possible tone of the sorted study materials. When the content of selected EISs was analyzed, it was found that some reports cover equity as a general subject rather than providing insights into the approaches to intra- and intergenerational equity. Priority was given to the systematic investigation and apparent interpretation based on the definitions of core concepts and search terms identified from the document review of EIA and related literature, in as much detail as possible.

3.3 Study Limitations

The study has several limitations. First, the academic contributions to EIA are limited with regard to intra-and intergenerational equity (Bond & Morrison-Saunders, 2011; Bond et al., 2012). This limitation restricted the extent of both the general literature review and the subsequent systematic document review, and may hinder research outcomes. To address this

concern, attention was paid to locating and analyzing pertinent grey literature and literature from adjacent fields of academic enquiry. Second, the researcher acknowledges that only one reviewer conducted the research and that interpretations may vary from one researcher to another. However, the researcher does not claim that these interpretations comprise views from different researchers as it is beyond the scope of this study. Third, the present study on the integration of intra- and intergenerational equity in EIA practice is limited by its specific focus on transportation (roads and highways) infrastructure development sector in Canada, specifically the transportation sector, and this is not the only sector to which EIA applies in practice-focused literature. However, this study does not claim to be comprehensive of all views on the subject and acknowledges that further insight may be gleaned from examining EIA practices in other sectors, for example, the mining and energy sectors. Finally, and critically, it is possible that inter- and intergenerational equity, being complex concepts, might be addressed latently rather than explicitly within the EIS documents reviewed. The content analysis was designed to identify both explicit and latent references to inter- and intra-generational equity in the sampled documents, but as latent meaning is a matter of subjective interpretation, some meaning in the data may have been missed. Despite these potential constraints, it is expected that the research will make a considerable contribution to the literature.

Chapter Four

Laying the Foundation for a Content Analysis of Environmental Impact Statements:

An Exploration of Definitions for the Terms ‘Equity,’ ‘Intra-Generational Equity’ and ‘Intergenerational Equity’

The initial, exploratory search for the terms ‘equity,’ ‘intergenerational equity’ and ‘intra-generational’ within the 14 selected road construction EISs revealed that none of these terms were present. It was therefore necessary to go back to the literature that discusses these topics to see if synonyms or related terminology could be identified. Although the three terms were not explicitly addressed or discussed in any of the 14 EIS, they have may been implicitly addressed using different terminology for the same concepts. In other words, the academic lexicon may differ from the lexicon typically used by environmental assessment practitioners. Thus, to more deeply explore the content of the 14 road construction EISs, a document review of 148 journal articles was performed to explore broad definitions, principles, and indicators for each of the three terms.

The 148 journal articles were drawn from environmental disciplines and sub-disciplines such as Environmental Impact Assessment, Sustainability Assessment, Social Impact Assessment, Environmental Justice and other relevant literature (see the method described in Chapter 3). By reviewing these documents, it was possible to analyze numerous passages containing the terms ‘equity,’ ‘intergenerational equity’ and ‘intra-generational equity’ and to identify a broad range of additional terms used in the content analysis of the 14 EISs (presented in Chapter 5). This chapter presents and discusses results from the document analysis for the terms ‘equity,’ ‘intergenerational equity’ and ‘intra-generational equity,’ in that order.

4.1 Equity: Definitions and Principles

The Oxford English Dictionary defines equity as ‘the quality of being equal or fair’ (OED, 1891). Equity essentially refers to ‘fairness’ or ‘impartiality’ and can also be defined as ‘even-handed dealing.’ (OED, 1891) The literature reviewed revealed some richer definitions of equity within the context of environmental management, as well as some general principles and indicators for achieving equity. First, seven formal definitions of the term equity were identified in the course of the document analysis, summarized in Table 4.1.

Table 4.1: Definitions of equity

Definition	Source
“Equity is both temporal and intergenerational (Geisler et al. 1981). Temporal equity is the present fairness of policies and actions and, for small farmers, refers to land tenure, pollution and health, local economic multipliers, viability of local community institutions, and the effects of new ones. (Bennett 1976).”	(Rickson & Rickson, 1990, p. 107)
“The U.N. General Assembly resolutions dealing with the establishment of a New International Economic Order (‘NIEO’), which was primarily a developing country initiative, specifically refer to ‘equity,’ as a standard for ensuring fairness in access, consumption and receipt of the benefits of environmental, financial and technical resources among nations as the means for ushering in the NIEO.”	(Maggio, n.d., p. 204, 205)
“Procedural equity ensures a fair process of environmental decision making. Distributional equity involves ensuring that there is fairness regarding the spatial location and distribution of impacts and benefits resulting from the development process.”	(Scott & Oelofse, 2005, p. 452)
“A broader conceptualization of environmental equity, as discussed by Hockman & Morris (1998), Pezzoli (1997) and Touche (2004), would be in agreement with the promotion of long-term ecological sustainability for all humanity.”	(Touche & Rogers, 2005, p. 912)
“EJ [Environmental Justice] groups and scholars have offered a variety of notions over the years, and nearly all of them go beyond a consideration of justice defined primarily as equity. These definitions certainly include discussions of inequity in the distribution of environmental goods and bads. But they also address recognition of the various cultures and races that have been at the receiving end of that inequity, authentic inclusion and political participation of a broad array of peoples and interests, and various capabilities necessary for individuals and communities to be free, equal, and functioning. Many discussions embody a number of these notions simultaneously, supporting a diverse and pluralistic understanding of the definition of environmental justice.”	(Schlosberg & Carruthers, 2010, p. 14, 15)
“At its most general, equity is about fair shares, in contrast to equality, which is about equal shares (Global Equity Gauge Alliance, 2003).”	(Snyder et al., 2012, p. 83)
“One of the five key sustainability issues that provided the focus of the Panel’s assessment of the Mackenzie Gas Project were (Joint Review Panel for the Mackenzie Gas Project, 2009, p.589): Equity Impacts: fair distribution of benefits and risks”	(Morrison-Saunders et al., 2014, p. 42)

Looking at the formal definitions of equity from the document analysis, it was evident that very little attention is paid to defining the term equity in the literature. Although research

on the subject is limited, the definitions above indicate that equity is thought of as ‘fairness,’ either in the form of a fair process of development or decision making (Maggio, n.d.; Morrison-Saunders et al., 2014; Rickson & Rickson, 1990; Scott & Oelofse, 2005; Snyder et al., 2012).

Table 4.2 summarizes key passages from the literature that seem to speak to the underlying principles for equity achievement in environmental management.

Table 4.2: Principles of equity

General principles of equity	Source
“...‘equity’ is not the same as ‘equality’, since egalitarian principles are not the only possible kind of principles of equity. Nevertheless, theories of equity within generations contain as a crucial ingredient some appeal to the desirability of equality of something or other.”	(Beckerman, 1997, p. 397)
“Equity requires that there be no barrier to developing countries doing the same as industrial ones. This requirement can be implemented in various ways, depending on how much habitat can be lost globally without major risk and what approach is taken by industrial countries. The simplest approach is to assume that industrial countries should go no further in their own destruction of natural habitat. For them, the criterion then is zero habitat loss. The corresponding criterion for developing countries is a loss of natural habitat up to that already experienced by industrial countries, but no further (measured for example as a proportion of total land area).”	(George, 1999, p. 190)
“A key pillar of sustainable development is equity.”	(Bond, 2015, p. 1550006-1)

The literature review indicated that in the context of environmental impact assessment, as suggested by Bond (2015), equity is essential for sustainable development. However, the general picture that emerged from the table 4.2 was that very few attempts have been made to identify general principles of equity. It was also apparent that there is not enough information to know what equity principles would really consist of in an environmental assessment setting.

Table 4.3 summarizes key passages from the literature that seem to speak to the underlying indicators for equity achievement in environmental management.

Table 4.3: Indicators of equity

Indicators for achieving equity	Source
<p>“What it is that should be distributed equally is, of course, a subject of hot dispute. Candidates include equal distribution of welfare, preference satisfaction, capabilities, primary goods (as defined by Rawls), functionings, economic resources and so on, all with possible variants, such as the exclusion of allowances for ‘expensive’ tastes.”</p>	<p>(Beckerman, 1997, p. 397)</p>
<p>“For the indigenous movements calling for environmental and social justice, equity, recognition, and participation are intricately woven together.”</p>	<p>(Schlosberg, 2004, p. 527)</p>
<p>“...minority, poverty, property value and education. These factors reflect the theories of equity and justice that are most strongly emphasized in the literature.”</p>	<p>(Touche & Rogers, 2005, p. 900)</p>
<p>“Equity could be measured by several methods. For example, composite indicators are multidimensional measures produced by combining various kinds of social indicators. One popular and widely used composite indicator is the Human Development Index (HDI), which was developed by the United Nations Development Program (UNDP) in 1990. The HDI combines income, life expectancy, adult literacy, and school enrolment. An even more comprehensive equity index may measure regional, gender-related, racial, ethnic, and religious disparity in terms of human development.”</p>	<p>(Mitchell & Parkins, 2011, p. 7)</p>
<p>“Equity requires that individuals or groups receive a fair or just amount of certain resources or be treated fairly or justly by institutions or policies, and this is context specific (Global Equity Gauge Alliance, 2003).” (p. 87) “Equity requires attempting to ensure equal opportunity of each person to live a fulfilling human life.” (p. 87) “Equity in health implies that ideally everyone should have a fair opportunity to attain their full potential and, more pragmatically, that no one should be disadvantaged from achieving this potential, if it can be avoided” (WHO, 1986).” (p. 87) “Equity can be understood as requiring a focus on mitigation or providing resources in certain areas in order to ensure equal opportunity throughout the affected communities, prioritizing the needs of those considered most disadvantaged, and/or on ensuring a sufficient level of well-being across the determinants of health.” (p. 90)</p>	<p>(Snyder et al., 2012)</p>
<p>“Equity was a key frame in the initial consideration of environmental injustice.”</p>	<p>(Schlosberg, 2013, p. 38)</p>
<p>“Public participation in SIA is an effective measure to ensure social and economic justice and equity.”</p>	<p>(Liu, Liu, & Zhang, 2014, p. 8769)</p>
<p>“The concept of equity relates to how social benefits and disbenefits are distributed across society and space.”</p>	<p>(Lucas & Pangbourne, 2014, p. 71)</p>
<p>“Understanding matters of equity with respect to the distribution of project benefits and costs or the legacy and bridging outcomes during a follow-up study would require social research involving individuals and groups.”</p>	<p>(Morrison-Saunders et al., 2014, p. 43)</p>
<p>“Equity has aspects of both distributive and procedural justice (Walker and Bulkeley 2006) and is linked to the fairness of mechanisms by which social exchanges take place between different groups of people (Brashear et al. 2004), as well as intended and unintended desirable and undesirable outcomes of human interventions upon the environment (Ikeme 2003).”</p>	<p>(Adams & Bell, 2015, p. 1475)</p>
<p>“In terms of game theory, ... in referring to equity, there are two key players involved – the local authority and the developer—so equity has a limited interpretation which relies on the local authority acting on behalf of society in order to be fully equitable.”</p>	<p>(Bond, Pope, Morrison-Saunders, & Retief, 2016, p. 192)</p>

