

Implementing Sustainable Community Plans through Market-based Instruments

by
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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Abstract

Sustainable community development has gained momentum in recent years in order to address complex environmental, social and economic problems at the local level. Municipalities and communities are also becoming interested in the implementation of sustainable community plans. These plans are sometimes called integrated community sustainability plans (ICSPs), local agenda 21s, or may be part of a municipal official/master plan. They generally include environmental goals on: transportation, water, waste, air quality & energy, climate change, food security, ecological diversity and/or land use. Although there are over 1000 of these plans in Canada and over 10,000 worldwide, it is becoming increasingly difficult to ignore the gap between formulating and implementing such plans. The focus of this research is on the potential use of Market-Based Instruments (MBIs) for implementing sustainable community plans.

Many researchers have investigated the importance of price signals and market-based mechanisms for sustainability. These studies have highlighted the need for Market-Based Instruments as a means for sustainability. Literature discusses the importance of a sustainable community plan for sustainable development and the benefits of Market-Based Instruments for communities. From this review, existing Market-Based Instruments were synthesized and a preliminary set of Market-Based Instruments was developed, for the creation of a Sustainability Alignment Methodology (SAM) tool.

SAM tool that was developed for this research, is one which considers Market-Based Instruments under municipal jurisdiction. It might help to achieve the environmental goals in a sustainable community plan. The framework of the developed SAM was deductively tested with publicly available information from two mid-size Ontario communities - the city of Kingston and the Region of Waterloo. Further inductive findings were collected through focus groups with key municipal staff. These two communities were chosen from across Ontario based on a set of criteria. The focus groups gained information on the list of market-based instruments, the categorization of the market-based instruments and the set of scoring criteria. The preliminary version of the SAM tool found acceptance during the focus groups, with some recommendations for revision – such as the exclusion of the scoring criteria. Based on these findings, the preliminary draft of the SAM tool was revised to be more user-friendly.

The revised version contains over 50 Market-Based Instruments across eight different environmental topics and identifies the municipal departments associated with these MBIs. This study makes an important contribution to sustainable community development by equipping municipal governments with a better understanding of market-based instruments and providing a useful tool for helping implement their sustainable community plans. It also contributes theoretically to our understanding of MBIs that are applicable at the local level.

Keywords: Market-based instruments; sustainable community plans; implementation

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1. Introduction

1.1 Research Context and Purpose

Sustainable development was first defined in the Brundtland report as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development, 1987, p. 43). Concepts of sustainability and sustainable development have become increasingly important for this generation. Interests in sustainability also motivate progress in sustainable development at a local level. Sustainable community development focuses on the abilities of municipalities and communities to "initiate and generate their own solutions to their common economic problems and thereby build long-term community capacity and foster the integration of economic, social and environmental objectives" (McRobie & Ross, 1987, p. 1).

Hence, communities have developed sustainable community plans to address environmental, social and economic problems (L. C. F. L. E. L., 2002; Berke & Conroy, 2000; Clarke, 2012; Clarke & Erfan, 2007; Lindberg, 2007). Sustainable community plans, a Federation of Canadian Municipalities' term, are also referred to as Local Agenda 21s, collaborative community sustainability strategies, integrated community sustainability plan and collaborative regional sustainable development strategies (Clarke & MacDonald, 2012). Approximately 10,000 local communities worldwide currently have a sustainable community plan and the numbers continue to grow (Clarke, 2014). These plans are developed through public consultation involving multiple stakeholders (Clarke, 2012). They are crucial to sustainable community development as each plan identifies a vision, includes integrated environmental, social and economic, goals and sets targets for the community (Clarke, 2012; Clarke, Huang, Roseland & Chen, 2014).

Sustainable community plans also support the implementation of sustainable development by setting time-spans for reaching goals and targets (Clarke, 2012).

Although the interest for sustainable community planning remains high, there are also many associated issues. These include: a lack of financial resources, limited implementation tools and poor stakeholder engagement (Gahin, Veleva, & Hart, 2003; Hendrickson et al. 2011; Lindberg, 2007; Parkinson & Roseland, 2002). Lindberg (2007) identified over 50 barriers to sustainable development at the local level. Some of the top barriers that were identified were: lack of education and understanding, political resistance, lack of political leadership, difficulty in shifting values and behaviour and lack of current and accessible data and sustainable development tools (Lindberg, 2007). Associated barriers translate to a planning-implementation gap for many communities in Canada (Lindberg, 2007). While many communities have adopted a sustainable community plan, not all are successful in implementing the sustainability objectives and documenting the strategies (Clarke & Fuller, 2010; Lindberg, 2007). Thus, it is becoming increasingly difficult to ignore the gap between planning and implementing such sustainable community plans.

The use of Market-Based Instruments has had the potential to help overcome some of the barriers associated with sustainable community plan implementation. They serve as “policy tools that encourage behavioural change through market signals” (Scoccimarro & Collins, 2008, p. 2). Pricing and market signals, have the power to stimulate behaviour changes and a paradigm shift, through economic rationales (Hendrickson et al., 2011; Lindberg, 2007). Market-Based Instruments also help to mitigate the limitations of conventional regulatory and legislative approaches by stimulating Environmental Pricing Reform (EPR) through combinations of pricing, taxes, charges and subsidies (Bosquet, 2000; Hendrickson et al., 2011; Lindberg, 2007;

National Round Table on the Environment and the Economy, 2002). Environmental Policy Reform is a policy approach that uses a series of market-based tools to support environmental objectives while creating social and financial incentives (Calvert, 2010).

Market-Based Instruments are often classified into many broad categories (Hendrickson et al., 2011; Whitten, Van Bueren, & Collins, 2003). These are Market-Based Instruments that address environmental impacts using pricing and economic signals (Clarke & MacDonald, 2012; Sargent, 2002; Whitten et al., 2003). In times of increasing financial stress for local governments, Market-Based Instruments could help communities achieve their environmental objectives and diversify local revenue streams (Calvert, 2010; Jacobs, 1993; Roseland, 2012; Thompson & Bevan, 2010). For example, environmental taxations have the ability to reduce negative environmental impacts while increasing social welfare; creating a double dividend effect (Bosquet, 2000). Hence, Market-Based Instruments are important implementation tools.

1.2 Research Questions and Objectives

In order to advance community sustainability and achieve the objectives in sustainable community plans, the ‘plan-implementation gap’ described above needs to be addressed (Lindberg, 2007). In partnership with Sustainability Prosperity (SP), the primary purpose of this research is to create a Sustainability Alignment Methodology (SAM) tool. Thus, the research consists of two-phases: the development of the SAM tool and pilot testing the developed SAM tool in two Ontario municipalities. The development and improvement of the tool, allows a theoretical contribution to be made to the literature, regarding the utility of market-based instruments at a local level. It also, closes the plan-implementation gap, that is often found in

sustainable community planning. The objectives of research and the associated research questions are specified below:

Objective 1: Create a list of Market-Based Instruments and the associated environmental topics in the sustainable community plan.

Question 1: What are the existing and emerging Market-Based Instruments that are relevant for sustainable community plan implementation in Ontario?

Objective 2: Develop a Sustainability Alignment Methodology to assess Market-Based Instruments for sustainable community plan implementation.

Question 2: What continuum of measurement and scoring methodology, for the Sustainability Alignment Methodology tool, is ideal for communities in Ontario?

Objective 3: Assess and determine the usefulness of the Sustainability Alignment Methodology by testing it with two pilot communities.

Question 3: How can the Sustainability Alignment Methodology tool be improved so it meets the needs of Ontario communities?

Question 4: What lessons can be drawn from the development and improvement of a Sustainability Assessment Methodology tool for sustainable community planning and/or market-based instrument literature?

1.3 Contribution of Research

This research has both academic and practical contributions. The Sustainability Alignment Methodology tool will be further developed and revised, into a public evaluation manual for practitioners. This will provide the public – especially municipal decision-makers and

influencers – with a list of Market-Based Instruments to help achieve the environmental objectives found in their sustainable community plans. The development of the framework makes a methodological contribution to academic literature. The second phase of the research contributes theoretically to the concept of sustainable community development and the implementation of sustainable community plans. The thesis also assesses and determines the alignment between the Market-Based Instruments and the environmental topics in the sustainable community plans. The new categorization of MBIs provides a new understanding on the use of the market-approach for implementing SCPs. Emerging challenges and lessons are identified for implementing Market-Based Instruments through focus groups. This research also contributes academically to the understanding of Market-Based Instruments for local sustainable development. Overall, this study aims to provide a foundation for further research in this direction and stimulate an increase in the awareness of pricing signals and Market-Based Instruments, as a means of achieving community sustainability.

1.4 Structure of the Thesis

This thesis consists of an additional seven chapters.

Chapter 2 reviews academic, empirical and grey literature. The literature review focuses on the concepts of: sustainable development and sustainability, sustainable community plans, environmental pricing reforms, market mechanisms and market-based instruments. It concludes with a new framework which brings together the environmental topics of a sustainable community plan, with potentially relevant market-based instruments.

Chapter 3 describes the detailed methods for this study. The research was conducted in two phases: using archival research to identify a list of potential price-based instruments for the

Sustainability Alignment Methodology tool that was to be developed and using a case study approach to test the developed SAM tool with the two chosen pilot communities.

Chapter 4 explains and presents the development of the Sustainability Alignment Methodology (SAM) tool.

Chapter 5 presents the results obtained from two different pilot communities on the usefulness of the developed Sustainability Alignment Methodology tool. Two pilot communities within Ontario were chosen using criteria such as: geographic boundary, population, community commitment, age and the time span of the plan. Focus groups and a questionnaire, were used for data collection.

Chapter 6 discusses the findings in relation to the literature and concludes with key findings from phase one and phase two results. Each research question is also discussed in detail in this chapter.

Chapter 7, summaries the theoretical and practical contributions, discusses the limitations of the study and recommends further research directions.

2. Literature Review

This chapter considers literature pertaining to sustainable development, sustainable community plans and market-based instruments. The literature review begins with broad concepts of sustainable development. It, then, introduces the idea of sustainable community plans. This chapter also contains a general section on market-based instruments, followed by, specific sections on Market-Based Instruments in relation to the environmental themes found in sustainable community plans.

2.1 Sustainable Development

The first official definition of sustainable development appears in the Brundtland report as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”(World Commission on Environment and Development, 1987, p. 43). This definition, which was created by the World Commission on Environment and Development (WCED), has been highly instrumental in the field of environment and sustainability (Mebratu, 1998). Following the WCED, many initiatives were taken by governments, international agencies and organizations across the world, to address the sustainability challenge (Roseland, 2000). However, their impacts were mostly minimal (Mebratu, 1998). Nonetheless, these localized initiatives have led to many different interpretations of the concept of sustainable development (Mebratu, 1998).

The most commonly accepted concept is that of the three pillars of sustainable development. In this concept, one pillar represents the environment, another represents the economy and the last pillar represents society. Frameworks around the three pillars were generally represented by

either a ‘Venn diagram model’ or a ‘concentric circles model.’ These models were used to illustrate the interaction and relationship between, the three pillars (Campbell, 1996; Lozano, 2008). The two models present different perspectives on the connections between the three pillars. In the Venn diagram model, the environment, the society and the economy are equally important in achieving sustainable development (Campbell, 1996). In contrast, the concentric circles model highlights a hierarchical relationship for sustainable development, where the environment is of most importance (Lozano, 2008). The three pillars of sustainable development can be further divided in to those that need to be sustained: nature, life support and community; and those that need development, such as the: people, economy, society (Robert, Parris, & Leiserowitz, 2005). Despite the variations in the concept of sustainable development, the fundamental core of sustainability and sustainable development is *living in harmony with nature and in society* (Mebratu, 1998).

2.2 Sustainable Community Development

Sustainable community development means that the resources of the community can be sustained for future generations (Maser, 1997; Roseland, 2000). The importance of sustainable community development was identified as early as 1976 by UN habitat. In 1987, chapter 9 of the Brundtland Report highlighted the urban challenge and the need for community-based initiatives and strategies (World Commission on Environment and Development, 1987). For example, communities within North America should focus on the “efficient use of urban space, minimizing the consumption of natural capital, multiplying social capitals” (Roseland, 2000, p. 105). Aside from the WCED, the International Institute for Environment and Development (IIED) is also a promoter of sustainable community development. The IIED focuses on addressing sustainability by empowering communities where municipal governments and local

NGOs are in charge of development (Mebratu, 1998). The objective of the IIED's version of sustainable development is for communities to achieve the goals and targets for each pillar of sustainability (Mebratu, 1998).

The 1992 Earth Summit from the United Nations Conference on Environment and Development in Rio de Janeiro was the turning point for sustainable community development (Selman, 1998). The summit pivoted from a focus on global sustainable commitments to also include a focus on municipalities (Freeman, 1996; Selman, 1998; Selman & Parker, 1997). Agenda 21, the first action plan for global sustainable development was released after the summit (Parenteau, 1994; Roseland, 2000; United Nations Sustainable Development, 2009). Chapter 7 and 28 of the Agenda 21 are dedicated to sustainable community development. They emphasize the need for local sustainability management and sustainable community plans (Freeman, 1996; Parenteau, 1994; Selman, 1998; Selman & Parker, 1997). Local Agenda 21 (LA21) emerged from Agenda 21 and offers the opportunity for local governments to take a prominent role in sustainable community planning and development initiatives (Freeman, 1996). Since then, LA 21 led to significant progress in sustainable community development, making it the core instrument for establishing sustainability policies and strategies in municipal governments (Selman, 1998; Selman & Parker, 1997). Moreover, a variety of initiatives were also established in support of LA 21 and sustainable community development, such as: the International Council for Local Environmental Initiatives (ICLEI) Model Communities Programme and the UN Environment Programme's Sustainable Cities Programme (Selman, 1998).

A sustainable community should be an independent entity. It should continuously supply the social and economic needs of the residents, as well as maintain the environment's ability to

sustain the demand (Maser, 1997; Roseland, 2000). Communities are committed to sustainability when the following five principles are taken into account:

1. Sustainable community development is a collaborative and participatory process that involves multiple stakeholders to accurately identify the needs for the community.
2. Earth is a closed system with limited and non-substitutable ecosystem products and services. Thus, sustainable community development must be within the global and local carrying capacity.
3. Development is qualitative, while growth is quantitative. Therefore, assessment of sustainable community development includes both economic and non-economic factors.
4. Sustainable community development requires the integration of economic, social and ecological factors into decision-making, with minimal tradeoffs.
5. Sustainable community development requires long-term planning that emphasizes the inter- and intra-generational equity for resources and opportunities.

(Lindberg, 2007, p. 25-26)

2.2.1 Natural Capital

Sustainability has become increasingly important. This is due to the increasing amount of complex environmental issues – such as: resource depletion, pollution and climate change – which younger generations have had to face in recent years and which future generations will continue to face (Roseland, 2000). In essence, the natural capital used for development must be sustained within the earth's carrying capacity (Lindberg, 2007). Natural capital, or environmental capital, is a term used by ecological economists. It is one of the six forms of community capital (Lindberg, 2007; Roseland, 2000). Natural capital refers to ecological products and services

which produce a continuous flow of future goods and services (Roseland, 2000, p. 78). It can be divided into three categories:

1. Non-renewable resources, such as fossil fuels.
2. Renewable resources: the finite capacity of an ecosystem to produce of resources, such as food and water.
3. Continuing resources: the capacity of an ecosystem to provide critical life support services, such as regulating waste and absorbing pollutants.

(Roseland, 2000)

According to Roseland (2000), the other five types of community capital are: social, economic, physical, human and cultural capital. Sustainable communities may require a combination of at least three forms of community capitals in order to survive. Therefore, each form of community capital, needs to be carefully managed, in order to ensure that it will sustain the needs of future generations (Lovins, Lovins, & Hawken, 1999; Roseland, 2000). The goal of sustainable community development is for local governments to improve and strengthen all six forms of community capital through collaborative strategic planning and implementation (Clarke & Fuller, 2010; Roseland, 2000). However, out of the six types of community capital, natural capital is the most critical in achieving sustainability (Daly, 1990). Hence, natural capital must be sufficient and remain diverse for future generations (Wackernagel & Rees, 1997).

2.2.2 Two Interpretations of Sustainability: Weak and Strong Sustainability

As defined in the Brundtland report, sustainability requires that future generations inherit sufficient resources from the previous generation and are compensated for any loss in resources for future needs (Roseland, 2000). There are two possible interpretations of sustainable

development: weak sustainability and strong sustainability (Daly, 1990; Dietz & Neumayer, 2007).

The weak sustainability interpretation aggregates all types of assets, which include natural and other capitals (Daly, 1990). In this interpretation of sustainability, every capital is considered substitutable (Daly, 1990; Dietz & Neumayer, 2007). For example, liquidated natural capital and assets are equivalent to the original form if the endowment remains the same for future generations (Rees, 1991).

Strong sustainability on the other hand, distinguishes among all forms of community capital and differentiates natural capital, from the rest. Natural capital and other forms of capital, are complements, rather than substitutes (Daly, 1990). The concept of strong sustainability recognizes that some conversion of natural capital, such as destruction of ecosystems, is an irreversible process (Rees, 1991). This is simply because it is impossible to substitute the basic life support systems that provide humans with food, water and air (Barbier, 1994).

There is a consensus among the literature that weak sustainability is insufficient; and strong sustainability must be pursued for sustainable community development (Daly, 1990; Dietz & Neumayer, 2007). Numerous studies have attempted to operationalize strong sustainability. Neumayer (2003) presents two requirements for strong sustainability:

1. Preserve the value of natural capital and compensate the extraction of non-renewable resources with equal investments in substitute renewable resources.
2. Preserve 'critical' natural capital and its functions. 'Critical' natural capital (CNC) is vital for human welfare and it is non-substitutable by any other form of capital.

Under strong sustainability, development decisions should be based, not only, on preserving ‘critical’ natural capital, but, they should also, recognize the value of natural capital, as well as investing in renewable energy sources (Dietz & Neumayer, 2007). Sustainable community development is subject to a ‘strong’ sustainability approach. It ensures equal community capital for every generation, while maintaining all types of community capital, especially the preservation of ‘critical’ natural capital (Lindberg, 2007). A strong sustainability approach to sustainable community development, requires qualitative improvements in society, the economy and the environment (Lindberg, 2007). However, the concept of “trade-offs” might come into effect, if, the improvement of society, the economy and the environment conflict with one another. For example, creating economic benefits might result in the destruction of natural capital (Rees, 1991).

This suggests that planning and decision-making on sustainable community development should be guided by what is important for each community with regards to sustainable development. The most common and effective way for communities to prioritize their goals for sustainable community development is by formulating a sustainable community plan.

2.3 Sustainable Community Plans

Sustainable Community Plans (SCPs) are designed to address complex issues in social, environmental and economic issues, by identifying sustainable goals and targets for the community. SCPs help communities identify and document areas for sustainable improvements and progress (Clarke, 2012). These community-wide plans, are developed through a collaborative effort between local governments and businesses, NGOs and public sector partners

(Clarke, 2014). There are many different terms for SCPs. Some which are referred in this document include the following:

- Local Agenda 21s
- Integrated Community Sustainability Plans (ICSPs)
- Collaborative Community Sustainability Strategies
- Municipal Sustainability Plan
- Local Action Plans

(Clarke & MacDonald, 2012; Parenteau, 1994)

In Ontario, the official community plan, if adapted to include sustainability objectives, can also be considered a form of SCP under the Federal Gas Tax Agreement (AMO, 2008).

2.3.1 Historical and Canadian Context

Since the 1992 Earth Summit, Agenda 21 has been adopted by more than 178 countries (Parenteau, 1994; Roseland, 2000; United Nations Sustainable Development, 2009). According to the ICLEI, approximately 64 countries engaged in the LA21 Initiatives. In addition, the Sustainable Cities Program, an initiative established by the UN in support of LA 21, also promoted the development of collaborative community planning (Clarke, 2014; Roseland, 2000). The Millennium Development Goals and the Johannesburg Declaration on Sustainable Development, – developed in 2000 and 2002 respectively – were based on Agenda 21 (United Nations, 2002; 2008). These include guidelines for sustainable community planning and will continue to be updated during future UN conferences – such as Rio +20 in 2012 and SDGS in 2015 (United Nations, n.d.). To date, there are over 10,000 LA21 initiatives around the world (Clarke, 2014).

Canada has a history of sustainable community plans. In 1992, Hamilton established the first sustainable community plan in Canada, Vision 2020 (Clarke & MacDonald, 2012). Canada also has a large urban population, with over 80 percent of Canadians living in urban communities and over 68 percent living in a census metropolitan area (CMA) (Statistic Canada, 2008). A CMA is defined as: an urban area with a population of at least 100,000 and an urban core with a population of at least 50,000 (Statistic Canada, 2012). Canadian communities are actively involved in the planning and implementation of SCPs. Canadian municipalities have had a growing interest in sustainable community plans, since 2005. This is due to the New Deal for Cities and Communities. The New Deal for Cities and Communities is a program that funds sustainable municipal infrastructure projects (I. C., 2011). Eligible communities must have a plan, that meets the criteria of an integrated community sustainability plan. The ongoing program has provided Canadian communities with \$9 billion over the past five years and is committed to the following the objectives:

1. Providing municipalities with a share of gas tax revenues
2. Renewing existing infrastructure programs as necessary
3. Increasing contributions to the Green Municipal Funds

(D. O. F. C., 2005)

In 2013, the federal Gas Tax Fund (GTF) was renewed as part of the New Building Canada Plan (Infrastructure Canada, 2014). The federal government is making significant improvements to the GTF to help make a difference in Canadian Municipalities (Infrastructure Canada, 2014). To date, \$13 billion has been invested, which exceeds the original \$9 billion predicted funding (Infrastructure Canada, 2014). Canada's Economic Action Plan for 2013 outlined the new

increase of the Gas Tax Fund to be at two per cent per year, applied in increments of \$100 million (Infrastructure Canada, 2014). In addition, there are great flexibilities in the use of GTF for communities (Infrastructure Canada, 2014). Municipalities can pool, bank and borrow against this funding to use toward a diverse range of projects beyond infrastructure programs (Infrastructure Canada, 2014).

The province of Ontario has played an important role in the development of SCPs in Canada as it is home to one third of the total Canadian population, as well as 15 out of the 33 Canadian CMAs. Ontario also received the most support from the New Deal for Cities and Communities, over 1.8 billion in sharing gas tax revenue by 2010 (D. O. F. C., 2005). In addition, under the new renewal, Ontario is also expected to receive an allocation of \$3,873,734,778 from 2014 to 2019 (Infrastructure Canada, 2014). As a result, most Ontario communities have developed, or improved their SCPs (Roseland, 2000; Wackernagel & Rees, 1997). According to the Canadian Sustainability Plan Inventory, there are 257 sustainability plans in Ontario (University of Alberta, n. d.)

2.3.2 Characteristics of Sustainability Plans

Although many Canadian municipalities adopted an SCP, individual plans still vary among different communities in terms of: the age of the plan, time horizon of the plan and the number of partners involved in the plan (Clarke & Erfan, 2007). The age of the plan refers to the length in time since the first plan had been implemented. For communities in Canada, the majority of plans are relatively young. According to Clarke et al. (2014), approximately 81% of Canadian SCPs are within the first five years of implementation. However, 2.3% of Canadian SCPs – such as Hamilton’s Vision 2020 – are more than 12 years old (Clarke et al., 2014). SCPs also differ

between the time horizons of the plan. This refers to the projected time (starting from one year and going up to over 30 years) to achieve the goals and targets listed (Clarke, 2012; Clarke et al., 2014). Due to the collaborative nature of SCPs, there are often partners involved. Depending on the community, SCPs may range from less than 10 partners to over 50 partners (Clarke et al., 2014).

SCPs usually contain a broad range of sustainable goals and targets, which can be grouped into topics. Many topics covered in the sustainable community plan are an integration of the three pillars of sustainability: society, economy and environment (Clarke, 2011). For Canadian communities, environmental topics are among the priority. Environment topics are among the top ten of the 16 most common topics covered in the SCPs. Therefore it is not surprising that, improving and preserving natural capital are two of the top priorities.

Table 2.1 Topics in the SCPs

Environmental Topics	Social Topics	Economic Topics
<ul style="list-style-type: none"> • Transportation: 97.5% • Water: 97.4% • Waste: 91.6% • Air: 90.3% • Energy: 89.5% • Land Use: 89.2% • Climate Change: 83.8% • Food Security: 80.6% • Ecological Diversity: 74.3% 	<ul style="list-style-type: none"> • Civic Engagement: 73% • Social Infrastructure: 71.4% • Housing: 65.8% • Safety (Crime): 57.6% 	<ul style="list-style-type: none"> • Local Economy: 78% • Employment: 57.6% • Financial Security / Poverty Alleviation: 40.7%

(Clarke et al., 2014)

The table above outlines the different topics found in Canadian SCPs, The topics appear in the order of percentage of appearance in Canadian SCPs. For example, the topic of transportation appears in 97.5% of SCPs.

2.3.3 The Planning-Implementation Gap for SCPs

Despite the fact that many communities have adopted SCPs, there is still little certainty about how to translate the sustainability goals and objectives, into tangible results (Bulkeley & Betsill, 2005; Lindberg, 2007). This planning-implementation gap of SCPs has the following consequences on the communities:

1. It reduces the ability of communities to reach desired goals, such as reducing energy and material consumption (Roseland, 2000).
2. It continues to deplete the six forms of community capital (Lindberg, 2007).
3. It increases public uncertainty and skepticism with regards to achieving sustainable community development (Lindberg, 2007).
4. Opportunities are lost as the outdated community strategies have little regard for long-term sustainability and community development (Lindberg, 2007; Roseland, 2000).

One reason behind this implementation gap is the gridlock between the planning and implementation stage of SCPs (Lindberg, 2007). Most Canadian communities are still using the forty-year-old strategies that prioritize growth (Roseland, 2000). These out-dated strategies and regulations also impede implementation (Lindberg, 2007). Thus, changes in the implementation process and strategies are necessary. There needs to be a greater emphasis on moderating the priorities of the individual stakeholders and on recognizing the difference among individuals and communities, in achieving sustainability (Lindberg, 2007). Williamson, 2001 argues that the implementation process needs greater individual flexibility and more flexible economic valuation processes. It is important to recognize there is a need for innovative approaches to compliment the traditional strategies and regulations. The new approach to implementing SCPs needs to have: proactive community participation, fundamental connections and collaboration among

multiple stakeholders, consideration for the market and must account for all aspects of community capital (Lindberg, 2007). Communities need to change the current revenue structure and develop alternate financing tools, to support the proposed approach. Thus, using Market-Based Instruments to support the sustainability objectives in the SCPs has the potential to mitigate the implementation gap and to achieve environmental, social and economical, gains for the community.

2.4 Market-based Instruments

Achieving sustainable community development typically requires the identification of sustainability goals and some means to reach them (Stavins, 2003). The previous section has already discussed using SCPs to identify the sustainability goals and targets within each community. This section focuses on the means of implementing SCPs, in particular, Market-Based Instruments (MBIs), policy tools that encourage environmentally positive behaviour through market signals and mechanisms (Clarke & MacDonald, 2012; Stavins, 2003).

Pigou (1920) was the first to recognize the potential of market-based instruments and their advantages. However, it was not until recent years that the community policy makers started to make connections between Market-Based Instruments and sustainable community development (Henderson & Norris, 2008).

Communities at the local level are becoming more interested in market-based approaches and instruments for the implementation of sustainable community plans. This interest is due to the planning-implementation gap and the economic pressures associated with sustainable community development (Hendrickson et al., 2011; Lindberg, 2007; Roseland, 2000).

2.4.1 Traditional Approach vs. Market-Based Instruments

As mentioned in 2.3.3, there is a need for implementation of new approaches to complement the traditional approaches to sustainability. The traditional approaches are often “command-and-control” regulations, where standards are uniform and environmental burdens are equally shared (Stavins, 2003). The traditional approach effectively limits the environmental pollutants and there is an equal distribution of the cost (Stavins & Whitehead, 1996).

Thus, conventional approaches are inadequate in aligning economic drivers with sustainability objectives (Hendrickson et al., 2011; Stavins, 2003). Moreover, they may also result in unacceptable expenses and high societal costs as individuals vary in their contribution to environmental problems (Stavins & Whitehead, 1996). Furthermore, using command-and-control regulations to achieve sustainable community development tends to result in nothing more than compliance (Stavins, 2003). Little, or no financial incentive, exists for those who strive to achieve objectives beyond compliance. Changes in policies and governance structure are also discouraged (Roseland, 2000; Stavins, 2003).

By contrast, Market-Based Instruments for sustainable community development offer greater flexibility, accountability and transparency (Hendrickson et al., 2011; Stavins, 2003). They also help to improve the allocation of environmental resources and the dissemination of information for individuals and society (Pirard & Lapeyre, 2014). The financial incentives associated with Market-Based Instruments motivate communities to better manage their community capitals, especially natural capitals (Henderson & Norris, 2008; Roseland, 2000). In addition, Market-Based Instruments, intended to be market-friendly, improve market efficiencies, if properly designed (Hendrickson et al., 2011). They also reflect shifts in the strategy and impact of policies (Hendrickson et al., 2011; Lindberg, 2007).

In theory, implementing Market-Based Instruments leads to increased cost-efficiency compared to the traditional approach to sustainability (Pirard & Lapeyre, 2014). However, it is important to recognize that they also have their limitations. For example, there is no guarantee that one will gain advantages from using Market-Based Instruments (Broughton & Pirard, 2011). Largely because two important factors that affect the use and effectiveness of the Market-Based Instruments:

- 1) The nature of the environmental problem/objective
- 2) The state of the market and the government

(Broughton & Pirard, 2011; Whitten et al., 2003)

The nature of the environmental problem/objective determines the success of the Market-Based Instruments. The gain from Market-Based Instruments for the environmental problems must exceed their cost to ensure success (Guerin, 2003). Point sources and stationary environmental problems are more amenable to the use of market instruments compare to non-point sources and mobile environmental problems (National Center for Environmental Economics, 2015).

However, MBI will be more cost-effective and beneficial if there is a greater the degree of heterogeneity among the polluters and the impacts of the environmental problems are broader (Stavins, 2003). Moreover, the degree of uncertainty regarding environmental problems affects the use and effectiveness of the Market-Based Instruments, especially their design (National Center for Environmental Economics, 2015). Lastly, clearly defining rights and responsibilities as well as who pay and who will benefit are necessary to ensure the effectiveness of the Market-Based Instruments (Whitten et al., 2003).

The market and the government have also played an influential role in the use and effectiveness of Market-Based Instruments. Sufficient levels of political support are required to ensure the

success of the MBIs (Whitten et al., 2003). Moreover, transparency and information disclosure are critically important (National Center for Environmental Economics, 2015). Lack of information is likely to discourage the proper design and use of Market-Based Instruments (Kulsum, 2012). Furthermore, market competitiveness is also determines the design and the price of Market-Based Instruments (National Center for Environmental Economics, 2015).

Therefore, Market-Based Instruments are by no means a replacement of the “command-and control approach” for implementation. In fact, they works to complement the traditional command-and-control approach as each approach could operate differently under different circumstances. This thesis explores the potential of Market-Based Instruments as an alternative approach to implementing sustainable community plans.

2.4.2 Categories of Market-Based Instruments

Market-Based Instruments are only a general term and can be categorized using many different approaches. Market-Based Instruments can be classified into three broad types: 1) priced-based instruments, 2) rights-based instruments, and 3) friction reduction instruments (Clarke & MacDonald, 2012; Hendrickson et al., 2011; Whitten et al., 2003).

Price-based instruments follow the approaches where the price of goods and services are adjusted to reflect the associated environmental and social costs. In this case, the government is responsible for setting the price of such products, or services, while, the quantity produced varies depending on market response (Sargent, 2002; Whitten et al., 2003).

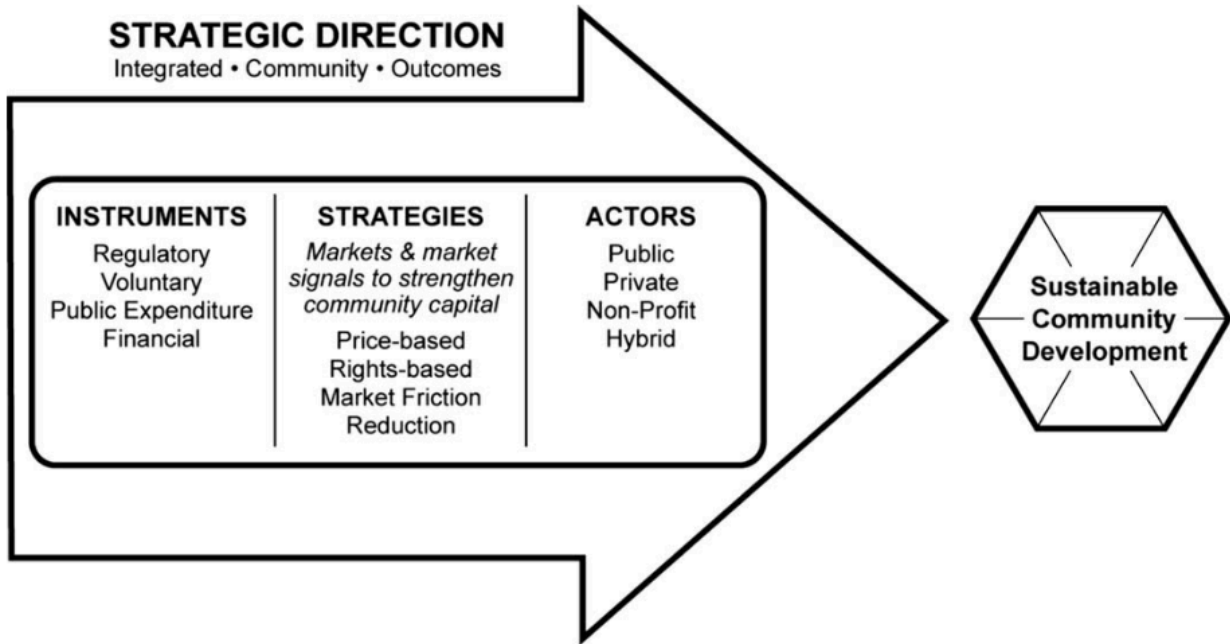
Rights-based instruments are those that control the type of goods and services produced. In contrast with the price-based approaches, the government establishes limits on the quantity or

quality of goods and services, while the price reflects the market's response (Whitten et al., 2003).

Friction reduction instruments aim to influence behavioural change through improving the market functions, such as market power (monopoly); public goods; externalities and information failures (Clarke & MacDonald, 2012; Hahn & Stavins, 1991). Clarke & MacDonald (2012) also discussed the use of friction reduction instruments in the implementation of sustainable community plans.

Table 2.2 provides common examples of different price-based instruments, rights-based instruments and friction reduction instruments. These three types are sub-categories of the market-mechanism strategies, a component that is required to achieve sustainable community development. The other three components are strategic directions, actors and policy instruments (refer to Figure 1). Strategies are specific approaches to achieve policy objectives.

Figure 1. Strategic directions within the policy development process are characterised by instruments, strategies, and actors working toward sustainable community development.