The results from the literature review show that there was some attention given to the indicators for achieving equity in the literature. Although research on the subject is limited, the equity indicators above suggest that it is imperative to ensure equal and just distribution of social and economic benefits, as well as resources, among every individual and group (Adams & Bell, 2015; Beckerman, 1997; Lucas & Pangbourne, 2014; Mitchell & Parkins, 2011; Snyder et al., 2012). In this regard, Mitchell and Parkins (2011) write about the utility of development indices:

One popular and widely used composite indicator is the Human Development Index (HDI), which was developed by the United Nations Development Program (UNDP) in 1990. The HDI combines income, life expectancy, adult literacy, and school enrolment. An even more comprehensive equity index may measure regional, gender-related, racial, ethnic, and religious disparity in terms of human development. (p. 7)

Furthermore, it is essential to understand that there could be different approaches to defining equity and equity indicators in the literature based on different fields and the origin and applications of the concept. For instance, Scott and Oelofse (2005) emphasize procedural and distributional equity, whereas Rickson and Rickson (1990) emphasize temporal equity. According to Bond and Morrison-Saunders & Howitt (2013), “The concept of sustainability has been an early theme in the evolution of the assessment system. Over time principles such as equality, intra- and intergenerational equity, etc. have made their way into mainstream law and subsequently the environmental assessment mandate” (p. 192) .

However, the general picture that emerged from the literature was that very few attempts have been made to identify general principles and equity indicators. For the purpose of this study, equity is defined as the quality of being fair in environmental policy and decision making to ensure equal distribution of impacts and benefits caused by a development process.

4.2 Intergenerational Equity: Definitions and Principles

The results showed that the literature paid some attention to defining intergenerational equity. Definitions available on intergenerational equity, both formal and informal, are summarized with references in Table 4.4.

Table 4.4: Definitions of intergenerational equity

Definition	Source
“States shall conserve and use the environment and natural resources for the benefit of present and future generations.”	(WCED, 1987, p. 286)
“Intergenerational equity is the maintenance of natural resources necessary for crop production and is equivalent to the concept of sustained yield (Bennett 1976).”	(Rickson & Rickson, 1990, p. 107)
<p>“Intergenerational equity, as employed in current international instruments, contains two distinct components regarding the utilization of resources. The first calls for fairness in the utilization of resources between human generations past, present and future. This component will be referred to as "intergenerational" equity. It requires attaining a balance between meeting the consumptive demands of existing societies and ensuring that adequate resources are available for future generations to meet their needs. Striking a balance between current consumption and foregoing use of resources or devoting resources for investment and thus for future generations has been a consideration for all societies.” (p.163)</p> <p>“Intergenerational equity constitutes a bridge for recognized mutual interests between environmental protection, socio-economic development and human rights law.” (p. 166)</p> <p>“Most international legal instruments use the phrase ‘for the benefit of present and future generations’ or ‘equitable sharing of benefits’ or similar language.” (p. 185)</p> <p>“Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities.” (p. 185)</p> <p>“Intergenerational equity is referred to as a ‘principle’ that ‘...requires that we avoid actions with harmful and irreversible consequences for our natural and cultural heritage.’” (p. 186)</p> <p>“The freedom of action of each generation in regard to the environment is qualified by the needs of future generations.” (p. 216)</p>	(Maggio, n.d.)
<p>“The moral claim of ‘sustainable development’ is alleged to rest largely on its appeal to intergenerational equity. The intergenerational distributional concern of sustainable development is, in fact, often contrasted with the standard economist's concern with simply maximising the future stream of utility over some relevant time period.”</p> <p>‘considerations of intergenerational equity would demand . . . that each generation be guaranteed roughly equal benefits and insist that one generation may justly enjoy certain benefits only if those advantages can be sustained for subsequent generations as well’</p>	(Beckerman, 1997, p. 397)
“The intergenerational equity connotes the level of development which provides increase in the welfare of the present generation without decreasing the welfare of the future generation.”	(Nagaraj & Chandrakanth, 1997, p. A-41)
“In the EIA context, intergenerational equity means that future generations should have the same possibilities as the present generation, even with project developments proceeding.”	(Bruhn-Tysk & Eklund, 2002, p. 132)
The present study concludes that, in order to ensure a fair treatment to future generations, we should recognize and protect their right to enjoy at least the same capacity of economic and ecological resources that present generations enjoy.”	(Padilla, 2002, p. 81)
“Development activities or planned interventions should be managed so that the needs of the present generation are met without compromising the ability of future generations to meet their own needs.”	(Vanclay, 2003, p. 10)
“Favour present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably”	(Gibson et al., 2005, p. 103)

“Favour present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably”	(Gibson, 2006, p. 174)
“favouring options most likely to preserve or enhance opportunities for future generations to live sustainably” (Gibson et al., 2005; Gibson, 2006)	(Morrison-Saunders & Therivel, 2006, p. 286)
“Intergenerational equity—favouring options most likely to preserve or enhance opportunities for future generations to live sustainably. (Integrated sustainability decision criteria and general trade-off rules (Gibson et al., 2005; Gibson, 2006)).”	(Therivel, 2006, p. 286)
“Favour present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably”	(Winfield, Gibson, Markvart, Gaudreau, & Taylor, 2010, p. 4119)
“Favour present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably.” (Gibson et al., 2005, Chapter 5)	(Sheate, 2010, p.400)
“Intergenerational equity refers to the need for a just distribution of rewards and burdens between generations and fair and impartial treatment towards future generations.” (p. 131) “Australia’s 1992 Intergovernmental Agreement on the Environment, which states that ‘the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.’” (p. 135) “...intergenerational equity demands that the current generation conserve the diversity of nature so as not to restrict the options available to future generations to solve problems and develop in ways that they choose.” (p. 138)	(Beder, 2012)
“The long-term consequences of alternatives should be evaluated in addition to the more immediate consequences.”	(Bond, Morrison-Saunders, & Pope, 2012, p. 60)
“Favour present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably” (Gibson et al., 2005:116–118)	(Morrison-Saunders & Retief, 2012, p. 35)
“...justice between people of different generations (intergenerational justice) (WCED 1987: 43).”	(Stefanie, 2012, p. 1)
“Favour present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably” (Gibson et al., 2005: ch.5)	(Bond, A. J., Morrison-Saunders, A., & Howitt, R. (Eds.), 2013, p. 8)
“Favour present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably.” (Gibson, 2006)	(Lamorgese & Geneletti, 2013, p. 117)
“...defined after Gibson et al. (2005, p. 235) as favouring ‘present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably’”	(Bond, 2015, p. 1550006-1)

While there were somewhat diversified opinions on the definition of intergenerational equity, most definitions were consistent with Gibson et al.’s definition (2005, p. 103). From the literature reviewed, it was clear that that intergenerational equity means balancing the welfare of future and present generations (Beckerman, 1997, p. 397; Beder, 2012; Bond, 2015, p. 1550006-1); Bond, Morrison-Saunders, & Howitt, 2013, p. 8; Bruhn-Tysk & Eklund, 2002, p. 132; Lamorgese & Geneletti, 2013, p. 117; Maggio, n.d.; Morrison-

Saunders & Retief, 2012, p. 35; Nagaraj & Chandrakanth, 1997, p. A-41; Padilla, 2002, p. 81; Vanclay, 2003, p. 10; WCED, 1987, p. 286.) As documented in the literature, for example, Bond, Morrison-Saunders and Howitt (2013), Lamorgese and Geneletti (2013), Morrison-Saunders and Therivel (2006) and Sheate (2010), all define intergenerational equity as “favoring the options of present generations” and, at the same time, securing “the opportunities of future generations” related to sustainable living. Some scholars go further in emphasizing the impartial utilization and distribution of resources among different generations, as well as the equitable sharing of health, productivity and benefits (Maggio, n.d.; Beder, 2012). These latter principles are seen in various national laws and agreements, such as the National Park Act (1916) in the US and Australia’s 1992 Intergovernmental Agreement, both of which include intergenerational equity as a principle (Beder, 2012). For the purpose of this study, intergenerational equity is defined as “favour[ing] present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably” (Gibson et al, 2005, p. 235).

Looking beyond formal definitions, it was possible to identify some general principles of intergenerational equity in the literature reviewed. Table 4.5 summarizes key passages from the literature that seem to speak to the underlying principles of intergenerational equity achievement in environmental management.