(Hendrickson et al., 2011, p.166)

Table 2.2 Examples of priced-based instruments, rights-based instruments, and friction reduction instruments

Priced-based instruments	Rights-based instruments	Friction reduction instruments
<ul style="list-style-type: none"> • Pollution charges • Subsidies • Taxes. 	<ul style="list-style-type: none"> • Tradable permits • Parking permits • HOV lanes • Pay-as-you-drive insurance, • GHG emission credits, • Renewable energy licenses • Regulated access 	<ul style="list-style-type: none"> • Reduce transaction costs • Research and development funding • Seed money for information programs • Liability funds for environmental or social impacts

(Hendrickson et al., 2011; Stavins, 2003; Whitten et al., 2003)

Similarities in classification exist between Hockenstein and Stavins. Hockenstein *et al.* (1997) has categorized market-instruments using the following criteria: pollution charges, tradable permits, a deposit refund system, reducing market barriers and the elimination of government subsidies. Stavins (2003) has created a new category for government subsidies. He has also considered the deposit refund system a sub-category of pollution charge systems. His revised four categories for market mechanisms are: pollution charges systems, tradable permits, market friction reductions and government subsidy reductions (Stavins, 2003). Table 2.3 presents a detailed classification of the Market-Based Instruments categorized by Stavins.

Market-Based Instruments are found to have attractive results and benefits (Hockenstein & Stavins, 1997). Most of the Market-Based Instruments identified in literature have an environmental focus. The results from using Market-Based Instruments with an environmental protection focus, provides valuable evidence that Market-Based Instruments have cost saving potential, while accomplishing their environmental objectives (Newell & Stavins, 2003; Stavins, 2003). Market-Based Instruments for specific environmental topics are also examined. These will be presented in the subsequent section. Overall, market instruments can be used for the implementation of sustainable community plans to generate optimal environmental, social, and economic benefits (Hendrickson et al., 2011).

Table 2.3 Major and Sub-Classification of Market-based Instruments

Major Classification	Sub-Classification
Pollution charge systems	1) Effluent charges 2) Deposit-refund systems 3) Tax differentiation 4) User charges 5) Insurance premium taxes 6) Administrative charges

Tradable permits	<ol style="list-style-type: none"> 1) Credit programs 2) Cap-and-Trade programs
Market friction reductions	<ol style="list-style-type: none"> 1) Market creation for inputs/outputs associated with environmental quality 2) Liability rules 3) Information programs
Government subsidy reductions	<ol style="list-style-type: none"> 1) Reduce energy subsidies for coal, fossil fuel, natural gas, etc. 2) Reduced pesticide and fertilizer subsidies 3) Removing harmful subsidies

(Stavins, 2003)

2.4.3 Market-Based Instruments by Environmental Topics.

Specific Market-Based Instruments can help with the implementation of different environmental objectives. The following table presents the Market-Based Instruments used worldwide.

Moreover, the Market-Based Instruments are sorted into categories using the classification by environmental topics and by Stavins (2003). Please note that this list of MBIs are gathered from literature around the world, Thus, there may be a slight difference in the list of MBIs that are relevant to Canadian municipalities due different jurisdiction and power. Section 2.5 of the literature review will specifically look at the municipal jurisdictions and power in Canada.

Table 2.4 Specific Market-based Instruments by Topics

	Pollution Charge System	Tradable Permits	Market Friction Reductions	Government Subsidy Reductions
Transportation (European Environment Agency, 2005; Stavins, 2003; Thompson & Bevan, 2010)	<ul style="list-style-type: none"> • Fuel Tax • Tax differentiation • Distance- and weight based pricing • Tolls (area, road, high occupancy tolls) • Vehicle registration charges • Vehicle Circulation tax • Congestion pricing • Parking pricing 	<ul style="list-style-type: none"> • Peak-period licensing • Carbon credit system (emission trading) 	<ul style="list-style-type: none"> • Liability rule for pollution activities • Green public procurement • Environmental Choice Label 	<ul style="list-style-type: none"> • Scrappage incentives • Subsidies for cleaner vehicle • Subsidies for energy-efficient cars
Water (European Environment Agency, 2005; Stavins, 2003; Thompson & Bevan, 2010)	<ul style="list-style-type: none"> • Water effluent charges (BOD loads, TSS, Nitrogen and Phosphorous) • Water abstraction charges (ground water) 	<ul style="list-style-type: none"> • Water abstraction license • Water quality permit trading 	<ul style="list-style-type: none"> • Measures that facilitate the voluntary exchange of water rights and thus promote more efficient allocation and use of scarce water supplies • (Stavins, 2003, p. 33) • Reporting requirement • Green public procurement 	<ul style="list-style-type: none"> • Funds to support water, wastewater treatment infrastructure

<p>Waste (European Environment Agency, 2005; Stavins, 2003; Thompson & Bevan, 2010)</p>	<ul style="list-style-type: none"> • Disposal tax (landfill, incinerator tax) • Vehicle disposal levy • Product tax/charges • Deposit-refund system • Packaging tax • Hazardous waste tax • Unit pricing of waste 		<ul style="list-style-type: none"> • Liability Rule for hazardous waste • Product labeling requirements • Green public procurement • Environmental Choice Label 	<ul style="list-style-type: none"> • Funds to support waste treatment infrastructure
<p>Air (European Environment Agency, 2005; Stavins, 2003; Thompson & Bevan, 2010)</p>	<ul style="list-style-type: none"> • Air Pollution Levy (NO_x, SO₂, VOC, etc.) • Carbon tax • Non-energy-related GHG tax (CFC, PFC, SF₆, HFC) 	<ul style="list-style-type: none"> • Carbon credit system • Cap and trade program • CFC trading • SO₂ Allowance Trading System 	<ul style="list-style-type: none"> • Liability rule for pollution activities • Reporting requirement • Green public procurement 	
<p>Energy (European Environment Agency, 2005; Stavins, 2003; Thompson & Bevan, 2010)</p>	<ul style="list-style-type: none"> • Energy tax • Unit pricing of Utilities (heating, electricity) • Tax differentiation 	<ul style="list-style-type: none"> • Carbon credit system (emission trading) • Cap and trade program • Lead Trading 	<ul style="list-style-type: none"> • Facilitate the restructuring of electricity generation and transmission • (Stavins, 2003, p. 33). • Product labeling requirements • Reporting requirement • Green public procurement • Environmental choice label 	<ul style="list-style-type: none"> • Reduce energy subsidies (coal, fossil fuel, natural gas, etc.) • Subsidy for renewable energy • Subsidies for energy-efficient cars
<p>Land Use (European Environment Agency, 2005; Stavins, 2003; Thompson & Bevan, 2010)</p>	<ul style="list-style-type: none"> • Density-based property tax • Land-value taxation • Tax differentiation 		<ul style="list-style-type: none"> • Liability rule for environmental damage • Reporting requirement • Green public procurement 	<ul style="list-style-type: none"> • Tax increment financing

Climate Change (European Environment Agency, 2005; Stavins, 2003; Thompson & Bevan, 2010)	<ul style="list-style-type: none"> • Carbon tax • Climate change levy • Fuel taxes • Product/sales tax 	<ul style="list-style-type: none"> • Carbon credit system • Cap and trade program • Lead trading • CFC trading • SO₂ Allowance Trading System 	<ul style="list-style-type: none"> • Liability rule for environmental damage • Reporting requirement • Green public procurement 	<ul style="list-style-type: none"> • Reduce energy subsidies (coal, fossil fuel, natural gas, nuclear) • Subsidy for renewable energy • Subsidies for energy-efficient cars
Food Security (European Environment Agency, 2005; Stavins, 2003; Thompson & Bevan, 2010)	<ul style="list-style-type: none"> • Pesticide and fertilizer tax • Nitrogen and phosphorous levy 		<ul style="list-style-type: none"> • Liability rule for environmental damage • Product labeling requirements • Green public procurement • Environmental choice label 	<ul style="list-style-type: none"> • Remove pesticide and fertilizer subsidies • Farm subsidies • Agro-environmental subsidies
Ecological Diversity (European Environment Agency, 2005; Pirard & Lapeyre, 2014)	<ul style="list-style-type: none"> • Natural resource extraction tax • Ecological fiscal regime 	<ul style="list-style-type: none"> • Mitigation banking (biodiversity, species, habitat, wetland) 	<ul style="list-style-type: none"> • Coasean-type agreements • Liability rule for environmental damage • Green public procurement • Environmental choice label 	<ul style="list-style-type: none"> • Reverse auctions • Agro-environmental subsidies • Environmental fund

2.4.4 General use of Market-Based Instrument Revenue

As mentioned in the previous section, the use of Market-Based Instruments creates financial incentives. These revenues are often reinvested into sustainability-related expenses (European Environment Agency, 2005). The following table outlines the some use of the revenue from market-based instruments.

Table 2.5 Use of Revenue by Topics

	Use of Revenue
Transportation	<ul style="list-style-type: none"> • General budget • Public transport investments and subsidies • Finances road maintenance and other road-related expenditures • Mass transit passes
Water	<ul style="list-style-type: none"> • General budget • Water quality management and monitoring • Wastewater treatment plants • Industrial clean technology equipment • Water quality policy • Water pollution control • Cost of licensing and administration • Income tax rebate for water conservation
Waste	<ul style="list-style-type: none"> • General budget • Fund waste management schemes • Clean up contaminated sites • Funds collection and recycling (old batteries, tires, oil waste)
Air	<ul style="list-style-type: none"> • General budget • Environmental fund • Pollution reduction research • Compensation of individuals • Low-interest pollution control loans • Local monitoring and administration • Income tax rebates for adoption of clean technology
Energy	<ul style="list-style-type: none"> • Industrial clean technology equipment • Income tax rebates for adoption of clean technology • Income tax rebates for industrial pollution abatement investments • Income tax rebate for solar energy equipment
Land Use	<ul style="list-style-type: none"> • General budget • Environmental fund
Climate Change	<ul style="list-style-type: none"> • Climate change research • Income tax rebates for adoption of clean technology
Food Security	<ul style="list-style-type: none"> • General budget • Environmental fund • Fund farm and agro-environmental subsidies

Ecological Diversity	<ul style="list-style-type: none"> • Environmental fund • Fund farm and agro-environmental subsidies • Fund ecological fiscal regime • Environmental conservation and policy • Clean up contaminated sites
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(European Environment Agency, 2005; Stavins, 2003)

2.5 Canadian Municipal Jurisdiction and Power

Despite the economic advantages of market-based instruments, many communities are only beginning to consider them as a means to implement SCPs. Hence, local governments need to understand their legislative power in order to achieve sustainable community development and effectively use tools for the implementation of SCPs (Osborne, 1993; Roseland, 2000).

In Canada, under the Constitution Acts, Canadian municipal institutions are subjects of exclusive provincial legislation (Justice Laws, 2015). The municipalities receive power from the provincial legislatures and are bound provincial laws and regulations (Australian Government, 2013). Thus, the provincial controls and delegates the roles and responsibilities of local governments (Australian Government, 2013). In Ontario, local governments are responsible for the following:

- Transport and communication
- Housing and community amenities
- Public order and safety
- Recreation and culture
- Social/Welfare services
- Public utilities
- Planning and development
- Public health

- Economic development.

(Australian Government, 2013)

Most municipalities are also responsible for residential waste collection, drinking water treatment and urban wastewater treatment and hold partial authority over water resource management for the local area (Environment Canada, 2010).

Canada municipalities generate their own revenue from taxes, user fees, sales of goods and services and grants (Australian Government, 2013). However, municipalities in Canada have limited power of taxation. Hence, they are limited to imposing only property taxes and fees from permits and licenses (Tindal & Tindal, 2000). As a result, new local revenue is mainly raised from new introduction or increase of user fees (Australian Government, 2013). It is important to note the difference between user fees and taxes. Firstly, A tax is a compulsory but users fees are paid only by individual using the goods or services (Althaus et al., 2011). Secondly, tax serves a public purpose as it raises money for the general budget, while revenue from user fees are intended to be reinvested into the goods or services in order to benefit the users (Althaus et al., 2011). Unlike taxes, the size of the user fees is limited. The user fee charged cannot exceed the cost of providing the goods or services (Althaus et al., 2011).

The Municipal Act of Ontario is the first consolidated statute of Ontario's municipal legislation (AMO, 2013). It also clearly states the extent of powers and duties for municipalities in Ontario (AMO, 2013) and provides the additional information for identifying the appropriate Market-Based Instruments for municipal implementation. Moreover, the understanding of Canadian municipal jurisdictions and power provides foundations to develop an useful and a credible SAM.

2.6 Summary

In conclusion, the literature shows the importance of local sustainability development and the implementation of SCPs to achieve this overarching objective. Market-Based Instruments need to be considered in order to stimulate progress on community sustainability. Most research recognizes the benefits of individual market-based instruments, especially the financial incentives. However, there is a lack of a comprehensive understanding on the appropriate Market-Based Instruments for local sustainable development. The literature rarely discussed the use of Market-Based Instruments as a means for community sustainability and SCP implementation.

Thus, there is a need to bridge the gap between the understanding of Market-Based Instruments and the practical application of market-based instruments, to realize the environmental goals in the SCPs. Furthermore, there is a need to develop a comprehensive manual of market-based instruments, to help with the implementation of SCPs in order to progress towards realizing sustainability at the local level. This research aims to create a SAM tool, which includes a comprehensive set of MBIs that are tied to common environmental objectives found in Canadian SCPs. This set of MBIs will benefit municipalities by providing valuable alternatives for implementing their SCPs. The comprehensive table of MBIs outlined in section 2.4.2 is expected to provide the foundation for the development of the SAM tool.

3. Methods

This chapter provides a descriptive overview of the process undertaken to answer the research questions. The research design is discussed first. This is followed by a detailed description of two-phases study; the development of the Sustainability Alignment Methodology (SAM) and the criteria for: case studies selection, data collection and analysis.

3.1 Research Design

This multi-phase research is designed to assess the use of Market-Based Instruments by municipal governments for community sustainability. The first phase of the study concentrated on the development of a SAM tool (Research Objectives 1 & 2 and Research Questions 1 & 2). The second phase of the study consisted of two in-depth case studies for identifying and assessing the use of Market-Based Instruments and the usability of the SAM tool (Research Objective 3 and Research Questions 3 & 4).

This study followed a qualitative research paradigm. Qualitative research attempts to address research objectives and answer research questions through the understanding of a holistic view of the social phenomenon (Creswell, 2014). A qualitative research design strives to gather meaningful data from firsthand experience and a range of interacting variables (Fraenkel & Wallen, 1990; Lincoln & Guba, 1985; Merriam, 1998). The lack of hypotheses for this study allows researchers to discover what naturally occurs in this setting (Fraenkel & Wallen, 1990). Thus, the nature of qualitative research aligns with this study, by allowing the researcher to use the participants' knowledge and perceptions and to develop the method and theory (Allan, 1991; Flick, 2006).

There are many identified types of qualitative research, such as: generic qualitative studies, ethnographies, grounded theories and case studies (Merriam, 1998; Patton, 1990). A case study approach bridges the gap between theory and practice. Moreover, it allows researchers to gain an in-depth understanding of the specific social phenomenon, by focusing on the underlining process and the context of the situation (Merriam, 1998; Yin, 2009). The partnership between Sustainable Prosperity and the University of Waterloo, allowed this study to have a hybrid of academic and practitioner, research objectives. Both the theoretical framework and the municipal implementation, of the SAM tool, are of equal importance. This study used a case study approach to conduct qualitative research. Specifically, multiple explanatory case studies approach was the appropriate choice. According to Yin (2009), multiple explanatory case studies present a cause and effect relationship by explaining how or why events occur. The study site selection, as well as, methods of data collection and analysis, of this case study, are described in detail in the coming sections.

3.2 Phase One: Sustainability Alignment Methodology Tool Development

Phase one of the study focused on the development of the Sustainability Alignment Methodology tool. A literature review and document analysis, were used to answer the first two Research Questions. A list of existing and emerging Market-Based Instruments was created using both academic and grey literature. The objective of this step was to create a preliminary version of the SAM tool with all the possible market-based instruments. However, the list of Market-Based Instruments for the SAM was constrained to the following:

- Intended for the use of environmental topics and goals, covered in the Sustainable Community Plan and specified below in Table 3.1.

- Controlled by local governments and has a city, municipal, or regional, focus
- Applicable in the context of Ontario

Once all the Market-Based Instruments were identified from the literature, they were separated into a range of environmental topics (i.e. transportation, water, waste, air, energy, land use, climate change, ecological diversity and food security) covered in the Sustainable Community Plans (Taylor, 2012; Clarke et al., 2014). Then, if there were sub-topics under each larger environmental topic, the Market-Based Instruments were further sub-categorized. Table 3.1 outlines the topics and sub-topics, used for the initial development of the SAM tool.

Table 3.1 Environmental Topics and Sub-topics for the classification of MBIs

Environmental Topics	Environmental Sub-topics
1. Transportation	1a. Vehicle Specific 1b. Emission Specific
2. Water	2a. Water Quality 2b. Water Consumption
3. Waste	3a. Waste Diversion 3b. Waste Disposal
4. Air	4a. GHG-related emissions 4b. Other emissions
5. Energy	5a. Energy Consumption 5b. Energy Source
6. Land Use	6a. Land property development 6b. Green Space
7. Climate Change	N/A
8. Food Security	N/A
9. Ecological Diversity	N/A

3.3 Phase Two: Case Studies

3.3.1 Understanding Community and How Municipalities Works in Ontario

The Oxford English Dictionary defines a community as a particular area or place that is to be considered together with its inhabitants (Oxford Dictionary, n.d.). For the context of this thesis, the “particular area or place” refers to municipalities. Terminologies such as city, town, or township, are given depending on the population of the municipalities. Municipalities are also classified based on legal powers and responsibilities. In, Ontario, there are two major types of municipal structures:

1. The two tier municipal structure: where municipalities are governed by an upper tier and a lower tier municipal government.
 - Upper tier municipalities are municipalities that provide certain services over an area that includes more than one lower tier municipality.
 - Lower tier municipalities are municipalities that depend on an upper level of municipal government, such as a regional government, to provide them with certain services.
2. Single tier municipalities are municipalities that have only one level of municipal government in their area.

(AMO, 2013; Ministry of Municipal Affairs and Housing, 2011)

Some municipal governments have amalgamated voluntarily, or with facilitation from the province, to provide services in a more cost-effective and efficient way (AMO, 2013). This creates another type of municipal structure. In order to avoid confusion, the thesis will simply refer to these amalgamated municipal governments as communities.

3.3.2 Study Site Selection

Two municipalities were chosen for explanatory case studies. Two sets of criteria (i.e., similarities and differences) were applied to identify the potential pilot municipalities for a comparative case study analysis:

1. Similarities between the two case studies:

- Geographic Boundary: Both municipalities need to be located within the boundary of Ontario
- Sustainable Community Plan: Both municipalities need to have some form of Sustainable Community Plan (as determined by the Canadian Sustainability Plan Inventory).
- Size and Scale: Both municipalities should be similar in size, with a population of over 100,000 (as determined by the population listed in the 2008 Census of Canada).
- Similarity in the characteristics of the plan: There should be some similarities between the two municipalities in terms of the age of the plans, or the time horizon of the plans. These communities must be at least 2-3 years into the implementation phase of their SCPs.
- Willingness to participate in the research project.

2. Differences between the two case studies:

- Difference in governance structure: One municipality should represent a two tier municipal structure, while the other, should represent a single tier municipality.

From the above criteria, a list of potential communities was created (see Appendix A). However, the most important criteria for the study site selection, was the chosen municipalities' willingness to participate. Both municipalities needed to be committed to participate in the research study, as

well as in their sustainable community plan. In addition, as each focus group was held in the selected municipality, both communities needed to be within a reasonable traveling distance from the University of Waterloo. Upon careful consideration, the city of Kingston was selected as the single tier municipality and the Region of Waterloo (which includes the cities of Kitchener, Waterloo and Cambridge) was selected to represent the two-tier municipal structure. The city of Hamilton and the Durham Region (Ajax), were chosen as back-up pilot municipalities.

3.3.3 Case Study Profiles – City of Kingston and Region of Waterloo

The City of Kingston and the Region of Waterloo, (which includes the Cities of Kitchener, Waterloo and Cambridge,) are two communities which are located in Southern Ontario. The city of Kingston has both a SCP and a corporate strategic plan. The Region of Waterloo also has a regional sustainability strategy and the lower tier municipalities each have their own SCPs. Both the city of Kingston and the Region of Waterloo, are leaders in community sustainability and displayed a strong interest in and commitment to, this research.

3.3.4 Data Collection

After the two pilot municipalities were confirmed, archival data was first gathered in an attempt to test the usability of the SAM tool created for this study. Prior to each focus group, attempts were made to evaluate each market-based instrument. This was gathered using municipal websites and documents, such as Kingston's corporate strategic plan and the sustainable community plans of each community involved.

Two half-day focus groups were held to collect remaining data and gather feedback on the usability of the SAM tool. The key participants from the chosen municipalities were first

contacted via email (see Appendix B). The desired key participants would be municipal decision-makers and influencers, with an interest in the sustainable community plan and market-based schemes for sustainability (Lindberg, 2007). The name and contact information of these key participants was found on the municipal websites. Only the participants interested in the focus group were provided with a detailed letter regarding the focus group (see Appendix C). Upon receiving a confirmation of participation from the participants, a third email along with supplementary documents for the focus group (i.e. the draft SAM tool and the agenda for the focus group) was sent to the participants.

On November 28, 2014, the first half-day focus groups were held in the City of Kingston. The following municipal staff (listed in alphabetical order), were invited to participate in the focus group discussions:

- Daniel Shipp (Sustainable Initiatives Coordinator, City of Kingston)
- Paul MacLatchy (Director of Environment & Sustainability Initiatives, City of Kingston)

On December 1, 2014, the second half-day focus groups were held in the Region of Waterloo. The following municipal staff, (listed in alphabetical order), were invited to participate in the focus group discussions:

- David Roewade (Sustainability Planner, Region of Waterloo)
- Elaine Brunn Shaw (Director of Policy Planning, City of Cambridge)
- John Lubczynski (Urban Planner, Region of Waterloo)
- Robyn McMullen (Policy Planner, City of Waterloo)

These participants directly influence sustainable community development and SCPs implementation. Thus, they are the most familiar with the Market-Based Instruments used for implementing SCPs in their communities.

The objective of this focus group was to teach the participants about the SAM tool and seek feedback for further revisions. The participants had the opportunity to review and complete the consent form (see Appendix D). The consent forms were collected prior to the commencement of the focus group. During the session, the facilitators (Dr. Amelia Clarke, Stephanie Cairns and Ying Zhou) introduced the SAM tool and discussed each of the market-based instruments in detail. The participants were invited to provide feedback and share their opinions about the SAM tool. More specifically, responses were gathered from the following questions:

1. Are the sub-topics for the environmental topics appropriate? What are some other good sub-classifications?
2. Are the MBIs relevant to municipalities? Are there any MBIs that are missing? Are there any MBIs that are not under your municipal jurisdiction?
3. Where can the user find the information on each MBI?
4. How can we present the assessment criteria and scoring in a positive way? How useful is scoring?
5. What are some possible next steps for the SAM tool?

The participants were also provided with a feedback forms (see Appendix E) at the beginning of the focus group session to share their comments on the method, the SAM tool and the overall project in a written format. The research project and focus group obtained ethical clearance from the Office of Research Ethics at the University of Waterloo (see Appendix F). To capture areas of importance during the interview, the researcher took hand-written notes and used a recorder.

Chatham House Rule was enforced during the focus group, as the participants at the meeting were free to use information from the discussion, but they were not allowed to reveal the identity of the person making the comment. This enabled an open discussion during the focus groups, while ensuring that participants' specific comments remained anonymous.

After the completion of the focus groups, emails were sent thanking the participants (see Appendix G). Each participant will receive a copy of the SAM tool and/or a copy of the full thesis upon request.

3.3.5 Data Analysis

Audio recordings and hand written notes from the two focus groups were first transcribed, before being coded to analyze the areas of improvement for the SAM tool. The transcription was coded three times. The codes were initially assigned based on the questions asked during the focus group discussion. After that, they were assigned based on the environmental topics identified in Table 3.1. The transcripts were deductively coded for first two times, however, it was inductively coded for the last round of coding. The final codes were assigned based on emerging themes (Flick, 2006). The same codes were applied to the same emergent themes. The assignment coding was compared with similar responses from interviewees and surveys, to ensure that it was accurately coded. Areas of improvement for the SAM tool could be identified upon the completion of the analysis of the focus group discussions. Once this is done, the refinement of the draft SAM tool could be made to improve the usefulness and effectiveness of this tool for the implementation of sustainable community plans. The refinement of the draft SAM tool could also, answer research questions 2 and 3.

3.4 Validity and Reliability

The challenge with case studies revolves around construct validity, especially external validity (Flyvbjerg, 2006). Strategies were used in this research to address the validity and reliability of the study. Triangulation of data sources was used to establish the validity of the research (Creswell, 2014). More specifically, multiple sources of data were used (e.g. the data collection consisted of three different methods and each case study conducted a focus group with multiple participants). The focus groups were open discussion and detailed answers from the questions added to the validity of the results. Moreover, an external advisor reviewed the framework for the SAM tool, as well as the case studies. As for external validity, there are always concerns with generalizing findings using case studies (Flyvbjerg, 2006). In this study, a comparative analysis of two case studies was conducted and transferability was identified to help with generalization of the case study findings. In addition, specific criteria were applied for the selection of case studies (Yin, 2009). Lastly, strategies for addressing reliability included a clear and detailed methodology that was reviewed by the thesis committee and consistent protocol for data collection, coding and analysis.

4. Draft Sustainability Alignment Methodology (SAM)

4.1 Introduction to the SAM tool

This chapter presents a draft of the SAM tool that created for the purpose of this research study. The SAM tool was created in the form of a manual that was designed to assess municipal price signals and identify the potential Market-Based Instruments (MBIs) that help to implement a sustainable community plan. It was created with the goal of mitigating the gap between the planning and implementation stage for sustainable community development. The version presented in this chapter is based on phase one of the research, prior to the focus group. It is the version that was built based on the academic and grey literature.

Market-Based Instruments are first categorized in to the nine environmental topics from the sustainable community plans (note: some MBIs might appear in multiple topics). They are then further categorized according to their MBI type (i.e. price-based MBIs, rights-based MBIs and market friction reductions and government subsidy reduction). The environmental topics are listed in the order of the most common covered topics in the SCPs (refer to Table 3.1).

4.2 Assessment Criteria

In order, to assess and score each MBI, a series of assessment criteria were chosen. Each MBI is given a numerical score based on these criteria.

Table 4.1 Assessment Criteria and Scores

Assessment Criteria	Total Score
1. Environment/Sustainability supported through evaluation and removal of market disincentives	3
2. Environment/Sustainability supported through an MBI	3
3. Complementary communications and education	2
4. Stakeholder engagement	2
5. Comprehensive	1
6. Evaluation	1

4.2.1 Rationale and Scoring Guidelines

1. Environment/Sustainability supported through evaluation of and, where necessary, removal of market signals creating disincentives to the SCP goals.

Often, existing market signals affects the evaluated MBIs. Thus, it is important to know if there are market disincentives and whether actions are taken to remove these market signals. A maximum of three points can be awarded:

- One point is awarded for an assessment of existing market signals with relation to SCP goals.
- Two points for removal on an existing market signal that sends disincentives to the SCP goals.
- Three points for removal on an existing market signals, which sends disincentives to the SCP goals and substitution of a new market signals supporting the SCP goal.

2. Environment/Sustainability supported through an MBI

Well designed MBIs are important for achieving the environmental objective in sustainable community plans. Therefore, each MBI is evaluated based on their structure and design. A maximum of three points can be awarded.

For price-based MBIs (including subsidies) only:

- One point is awarded for the existence of the MBI in the community to address the SCP goals with a flat-fee.
- Two points, if the pricing structure follows a unit-based price with constant increments.
- Three points, if the pricing structure follows a unit-based price with dynamic/varied increments.

For rights-based MBIs:

- One point is awarded if there is a rights-based MBI.
- Two points is awarded if the quantity that has been set aligns with the SCP goals.
- Three points, if the market able to find the true price.

For market friction reductions MBIs:

- One point if only internal audience are reached.
- Two points if audiences from some sectors are reached.
- Three points if audience reached are community-wide.

3. Complementary communications and education

Since the users of the MBIs are community residents, it is important for municipal government to communicate with its residents about the about the purpose of each MBI and the link to the sustainability objectives. A maximum of one point can be awarded.

- One point, if the municipality has a communication and education program to inform residents about the link between the SCP goal and this MBI.

4. Stakeholder engagement

Implementation of each MBI affects multiple stakeholders. Therefore, municipal government needs to involve stakeholders into the design and implementation process to increase the transparency and accountability of the MBIs. A maximum of two points can be awarded.

- One point, if the municipality collaborated with the SCP stakeholders in designing the MBI.
- Two points, if there is stakeholder engagement for implementation.

5. Comprehensive

Consistent implementation of each MBI needs to be evaluated to ensure fairness and equity among the users. A maximum of one point can be awarded.

- One point is awarded if MBI policy is consistently applied across all actors under municipal control, with no special exemptions.

6. Evaluation

Regular update and revision are important to ensure the efficiency and effectiveness of the MBIs in achieving environmental goals in the sustainable community plans. A maximum of one point can be awarded.

- One point, if there is a commitment to a regular assessment of performance of the MBI towards the goal and revisions as necessary

4.3 Draft SAM

The following tables present the preliminary version of the Sustainability Alignment Methodology. This version of the SAM is build from the literature review chapter, Table 4.2 presents a summary of all the MBIs for the nine environmental topics and Table 4.3 to 4.11 presents the MBIs, assessment and scoring guidelines for each environment topics. The order of each MBI on Table 4.2 matches with the order of MBIs appeared for each corresponding environmental topic.

Table 4.2 Index of MBIs

Topics	Sub-topics	MBIs
Transportation	Vehicle Specific	<ul style="list-style-type: none">• Congestion pricing• Parking pricing• Vehicle registration charges
	Emission Specific	<ul style="list-style-type: none">• Distance- and weight based pricing• Tolls (area, road, high occupancy tolls)
	Both	<ul style="list-style-type: none">• Peak-period licensing• Environmental Choice Label• Subsidies for cleaner/energy-efficient vehicles

	Other	<ul style="list-style-type: none"> • Funds and grants • Green public procurement • Other subsidies • Scrappage incentives
Water	Water Quality	<ul style="list-style-type: none"> • Charges for BOD loads • Nitrogen Levy • Phosphorous Levy • TSS Charges • Water quality permit trading
	Water Consumption and Treatment	<ul style="list-style-type: none"> • Funds to support water, wastewater treatment infrastructure • Water abstraction charges (ground water) • Water abstraction license
	Both	<ul style="list-style-type: none"> • Green public procurement • Partnership approach • Reporting requirements
	Other	<ul style="list-style-type: none"> • Funds and grants (Specify): • Other subsidies (Specify):
Waste	Waste Diversion	<ul style="list-style-type: none"> • Deposit-refund system • Product labeling requirements
	Waste Disposal	<ul style="list-style-type: none"> • Funds to support waste treatment infrastructure • Vehicle disposal levy
	Other	<ul style="list-style-type: none"> • Funds and grants (Specify): • Other subsidies (Specify): • Environmental choice label • Green public procurement • Partnership approach
Air Quality	GHG-related emissions	<ul style="list-style-type: none"> • Anti-idling development charges • Anti-idling pay-per-use charges • Utility pricing (electricity) • Utility pricing (gas)
	Non-GHG emissions	<ul style="list-style-type: none"> • Other emissions charges (Specify):
	Others	<ul style="list-style-type: none"> • Funds and grants (Specify): • Other Subsidies (Specify): • Green public procurement • Partnership approach • Reporting requirements

Energy	Energy Consumption	<ul style="list-style-type: none"> • Utility pricing (electricity) • Utility pricing (gas)
	Energy Source	<ul style="list-style-type: none"> • Subsidies for renewable energy/district energy
	Both	<ul style="list-style-type: none"> • Subsidies for cleaner/energy-efficient vehicles • Environmental choice label • Product labeling requirements
	Other	<ul style="list-style-type: none"> • Funds and grants (Specify): • Other Subsidies (Specify): • Green public procurement • Partnership approach
Land Use	Land property development	<ul style="list-style-type: none"> • Anti-idling development charges • Density Bonus • Density-based property tax • Tax increment financing
	Green Space	<ul style="list-style-type: none"> • Land-value taxation • Liability rule for environmental damage
	Other	<ul style="list-style-type: none"> • Funds and grants (Specify): • Other subsidies (Specify): • Green public procurement • Partnership approach • Reporting requirement
Climate Change		<ul style="list-style-type: none"> • Anti-idling development charges • Anti-idling pay-per-use charges • Climate change levy • Other GHG emissions (Specify): • Subsidies for cleaner/energy-efficient vehicles • Subsidies for renewable energy/district energy • Funds and grants (Specify): • Other subsidies (Specify): • Environmental Choice Labels • Green public procurement • Partnership approach • Reporting requirement

<p style="text-align: center;">Food Security</p>		<ul style="list-style-type: none"> • Agro-environmental subsidies • Farm subsidies • Nitrogen levy • Phosphorous levy • Funds and grants (Specify): • Other subsidies (Specify): • Environmental Choice Label • Green public procurement • Partnership approach • Product labeling requirements
<p style="text-align: center;">Ecological Diversity</p>		<ul style="list-style-type: none"> • Agro-environmental subsidies • Ecological fiscal regime • Environmental fund • Funds and grants (Specify): • Other subsidies (Specify): • Mitigation Banking • Environmental Choice Label • Green public procurement • Partnership approach • Reporting requirements

Table 4.3 MBIs and Scoring Guidelines for Transportation

MBIs for Transportation	Evaluation and removal of market disincentives	Environment/Sustainability Supported through an MBI	Complementary communications and education	Stakeholder engagement	Comprehensive	Evaluation
<i>Price-based MBIs (including Subsidy, Reductions and Funding)</i>						
• Anti-idling development charges						
• Anti-idling pay-per-use charges						
• Congestion pricing						
• Distance- and weight based pricing						
• Parking pricing						
• Scrappage incentives						
• Subsidies for cleaner/energy-efficient vehicles						
• Tolls (area, road, high occupancy tolls)						
• Vehicle registration charges						
• Vehicle disposal levy						
• Other subsidies (Specify):						
• Funds and grants (Specify):						
<i>Rights-based MBIs</i>						
• Peak-period licensing						
<i>Market Friction Reductions</i>						
• Environmental Choice Label						
• Green public procurement						
• Partnership approach						

Table 4.4 MBIs and Scoring Guidelines for Water

MBIs for Water	Evaluation and removal of market disincentives	Environment/Sustainability Supported through an MBI	Complementary communications and education	Stakeholder engagement	Comprehensive	Evaluation
<i>Price-based MBIs (including Subsidy, Reductions and Funding)</i>						
• Charges for BOD loads						
• Funds to support water, wastewater treatment infrastructure						
• Nitrogen levy						
• Phosphorous levy						
• TSS Charges						
• Water abstraction charges (ground water)						
• Funds and grants (Specify):						
• Other subsidies (Specify):						
<i>Rights-based MBIs</i>						
• Water abstraction license						
• Water quality permit trading						
<i>Market Friction Reductions</i>						
• Green public procurement						
• Partnership approach						
• Reporting requirements						