Table 4.5: Principles of intergenerational equity

General principles of intergenerational equity	Source
“Access to the enjoyment of global resources, and responsibility for resulting environmental degradation and depletion, have become focal points for the current thinking on intergenerational equity.”	(Maggio, n.d., p. 176)
“Intergenerational equity: a necessary condition for sustainability.” (One of the Twin Pillars of Sustainable Development) (p. 178) “To expand on the principle of intergenerational equity, it is helpful to restate it as the principle of conservation of capital. If the capital, natural or human made, that future generations inherit is no less than the current capital stock, then development is equitable intergenerationally.” (p. 180)	(George, 1999)
“To appropriately address the problem of intergenerational equity, more than modifying the discount or the weights applied to the different generations, it is essential to overcome the limitations of conventional economic analysis in relation to sustainable development.” (p. 71) “But the efficient intergenerational allocation depends on which initial endowment of resources is assumed. Economic analysis can consider different distributions, but moral considerations about the rights of the future have to be included in order to decide which is the most appropriate.” (p. 72)	(Padilla, 2002)
“Intergenerational equity is a more illusive and difficult principle to apply. The main goal here is to ensure that the location of a facility does not have	(Scott & Oelofse, 2005, p.

detrimental effects on future generations to the benefit of present generations.”	452)
“Favour present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably.” “Need to return current resource exploitation and other pressures on ecological systems and their functions to levels that are safely within the perpetual capacity of those systems to provide resources and services likely to be needed by future generations. Need to build the integrity of socio-ecological systems, maintaining the diversity, accountability, broad engagement and other qualities required for long-term adaptive adjustment.”	(Gibson, 2006, p. 174)
“The maximin criterion has also been called the “Rawlsian criterion” even though Rawls had expressed strong reservations about the use of maximin as a principle for intergenerational equity. The fascination with the maximin criterion has spawned a stream of theoretical literature that seeks to characterize development paths that ensure a constant level of consumption, or constant utility, for all generations.”	(Alvarez-Cuadrado & Van Long, 2009, p. 155)
“The use of non-renewable resources should be balanced according to the level of substitution with new resources. Future development should not diminish or threaten any kind of capital: human, social, ecological or economic.” (p. 104) “The non-renewable resources are assigned to the principle of intergenerational equity due to their long-term importance for future generations.” (p. 106)	(Mzavanadze, 2009)
“to assure intergenerational equity for renewable resources, the consumption rate should not exceed the regeneration rate.”	(Pan & Kao, 2009, p. 729)

Looking at the general principles of intergenerational equity from the document analysis, it was evident that few scholars have explored any specific principles in the literature. Although research on the subject is limited, the general principles above indicate the necessity of ensuring efficient allocation, consumption and distribution of resources among generations, either in the form of non-renewable or renewable resources (Alvarez-Cuadrado & Van Long, 2009, p. 155; Mzavanadze, 2009; Padilla, 2002; Pan & Kao, 2009, p. 729). Key to understanding the specific principles of intergenerational equity is that researchers use diverse approaches to explore them based on these principles’ divergent origins and applications. For instance, Maggio (n.d.) emphasizes minimizing environmental degradation and depletion for the benefit of intergenerational equity, whereas Gibson (2006) emphasizes maintaining the diversity and integrity of socio-ecological systems, so future generations can live sustainably. Thus, as suggested by Scott and Oelofse (2005), the principles of intergenerational equity are elusive and complex to apply, but at the same time critical so that the detrimental impacts on future generations can be nominal. However, the general picture that emerged from the literature was that few attempts have been made to identify general principles. On the other hand, no specific indicators of intergenerational equity were found in the literature.

4.3 Intra-Generational Equity: Definitions and Principles

There were fewer results when it came to defining intra-generational equity in the literature. Definitions of intra-generational equity identified during the document analysis, both formal and informal, are summarized with references in Table 4.6.

Table 4.6: Definitions of intra-generational equity

Definition	Source
“Ensure that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and health, security, social recognition, political influence, and so on) between the rich and the poor.”	(Gibson et al., 2005, p. 101)
“Ensure that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and health, security, social recognition, political influence, and so on) between the rich and the poor.”	(Gibson, 2006, p. 174)
“ensuring equity of sufficiency and opportunity for all people” (Gibson et al., 2005; Gibson, 2006)	(Morrison-Saunders & Therivel, 2006, p. 286)
“Intra-generational equity—ensuring equity of sufficiency and opportunity for all people. (Integrated sustainability decision criteria and general trade-off rules (Gibson et al., 2005; Gibson, 2006))”	(Therivel, 2006, p. 286)
“Ensure that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and health, security, social recognition, political influence, etc.) between the rich and the poor.”	(Winfield, Gibson, Markvart, Gaudreau, & Taylor, 2010, p. 4119)
“Ensure that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and health, security, social recognition, political influence, and so on) between the rich and the poor.” (Gibson et al., 2005, Chapter 5)	(Sheate, 2010, p. 400)
“Ensure that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and health, security, social recognition, political influence, and so on) between the rich and the poor.” (Gibson et al., 2005:116–118)	(Morrison-Saunders & Retief, 2012, p. 36)
“Ensure that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and health, security, social recognition, political influence, and so on) between the rich and the poor.” (Gibson et al., 2005: ch.5)	(Bond, Morrison-Saunders, & Howitt, 2013, p. 8)
“Ensure equity of opportunity for everyone, particularly the poorest and most vulnerable members of the community and seek to create a good quality of life for everyone.”	(Lamorgese & Geneletti, 2013, p. 119)
“... (defined after Lamorgese and Geneletti (2013, p.119) as ensuring equity of opportunity for everyone, particularly the poorest and most vulnerable members of the community and seek to create a good quality of life for everyone.”	(Bond, 2015, p. 1550006-1)
“Fairness in utilization of resources among humans.” (p. 163) “The ‘intra-‘generational aspect is directed at the serious socio-economic asymmetry in resource access and use within and between societies and nations that has exacerbated environmental degradation and the inability of a large part of humanity to meet adequately even its basic needs.” (p. 164) “Schachter's comment suggests that one aspect of international equality among States is the right to intra-generational equity as manifest in distributive justice. This would mandate creating conditions to assure among all nations fair access, distribution and consumption of global resources.” (p. 184) “Fairness in utilization and enjoyment of resources as well as in enduring the	(Maggio, n. d.)

costs for degradation, disposal, and rehabilitation of resources, among all persons and groups both domestically and internationally.” (p. 193)	
“Intra-generational equity refers to a fair distribution of resources among present generations without discriminating against minority groups. This means that all minority and majority groups affected by a project should have the opportunity to discuss the project’s development.”	(Bruhn-Tysk & Eklund, 2002, p. 132)
“The benefits from the range of planned interventions should address the needs of all, and the social impacts should not fall disproportionately on certain groups of the population, in particular children and women, the disabled and the socially excluded, certain generations or certain regions.”	(Vanclay, 2003, p. 10)
“... global justice between different people of the present generation (intra-generational justice) (WCED 1987 [,][p.] 43).”	(Stefanie, 2012, p. 1)

From these definitions it appears that intra-generational equity promotes the approach of “fair and equitable” distribution of resources among “all minority and majority groups” (Bruhn-Tysk & Eklund, 2002, p. 132), and sometimes “within and between societies and nations” (Maggio, n.d., p. 164). Many scholars (e.g., Bond, 2015; Bond, Morrison-Saunders, & Howitt, 2013; Lamorgese & Geneletti, 2013; Morrison-Saunders & Retief, 2012; Morrison-Saunders & Therivel, 2006; Sheate, 2010) argue that opportunities for such basic rights such as health and security, should be available for all groups. The literature also supports the impartial distribution of benefits among all persons, domestically and internationally (Maggio, n. d.) and among socially excluded and vulnerable groups, including women, children and disabled people (Vanclay, 2003.) As with the term ‘intra-generational equity,’ many of the researchers simply adopted Gibson et al. (2005, p. 101) definition of intra-generational equity (Bond, 2015; Bond, Morrison-Saunders, & Howitt, 2013; Lamorgese & Geneletti, 2013; Morrison-Saunders & Retief, 2012; Morrison-Saunders & Therivel, 2006; Sheate, 2010). For the purpose of this study, intra-generational equity is defined as “ensur[ing] that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and health, security, social recognition, political influence, and so on) between the rich and the poor” (Gibson et al, 2005, p. 101).

Looking beyond formal definitions, it was possible to identify some general principles of intra-generational equity in the literature reviewed. Table 4.7 summarizes key passages from the literature that seem to speak to the underlying principles of intra-generational equity achievement in environmental management.

Table 4.7: Principles of intra-generational equity

General principles of intra-generational equity	Source
<p>“Schachter suggested in the late 1970s the bare minimum entailed by ‘intra-generational’ equity: It has become virtually platitudinous to suggest that everyone is entitled to the necessities of life: food, shelter, health care, education, and the essential infrastructure for social organization ... It is scarcely startling to find that a similar principle has been advanced on the international level.”</p>	(Maggio, n. d., p. 164)
<p>“Intra-generational equity: a necessary condition for development. (One of the Twin Pillars of Sustainable Development)” (p. 178) “The principle of intra-generational equity is considered at three levels: local or national, transnational, and global” (p. 180) “To ensure intra-generational equity, it is necessary to identify all impacts that may be significant to any of the people affected and ensure that any necessary mitigation is satisfactory for all of them. Where the issues are complex, this may entail a full social impact assessment, techniques for which are well established (Inter organizational Committee on Guidelines and Principles for Social Impact Assessment 1994; Vanclay and Bronstein 1995). However, Principle 10 of the Rio Declaration, the participation principle, requires that the results of such an assessment, and indeed the whole of the environmental assessment, be subjected to the views of the public. Through publication of the EIA report, public comment on it, public hearings, public inquiries, and all the normal democratic processes that steer decision-makers, the public can then make its own decisions on what is equitable.” (p. 182) “One aspect of intra-generational equity for which existing processes are not as strong as they might be is in dealing with the interests of minority groups. EIA” (p. 182) “For intra-generational equity, it is necessary also to ensure that Rio’s Principle 20 is implemented (“women have a vital role in environmental management and development. Their participation is therefore essential . . .”).” (p. 183) “Another area where existing processes do not necessarily provide a good test for intra-generational equity is in relation to international and global impacts. Under Principle 2 of the Rio Declaration, ‘states have . . . the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction.’” (p. 183)</p>	(George, 1999)
<p>“At least from a developmental point of view, a ‘no action’ alternative would mean that some aspects of intra-generational equity are considered because project developers, permitting authorities, as well as the public evaluate the impacts of the project.”</p>	(Bruhn-Tysk & Eklund, 2002, p. 139)
<p>“Ensure that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and health, security, social recognition, political influence, and so on) between the rich and the poor.” “Need to build sustainable livelihoods for all, including practically available livelihood choices and the power to choose. Need to emphasize less materially- and energy-intensive approaches to personal satisfactions among the advantaged, to permit material and energy sufficiency for all.”</p>	(Gibson, 2006, p. 174)
<p>“Poverty, gender inequality and social stress should be declining. The development should ensure access to adequate basic public services such as health, education and culture.” (p. 104) “The principle of intra-generational equity is represented by two criteria, where the first focuses on the trends of social welfare and the second looks at the policy response and mitigating social policies.” (p. 106) “Social welfare needs to be distributed in such a way that everybody’s basic needs should be satisfied. Social welfare trends are represented by poverty, inequality, gender and social behaviour indicators. Mitigating social policies include social care, health care, education and culture.” (p. 106)</p>	(Mzavanadze, 2009)

As Table 4.7 shows, in addition to offering definitions of intra-generational equity, the literature also discusses guiding principles. Mzavanadze (2009), for example, emphasizes the need to equally distribute social welfare and provide adequate access to “health care,” “education and “culture” to reduce “poverty, gender inequality and social stress” (p.104, 106). Bruhn-Tysk & Eklund, 2002 point out that the public has a role in facilitating intra-generational equity by evaluating and commenting on the impacts of local projects:

On a local level, project developments may facilitate intra-generational equity in some ways, when considering how local impacts are described and compared with different project designs. However, the failure to assess local impacts, as well as effects, of resource use together with the public’s difficulty in commenting on the project may indicate that other aspects of intra-generational equity are overlooked. (p. 41, 42)

Among the 148 papers, only 23 explicitly defined the terms of interest, even though these topics were of importance to each of the papers. Notwithstanding the importance of intra- and intergenerational equity to sustainable development, these concepts were not fully explored in the academic literature examined in this study. Looking across all the terms, few were formal definitions or principles that might guide practice and allow for subsequent evaluation of good practice or indicators that would facilitate measurement of the concepts. This dearth of defined terms made it difficult to determine whether different forms of equity were being achieved, for example, in environmental impact assessment. Regardless, the definitions of intra- and intergenerational equity found in the literature were deemed sufficient to guide the next part of the research: a content analysis of selected environmental impact statements to investigate whether and how these concepts are being addressed in practice.