Table 4.5 MBIs and Scoring Guidelines for Waste

MBIs for Waste	Evaluation and removal of market disincentives	Environment/Sustainability Supported through an MBI	Complementary communications and education	Stakeholder engagement	Comprehensive	Evaluation
<i>Price-based MBIs (including Subsidy, Reductions and Funding)</i>						
• Deposit-refund system:						
• Auto batteries						
• Beverage containers						
• Fluorescent light bulbs						
• Plastic shopping bags						
• Tires						
• Funds to support waste treatment infrastructure						
• Vehicle disposal levy						
• Funds and grants (Specify):						
• Other subsidies (Specify):						
<i>Market Friction Reductions</i>						
• Environmental choice label						
• Green public procurement						
• Partnership approach						
• Product labeling requirements						

Table 4.6 MBIs and Scoring Guidelines for Air Quality

MBIs for Air Quality	Evaluation and removal of market disincentives	Environment/Sustainability Supported through an MBI	Complementary communications and education	Stakeholder engagement	Comprehensive	Evaluation
<i>Price-based MBIs (including Subsidy, Reductions and Funding)</i>						
• Anti-idling development charges						
• Anti-idling pay-per-use charges						
• Utility pricing (gas)						
• Other emissions charges (Specify):						
• Funds and grants (Specify):						
• Other Subsidies (Specify):						
<i>Market Friction Reductions</i>						
• Green public procurement						
• Partnership approach						
• Reporting requirements						

Table 4.7 MBIs and Scoring Guidelines for Energy

MBIs for Energy	Evaluation and removal of market disincentives	Environment/Sustainability Supported through an MBI	Complementary communications and education	Stakeholder engagement	Comprehensive	Evaluation
<i>Price-based MBIs (including Subsidy, Reductions and Funding)</i>						
• Utility pricing (electricity)						
• Utility pricing (gas)						
• Subsidies for cleaner/energy-efficient vehicles						
• Subsidies for renewable energy/district energy						
• Funds and grants (Specify):						
• Other Subsidies (Specify):						
<i>Market Friction Reductions</i>						
• Environmental choice label						
• Green public procurement						
• Partnership approach						
• Product labeling requirements						
• Reporting requirement						

Table 4.8 MBIs and Scoring Guidelines for Land Use

MBIs for Land Use	Evaluation and removal of market disincentives	Environment/Sustainability Supported through an MBI	Complementary communications and education	Stakeholder engagement	Comprehensive	Evaluation
<i>Price-based MBIs (including Subsidy, Reductions and Funding)</i>						
• Anti-idling development charges						
• Density Bonus						
• Density-based property tax						
• Land-value taxation						
• Tax increment financing						
• Funds and grants (Specify):						
• Other subsidies (Specify):						
<i>Market Friction Reductions</i>						
• Green public procurement						
• Liability rule for environmental damage						
• Partnership approach						
• Reporting requirement						

Table 4.9 MBIs and Scoring Guidelines for Climate Change

MBIs for Climate Change	Evaluation and removal of market disincentives	Environment/Sustainability Supported through an MBI	Complementary communications and education	Stakeholder engagement	Comprehensive	Evaluation
<i>Price-based MBIs (including Subsidy, Reductions and Funding)</i>						
• Anti-idling development charges						
• Anti-idling pay-per-use charges						
• Climate change levy						
• Other GHG emissions (Specify):						
• Subsidies for cleaner/energy-efficient vehicles						
• Subsidies for renewable energy/district energy						
• Funds and grants (Specify):						
• Other subsidies (Specify):						
<i>Market Friction Reductions</i>						
• Environmental Choice Labels						
• Green public procurement						
• Partnership approach						
• Reporting requirement						

Table 4.10 MBIs and Scoring Guidelines for Food Security

MBIs for Food Security	Evaluation and removal of market disincentives	Environment/Sustainability Supported through an MBI	Complementary communications and education	Stakeholder engagement	Comprehensive	Evaluation
<i>Price-based MBIs (including Subsidy, Reductions and Funding)</i>						
• Agro-environmental subsidies						
• Farm subsidies						
• Nitrogen levy						
• Phosphorous levy						
• Funds and grants (Specify):						
• Other subsidies (Specify):						
<i>Market Friction Reductions</i>						
• Environmental Choice Label						
• Green public procurement						
• Liability rule for environmental damage						
• Partnership approach						
• Product labeling requirements						

Table 4.11 MBIs and Scoring Guidelines for Ecological Diversity

MBIs for Ecological Diversity	Evaluation and removal of market disincentives	Environment/ Sustainability Supported through an MBI	Complementary communications and education	Stakeholder engagement	Comprehensive	Evaluation
<i>Price-based MBIs (including Subsidy, Reductions and Funding)</i>						
• Agro-environmental subsidies						
• Ecological fiscal regime						
• Environmental fund						
• Funds and grants (Specify):						
• Other subsidies (Specify):						
<i>Rights-based MBIs</i>						
• Mitigation Banking						
• Biodiversity						
• Habitat						
• Species						
• Wetland						
<i>Market Friction Reductions</i>						
• Environmental Choice Label						
• Green public procurement						
• Partnership approach						
• Reporting requirements						

5. Empirical Findings

This chapter analyzes and discusses, the data collected from the city of Kingston and the Region of Waterloo. As mentioned in the methods section, public data was gathered prior to each focus group, from municipal websites and documents, in attempts to complete the SAM tool. Location of information gathered was also noted by the researchers. This attempt is mainly to test the scoring methodology and provide a semi-filled SAM tool to stimulate discussion during the focus group. Due to the outcome of the focus groups, it is important to note that the semi-filled SAM tools from the two case communities are not included, or discussed, in this thesis.

This chapter focuses on the findings gathered from the focus group discussions. The transcripts from the focus groups were deductively coded into the following categories: transportation, water, waste, air quality, energy, climate change, land use, food security, ecological diversity and the usefulness of the SAM tool. The participants from the focus groups were also asked to identify the associated municipal department that was responsible for each of the environmental topics. The draft SAM was built based on existing academic and grey literature. Therefore, these categories were devised prior to the focus groups, in order to identify areas of improvement for this framework. This chapter consists of three subsections: suggestions for improvements for each environmental topic, suggestions on improving the usability of the SAM tools and the revised Sustainability Alignment Methodology (SAM)

5.1 Suggestions for Improvements for the Environmental Topics

During the focus groups, the participants provided suggestions for the nine environmental topics in the sustainable community plans. These were: transportation, water, waste, air quality, energy, climate change, land use, food security and ecological diversity.

Participants were asked to comment on the content and categorization of the draft SAM tool that was created for their particular community. Their suggestions were divided into the following sub-areas:

- Appropriateness of the sub-topics
- Appropriateness of the MBIs at the local level
- Location of information and the associate department

The following subsections present the results for each environmental topic. The tables at end of each subsection summarize the modifications of the revised SAM framework compared to the initial draft.

5.1.1 Suggestions for Improvements for the Transportation Section

Regarding the appropriateness of the sub-topics, participants from both sessions suggested modifications to the sub-topics under the transportation topics. One key participant mentioned that the initial sub-topics, vehicle specific and emission specific, were more appropriate for senior-level governments and should be replaced with the modal split. Another participant suggested including an additional category for active and public transportation.

“We are shifting toward an active transportation label, a mobility label...we do measure our modal share as a KPI, we are interested in [induce] the economic and

advertise it as an incentive to come to our city...maybe you want to consider [broadening] the topic to somehow include active transportation.”

Many participants identified some MBIs to be beyond their municipal jurisdiction. The vehicle registration tax, the carbon credit system and distance-weight based pricing, are all under provincial jurisdiction. Although the fuel tax is allocated to municipal governments, the senior-level governments collect it. Many participants also mentioned that although congestion pricing and tolls, are under municipal jurisdiction, it is more relevant for large-size communities. The participants from both communities also provided additional MBIs that are relevant to the local level. Some examples include: public charging structures for electric vehicles, dedicated parking for electric vehicles and bicycles, licensing of commercial parking spaces, subsidies for alternative transportation, subsidized security for cycling and public transit pricing. One participant mentioned that his community provides transit subsidies for congestion purposes during special events.

Table 5.1 Modifications of the SAM Framework for Transportation

	Sub-topics	MBIs
Inclusion	<ul style="list-style-type: none"> • Modal split • Active and public transportation 	<ul style="list-style-type: none"> • Licensing commercial parking space • Hybrid/EV parking locations • Subsidies/incentive for carpool • Subsidies for bike parking • Subsidized security for cycling • Subsidies for transit pass • Public transit pricing • Alternate transportation demand management for new development
Exclusion	<ul style="list-style-type: none"> • Vehicle specific • Emission specific 	<ul style="list-style-type: none"> • Distance-weight based pricing • Subsidies for cleaner/energy-efficient vehicles • Congestion Pricing • Tolls • Vehicle registration charges • Vehicle disposal levy

The transportation department, public works department, planning department were identified to be the departments that is mainly responsible for the implementation and enforcement, of the MBIs, under the topic of transportation.

5.1.2 Suggestions for Improvements for the Water Section

Regarding the appropriateness of the sub-topics, one participant pointed out that one important sub-topic for the water section is its source.

“Source really [influences] the types of programs you have, whether its surface water or ground water here. It changes your protection mechanisms...and may affect the conservation by-law.”

Aside from the inclusion of the source of water, most participants thought the initial sub-topics were appropriate. In addition to the modification of sub-topics, the participants also suggested changing the topic names to: water, wastewater and storm water, in order to avoid confusion with the waste section.

Out of all the water-related MBIs identified from the literature, only water extraction charges are not within the municipal jurisdictions. Also, the structure of nitrogen and phosphorous levies may vary between communities. Surcharges or levies are available in communities with heavy-loading bylaws; otherwise, fines are applied to the effluents. In addition, participants identified additional water-related MBIs under the municipal jurisdiction. One participants mentioned storm water utility charges and associated water rebates.

“You pay for the storm water you create which is based on how impervious your site is. It was a new utility fee that was introduced a couple years ago. As part of that, they also have [a] rebate program. If you have infrastructure, such as a rain barrel, or a rain garden, you may pay less on the storm water utility rate.”

Other MBIs mentioned during the focus groups were water quality programs and education programs.

Table 5.2 Modifications of the SAM Framework for Water, Wastewater and Storm Water

	Sub-topics	MBIs
Inclusion	<ul style="list-style-type: none"> • Water Source 	<ul style="list-style-type: none"> • Water quality program • Certification program (e.g. smart salt application) • Water rebates • Storm water utilities fees/charges • Subsidies for rain barrels • Education programs • Incentive for bio-swales
Exclusion		<ul style="list-style-type: none"> • Water extraction charges (ground water)

Regarding the location of information, the results obtained from both focus groups resonated with the publicly available information. The local utilities company, the water services departments and the environmental services departments, are responsible for the implementation of water-related MBIs.

5.1.3 Suggestions for Improvements for the Waste Section

Regarding the appropriateness of the sub-topics, energy from waste was identified, as not related to diversion, or disposal. One participant also suggested changing the topic name to solid waste to distinguish it from the wastewater topic.

District energy programs and funds to support waste for thermal heating and fuels, were identified as relevant MBIs for this new sub-topic. The participants from the focus groups also listed other MBIs, such as: nutrient management, residential tipping fees and bag tag programs. Moreover, the deposit-refund system was found to be under provincial jurisdiction.

Table 5.3 Modifications of the SAM Framework for Solid Waste

	Sub-topics	MBIs
Inclusion	<ul style="list-style-type: none"> • Energy from waste 	<ul style="list-style-type: none"> • Bag tag program • Subsidies for reusable water bottle • High density residential disposal programs • Residential waste tipping fees • Farm waste and bio-solids management programs
Exclusion		<ul style="list-style-type: none"> • Deposit-refund system • Vehicle disposal levy

Information on MBIs for solid waste was found to be under the responsibilities of the solid waste management department and the environmental services department. A solid waste master plan also can contain information on the current initiatives and MBIs.

5.1.4 Suggestions for Improvements for the Air Quality Section

Many participants mentioned that – with the exception of charter cities such as Toronto – air quality is under provincial jurisdiction in Canada. Moreover, municipal governments do not have an air quality department. Thus, most of the MBIs under this section are not appropriate at the local level. Participants suggested combining this section with either the energy, or climate change, section.

5.1.5 Suggestions for Improvements for the Energy Section

Distribution was identified as one of the modifications for the sub-topics under the energy section. One of the participants thought that there were many local level MBIs associated with this sub-topic. Another participant mentioned that many of the MBIs under energy are not perceived to be under the municipal realm due to a lack of authority.

“[the] Green Energy Act stripped any municipal authorities [power] over approvals. So we have very limited role now through the Ontario Power Authorities’ FIT [Feed-

in tariff] program...Municipalities plays a role in municipal council support resolution...We can be part of the process but we are not the approval authority.”

The pricing of utilities, the cap and trade credit system and subsidies for energy-efficient cars, are all under the jurisdiction of the province. One participant also mentioned that the subsidy for renewable energy has linkages to the density bonus. However, the number of MBIs was identified under the sub-topic of energy source, which includes things like: district energy systems and micro-fit programs.

Table 5.4 Modifications of the SAM Framework for Air Quality and Energy

	Sub-topics	MBIs
Inclusion	<ul style="list-style-type: none"> • Energy consumption, distribution and air emissions 	<ul style="list-style-type: none"> • Subsidies for district energy • Micro-fit programs • District energy programs • Energy distribution zones
Exclusion	<ul style="list-style-type: none"> • Energy consumption 	<ul style="list-style-type: none"> • Utility pricing (electricity) • Subsidies for cleaner/energy-efficient vehicles

The information for air quality and energy MBIs can be found under the energy department, municipal utilities, environmental services department, planning department and at the commission and council level, for the partnership approach.

5.1.6 Suggestions for Improvements for the Land Use Section

All the participants agreed with the sub-categorization of the land use section. One participant mentioned that anti-idling development charges should be simplified to development charges.

“Development charges [affect] more than just idling.”

Incentives for: environmental assessment, tax relief for natural areas, tree cultivation/conservation programs, land trust, environmental land acquisition programs, as well as for urban canopy, were just some of the additional MBIs obtained from the participants. In addition, one participant identified alternate transportation demand management for new development as a land use mechanism that crosses-over with transportation.

Table 5.5 Modifications of the SAM Framework for Land Use

	MBIs
Inclusion	<ul style="list-style-type: none"> • Subsidies for environmental assessment • Alternate transportation demand management for new development • Environmental land acquisition • Land trust • Tree cultivation/conservation program • Incentive for urban canopy • Pay for ecological services • Tax relief for natural areas (forest stewardship) • Environmental land acquisition
Exclusion	<ul style="list-style-type: none"> • Anti-idling development charges

The department responsible for the land use topics and the MBIs is the planning department

5.1.7 Suggestions for Improvements for the Climate Change Section

Many participants suggested mitigation and adaptation as appropriate sub-topics for climate change.

Similar to the MBIs from the air quality and energy section, many of the MBIs related to climate change are under provincial or federal jurisdiction. Many other MBIs also overlap with other environmental topics. Moreover, one participant mentioned that some of the MBIs are not directly identified with climate change.

“A lot of the programs are done not under the banner of climate change... Climate change is a tricky one, it’s very different from the other ones like transportation, land and water, which are very defined.”

Flood mapping, asset management and storm water management are examples of some the new MBIs identified during the focus group sessions.

Table 5.6 Modifications of the SAM Framework for Climate Change

	Sub-topics	MBIs
Inclusion	<ul style="list-style-type: none"> • Mitigation • Adaption 	<ul style="list-style-type: none"> • Asset management • Storm water management • Incentive for urban canopy • Incentive for bio-swales
Exclusion		<ul style="list-style-type: none"> • Climate change levy • Subsidies for cleaner/energy-efficient vehicles

The location of information varies between communities for this topic. Some of the associated departments are: the planning department, integrated public works, public health, community services and the environmental services department. Communities’ climate action plans also contain information on their current initiatives and MBIs on climate change.

5.1.8 Suggestions for Improvements for the Food Security Section

The participants provided additional MBIs for food security. One participant suggested pricing for aggregate land uses to support farming activities. Most of the MBIs for food security are market-friction reduction MBIs.

“...for improving information, there [have] been a number of [educational] and public events and stakeholder consultation, around food systems and food security.”

Other MBIs for food security identified during the focus group include: subsidies for local food markets and land drainage grants.

Table 5.7 Modifications of the SAM Framework for Food Security

	MBIs
Inclusion	<ul style="list-style-type: none"> • Subsidies for local food markets • Land drainage grants • Land use pricing (i.e. aggregate land use v.s. lands for farming) • Public and education events

The departments associated with food security include: the public health department, the integrated public works department and the environmental services department.

5.1.9 Suggestions for Improvements for the Ecological Diversity Section

In addition to the MBIs identified from the literature, the participants provided additional MBIs for ecological diversity. The identified MBIs are partnership approach specific to each community. Examples of this include the city of Waterloo’s ‘Partners and Parks’ program, as well as the city of Cambridge’s ‘City Green’ committee. Others MBIs mentioned during the focus groups overlap with the MBIs from other sections.

Table 5.8 Modifications of the SAM Framework for Ecological Diversity

	MBIs
Inclusion	<ul style="list-style-type: none"> • Environmental fund • Pay for ecological services • Land trust • Environmental land acquisition • Tax relief for natural areas (forest stewardship) • Awards and recognition program • Tree cultivation/conservation program • Incentive for urban canopy
Exclusion	<ul style="list-style-type: none"> • Mitigation Banking • Ecological fiscal regime

The environmental services Department, community services department, planning department and integrated public works department, are the departments responsible for ecological diversity.

5.2 General Suggestions for Improving Usability

The participants from the focus groups were asked to comment on the usability of the SAM tool and provide suggestions for improvement. The following suggestions were made for the draft SAM tool:

- Simplicity
- Evidence and testimonials
- Brief problem statement
- linkage to existing strategies
- Glossary for the revised SAM (see Appendix H)
- MBIs for the Municipal level

The simplicity of the SAM tool was identified to be an important characteristic for improving the usability. One participant emphasized that anything created to help municipalities needs to be

simple, as well as easy to understand and implement. It would be difficult to gain traction if the municipalities perceive the SAM tool to be laborious and research intensive.

Another suggestion for improving usability, is to link MBIs to existing strategies. One participant recommended connecting the MBIs to other community plans.

“Perhaps a consideration of connecting [the] SAM to other strategies...So it’s not just for environment and sustainability, but, it’s also going to further the regional transportation master plan, or the water resources plan.”

The participants also suggested that it may be beneficial to provide evidence for the impacts of MBIs. These impacts could be proved using success stories, or quantitative indicators.

“You really need to show proof that these [mechanisms] could achieve the desired outcome.”

Another participant hoped that the SAM could have a problem statement for each MBI. He thought that it may be helpful for the users to connect the appropriate MBI, with the associated issues.

“What would be useful for me would [be] if you have the topic of transportation and a brief problem statement of the issue we are trying to address and [the] objective we are trying to achieve through these MBIs”

During both focus group sessions, the participants asked for clarifications of numerous MBIs.

Many of the participants were unfamiliar with the academic terminology. Thus, a description of the term may be another improvement in order to reduce user confusion.

Moreover, many of the participants suggested that the MBIs under municipal jurisdiction should be isolated. They pointed out that many of the MBIs from the draft SAM were beyond local

control. Municipal governments could adopt those MBIs but they would not have approval authority.

5.2.2 Feedback on the Assessment Criteria and Scoring

During the end of the focus group, the participants were asked to comment on the assessment criteria and scoring. Many participants thought that the criteria and scoring were complicated and that they were unlikely to use them. They offered alternative assessment options, such as pass/fail tests, or checklists.

5.2.3 Lessons Learned

Two of the lessons learned from the focus group are:

1. Municipal governments have a limited amount of authority over MBIs
2. Some MBIs may have high implementation costs and disincentives

The first lesson learned from the two focus groups is that the municipal governments only have limited authority to implement MBIs. In many cases, municipalities are already stretching the limits of their powers. It is important to identify and distinguish the types of MBIs within a municipal jurisdiction. Many of the MBIs shared during the focus group were of the market-friction reduction type.

“There are a lot of [opportunities] but, not a lot of changes are occurring at the municipal level, with a legislative focus and implementation ability”

Another lesson learned is that some MBIs may have high implementation cost and other disincentives for the municipality. In fact, the positive outcomes of some local MBIs may be offset by the presence of alternative options. Thus, the MBIs may not be achieving their purpose.

“We price the garbage and try to reduce it, but people end up shipping it to Michigan”

In addition, the costs of implementing MBIs vary between MBIs. Thus, it’s important to also recognize the financial cost of some of the MBIs. For example, the recycling program is creating a financial distinctive for the Region of Waterloo, it is important to acknowledge both the environmental incentive and the financial burden, for such an MBI. It is equally important that 1) the cost effectiveness of various MBIs be assessed, especially the w.r.t subsidies and the free rider effect; and 2) the cost effectiveness of an MBI approach, compared to alternative policies, be assessed.

5.3 Sustainability Alignment Methodology (SAM) Summary

The following is a summary of the SAM tool. It includes revised information on the tool, which was based on the feedback from the focus groups. This version of the SAM contains over 50 Market-Based Instruments across eight different environmental topics and identifies the associated municipal departments related to these MBIs. The Listed MBIs are divided based on the following type:

- Rights-based MBIs
- Price-based MBIs and subsidies
- ◆ Market-friction reduction MBIs

Table 5.9 Revised SAM Framework

Topics	Sub-topics	MBIs	Department/Location
Transportation	Modal split	<ul style="list-style-type: none"> ■ Anti-idling pay-per-use charges ■ Parking pricing ■ Subsidies for carpool ● Licensing commercial parking space ● Peak-period licensing ◆ Environmental choice label ◆ Hybrid/EV parking locations 	<ul style="list-style-type: none"> • Transportation department • Environmental services department • Planning department • Integrated public works department
	Active and public transportation	<ul style="list-style-type: none"> ■ Subsidized bike parking ■ Subsidized security for cycling ■ Subsidies for transit pass ■ Public transit pricing 	
	Other	<ul style="list-style-type: none"> ◆ Green public procurement ◆ Partnership approach ◆ Reporting requirements ◆ Other subsidies, funds and grants ■ Scrappage incentives 	
Water, Wastewater and Storm Water	Water quality	<ul style="list-style-type: none"> ■ Charges for BOD loads ■ Nitrogen levy ■ Phosphorous levy ■ TSS charges ■ Incentive for bio-swales ● Water quality permit trading ◆ Water quality program ◆ Certification program (e.g. smart salt application) ◆ Storm Water Management 	<ul style="list-style-type: none"> • Municipal utilities • Water services department • Environmental services department
	Water consumption and wastewater treatment	<ul style="list-style-type: none"> ■ Water rebates ■ Funds to support water, wastewater treatment infrastructure ■ Water pricing ■ Storm water utilities charges ■ Subsidies for rain barrels ◆ Storm Water Management 	
	Water source (ground water and surface sources)	<ul style="list-style-type: none"> ◆ Water source protection incentive programs or policy. 	

	Other	<ul style="list-style-type: none"> ◆ Green public procurement ◆ Partnership approach ◆ Education programs ◆ Reporting requirements ■ Other subsidies, funds and grants 	
Solid Waste	Waste diversion	<ul style="list-style-type: none"> ■ Waste pricing ■ Scrappage incentives ■ Subsidies for reusable water bottle ◆ Product labeling requirements ◆ Environmental choice label ● Bag tag program 	<ul style="list-style-type: none"> • Solid waste management department • Environmental services department
	Waste disposal	<ul style="list-style-type: none"> ■ Residential waste tipping fees ◆ Farm waste and bio-solids management programs ◆ High density residential disposal programs 	
	Energy from waste	<ul style="list-style-type: none"> ◆ District energy programs ■ Funds to support waste for thermal heating and fuels 	
	Other	<ul style="list-style-type: none"> ◆ Green public procurement ◆ Partnership approach ◆ Reporting requirements ■ Other subsidies, funds and grants 	
Air Quality and Energy	Energy source	<ul style="list-style-type: none"> ■ Subsidies for renewable energy/district energy ◆ Environmental choice label ◆ Micro-fit program ◆ District energy program 	<ul style="list-style-type: none"> • Energy department • Municipal utilities • Environmental services department • Planning department • Commission and council
	Energy consumption, distribution and air emissions	<ul style="list-style-type: none"> ■ Utilities Pricing (gas) ■ Anti-idling development charges ■ Anti-idling pay-per-use charges ◆ Energy distribution zones 	
	Other	<ul style="list-style-type: none"> ◆ Green public procurement ◆ Partnership approach ◆ Reporting requirements ■ Other subsidies, funds and grants 	

Land Use	Land property development	<ul style="list-style-type: none"> ■ Anti-idling development charges ■ Density bonus ■ Density-based property tax ■ Land-value taxation ■ Tax increment financing (i.e. Brownfield) ■ Subsidies for environmental assessment ◆ Alternate transportation demand management for new development 	<ul style="list-style-type: none"> • Planning department • Infrastructure department
	Green Spaces	<ul style="list-style-type: none"> ■ Environmental land acquisition ■ Land trust ■ Incentive for urban canopy ■ Pay for ecological services ■ Tax relief for natural areas (forest stewardship) ◆ Tree cultivation/conservation program 	
	Other	<ul style="list-style-type: none"> ◆ Green public procurement ◆ Partnership approach ◆ Reporting requirements ■ Other subsidies, funds and grants 	
Climate Change and Adaptation	Mitigation	<ul style="list-style-type: none"> ■ Anti-idling development charges ■ Anti-idling pay-per-use charges ■ Subsidy for renewable energy/district energy 	<ul style="list-style-type: none"> • Planning department • Integrated public works department • Community services • Public health • Environmental services department
	Adaptation	<ul style="list-style-type: none"> ◆ Storm water management ◆ Partnership approach ◆ Reporting requirements ◆ Green public procurement ■ Incentive for urban canopy ■ Incentive for bio-swales ■ Funds to support environmental infrastructure ■ Other subsidies, funds and grants 	

<p>Food Security</p>		<ul style="list-style-type: none"> ■ Agro-environmental subsidies ■ Farm subsidies ■ Fertilizer tax ■ Nitrogen levy ■ Phosphorous levy ■ Subsidies for local food markets ■ Land drainage grants ■ Land use pricing (i.e. aggregate land use v.s. lands for farming) ■ Other subsidies, funds and grants ◆ Public and education events ◆ Environmental choice label ◆ Green public procurement ◆ Partnership approach 	<ul style="list-style-type: none"> • Integrated public works department • Environmental services department • Public health department
<p>Ecological Diversity</p>		<ul style="list-style-type: none"> ■ Agro-environmental subsidies ■ Environmental fund ■ Pay for ecological services ■ Land trust ■ Environmental land acquisition ■ Tax relief for natural areas (forest stewardship) ■ Incentive for urban canopy ■ Other subsidies, funds and grants ◆ Awards and recognition program ◆ Tree cultivation/conservation program ◆ Environmental choice label ◆ Green public procurement ◆ Partnership approach ◆ Reporting requirements 	<ul style="list-style-type: none"> • Environmental services department • Community services department • Planning department • Integrated public works department

6. Discussion

This chapter synthesizes and discusses the findings from the research in relation to the research questions posed in the introduction. The discussion follows the order of the research questions in Chapter 1. It is divided into the following sections: Market-Based Instruments for the local level (Research Questions 1 and 3), SAM topics and sub-topics (Research Question 3), categorization of Market-Based Instruments' scoring and assessment (Research Question 2) and finally the challenges and lessons (Research Question 4).

6.1 Market-Based Instruments for the Local Level

As seen throughout this thesis, Market-Based Instruments have been the focus of this research. This chapter discusses Market-Based Instruments for the local level; an idea which pertains to research questions 1 and 3. As a reminder:

Question 1: What are the existing and emerging, Market-Based Instruments that are relevant for Sustainable Community Plan implementation in Ontario?

Question 3: How can the Sustainability Alignment Methodology tool be improved so that it meets the needs of Ontario communities?

Research question 1 is addressed throughout this thesis. The list of existing and emerging Market-Based Instruments was initially compiled from literature by Stavins (2003), EEA (2005), Thompson & Bevan (2010) and Pirard & Lapeyre (2014). As mentioned in the literature review, most of the literature focuses on the individual Market-Based Instruments and lacks a comprehensive focus. The above four literature were chosen in order to generate a list of common MBIs, without being exceedingly repetitive. They cover a broad range of Market-Based

Instruments and provide the foundation for the development of the initial SAM tool. Table 2.4 and Chapter 4, both highlight Market-Based Instruments which are solely from the literature review. The list was modified and improved, after the focus groups with the two mid-size Ontario communities - the city of Kingston and the Region of Waterloo. The revised list of Market-Based Instruments is presented in Chapter 5, in the form of a Sustainability Alignment Methodology tool. The following table compares the literature review to the results regarding the first research question.

Table 6.1 Market-based Instruments Discussion Summary

	Literature Review (Chapter 2)	Document Results (Chapter 4)	Focus group Results (Chapter 5)
Market-based Instruments for Local Level	<ul style="list-style-type: none"> Generic list of Market-based instruments. (European Environment Agency, 2005; Pirard & Lapeyre, 2014; Stavins, 2003; Thompson & Bevan, 2010) 	<ul style="list-style-type: none"> Preliminary set of market-based instruments by environmental topics in the sustainable community plan. 	<ul style="list-style-type: none"> Revised list of market-based instruments that is useful for mid-size communities.

The literature reviews provided a generic overview of the existing Market-Based Instruments (European Environment Agency, 2005; Pirard & Lapeyre, 2014; Stavins, 2003; Thompson & Bevan, 2010). Since the list from the literature is comprehensive, there is a great deal of overlap between the Market-Based Instruments listed in the literature review and those that were obtained from the focus groups. However, there were also some Market-Based Instruments that were not found in section 2.4.2. It is important to note that although some Market-Based Instruments were not found in the four literature, they are not new academic findings. In fact, many of the Market-Based Instruments that were brought up during the focus groups were

discussed individually in other literature, which will be further discussed in the following section.

In addition, the four literature presented many price-based and rights-based, MBIs that were not found within the selected pilot communities. On the other hand, the two focus group communities had many market-friction reduction initiatives and community-wide incentive programs, that were not found in the literature. This is due to limited authority for municipal governments and the high implementation costs for some MBIs, which will be further discussed in the challenges and lessons section. Revisions have been made from the initial list of Market-Based Instruments in order to improve the usefulness of the SAM tool. In response to research question 3, only the Market-Based Instruments that are within municipal jurisdiction have been adopted to create the SAM tool.

Table 6.2 Market-based Instruments in Literature Review (Section 2.4.2) and Focus Group Results

	Found in Four Sources used in section 2.4.2 but not the focus group	Found from the focus group but not in Four Sources used in section 2.4.2
Market-based Instruments for Local Level	<ul style="list-style-type: none"> • Carbon tax • Climate change levy • CFC trading • Lead trading • SO2 allowance trading system • Fuel taxes • Cap and trade program • Carbon credit system • Subsidy for energy efficient cars • Vehicle registration tax • Fuel tax • Distance-weight based pricing • Carbon credit system (emission trading) • Subsidy for energy efficient cars • Water extraction charges (ground water) • Deposit-refund system • Price of electricity • Carbon credit system • Subsidy for energy efficient cars • Pesticide tax • Mitigation Banking • Natural resource extraction tax 	<ul style="list-style-type: none"> • Environmental fund • Land trust • Environmental land acquisition • Tax relief for natural areas (forest stewardship) • Awards and recognition program • Tree cultivation/conservation program • Incentive for urban canopy • Subsidies for local food markets • Land drainage grants • Land use pricing (i.e. aggregate land use vs. lands for farming) • Public and education events • Asset management • Storm water management • Incentive for bio-swales • Subsidies for environmental assessment • Alternate transportation demand management for new development • Subsidy for district energy • Micro-fit programs • District energy programs • Energy distribution zones • Subsidies for reusable water bottle • High density residential disposal programs • Residential waste tipping fees • Farm waste/bio-solids management programs • Water quality program • Certification program (e.g. smart salt application) • Water rebates • Storm water utilities fees/charges • Subsidies for rain barrels • Education programs • Licensing commercial parking space • Hybrid/EV parking locations • Subsidies/incentive for carpool • Subsidized bike parking • Subsidize security for cycling

With respect to the list of Market-Based Instruments identified above, those new to the literature have to be determined. This was accomplished by comparing these Market-Based Instruments with other literature, in order to verify the existing and identify new Market-Based Instruments. Table 6.3 identified some of the literature in which the listed Market-Based Instruments appeared.

Table 6.3 Market-based instruments in Other Literature

	Empirical Results	Examples of Other Literature
Transportation	<ul style="list-style-type: none"> • Alternate transportation demand management for new development • Licensing commercial parking space • Hybrid/EV parking locations • Subsidies/incentive for carpool • Subsidized bike parking • Subsidized security for cycling 	(Brown & McKellar, 2001; Gayer & Horowitz, 2006; Giuliano, 2007; Winston & Shirley, 2010)
Water, Wastewater and Storm Water	<ul style="list-style-type: none"> • Water quality program • Certification program (e.g. smart salt application) • Education programs • Storm water management • Water rebates • Storm water utilities fees/charges • Subsidies for rain barrels • Subsidies/incentive for bio-swales 	(Bennear et al., 2011; Gayer & Horowitz, 2006; Marsalek, 2003; Michelsen et al., 1999; Urbonas & Stahre; 1993)
Solid Waste	<ul style="list-style-type: none"> • Subsidies for reusable water bottle • High density residential disposal programs • Residential waste tipping fees • Farm waste and bio-solids management programs 	(Beecher et al., 2005; Gayer & Horowitz, 2006; Miranda & Aldy, 1998; Ready & Ready, 1995)

	Empirical Results	Examples of Other Literature
Air and Energy	<ul style="list-style-type: none"> • Subsidy for district energy • Micro-fit programs • District energy programs • Energy distribution zones 	(Gayer & Horowitz, 2006; Lyon et al., 2006; Trichakis et al. 2008; Wu & Rosen, 1999; Yatchew & Baziliauskas, 2011)
Land Use	<ul style="list-style-type: none"> • Land drainage grants • Land use pricing (i.e. aggregate land use vs. lands for farming) • Public and education events • Asset management • Subsidies for environmental assessment 	(Found et al. 1975; Gayer & Horowitz, 2006)
Food Security	<ul style="list-style-type: none"> • Subsidies for local food markets 	(Connelly et al., 2011; Gayer & Horowitz, 2006; Halweil, 2002)
Ecological diversity	<ul style="list-style-type: none"> • Awards and recognition program • Environmental fund • Environmental land acquisition • Incentive for urban canopy • Land trust • Tax relief for natural areas (forest stewardship) • Tree cultivation/conservation program 	(Brewer, 2004; Montana Land Reliance, 1982; Pagiola et al., 2002).