4.4 Search Terms from Document Review

This document review of journal articles was important for laying the foundation for the content analysis of environmental impact statements. By drawing from the definitions, general principles and indicators of equity, intra- and intergenerational equity from the document review of journal articles, a total number of 119 search terms were identified to conduct a content analysis of 14 road construction EISs. The 119 words were then categorized into six different groups based on the framework of Bond, Morrison-Saunders, and Howitt (2013), which “compares and evaluates the effectiveness of sustainability assessment practice in different jurisdictions” (p. 117). Most of the categories in the

framework fit well at this stage of the research, but the framework is not totally ideal, as not all its categories are equally useful (e.g., transactive effectiveness). Despite its flaws, this framework is the only one available that evaluates the sustainability assessment process.

Among the search terms, 54, 42 and 23 were identified for intergenerational equity, intra-generational equity and common words for both intra- and intergenerational equity, respectively. Tables 4.8 through 4.13 summarize the useful search terms (from the document analysis) used to analyze the content of selected impact statements. According to Bond, Morrison-Saunders, and Howitt (2013), in the context of sustainability assessment (SA), a set of questions can be asked to evaluate how procedural effectiveness, substantive effectiveness, transactive effectiveness, normative effectiveness, pluralism, knowledge and learning can be adopted in the assessment processes. These questions are as follows (Bond, Morrison-Saunders, & Howitt, 2013, p. 128):

“Procedural effectiveness: Have appropriate processes been followed that reflect institutional and professional standards and procedures?

Substantive effectiveness: In what ways, and to what extent, does SA lead to changes in process, actions, or outcomes?

Transactive effectiveness: To what extent, and by whom, is the outcome of conducting SA considered to be worth the time and cost involved?

Normative effectiveness: In what ways, and to what extent, does the SA satisfy the following imperatives: reverse prevailing (unsustainable) trends? integrate all the key intertwined factors affecting sustainability? seek mutually reinforcing gains, minimize trade-offs? respect contexts in which sustainability assessment takes place? is open and broadly engaging?

Pluralism: How, and to what extent, are affected and concerned parties accommodated into and satisfied by the SA process?

Knowledge and learning: How, and to what extent, does the SA process facilitate instrumental and conceptual learning?”

Table 4.8: Search terms from document review (Procedural effectiveness)

Framework Criterion	Procedural effectiveness “(Have appropriate processes been followed that reflect institutional and professional standards and procedures?)”					
Category	Intergenerational equity		Intra-generational equity		Common words for both intra and intergenerational equity	
Search Terms	Search Term	Source	Search Term	Source	Search Term	Source
	Effective process	(Gibson et al., 2005, p. 101)	Justice *and global	(Maggio, n. d., p. 184)	Justice	(Schlosberg & Carruthers, 2010, p. 14, 15)
	Time horizon	(Bond et al., 2012, p.60)			Fair*	(Morrison-Saunders et al., 2014, p. 42)
	Prediction horizon	(Noble, 2015)			Fair process	(Scott & Oelofse, 2005, p. 452)
	Future option*	(WCED, 1987, p. 286)			Fairness of policies	(Rickson & Rickson, 1990, p. 107)
	Future consequence*	(Beckerman, 1997, p. 397)			Fairness	(Maggio, n. d., p. 163)
	Future effect*	(Mzavanadze, 2009, p. 106)			Fairness of actions	(Maggio, n. d., p. 193)
					Fairness in decision making	(Rickson & Rickson, 1990, p. 107)

Source: Bond, A. J., Morrison-Saunders, A., & Howitt, R. (Eds.). (2013), p. 128

Table 4.9: Search terms from document review (Substantive effectiveness)

Framework Criterion	Substantive effectiveness “(In what ways, and to what extent, does SA lead to changes in process, actions, or outcomes?)”					
Category	Intergenerational equity		Intra-generational equity		Common words for both intra- and intergenerational equity	
Search Terms	Search Term	Source	Search Term	Source	Search Term	Source
	Substantive effectiveness	(Gibson et al., 2005, p. 101)	Sustainab* livelihood*	(Gibson, 2006, p. 174)	Sustainab* living	(Gibson, 2006, p. 174)
	Sustainab*	(Gibson, 2006, p. 174)	Energy intensive approach*	(Gibson, 2006, p. 174)	Utilize* *and resources	(Maggio, n. d., p. 163)
	Conserv*	(Beder, 2012, p. 138)	Material sufficiency	(Gibson, 2006, p. 174)		
	Protect*	(Maggio, n. d., p. 185)	Energy sufficiency	(Gibson, 2006, p. 174)		
	Maintain*	(Gibson, 2006, p. 174)	Benefit* *and interventions	(Vanclay, 2003, p. 10)		
	Irreversible	(Maggio, n. d., pg. 186)	Rehabilitat* *and resources	(Maggio, n. d., pg. 193)		

	Long term consequence*	(Bond, Morrison-Saunders, & Pope, 2012, pg. 60)				
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Source: Bond, A. J., Morrison-Saunders, A., & Howitt, R. (Eds.). (2013), p. 128

Table 4.10: Search terms from document review (Transactive effectiveness)

Framework Criterion	Transactive effectiveness “(To what extent, and by whom, is the outcome of conducting SA considered to be worth the time and cost involved?)”					
Category	Intergenerational equity		Intra-generational equity		Common words for both intra and intergenerational equity	
Search Terms	Search Term	Source	Search Term	Source	Search Term	Source
	Generation	(Beckerman, 1997, p. 397)	Rich *and poor	(Gibson et al., 2005, p. 101)	Present generation	(Bruhn-Tysk & Eklund, 2002, p. 132)
	Human generation	(Maggio, n. d., p. 163)	Cost *and degradation	(Maggio, n. d., p. 193)	Equality	(Beckerman, 1997, p. 397)
	Past generation	(Maggio, n. d., p. 163)	Sharing *and development	(Bruhn-Tysk & Eklund, 2002, p. 132)	Equit*	(Rickson & Rickson, 1990, p. 107)
	Future generation	(WCED, 1987, p. 286)	Sharing *and benefit*	(Maggio, n. d., p. 185)	Equitable	(Bond, Pope, Morrison-Saunders, & Retief, 2016, p. 192)
	Intergenerational	(Maggio, n. d., p. 163)	Rural community	(Rickson & Rickson, 1990, p. 107)	Equal distribution	(Beckerman, 1997, p. 397)
	Intergenerational	(Rickson & Rickson, 1990, p. 107)	Intra-generational	(Bruhn-Tysk & Eklund, 2002, p. 132)		
	Modify discount	(Padilla, 2002, p. 71)	Intra-generational	(Maggio, n. d., p. 164)		
	Benefit	(Maggio, n. d., p. 185)	Children	(Vanclay, 2003, p. 10)		
	Equitable sharing of benefits	(Maggio, n. d., p. 185)	Women	(Vanclay, 2003, p. 10)		
	Equal benefits	(Beckerman, 1997, p. 397)	Disabled	(Vanclay, 2003, p. 10)		
	Distribut* *and burdens	(Beder, 2012, p. 131)	Gender equality *or equity	(Mzavanadze, 2009, p. 104)		
	Distribut* *and rewards	(Beder, 2012, p. 131)	Vulnerable *and community	(Lamorgese & Geneletti, 2013, p. 119)		
	Fair treatment	(Beder, 2012, p. 131)	Societ*	(Maggio, n. d., p. 185)		

		131)		d., p. 164)		
	Impartial treatment	(Beder, 2012, p. 131)	Nations	(Maggio, n. d., p. 164)		
	Different generations	(Stefanie, 2012, p. 1)	Aboriginal	(Noble, 2015, p. 227)		
	Consumption rate	(Pan & Kao, 2009, p. 729)	Indigenous	(Schlosberg, 2004, p. 527)		
	Trade-off	(Therivel, 2006, p. 286)				
	Distribut* and *rights	(Padilla, 2002, p. 72)				
	Distribut* *and consequences	(Scott & Oelofse, 2005, p. 452)				

Source: Bond, A. J., Morrison-Saunders, A., & Howitt, R. (Eds.). (2013), p. 128

Table 4.11: Search terms from document review (Normative effectiveness)