From table 6.2 and 6.3, it is evident that the Market-Based Instruments identified from the focus groups mostly take the form of subsidies and community programs. Although each subsidy and community program, serves a specific purpose, they are not new to the academic literature. A subsidy can be relevant to many different policies (Gayer & Horowitz, 2006), such as those listed in table 6.2 and 6.3. Thus, much of the literature often focuses on subsidies in general. The same could also be applied to the various community programs.

6.1.1 Transportation

Transportation plays an important role in the lives of urban commuters and is the top concern for

communities. As a policy instrument, Transportation Demand Management (TDM) has been found to have significant influence on travellers' behaviour and mitigate urban congestion problems (Giuliano, 2007). The possibility of implementing a licensing and tax scheme, for commercial parking, has also been investigated in the city of Perth (Brown & McKellar, 2001). Well-designed Market-Based Instruments create advantages for community transportation. MBIs provide: abatement incentives for emission reductions, increase travel-time savings for community residents and reduce vehicle travel and ownership (Dachis, 2011; Flachslan et al. 2011; Nakamura & Kockelman, 2002).

6.1.2 Water, Wastewater and Storm Water

The literature specifically discussed the following: water quality program, certification program (e.g. smart salt application), education programs, water rebates, storm water management and storm water utilities fees/charges (Bennewer et al., 2011; Michelsen et al., 1999; Urbanas & Stahre; 1993). In fact, rebate programs and other non-price conservation measures (i.e. certification and education programs) have become a common conservation policy tool for local municipalities. The effectiveness of non-price conservation programs has also been studied by many researchers (Bennewer et al., 2011; Michelsen et al., 1999).

6.1.3 Solid Waste

Market-Based Instruments encourage both source reduction and waste diversion activity (Callan & Thomas, 2001). Numerous literature have presented the case on residential waste tipping fees (Miranda & Aldy, 1998; Ready & Ready, 1995). Models were also established to determine optimal tipping fees (Ready & Ready, 1995). There were also specific literature on the risk, consideration and stakeholder communications, for farm waste and bio-solids management

programs (Beecher et al., 2005). Hence, many of the Market-Based Instruments for the solid waste section have also been widely used and researched.

6.1.4 Air and Energy

Energy distribution zones, district energy programs and micro-fit programs also appeared in other literature. The impacts of small energy distribution zones were studied in detail (Lyon et al., 2006). The appropriate control approaches were also analyzed to increase the commercial and environmental benefits, of the energy distribution zones (Trichakis et al. 2008). Wu & Rosen's Research in 1999 focused on optimizing the economic and environmental impacts, of district energy systems. Moreover, feed-in-tariff (FIT) programs in Ontario were also found in the literature, Yatchew & Baziliauskas (2011) also published a paper that analyses Ontario's FIT programs and their efficacy and sustainability.

6.1.5 Land Use

Land drainage grants and land use pricing are the most rigorously discussed Market-Based Instruments for the land use section. The economic and environmental impacts of land drainage in Ontario were studied in the literature, as early as 1975; however, literature pertaining to land drainage policies and grants, has been significantly less prominent ((Found et al. 1975). This Market-Based Instrument being especially important for agriculturally intense communities should be further researched.

Land use pricing is an interesting Market-Based Instrument that was not found in the literature. The concept of land use pricing differs from tax increment financing for brownfields. For land use pricing, the idea is to differentiate aggregate land use from farming lands and natural lands.

Hence, the value and/or cost of the lands are adjusted accordingly, to encourage sustainable land use.

During the focus group discussion of Market-based instruments for land use, the concept of asset management arose. Asset management, though widely found in business literature, is rarely linked with community sustainability and SCP goals. However, as asset management is intended for internal use, it is not considered as a Market-based instrument. Yet from the discussion, it was evident that asset management was the precursor to the implementation of many land use Market-based instruments. Existence of asset management could help facilitate the implementation of many land use Market-based instruments listed in SAM. Thus, asset management is another interesting concept that was not found in the literature. Since research on environmental assets management has been done only on the national level (Latacz-Lohmann & Schilizzi 2014; Stoneham et al., 2012), asset management can be considered a relatively new concept for local sustainability development and SCP implementation. However, further research is necessary to determine how does the asset management works with different Market-based instruments and how it should be represented in SAM.

6.1.6 Ecological Diversity

Aside from the Market-Based Instruments identified in the literature review, the environmental fund, environmental land acquisition, the land trust and the tree cultivation/conservation program, have also appeared in other literature (Brewer, 2004; Montana Land Reliance, 1982; Pagiola et al., 2002). Similar to the land use section, most of the literature discussed these market-mechanisms on a broader scale. Hence, using these Market-Based Instruments for community level bio-diversity, can be considered a relatively new and innovative concept.

6.1.7 Summary

The Market-Based Instruments identified during the focus group can be found in the literature. However, some literature, especially for the land use section and the ecological diversity section, focused on the national scale. Thus, some of these Market-Based Instruments can be considered a relatively new and innovative concept for the implementation of SCPs. Overall there is a lack of consideration of the potential of these Market-Based Instruments for local sustainable development. Hence, this study verifies the Market-Based Instruments existing at the local level and identifies higher-level Market-Based Instruments that are also applicable to the local level.

6.2 SAM Topics and Sub-topics

This section discusses the topics and sub-topics used in the SAM and provides insight into answering research question 3.

Question 3: How can the Sustainability Alignment Methodology tool be improved so that it meets the needs of Ontario communities?

Table 6.4 SAM Topics and Sub-topics Discussion Summary

	Literature Review	Document Results	Focus group Results
SAM topics and sub-topics	<ul style="list-style-type: none">• Common topics covered in the SCPs (Clarke et al., 2014)	<ul style="list-style-type: none">• Preliminary set of topics and sub-topic for the SAM	<ul style="list-style-type: none">• Revise and modification to the topics and sub-topics

The SAM tool which was developed for this research study was designed to help with the implementation the environmental goals in sustainable community plans. Thus, its topics are designed to align with those found in specific sustainable community plans to improve the usefulness of the SAM tool for the particular community for which it was designed. The

literature notes that the topics covered in the sustainable community plan could be divided into the three pillars of sustainability: society, economy and environment (Clarke, 2011). 16 topics are most commonly covered in the SCPs of Canadian communities. Furthermore, environmental topics are among the top ten most frequently found in Canadian SCPs (Clarke et al., 2014). The SCPs topics which were used to create the framework for the SAM tool can be found in chapter 4. The created topics were then tested with the two communities. The revised topics and sub-topics, are presented in Chapter 5. Table 6.2 compares the changes found in topics, between the literature review and the focus groups.

Table 6.5 SAM Topics in literature review and focus group results

	Literature Review	Results
SAM topics	Transportation	Transportation
	Water	Water, Wastewater and Storm Water
	Waste	Solid Waste
	Air	
	Energy	Air and Energy
	Land Use	Land Use
	Climate Change	Climate Change
	Food Security	Food Security
Ecological diversity	Ecological diversity	

As can be seen in the table above, changes between the topics are very subtle. The results of the focus groups indicate that, none of the topics were to be excluded from the SAM tool that was designed for this research study. The changes only included clarifying some terms and combining some others. Sub-topics were also developed for each topic, in order to improve the usefulness of the SAM tool designed for this research study. There more modifications for the

sub-topics compared with the SAM topics, especially for the transportation section. Overall, the results yielded an acceptance of these topics and sub-topics, for the SAM tool and thus validate the works of Taylor (2012) and Clarke & Efran (2014).

6.3 Categorization of Market-Based Instruments

The literature review section noted that Market-Based Instruments are only a general term. There are many different categorization approaches. From the literature, the researchers included three general categorizations of Market-Based Instruments:

- Priced-based instruments, rights-based instruments and friction reduction instruments (Clarke & MacDonald, 2012; Hendrickson et al., 2011; Whitten et al., 2003).
- Pollution charges, tradable permits, a deposit refund system, reducing market barriers and the elimination of government subsidies (Hockenstein et al., 1997).
- Pollution charges systems; tradable permits; market friction reductions; and government subsidy reductions (Stavins, 2003).

Many studies focus on the first classification approach, by three broad types of MBI (Clarke & MacDonald, 2012; Hendrickson et al., 2011; Whitten et al., 2003). Another method of MBI categorization is by function. Hockenstein et al. (1997) used a four-category model, separating pricing and non-pricing, Market-Based Instruments. Stavins (2003) also presented a similar categorization framework to that of Hockenstein et al. (1997). Stavins' framework introduced a new category for government subsidies, as well as the deposit refund system category with pollution charge systems.

Each type of MBI categorization framework, from the literature review (Hendrickson et al., 2011; Hockenstein & Stavins, 1997; Stavins, 2003; Whitten et al., 2003), has individual benefits and drawbacks. However, one main flaw with these categorization frameworks is that they mainly focus on the economic dimension of Market-Based Instruments and lack the alignment with the sustainability objectives. Thus, the categorization of Market-Based Instruments needs to change, in order to better inform decision making for implementing SCPs.

As mentioned in the previous section, the sustainability goals are first categorized based on the three pillars and then, by topics (Clarke, 2011; Clarke et al., 2014). These categorizations for Market-Based Instruments are created without the intention of using them toward sustainable development. Throughout the literature review process, it became clear that the categorization of Market-Based Instruments and the goals in sustainability community plans, are vastly different. Hence, if Market-Based Instruments are to be used for sustainability purposes, then, perhaps they should be characterized in a new and different, manner.

The SAM, a new way of categorizing market-based instruments, builds on the framework of the priced-based instruments, rights-based instruments, and friction reduction instruments by further separating each Market-Based Instrument according to environmental objectives. Hence, each Market-Based Instrument is clearly linked with the associated environmental goals. In addition, the municipal departments responsible for the environmental topics are also identified in this framework. It is important to note that there is an extremely diverse array of market-based instruments. Thus, simple categorizations presented in previous literature do not necessarily align the economic dimensions with the environmental objectives in the SCPs. The advantage of the SAM framework is that this matrix framework creates direct links between MBIs (economic dimension) and the environmental objectives. The user is able to pinpoint the appropriate MBIs

(both pricing and non-pricing options) to implement certain environmental objectives in a SCP. Moreover, the framework allows the user to accurately locate relevant information and pinpoint the appropriate department for implementing a specific MBI. Canadian municipalities often operate in silos, and they are often departmentalized based on municipal responsibilities (as outlined in 2.5). Thus, the SAM framework could stimulate an increase in interdisciplinary users and the usability of market-mechanism for community sustainability.

This framework was presented to the two communities to gather feedback on its categorization. All the participants from the focus groups expressed acceptance of this categorization framework. Many thought that this framework would be beneficial for implementing sustainable community plans. The findings from the focus groups reinforced the assertions for a new categorization framework that emphasizes sustainable development. Hence, the development of this SAM tool contributes to both literature and practice.

Table 6.6 Categorization of MBIs in literature review and focus group results

	Literature Review	This Study
Categorization of MBIs	<ul style="list-style-type: none"> • By types: priced-based, rights-based, friction reduction (Clarke & MacDonald, 2012; Hendrickson et al., 2011; Whitten et al., 2003). • By function: pollution charges, tradable permits, a deposit refund system, reducing market barriers and elimination of government subsidies (Hockenstein & Stavins, 1997) • By function: pollution charges systems; tradable permits; market friction reductions; and government subsidy reductions (Stavins, 2003). 	<ul style="list-style-type: none"> • New categorization by environmental topics and sub-topics (Chapter 4 & 5)

6.4 Scoring and assessment

This section discusses the scoring and assessment and provides insight into answering research question 2.

Question 2: What continuum of measurement and scoring methodology, for the Sustainability Alignment Methodology, is ideal for Ontario communities?

It is evident – from literature such as: Choon et al., 2011 and Kondyli, 2010 - that scoring frameworks are beneficial for achieving sustainable communities. Scoring allows the sustainability effort to be recognized, compared and reported (Skouloudis, Evangelinos, & Kourmousis, 2009). Thus, the assessment and scoring framework presented in Chapter 4, provides a guideline for evaluating the use of Market-Based Instruments in each community. It was then tested on the two selected communities in order to gather feedback on this scoring framework and the idea of scoring in general. In these discussions, both communities were against the idea of scoring and comparison. The main issue with scoring was that many participants thought that the criteria and scoring, were complicated and that they were unlikely to use them. They thought that scoring might decrease the usability of the developed SAM tool. Another issue was that not all the communities were on the same level, in terms of their implementation of Market-Based Instruments for SCPs. Thus, scoring might put these communities at a disadvantage and create a disincentive for them to use the SAM tool. Overall, participants from both communities thought that scoring had the potential to be destructive to the usability of the SAM tool. They also highlighted issues with scoring, which were not found in the literature on sustainability scoring methodologies.

6.5 Challenges and Lessons

This section presents the challenges and lessons, from the development and improvement of the SAM tool. It also relates to the fourth research question from the introduction.

Question 4: What lessons can be drawn from the development and improvement, of a Sustainability Assessment Methodology, for sustainable community planning and/or Market-Based Instrument literature?

There are three themes that emerged from this research: limited authority, cost and the development of the SAM tool. Potentially new contributions to literature and future research could provide a better understanding of these themes.

6.5.1 Limited Authority

Participants from both focus groups discussed municipal authority and capacity as issues for implementing Market-Based Instruments. The main challenge is that municipalities' governments only have limited authority, when compared with those at the provincial and federal levels. In many cases, municipalities are already stretching the limits of their powers. These are issues that other communities might also face. Both communities are able to mitigate this problem by enforcing more community-wide Market-Based Instruments. These Market-Based Instruments include local funds and incentives, that promote sustainable behaviours, education programs and certification programs. The SAM tool that was developed for this research study could help highlight areas where the communities lack municipal authority as the communities use the SAM tool to track the MBIs used within their community. The future version of the SAM tool would allow the sharing of experiences through case studies for proving the potential and the effectiveness, of MBIs for sustainable community development.

6.5.2 Cost

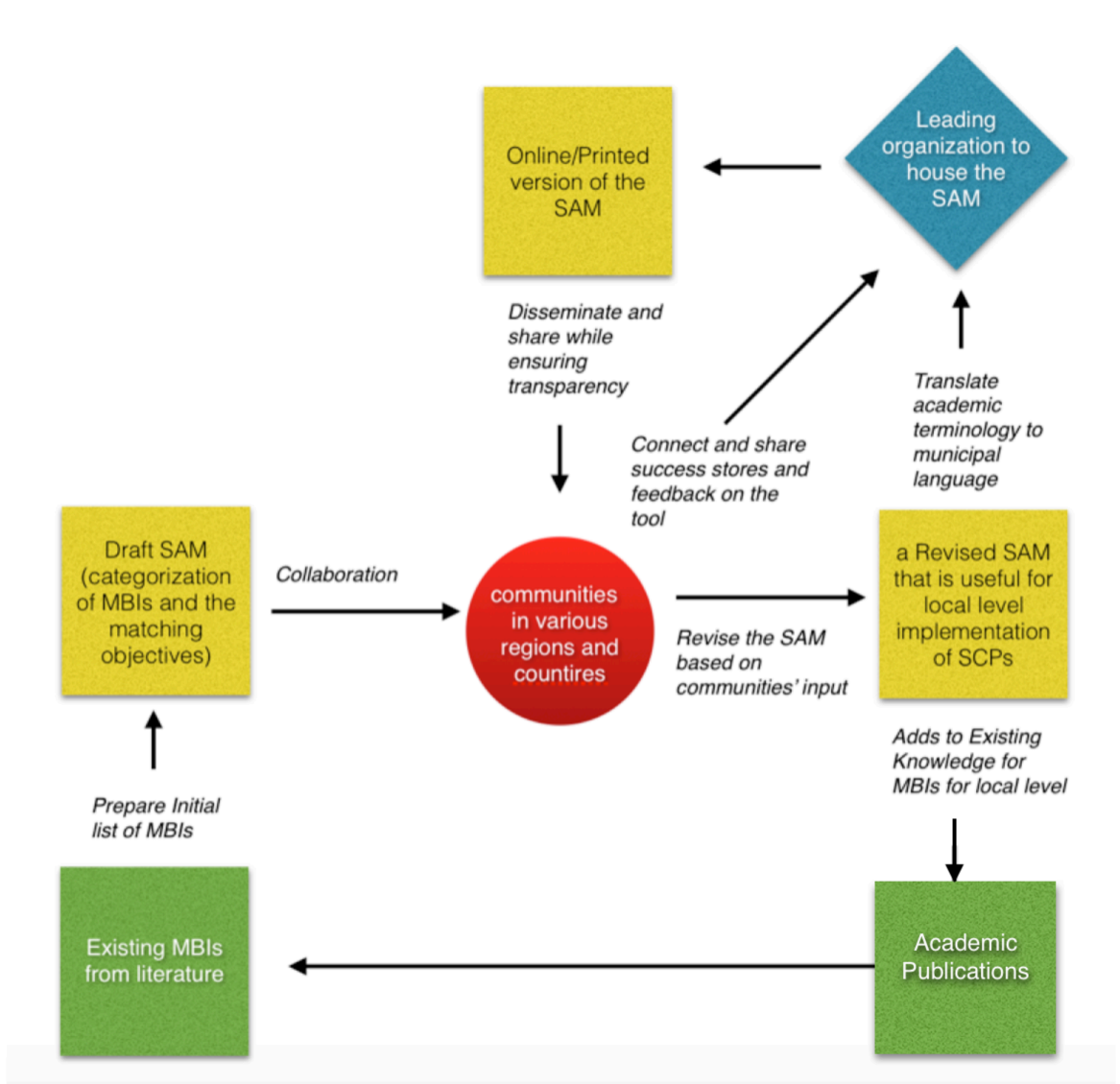
Many participants from both focus groups were concerned with the cost of implementation of the MBIs. It is important to note that implementation costs differ between MBIs. Some MBIs have higher implementation costs and other have disincentives for the municipality. The positive outcomes of some local MBIs may be offset by the present constraints. Thus, sharing experiences is also important in terms of understanding the cost of implementing MBIs. Leadership roles can be taken by those communities with success stories in implementing MBIs to achieve their sustainability goals. This would help communities develop environmental incentives and facilitate smarter choices.