Framework Criterion	Normative effectiveness “(In what ways, and to what extent, does the SA satisfy the following imperatives: reverse prevailing (unsustainable) trends? integrate all the key intertwined factors affecting sustainability? seek mutually reinforcing gains, minimise trade-offs? respect contexts in which sustainability assessment takes place? is open and broadly engaging?)”					
	Intergenerational equity		Intra-generational equity		Common words for both intra- and intergenerational equity	
Search Terms	Search Term	Source	Search Term	Source	Search Term	Source
	Resource *and endowment	(Padilla, 2002, p. 72)	Access *and services	(Mzavanadze, 2009, p. 104)	Distribution *and impacts	(Scott & Oelofse, 2005, p. 452)
	Distribution *and equal	(Padilla, 2002, p. 72)	Social welfare	(Mzavanadze, 2009, p. 106)	Distribution *and risks	(Morrison-Saunders et al., 2014, p. 42)
	Balanced use	(Maggio, n. d., p. 163)	Mitigat* *and social policy	(Mzavanadze, 2009, p. 106)	Distribution *and benefits	(Morrison-Saunders et al., 2014, p. 42)
	Natural heritage	(Maggio, n. d., p. 186)	Sufficiency	(Gibson et al., 2005, p. 101)	Distribution *and environmental costs	(Maggio, n. d., p. 193)
	Cultural heritage	(Maggio, n. d., p. 186)	Reduce *and gaps	(Gibson et al., 2005, p. 101)	Distribution *and welfare	(Beckerman, 1997, p. 397)
	Freedom of action	(Maggio, n. d., p. 216)	Equal *and opportunity	(Morrison-Saunders & Therivel, 2006, p. 286)	Distribution *and primary goods	(Beckerman, 1997, p. 397)
	Responsibility	(Maggio, n. d., p. 176)	Equity *and opportunity	(Morrison-Saunders & Therivel, 2006, p. 286)	Distribution *and economic resources	(Beckerman, 1997, p. 397)
	Welfare	(Beckerman, 1997, p. 397)	Opportunity	(Gibson, 2006, p. 174)	Needs	(Vanclay, 2003, p. 10)
	Balance	(Maggio, n. d., p. 163)	Quality of life	(Lamorgese & Geneletti, 2013, p. 119)	Access *and global resources/ Access* and	(Maggio, n. d., p. 176)

					resource	
	Maintenance *and culture	(Mzavanadze, 2009, p. 104)	Socio economic symmetry	(Maggio, n. d., p. 164)		
	Maintenance *and health	(Beder, 2012, p. 135)	Equal *and access	(Maggio, n.d., p. 204, 205)		
	Maintenance *and diversity	(Beder, 2012, p. 135)				
	Equal *or same capacity	(Padilla, 2002, p. 81)				
	Consequence*	(Maggio, n. d., p. 186)				
	System integrity	(Gibson, 2006, pg. 174)				
	Adaptive management	(Gibson, 2006, p. 174)				
	Constant level of consumption	(Alvarez- Cuadrado & Van Long, 2009, p. 155)				
	Constant utility	(Alvarez- Cuadrado & Van Long, 2009, p. 155)				

Source: Bond, A. J., Morrison-Saunders, A., & Howitt, R. (Eds.). (2013), p. 128

Table 4.12: Search terms from document review (Pluralism)

Framework Criterion	Pluralism “(How, and to what extent, are affected and concerned parties accommodated into and satisfied by the SA process?)”					
	Intergenerational equity		Intra-generational equity		Common words for both intra- and intergenerational equity	
Search Terms	Search Term	Source	Search Term	Source	Search Term	Source
	Protect rights *and future generations	(Padilla, 2002, p. 81)	Domestic groups	(Maggio, n. d., p. 193)	N/A	N/A
	Future opportunit*	(Gibson et al., 2005, p. 103)	International groups	(Maggio, n. d., p. 193)		
	Future capabilit*	(Gibson et al., 2005, p. 103)	Impact *and evaluation *and public	(Bruhn-Tysk & Eklund, 2002, p. 139)		
	Recognize *and future generations *and right	(Padilla, 2002, p. 81)	Social* *and *exclud*	(Vanclay, 2003, p. 10)		
			Minority group	(Bruhn-Tysk & Eklund, 2002, p. 132)		
			Majority group	(Bruhn-Tysk & Eklund, 2002, p. 132)		
			Opportunity to comment	(George, 1999, p. 182)		

Source: Bond, A. J., Morrison-Saunders, A., & Howitt, R. (Eds.). (2013), p. 128

Table 4.13: Search terms from document review (Knowledge and learning)

Framework Criterion	Knowledge and learning “(How, and to what extent, does the SA process facilitate instrumental and conceptual learning?)”					
Category	Intergenerational equity		Intra-generational equity		Common words for both intra and intergenerational equity	
Search Terms	Search Term	Source	Search Term	Source	Search Term	Source
	N/A	N/A	Adaptive follow-up	(Gibson, 2006, p. 174)	N/A	N/A

Source: Bond, A. J., Morrison-Saunders, A., & Howitt, R. (Eds.). (2013), p. 128

Apart from the 119 search terms detailed in Tables 4.8 through 4.13, a few more search terms were added to the search list to further expand the research. These additional search terms are as follows: ‘gender,’ ‘gender effects,’ ‘seven generation,’ ‘seventh generation,’ ‘seventh generations,’ and ‘first nations.’ In consultation with the MES advisory committee, the terms were added because it was anticipated that this additional search might give a broader perspective of the content in the 14 road construction EISs. It was expected that this search would help to investigate whether and how these concepts are being addressed in practice.

Chapter Five

Results and Discussion of the Content Analysis of Environmental Impact Statements

5.1 Introduction

This stage in the research methodology investigated empirical examples of approaches to intra- and intergenerational equity within the context of EIA in major transportation (highways) development projects in Canada. The next sections document the findings of a review of 14 EISs using 119 terms (see Chapter 4). However, many of the results returned from the EIS review (based on an NVivo search) were not usable because they were found to be unrelated to the core issues under investigation, i.e., intra- and intergenerational equity. The usable results found in selected EISs are discussed below and organized according to sections of the EISs that were examined: (1) terms of reference; (2) scoping; (3) management plan; (4) public engagement; and (5) follow-up and monitoring plan.

5.1.1 Terms of Reference

For the terms of reference for the EISs reviewed, the search revealed very few discussions of intra- and intergenerational equity issues. Among the 14 projects, in only four (i.e., Inuvik to Tuktoyaktuk Highway Project, Local Access Road – Highway 58, Waskaganish Permanent Road and 407 East Transportation Corridor) were equity concepts sometimes acknowledged. Generalized terms, such as “... meet the needs of current and potential future,” were typically used, alluding to but not directly raising the issues of intra- and intergenerational equity.

The wording found in the terms of reference for these four projects resembled that used in the definition of ‘sustainable development’ in the Brundtland Report: “To equitably meet developmental and environmental needs of present and future generations” (United Nations, 1992) (World Commission on Environment and Development, 1987, p. 43). An example of similar wording is found in this extract from the Ontario provincial policies and

plans guiding the 407 East Transportation Corridor project: “The policies ... state that authorities shall plan for and protect corridors and right-of-ways for transportation, transit and infrastructure facilities to meet current and future demand” (p. 3-48). However, in this example, as with others, it is not explicit whether meeting current and future demand has anything to do with ensuring equity, either intra- or intergenerationally.

In the Inuvik to Tuktoyaktuk Highway Project, there is mention of “equitable distribution of benefits to residents and communities in the Project area” (Inuvik to Tuktoyaktuk Highway Project, p. lxxii). This is elaborated in latter parts of the EIS. In section 1.6.2, for example, importance is placed on the involvement of public and communities potentially affected by the project. Section 2.2.4 of the Inuvik to Tuktoyaktuk Highway Project indicates that a number of social indicators should be considered in project development to ensure low collision risk, other measures of public safety, increased trade and local business to provide economic benefits to the local communities, improved job creation and quality of daily life of the community members, and preserved cultural heritage and surrounding land (Inuvik to Tuktoyaktuk Highway Project, p. 49-50). This emphasis in the EIS can be related to the research of Bruhn-Tysk & Eklund (2002), who note that intra-generational equity means a reasonable resource distribution among present generations without privileging or discriminating against the needs of any minority groups.

5.1.2 Scoping

‘Scoping,’ the first phase of the environmental assessment process, consists of establishing “parameters that should be addressed in an EIA, establishing the spatial and temporal boundaries of the assessment” and “identify[ing] the components of the biophysical and human environment that may be affected by development” (Noble, 2015, p. 95). The results of the content analysis show that three of the projects described the temporal boundary of the assessment as ‘long term’ (i.e., 407 East Transportation Corridor, Greenville Kincolith and Inuvik to Tuktoyaktuk Highway Project) or long term as in ‘several decades’ (i.e., Greenville Kincolith). Only four of the 14 EISs contained a specific time frame for the assessment identified (i.e., 407 East Transportation Corridor, Greenville Kincolith, Inuvik to Tuktoyaktuk Highway Project and Wollaston Lake Road). In these EISs, the time frame for assessment predictions ranged between 20 and 50 years. The notion of temporal scale was seldom expressed with statistical information or via any in-depth description of possible development scenarios. For example, the proponents of the Inuvik to Tuktoyaktuk Highway

Project expected to manage potential project effects of environmental change caused by the project for “25 and 50 years after construction” (Inuvik to Tuktoyaktuk Highway Project, p. 130). Likewise, potential impacts of the construction of Wollaston Lake Road (required to meet the growing needs of the Wollaston Lake community) expected effects to be managed “to the year 2025” (Wollaston Lake Road). The Durham Transportation Master Plan (2005) of 407 East Transportation Corridor reported a similar timeframe: “[The plan] was prepared to define the policies, programs and infrastructure improvements required to address the Regional Municipality of Durham’s transportation needs for the next 20 years and beyond” (p. v).

According to Bond and Morrison-Saunders (2011), it is debatable whether it is possible to ensure that both intra- and intergenerational equity are addressed in the EIA process, as defining a generation and appropriate time boundaries for intra-generational equity are neither easily done nor easy to gather measurements for. A generation can be defined as its “biological origins as it refers to those members of a particular species that are at the same stage of descent. So grandparents, parents and their children comprise three generations” (Bond & Morrison-Saunders, 2011, p. 4). Time can be measured through the longevity of one generation, but that is not a constant number and varies from one place to another (Bond & Morrison-Saunders, 2011).

In dealing with the temporal scale of EIA, consideration is typically given to past, present and future impacts (Noble, 2015). It is feasible to determine past boundaries because it is often possible to collect 40 or 50 years of land use maps, historical data, census data, etc. for evaluation in the proposed project. However, establishing an appropriate future boundary for an EIA project cannot be straightforwardly assured as it may depend on a number of different future scenarios, and data used for assessment can be “hypothetical” in nature (Noble, 2015, p. 112). Noble (2015) also suggests that although the usual practice is to adopt future boundaries within a decade of the decommissioning of a project, this can create difficulty with “legacy projects” (mining operations and contaminated sites) (p. 112). The results from the content analysis show that in all 14 of the EISs examined, inconsistent and vague language is used to describe the prediction horizons in the scoping section.

On the other hand, discussion of spatial scales specifically in relation to inter- and intra-generational equity was completely absent in the EISs of the selected road construction projects. The lack of results returned by content analysis suggests that boundary determination does not involve the consideration of inter-/intra-generational equity at all. For

example, the Compliance with Provincial Plans and Policies section of 407 East Transportation Corridor (i.e., just one of the 14 EISs) explains that the area served by the EIS (the province and municipalities) is not specific to any geographically-defined community or group of people within those administrative units: “[The EIS] has met all applicable criteria in all of the provincial documents to establish the project as a legitimate and appropriate use and activity that is needed to meet the growth and land use needs of both the Province and area municipalities in an effective manner” (p. 11-2).

According to Joao (2002), the spatial scale of an assessment should include attention to both the “scale as the spatial extent of the assessment and scale as the amount of geographic detail” (p. 289). The specific location of anticipated actions and their effects should be given due consideration when defining the spatial limits of assessment (Noble, 2015).

The results show that eight of the 14 EISs examined notionally acknowledged intra- and intergenerational equity: 407 East Transportation Corridor, Completion of Highway 35 [US Border], Greenville Kincolith Road, Inuvik to Tuktoyaktuk Highway Project, Lake Winnipeg East Side Road Project, Local Access Road – Highway 58, New Route to Trans Canada Highway, and Wollaston Lake Road. However, the content analysis indicates that this acknowledgement emerged latently, and when it did emerge, it was mostly reminiscent of the definition of sustainability from the Brundtland Report (World Commission on Environment and Development, 1987), i.e., to meet the needs of the present and those of the future. In these eight EISs, then, the concepts of intra- and intergenerational equity have not been well clarified.

5.1.3 Management Plan

According to Noble (2015), “Impact management is the foundation to the entire EIA process in that it requires the identification of impact management measures that translates the findings from an EIS into recommendations to enhance positive outcomes and avoid, minimize, or offset potentially adverse impacts” (p. 149). In the management plan section of the 14 EISs reviewed, the NVivo search revealed that only five contain examples of passages that can be connected to equity issues: 407 East Transportation Corridor, Local Access Road – Highway 58, New Route to Trans Canada, Inuvik to Tuktoyaktuk Highway Project and Lake Winnipeg East Side Road Project). In the management plan section, generalized terms such as “...fair market value in accordance with Ministry policy and directives” were often

used, alluding to but not directly raising the issues of intra- and intergenerational equity. For example, the 407 East Transportation Corridor EIS stated the following in its ‘Summary of Key Mitigation/Compensation Measures’: “All property owners would be compensated for loss of property at fair market value in accordance with Ministry policy and directives” (p. 143). Essentially a concept that refers to ‘fairness’ or ‘impartiality,’ equity can also be defined as ‘even-handed dealing’ (OED, 1891). Thus, if compensation measures are fair, those impacted by the project should receive monetary benefits, and ensuring the maximum possible distribution of monetary benefits among property owners is considered a key management strategy (Noble, 2015). The above statement from the 407 East Transportation Corridor EIS was consistent with this notion of equity.

In all of the five project management plans that suggested consideration should be given to compensating stakeholders, the wording was close to the term “fair market value” (407 East Transportation Corridor, pg 8-244; New Route to Trans Canada, pg. 430). Other similar terms used were “fair negotiation process” (Local Access Road - Highway 58, p. 176); “fair market prices” (New Route to Trans Canada, p. 456); and “requirements of fairness” (Inuvik to Tuktoyaktuk Highway Project, final report, p. 16) However, such terms represent an indirect measure of the value of compensation stakeholders actually require and are not explicit about trade-offs, or whether such means can remediate and compensate affected communities equitably. The New Route to Trans Canada EIS stated that there was no direct accounting for such items as lack of control over property values, unpredictable fluctuations in the marketplace, individual decision-making and the financial abilities of the stakeholders involved.

To facilitate impact management, engaging local and Aboriginal communities in the management plan could be beneficial (Noble, 2015) and, in fact, is required in Canadian federal environmental assessment legislation. Among the 14 projects, only two (the 407 East Transportation Corridor and Inuvik to Tuktoyaktuk Highway Project) mentioned accommodating the needs of Aboriginal people (Inuvik to Tuktoyaktuk Highway Project, p. lxxix), and involving all interest groups (i.e., federal and provincial agencies, project proponents, First Nations and the general public) directly in the project planning and design process through continuous consultation (407 East Transportation Corridor, p. 11-7). Also, only one EIS, the 407 East Transportation Corridor, provided a Cultural Heritage Evaluation Report (CHER): “Complete a Cultural Heritage Evaluation Report (CHER) for all directly

displaced Built Heritage Resources and Cultural Heritage Resources to determine their heritage value and specific mitigation measures” (p. 144).

Discussion of cultural heritage resources was found in the management section of only one EIS, which shows that, importance is not placed on this subject. Weiss (1990) notes that: “if we were to license the present generation to exploit our natural and cultural resources at the expense of the well-being of future generations, we would contradict the purposes of the United Nations Charter and international human rights documents.” (p. 201), suggesting that impacts on cultural heritage resources deserve attention in EISs.

Finally, in two other EISs, (New Route to Trans Canada CSR and Wollaston Lake Road EIS) equity issues were briefly and generally mentioned. For example, the scope of the project and assessment section of the New Route to Trans Canada CSR stated that it was “mandatory” for the comprehensive study to “consider the capacity of renewable resources that are likely to be significantly affected by the project to meet the needs of the present and those of the future” (New Route to Trans Canada, CSR, p. 90-91). Because the wording in these examples was vague, it was not possible to determine whether meeting current and future demand had anything to do with ensuring equity, either intra- or intergenerationally. Overall, the content analysis indicated that very little attention was paid to intra- or intergenerational equity in the management plans of the EISs reviewed in this study.

5.1.4 Public Engagement

According to Noble (2015), “Public participation refers to the involvement of individuals and groups that are positively or negatively affected by a proposed intervention subject to a decision-making process or are interested in it” (p. 217) The results of the content analysis show that there are some discussions of intra- and intergenerational equity issues in the EIS reviewed. Among the 14 projects, six sometimes acknowledged different groups of people impacted by development: 407 East Transportation Corridor, Lake Winnipeg East Side Road Project, New Route to Trans Canada, Wollaston Lake Road, Inuvik to Tuktoyaktuk Highway Project and Greenville Kincolith Project.

Two of these projects, the 407 East Transportation Corridor and the New Route to Trans Canada, described public participation and Aboriginal consultation during the assessment process as opportunities to comment and participate. For example, the Environmental Assessment Requirements of 407 East Transportation Corridor contains this passage:

The Agency will now invite the public and Aboriginal groups to provide comments on the conclusions and recommendations and any other aspect of the CSR. The Minister of the Environment will then consider the CSR and any comments received on the report and determine whether any additional information is required or if any of the concerns cited in the comments need to be further addressed. (p. i)

It is not clear whether “opportunities to comment and participate” include activities that may be conducive to ensuring intra- and intergenerational equity. It is possible that submissions made by Aboriginal groups to the comprehensive study panel review processes did indeed bring up intra- and intergenerational equity issues, but this kind of public testimony did not appear in the EIS documents. It would appear as part of the public record for the EIS hearing process.

According to Noble (2015), involving Aboriginal groups actively with the project proponents in the beginning of the planning and design phase of EIA can benefit the process and all stakeholders involved. However, the content analysis suggests that meaningful engagement of the local Aboriginal community, if it in fact it did take place, was not explicitly reported in the EISs examined. For example, the Watercourse Crossing Alternatives of New Route to Trans Canada said “the public [has] an opportunity to comment” but makes no mention of Aboriginal engagement:

During the course of the CEAA review process, the public have an opportunity to comment on navigational use of the watercourses crossed by the Project. During the advertisement period for the approval process under Navigable Waters Protection Act subsection 5(1), the public will again have an opportunity to comment on the potential of the Project to affect navigation. (p. 23)

Noble (2015) reports that in practice, there are frequent criticisms of the EIA process for not substantively involving all stakeholders, including Aboriginal groups, in project review; involvement often remains limited to submission of written comments after the EIS is prepared. This observation is consistent with the findings of the content analysis of the public engagement for the EISs reviewed.

The engagement of Aboriginal groups in EIA was strengthened in 2012 with the new Federal Environmental Assessment Act. This legislation cemented Aboriginal traditional knowledge as important to the EIA of designated projects (Canadian Environmental Assessment Act, 2012). Traditional Ecological Knowledge (TEK) is “knowledge of land, animals and the local environment, followed by knowledge of management systems, values, social institutions, and a particular world view” (Noble, 2015). The content analysis indicates

that only two of the 14 EISs (Lake Winnipeg East Side Road Project and Inuvik to Tuktoyaktuk Highway Project) mentioned the incorporation of traditional knowledge and values in the environmental assessment process. For example, in the Inuvik to Tuktoyaktuk Highway Project, there was a section titled “Respect for and Use of Traditional Knowledge”:

The Developer acknowledges that traditional knowledge has been passed on between generations for centuries through a variety of means, including legends, stories, songs, dances and experience. The knowledge continues to be relevant today as the traditions and activities (such as hunting, trapping, and fishing) are still practiced. The Developer has incorporated traditional knowledge throughout the environmental assessment to ensure that the assessment is fair to resource users, by documenting the potential ways in which development location itself and associated activities may affect those who use the land for cultural or subsistence purposes. (p. 21)

According to Nadasdy (1999), incorporating traditional knowledge into environmental assessment benefits all concerned, including governments, project proponents and local Aboriginal groups. It improves communication and understanding of the environment and project impacts. However, the content analysis indicates that, in practice, TEK was not given due consideration, and, according to Noble (2015), it is debatable if local people and Aboriginal communities are given sufficient access to participate and engage in all the phases of EIA. Arguably, public participation remains limited to providing information or negotiating trade-offs (Noble, 2015). Public participation in projects needs to be fair and transparent. This is especially the case when the government is the project proponent, as seen in this extract from the Public Response (Manitoba Wildlands) section of the Lake Winnipeg East Side Road Project CSR:

Whenever government is licensing itself public review is essential, and disclosure and access to information needs to be thorough and transparent. As there are public funds being used and government agencies involved as proponents, this is an instance where government is contracting services, entering into various agreements, handing off services; and some decision making to a government agency, conducting reviews, and licensing and funding the proposal under the Environment Act. (p. 6)

In the context of EIA, as we have seen, intergenerational equity is achieved when the interests of future generations in resource distribution are given the same consideration as those of the present generation, while intra-generational equity means a reasonable resource distribution among present generations without discriminating against the needs of any minority groups (Bruhn-Tysk & Eklund, 2002). Based on the content analysis, neither of these is explicitly addressed via provisions for public participation in the 14 EISs studied.

Finally, it can be said that six of the 14 road construction project EISs examined (407 East Transportation Corridor, Lake Winnipeg East Side Road Project, New Route to Trans Canada, Wollaston Lake Road, Inuvik to Tuktoyaktuk Highway Project and Greenville Kincolith Project) contained some content to suggest that inter and intra-generational equity had been considered, but this was weak at best. In other words, no clear trends emerged from the content analysis to indicate inter and intra-generational equity are commonly considered in EISs, either explicitly or implicitly.

5.1.5 Follow-up and Monitoring Plan

According to Noble (2005), “Follow-up occurs after a project’s approval and involves determining whether a project has had or is continuing to have environmental effects” (p. 194). In the follow-up and monitoring plans analyzed, generalized terms such as “... meet the needs of the present and those of the future” are typically used, alluding to but not directly raising the issues of intra- and intergenerational equity. In only one of the 14 EISs, the Inuvik to Tuktoyaktuk Highway Project, was there mention of equity issues in the follow-up and management plan section:

The Environmental Assessment Process: The Substitution Agreement required that the review include: the need for and requirements of any follow-up programs; the capacity of renewable resources that are likely to be significantly affected to meet the needs of the present and those of the future (p. 3)

This is almost the exact same requirement as noted in the previous section for the New Route to Trans Canada CSR. Again, the wording is non-specific: discussion of equities in the long run for follow-up and monitoring, specifically in relation to intra- and intergenerational equity, was completely absent in this and the other EISs of the selected road construction projects.

In summary, the results of the review of 14 EISs and the literature review in major transportation (highways) development projects in Canada using 119 terms indicate a clear gap between how intra- and intergenerational equity is discussed in the literature and in the EISs. The recommendations in the literature for considering the interests of both the current and future generations in equal measure are not necessarily followed in practice. Thus, there appears to be a disconnect between how this issue is conceived normatively (in the literature) and how it is emerging empirically (in the EISs).

The following chapter discusses major conclusions drawn from Chapters Four and Five and will comment in light of the purpose and objectives of the study. Chapter Six summarizes areas in which future studies are needed to improve and strengthen EIA practices.

Chapter Six

Conclusions

Using the transportation (roads and highways) infrastructure development sector in Canada as the context, this research has investigated Canadian EIA practices in relation to multigenerational equity as expressed in environmental impact statements. The purpose of the research was to investigate how and to what extent intra- and intergenerational equity, as concepts, are integrated into EIAs for highway projects prepared under CEAA 2012, and to what extent these practices align with normative, academic expressions of these concepts. Although there is an ongoing and pressing need to determine how intra- and intergenerational equity can be more readily addressed and considered in EIA for environmentally and socially responsible development (Gibson et al., 2005), further research is required to better understand how well EIA is actually contributing to sustainability agendas (Morrison-Saunders & Retief, 2012). This chapter summarizes the most important findings to emerge from this thesis and reflects upon the research problem and the gap between academic knowledge and practice. Finally, the chapter identifies areas for future research within the context of EIA in major transportation (roads and highways) infrastructure projects in Canada.

6.1 Addressing the Research Purpose and Objectives

Based on the content analysis of 14 EISs using 119 terms and a literature review on intra- and intergenerational equity, the researcher reached the following conclusions.

6.1.1 Notion of Intra- and Intergenerational Equity:

The search revealed that in the 14 EISs reviewed projects, there was insufficient evidence to determine whether the common objectives of “meeting current and future demand” had anything to do with ensuring equity, either intra- or intergenerationally. Although road construction, especially major new roads in remote, rural, and northern areas can have lasting impacts on the local populations and the physical environment, the content analysis of the 14 EISs revealed few substantive discussions about intra- and

intergenerational equity issues. In most of the impact statements, nominal statements in generalized terms such as "... meet the needs of current and potential future" were found (for example: Inuvik to Tuktoyaktuk Highway Project, Local Access Road - Highway 58, Waskaganish Permanent Road and 407 East Transportation Corridor).

The wording of the impact statements typically does not directly raise the notions of inter and intragenerational equity. When these concepts were indirectly alluded to, the discussion was most reminiscent of, and consistent with, the definition of sustainable development established in the Brundtland Report: "To equitably meet developmental and environmental needs of present and future generations" (World Commission on Environment and Development, 1987, p. 43) (see, for example: Inuvik to Tuktoyaktuk Highway Project, Local Access Road – Highway 58, Waskaganish Permanent Road and 407 East Transportation Corridor). These vague allusions to present and future generations were insufficiently explicit to say with any confidence that intra- and intergenerational were actually being considered in these EIAs. According to the literature (e.g., Bond & Morrison-Saunders, 2011), for EIA to be a valid tool both to predict environmental and societal impacts and to meet the needs of the present without compromising the future, then it must address both intra- and intergenerational impacts and equity in EIA processes and, in environmental impact statements.

6.1.2 Impact Prediction Horizon:

For EIA to be effective, it is critical that appropriate time horizons be established that allow decision makers to understand distant future impacts on nature and people (Bond & Morrison-Saunders, 2011). The search of the 14 EIS revealed that descriptions of prediction horizons were inconsistent and inadequate for assessing consideration of intra- and intergenerational equity, and when time horizons were discussed, vague terms such as 'long term' were used. As the literature points out, there are debates associated with appropriate impact prediction horizons, According to Bond and Morrison-Saunders (2011),

Perhaps the most intractable problem we have identified is that of the appropriate timescale over which intra- and intergenerational sustainability should be considered. There is no consensus on what appropriate timescales should be, and intra-generational sustainability timescales appear to be driven by the decision-making context and not by the timescales of generations. (p. 5)

Although in practice these debates exist, the literature is quite clear about the need for appropriate time horizons (Bruhn-Tysk & Eklund, 2002; Bond, Morrison-Saunders, & Howitt

(2013). The 14 EISs were not found to contain statistical information on temporal scales. To assess multi-generational impacts, time horizons need to cover numerous decades (Bond et al., 2012; Noble, 2015). Yet the time horizons used in the 14 EISs examined typically adopted 20- to 50- year time horizons (i.e., 407 East Transportation Corridor, Greenville Kincolith, Inuvik to Tuktoyaktuk Highway Project and Wollaston Lake Road). Hence, there should be specific guidelines for determining appropriate prediction horizons considering both short and longer time scales that can deliver sustainable outcomes.

6.1.3 Public Participation:

According to Noble (2015), engaging local and Indigenous communities in phases of project development helps facilitate impact management, and this engagement is an essential requirement in Canadian federal environmental assessment legislation. The projects examined addressed public participation, but in a tokenistic manner, possibly compromising goals for sustainable development, social justice and environmental equity (Scott & Oelofse, 2005; Noble, 2015). The content analysis of the 14 EIS revealed few discussions about different development impacts of road projects on people and communities. Nor did the EISs explicitly report meaningful engagement of local Aboriginal communities (e.g., 407 East Transportation Corridor, Lake Winnipeg East Side Road Project, New Route to Trans Canada, Wollaston Lake Road, Inuvik to Tuktoyaktuk Highway Project and Greenville Kincolith Project).

6.1.4 Managing Trade-offs:

Gibson et al. (2005) indicate that the handling of trade-offs is one of the key elements of any sustainability-focused assessment process, arguing that sustainability trade-offs be proactively and transparently addressed. The content analysis demonstrated that, rather than being handled as Gibson et al. (2005) and others such as Liu et al., 2014, suggest, trade-offs were inadequately addressed, possibly compromising substantive outcomes throughout the process. As Morrison-Saunders et al., 2014 argue, knowing how to evaluate and manage trade-offs is particularly important when working with intra- and intergenerational receptors. In their study, Morrison-Saunders et al. (2014) traced problems with considering trade-offs to insufficient shared values, indicating that without mutual “recognition and understanding of the role of values,” solutions can be difficult to find (p. 43).

Although for the projects analyzed, proponents offered stakeholders support and compensation, the terms used to discuss compensation gave neither a sense of the value or type of compensation stakeholders would require or receive, nor an indication of how to determine if such compensation would be appropriate to their needs. Moreover, because terms used such as ‘fair market value,’ ‘fair negotiation process,’ ‘requirements of fairness’ were not specific about sustainability trade-offs, it was uncertain if compensation described in these terms would fairly or equitably remediate and compensate affected people or communities (e.g., 407 East Transportation Corridor, p. 8-244; New Route to Trans Canada, p. 430; Local Access Road - Highway 58, p. 176; Inuvik to Tuktoyaktuk Highway Project, p. 16). While the EIAs themselves used imprecise language, a similar situation exists with the EIA academic literature, in which the explicit means and mechanisms of making and reporting trade-offs has not been well clarified; thus, how exactly to acknowledge equity aspects of the trade-off process is not yet well articulated by scholars (Bond & Morrison-Saunders, 2011; Lamorgese & Geneletti, 2013; Morrison-Saunders et al., 2014).

6.2 Improving EIA Practice

6.2.1 Operational Definition

Based on the academic literature examined in this research, the concepts of both intra- and intergenerational equity appear to be insufficiently developed, with minimal attention given to establishing formal definitions that might guide practice. On a positive note, most of the scholars’ descriptions of intra- and intergenerational equity are consistent with Gibson et al.’s (2005) definition. However, Gibson’s sustainability assessment framework is neither widely discussed nor applied in practice. The results of the content analysis suggest that most practitioners have only a cursory understanding of sustainable development and how to achieve it in practice. This conclusion is consistent with Padilla (2002), who found that the most widely used definition coincides with that of the WCED’s 1987 report: “meet[ing] the needs of the present without compromising the ability of future generations to meet their own needs” (p. 43). Padilla goes on to write that since the WCED’s definition does not explicitly define these needs, differing interpretations are likely.

To increase understanding and enhance evaluation of good practice, EIA scholars and practitioners need to adopt and apply operational definitions of intra- and intergenerational equity: normative definitions, as they may exist, are not enough. As this research has demonstrated, the terminology used in the literature may differ substantially from the terms

used by EIS practitioners. It would be useful to examine the provinces' and territories' EIA regimes, each of which is distinct. More specificity in the terms used to define intra- and intergenerational equity is needed both in the academic arena and in practice to clarify communication about intra-and intergenerational equity issues.

6.2.2 Specific Indicators and Principles

Academic contributions to intra-and intergenerational impacts and equity in the field of EIA are much less common than contributions on other subjects such as uncertainty (Bond & Morrison-Saunders, 2011; Lamorgese & Geneletti, 2013). Simpson et al. (2005) argue that assessment processes fail to address inequities, including methods for addressing them and for avoiding the negative effects of development on current and future generations. The current study confirms the academic literature: there is insufficient information to identify what indicators and principles should consist of in an environmental assessment setting. Thus, there is a pressing need to define specific indicators and principles, so practitioners can evaluate intra- and intergenerational equity in their practice.

6.2.3 Guidance and Methods for Stakeholder Involvement

Determinations about intra- and intergenerational equity certainly cannot be achieved without adequate public and Indigenous engagement. Noble (2015) argues that Aboriginal groups and community members should be included in every phase of EIA and that all affected people should have sufficient access for participation. Noble further argues that many EIA failures revolve around exclusion and poor treatment of Aboriginal groups. Dryzek et al. (2003) describe an inclusive environmental decision-making procedure that could serve as a model:

- “Franchise: the number of people effectively participating in collective decision making.
- Scope: the areas of social, economic and political life brought under conscious collective control.
- Authenticity: the degree to which participation... is effective rather than symbolic, and engaged [in] by competent actors”. (p. 104)

No matter whether Dryzek et al.'s model or another is used, this study recommends that a basic guide or set of methods be developed to equitably and evenly incorporate the views and rights of all stakeholders, including minority and Indigenous groups and community members. There should also be opportunities to modify the guidelines based on project

requirements and regional contexts during the initial project planning and decision-making process. Firm but modifiable guidelines would help facilitate intra- and intergenerational equity and improve the EIA process generally (Bruhn-Tysk & Eklund, 2002; Noble, 2015; Scott & Oelofse, 2005).

6.3 Recommendations

Based on the document review and content analysis, specific recommendations to improve practice, particularly in intra- and intergenerational equity, are as follows:

1. Examine EISs in other sectors and under different versions of the federal EIA legislation to obtain a clearer picture of how equity issues are treated.
2. Develop guidelines on multigenerational equity to strengthen EIA practice.
3. Derive operational definitions of the terms intra- and intergenerational equity that can be applied by EIA scholars and practitioners.
4. Explore the range of possible indicators and principles that would provide a clear idea if different forms of equity are being achieved in an EIA process.
5. Ensure that trade-off decisions are acceptable to all stakeholders and that adverse effects are fairly explained and justified by the proponents.
6. Develop basic guidelines for methods that equitably incorporate the views and rights of all stakeholders.

6.4 Future Research

This research has explored the limitations of conventional EIA processes with respect to defining and addressing intra- and intergenerational issues. It has also examined some of the alternatives from literature outside the field, including environmental justice, social impact assessment and sustainability assessment. The research identified three key challenges: first, the guidance and methods on intra- and intergenerational equity incorporated into EIA are inadequate; second, although the interests of the present generation are generally considered, in conventional EIA processes, those of the future generations are neglected; third, this neglect has been extensively criticized by scholars because the impacts of environmental actions very often significantly affect several generations (Bond, et al., 2012; Bond & Morrison-Saunders, 2011; Bruhn-Tysk & Eklund, 2002; Lamorgese & Geneletti, 2013; Morrison-Saunders et al., 2014; Padilla, 2002; Scott & Oelofse, 2005). According to Blaber-Wegg, Hodbod and Tomei (2015),

At the moment, intra-generational equity should remain the focus of sustainability certification schemes, since by ensuring the well-being of environments and peoples in this generation, the next generation is likely to inherit healthy societies and ecosystems-catering, to some extent, for intergenerational equity. (p. 184)

Blaber-Wegg et al.'s idea for meeting the needs of future generations by considering intra-generational equity in the present could help re-shape current practices to deliver more sustainable outcomes. Despite the theoretical emphasis on intra- and intergenerational issues in EIA, in practice, project proponents, decision makers and the public seem to display little understanding of their importance. Likewise, ideas about how to incorporate intra- and intergenerational equity into EIA seem to be in their infancy, both nationally and internationally (Bond et al., 2012). Morrison-Saunders and Retief (2012) argue that little research has sought to better understand how well EIA is actually contributing to sustainability agendas.

Thus, future research could focus on the integration and application of sustainability principles, in particular, multigenerational equity issues in development projects. The concept of intra- and intergenerational issues in EIA was born in part out of concern for a sustainable environment, but few practitioners and stakeholders have adequate knowledge about sustainability principles. On a different note, interviews could be a logical next step forward. Possibly even a multidisciplinary approach such as critical discourse analysis, which “combines linguistics with social theory,” could be used as a different way to study EISs (Colombo & Porcu, 2014, p. 68).

Additionally, more needs to be known about how sustainable development principles are parlayed into EIA practice to solve the problems of inequity. Some of the most important inequity issues in current practice relate to Indigenous health and livelihoods, self-sufficiency of local and ethnic groups, gender impacts, social justice and economic equity (Liu, Liu, & Zhang, 2014). Research into these areas would permit more robust EIA processes that reflect the stated interests of the Canadian public (Infrastructure Canada, 2016) and support the development of practitioner guidance materials.

For this particular research study, the transportation (roads and highways) infrastructure sector in Canada with a specific focus on transportation (road construction) was selected. However, more studies focusing on other development sectors, for example, nuclear plants, mining, or other scales and types of EA processes in Canada and internationally could be conducted on the academic side. Further research should also evaluate contextual

dynamics of other energy development projects. Barriers identified to acknowledging social and environmental equalities include inadequate operational definitions, weak indicators and principles, insufficient stakeholder involvement and poorly managed trade-off decisions. It is important to know which practices for generating intra- and intergenerational equity scholars and practitioners identify as critical to EIA. There should be opportunities to investigate how individual stakeholders' experiences and knowledge influence EIA decisions and project approval. Thus, a multi-stakeholder technical committee comprised of representatives from different groups would help raise the profile of social and environmental equality issues. Instead of dealing with these issues in a desultory, fragmented manner, these issues could then be approached holistically as part of an overall plan, which takes a broader view and makes national and international comparisons.

6.5 Final Remarks

This research has laid the groundwork upon which more detailed research can be undertaken to improve the conventional procedural methods in Canadian EA, regarding issues of intra- and intergenerational equity. The first step for environmentally and socially responsible development in EIA practice is to incorporate intra- and intergenerational equity, ecological justice and environmental equity in all sustainability driven assessment (Lamorgese & Geneletti, 2013; Lara-Valencia et al., 2009). Decisions should reflect the views of affected local groups and community members, so EA can be a more effective tool. The treatment and inclusion to the EIA process of the people of Indigenous groups are not the same. According to Bond, Morrison-Saunders, & Howitt (2013): "Decision makers have not accepted the need to engage with affected Indigenous people, either denying the existence of a legitimate Indigenous interest in relevant outcomes, or believing that they themselves are able to identify and take account of any such interest" (p. 200). In this regard, Bond and Morrison-Saunders (2011) suggest residents need to come together at the beginning of the assessment process to discuss contentious policy issues and agree how to frame and formulate them for the remainder of the process.

Next, there is an ardent call for moving away from the conventional EIA to alternative practices that can both minimize social and environmental inequalities and be more responsive to sustainability driven assessment (Scott & Oelofse, 2005). Bond (2015) and Morrison-Saunders et al. (2011) recommend the following to attain intra- and intergeneration equity in EIA: accountability for longer time horizons, fairness in evaluating and determining

trade-offs and a collaborative approach among all stakeholders. According to Liu, Liu and Zhang (2014), to meet sustainability challenges, the focus should be on protection of the environment, respect for culture, economic and social equity and self-sufficiency of local ethnic groups. Liu, Liu and Zhang (2014) also indicate that although justice and equity guidelines are critical, neither EIAs nor Sustainable Environment Assessments (SEA) are adequately incorporating them. Thus, according to the authors, the emphasis is still on the physical environment, and EIAs and SEAs are as yet unable to address sustainability issues. To reach at this stage of EIA process and gain experience of how to manage and regulate the process effectively, it has taken almost 40 years of practice (Bond & Morrison-Saunders, 2009). Yet, EIA process is still evolving and improving through time. As of SA, there is still scope for incremental improvements so that SA can develop realistic and achievable guidelines that might be equitable between generations or between groups in the present generation. To add to that, according to Bond & Morrison-Saunders (2009):

It is possible that SA is at the start of a similar cycle of learning and improvement.

However, where EIA purported to have a single-issue focus (i.e. on natural capital), SA attempts to be a 'jack of all trades'. We would caution that there is an immediate need for reflection on the methods adopted and the interpretations of the results in the context of what really does constitute a sustainable outcome. (p. 327)

Traditional EIA process have been unsuccessful in addressing multigenerational equity issues; this process is neither comprehensive nor strategic but rather project specific and biophysically focused (Bond et al., 2015). According to Bond et al. (2015), to achieve sustainable outcomes through more equitable practices, an ideal form of any sustainability driven assessment requires incorporating all pillars of sustainability and needs to be forward looking.

To sum up, then, equity issues are not adequately captured by most contributions to the EIA literature. The pressing need to determine how intra- and intergenerational equity can be more readily addressed and considered in EIA draws attention to the call for further research. Bond & Morrison-Saunders (2011) states that, "As SA begins to develop and becomes more widespread, there is a window of opportunity to redefine SA as a facilitator of deliberation, and to move away from an embedded pragmatist discourse to a new deliberative sustainability discourse" (p. 5). Moving forward, intra- and intergenerational equity issues need to be developed, standardized and integrated, and EIA practices need to be more responsive in addressing the principles of sustainability. More attention to and guidance about multigenerational equity is required to strengthen the practice and process at large. This

research has attempted to answer a set of overarching questions through an investigation of the notions of intra- and intergenerational equity in literature and practice, with a specific focus on transportation (roads and highways) infrastructure development sector in Canada. The findings of this exploratory research are expected to contribute both to Canadian EIA and to international impact assessment by highlighting the need to consider multigenerational equity to improve the efficacy of future EIA practices.

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