6.5.3 Development of the SAM Tool

This section will discuss the development of the SAM tool based on the results of this research. It is evident, from the literature review, that there are many existing Market-Based Instruments. The SAM tool could serve as a useful inventory for a local government, when they are looking for new approaches to implementing their sustainability goals. However, most MBIs are found from national and even international, publications. Thus, one of the challenges for compiling the initial MBI list for the SAM tool was that it is hard to distinguish the appropriate MBIs for the chosen municipalities in Ontario. Another challenge is translating the literature terminology into ones that are familiar to the participants. The two focus group sessions provided valuable information for the development of the SAM tool, including those that would help overcome such challenges. The participants are able to identify MBIs that are relevant on a local level. They also translated academic terminologies in to municipal terms and provided insights on the new categorization of MBIs. Although there was some constructive criticism, most participants were interested in the SAM tool and its potential benefits

The next challenge for the SAM tool will be its dissemination. This would likely occur at Sustainable Prosperity (SP), a national research and policy network, that focuses on market-based approaches for communities. The SAM tool that was created from this research, could be housed there for dissemination purposes. Municipalities in other countries would probably have a similar organization that could house the SAM tool and facilitate its dissemination. Regardless of their location, the organization should be committed to sustainable communities and believe in the market-based approaches for sustainable development. Figure 6.6 shows the development process of the SAM tool.

Figure 2. The framework for developing a SAM tool



7. Conclusion

This section summarizes the research contributions of this thesis. It also discusses some limitations and possible future research suggestions.

7.1 Theoretical and Practical Contributions

The research objective and questions were answered throughout this thesis. Thus, the answers to the research questions account for both the theoretical and practical, contributions of the research.

Question 1: What are the existing and emerging Market-Based Instruments, that are relevant for sustainable community plan implementation in Ontario?

Question 2: What continuum of measurement and scoring methodology, for the Sustainability Alignment Methodology, is ideal for Ontario communities?

Question 3: How can the Sustainability Alignment Methodology tool be improved so that it meets the needs of Ontario communities?

Question 4: What lessons can be drawn from the development and improvement of a Sustainability Assessment Methodology tool, for sustainable community planning and/or market-based instrument literature?

Research question 1 is answered in section 2.4 of the literature review. Table 2.4 provides an important summary of existing Market-Based Instruments described in current literature. This finding also helps to improve to our understanding of MBIs that are applicable at the local level, as most literature either focuses on specific MBIs or lacks a local focus. Land use pricing and

asset management are two new contributions to literature. Land use pricing, a new Market-Based Instrument that was found during the focus group, is intended to differentiate aggregate land use and adjusted value lands to encourage sustainable land use. Asset management is a non-MBI identified during the focus group that is of importance to the implementation of MBIs for municipalities. However, further studies are necessary to understand the relationship between asset management and the implementation success of MBIs. The knowledge of current MBIs provides an important foundation for future research in this direction.

Research Question 2 was answered in Chapter 5. However, the answer to the question is unclear as most focus group participants were against the idea of scoring. Hence, future research is necessary to determine both its usefulness and its assessment criteria for the developed SAM tool.

The answer to research question 3 has both theoretical and practical contributions. The draft SAM tool was initially presented in Chapter 4 and was later refined in Chapter 5 to produce Table 5.9. The SAM tool builds on existing literature, to provide an innovative way to categorize Market-Based Instruments by combining the categorization of MBIs which was identified in the literature, with the categorization of SCPs goals and the associated municipal departments. This modification allows the initial MBIs classifications to be interdisciplinary. It also helps users unfamiliar with Canadian municipal government to accurately pinpoint the appropriate MBIs to implement certain environmental objectives in a SCP and locate relevant municipal departments. The SAM tool provides an important foundation for multidisciplinary research, as this categorization allows researchers to understand the usefulness of MBIs from different perspectives. In addition, it contributes theoretically to the understanding of the alternative implementation options of sustainable community plans. The SAM tool also has practical

contributions. Partnering with Sustainable Prosperity, the developed SAM tool will be revised into a public manual for practitioners. This SAM tool provides the public, especially municipal decision-makers and influencers, with a list of Market-Based Instruments that help to achieve the environmental objectives in sustainable community plans. In addition, the category of Department/Location in the SAM allows municipal users to communicate with each other to break the silos and allows other users to easily find the designated departments for the MBIs of their interest. Overall, the SAM tool increases the awareness and knowledge of Market-Based Instruments as means to achieve community sustainability.

The last research question is answered in Chapter 5. The answers emerged from the two focus group discussions. Limited authority and high cost are two concerns that could affect the usefulness of the MBIs for SCPs implementation, as well as the usefulness of the SAM tool itself. Thus, further research into these challenges is required in order to determine which MBIs are feasible for local level implementation. Moreover, the process of developing the SAM also offers a methodological contribution. This research increases our knowledge of the assessment framework and its development process.

7.2 Limitations

Two major limitations in conducting this research were the geographical limitations and a lack of time. Due to funding conditions, the case studies are limited to Ontario communities. Although, focus group discussions and the SAM tool were both successful, more communities across a broader geographical boundary, could have been involved in the research to help to ensure broader generalizations could be made. Time is also a major limitation. Both focus group

discussions used the entire three hours. If given more time, the participants would be more involved with the research and provide more in-depth input on the SAM tool.

Although the assessment and scoring section was removed from the SAM after the focus group discussions, the other limitation is the level of knowledge required to create appropriate assessment criteria and a proper scoring method. There was a lack of literature on scoring MBIs, therefore the assessment criteria was created after consulting my thesis committee and their economics colleagues. Thus, more knowledge on scoring systems, could have provided a better assessment and scoring section.

7.3 Future Research Suggestions

There are several possible areas for future research. First, future research is necessary to help build a more comprehensive version of the SAM tool. The SAM tool builds on current literature and the focus group discussions from the two Ontario municipalities. The identified MBIs in the SAM tool are applicable to most Ontario mid-sized communities. However, future research is still required to understand municipal jurisdiction and identify MBIs that are distinct to other Canadian and international communities.

As mentioned in the previous section, another future research project that would help improve the SAM tool is the investigation into assessment criteria and scoring methodologies. Although, scoring seems to be useful to determine the performance of communities, further research is necessary to help assess the usefulness of scoring for the framework of the SAM tool developed for this study and determine the best scoring methodology for it.

The issues with cost and authority arose from the focus group discussions. Hence, further research – either through statistical, or case study, analysis – is needed to identify and separate the MBIs with high implementation costs, from the others. This research would improve the SAM tool, by identifying the potential cost and barriers of the MBIs, allowing municipalities to choose the appropriate MBIs. It would, in turn, increase the usefulness and reliability, of the SAM tool itself.

Lastly, the SAM provides the foundation for potential future interdisciplinary research in the area of Market-Based Instruments and sustainability development. Economic researchers could examine the effects of using MBIs for green economic development. Perhaps, conducting comparison studies on various MBIs and examines and forecast its impact on the local economy. Policy researchers could explore the potential influence of MBIs implementation on policy and decision-making. Future researchers in the environmental, or sustainability field, could explore the effects of implementing SCPs through Market-Based Instruments.

7.4 Concluding Summary

Although Market-Based Instruments (MBIs) have become prominent in sustainability, research on them is often scattered. Thus, a larger collection of data on Market-Based Instruments is needed, in order to better inform decision making for community sustainability. This study was designed to help bridge this gap in literature, by focusing on the development of a SAM tool, which considers the potential uses of Market-Based Instruments, for implementing SCPs goals. Overall, this thesis has answered the four research questions proposed at the beginning of it. This study has numerous academic and practical, contributions and serves as a foundation for future research in this area. Hopefully, this thesis and the SAM tool which was created for it, will

contribute positively to the market-approach to community sustainable development, as well as improve the understanding of market-based instruments and influence better decision-making for local sustainable development.

References

- Allan, G., Skinner, C. (1991). *Handbook for Research Students in the Social Sciences*. London: The Falmer Press. <http://doi.org/10.1002/hpm.4740100215>
- Althaus, C., Tedds, M., & McAvoy, A. (2011). The Feasibility of Implementing a Congestion Charge on the Halifax Peninsula: Filling the “Missing Link” of Implementation. School of Public Administration, University of Victoria, Victoria, B.C.
- AMO. (2008). *A Sustainability Planning Toolkit for Municipalities in Ontario*. Retrieved from http://www.amo.on.ca/AMO-PDFs/Gas_Tax/Planning_Requirements_Gas_Tax/Sustainability-Planning-Toolkit.aspx
- AMO. (2013). *How Municipalities Works?*. Retrieved from <http://www.amo.on.ca/AMO-Content/Municipal-101/How-Municipal-Government-Works.aspx>
- Australian Government. (2013). *Local Government National Report*. Canberra, Australia: Commonwealth of Australia.
- Barbier, E. B. (1994). Valuing Environmental Functions: Tropical Wetlands. *Land Economics*, 70(2), 155. <http://doi.org/10.2307/3146319>
- Beecher, N., Harrison, E., Goldstein, N., McDaniel, M., Field, P., & Susskind, L. (2005). Risk perception, risk communication and stakeholder involvement for biosolids management and research. *Journal of Environmental Quality*, 34(1), 122-128.
- Benhear, L. S., Taylor, L., & Lee, J. (2011). Participation incentives, rebound effects and the cost-effectiveness of rebates for water-efficient appliances. *Duke Environmental Economics Working Paper, No. 11-10*. <http://dx.doi.org/10.2139/ssrn.1970011>
- Berke, P. R., & Conroy, M. M. (2000). Are We Planning for Sustainable Development? *Journal of the American Planning Association*, 66(1), 21–33. <http://doi.org/10.1080/01944360008976081>
- Bosquet, B. (2000). Environmental tax reform: does it work? A survey of the empirical evidence. *Ecological Economics*, 34(1), 19–32. [http://doi.org/10.1016/S0921-8009\(00\)00173-7](http://doi.org/10.1016/S0921-8009(00)00173-7)
- Brewer, R. (2004). *Conservancy: The land trust movement in America*. UPNE.
- Broughton, E., & Pirard, R. (2011). What's in a name: market-based instruments for biodiversity. *Health and Environmental Report*, (8), 1-44.
- Brown, G., & McKellar, R. D. (2001). Perth's Parking Policy, Licensing and Tax scheme Two years after Implementation. In *World Parking Symposium III, St Andrews, Scotland* (pp. 24-28).

- Bulkeley, H., & Betsill, M. (2005). Rethinking sustainable cities: multilevel governance and the “urban” politics of climate change. *Environmental Politics*.
<http://doi.org/10.1080/0964401042000310178>
- Callan, S. J., & Thomas, J. M. (2001). Economies of scale and scope: A cost analysis of municipal solid waste services. *Land economics*, 77(4), 548-560.
- Calvert, S. (2010). *State of Knowledge on Market Tools for Sustainable Communities*. Ottawa: Sustainable Prosperity.
- Campbell, S. (1996). Green cities, growing cities, just cities?: Urban planning and the contradictions of sustainable development. *Journal of the American Planning Association*, 62(3), 296–312. <http://doi.org/10.1080/01944369608975696>
- Choon, S., Siwar, C., Pereira, J. J., Jemain, A. A., Hashim, H. S., & Hadi, A. S. (2011). A sustainable city index for Malaysia. *International Journal of Sustainable Development and World Ecology*, 18(1), 28–35.
- Clarke, A. (2011). Key structural features for collaborative strategy implementation : a study of sustainable development/local agenda 21 collaborations. *Management & Avenir*, 50(10), 153. <http://doi.org/10.3917/mav.050.0153>
- Clarke, A. (2012). *Passing Go: Implementing the Plan*. Ottawa: Federation of Canadian Municipalities.
- Clarke, A. (2014). Designing Social Partnerships for Local Sustainability Strategy Implementation. In M. Seitanidi & A. Crane, *Social Partnerships and Responsible Business A Research Handbook* (pp. 79–102). London, UK: Routledge (Taylor and Francis).
- Clarke, A., & Erfan, A. (2007). Regional Sustainability Strategies: A Comparison of Eight Canadian Approaches. *Plan Canada*, 47, 15–18.
- Clarke, A., & Fuller, M. (2010). Collaborative strategic management: Strategy formulation and implementation by multi-organizational cross-sector social partnerships. *Journal of Business Ethics*, 94(85-101). <http://doi.org/10.1007/s10551-011-0781-5>
- Clarke, A., & MacDonald, A. (2012). *Partner Engagement for Community Sustainability: Supporting Sustainable Development Initiatives by Reducing Friction in the Local Economy*. State of Knowledge Report. Ottawa: Sustainable Prosperity.
- Clarke, A., Huang, L., Roseland, M. & Chen, H. (2014). Do Collaborative Planning Processes Lead to Better Outcomes? An Examination of Cross- Sector Social Partnerships for Community Sustainability. Presented at the Administrative Science Association of Canada conference.

- Community [Def. 1]. (n.d.). *Oxford Dictionaries*. In Oxford Dictionaries. Retrieved from http://www.oxforddictionaries.com/us/definition/american_english/community?q=Communities
- Connelly, S., Markey, S., & Roseland, M. (2011). Bridging sustainability and the social economy: Achieving community transformation through local food initiatives. *Critical Social Policy, 31*(2), 308-324.
- Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches (4th ed.)*. Thousand Oaks, CA: Sage Publications.
- Dachis, B. (2011). *Congestive Traffic Failure: The Case for High-Occupancy and Express Toll Lanes in Canadian Cities*. Ottawa: Sustainable Prosperity.
- Daly, H. E. (1990). Toward some operational principles of sustainable development. *Ecological Economics, 2*(1), 1–6. [http://doi.org/10.1016/0921-8009\(90\)90010-R](http://doi.org/10.1016/0921-8009(90)90010-R)
- Department of Finance Canada, (D. O. F. C.) (2005). Archived - A New Deal for Canada's Communities. Retrieved from <http://fin.gc.ca/budget05/pamph/pacom-eng.asp>
- Dietz, S., & Neumayer, E. (2007). Weak and strong sustainability in the SEEA: Concepts and measurement. *Ecological Economics, 61*(2007), 617–626. <http://doi.org/10.1016/j.ecolecon.2006.09.007>
- Environment Canada. (2010). *Shared Responsibility*. Retrieved from <http://https://www.ec.gc.ca/eau-water/default.asp?lang=En&n=035F6173-1>
- European Environment Agency. (2005). Market-based instruments for environmental policy in Europe. Retrieved from http://www.eee2006.org/presentations/EEA_technical_report_8_2005.pdf
- Flachsland, C., Brunner, S., Edenhofer, O., & Creutzig, F. (2011). Climate policies for road transport revisited (II): Closing the policy gap with cap-and-trade. *Energy policy, 39*(4), 2100-2110.
- Flick, U. (2006). *An Introduction to Qualitative Research (3rd ed.)*. London, UK: Sage Publications.
- Flyvbjerg, B. (2006). Five Misunderstandings About Case-Study Research. *Qualitative Inquiry, 12*(2), 219–245. <http://doi.org/10.1177/1077800405284363>
- Found, W. C., Hill, A. R., & Spence, E. S. (1975). Economic and environmental impacts of land drainage in Ontario. Dept. of Geography, Atkinson College, York University, Toronto, Canada.
- Fraenkel, J. R., & Wallen, N. E. (1990). *How to design and evaluate research in education*. New

York: McGraw-Hill.

- Freeman, C. (1996). Local government and emerging models of participation in the Local Agenda 21 process. *Journal of Environmental Planning and Management*, 39(1), 65–78. <http://doi.org/10.1080/09640569612679>
- Gahin, R., Veleva, V., & Hart, M. (2003). Do Indicators Help Create Sustainable Communities? *Local Environment*, 8(6), 661–666. <http://doi.org/10.1080/1354983032000152752>
- Gayer, T., & Horowitz, J. K. (2006). *Market-based approaches to environmental regulation*. Hanover: Now Publishers Inc.
- Giuliano, G. (1992). Transportation demand management: promise or panacea?. *Journal of the American Planning Association*, 58(3), 327-335.
- Guerin, K. (2003). Property Rights and Environmental Policy: A New Zealand Perspective. New Zealand: NZ Treasury.
- Hahn, R. W., & Stavins, R. N. (1991). Economic incentives for environmental protection: integrating theory and practice.
- Halweil, B. (2002). *Home grown: The case for local food in a global market* (Vol. 163). Worldwatch Institute.
- Henderson, B., & Norris, K. (2008). Experiences with market-based instruments for environmental management. *Journal of Environmental Management*, 15(2), 113–120. <http://doi.org/10.1080/14486563.2008.9725191>
- Hendrickson, D. J., Lindberg, C., & Connelly, S. (2011). Pushing the envelope: market mechanisms for sustainable community development. *Journal of Urbanism*. 4(2), 153-173. <http://doi.org/10.1080/17549175.2011.596263>
- Hockenstein, J. B., & Stavins, R. N. (1997). Crafting the next generation of market-based environmental tools. *Environment*, 39(4), 12–33. <http://doi.org/10.1080/00139159709603637>
- Infrastructure Canada, I. C. (2011). *Gas tax fund*. Retrieved from <http://www.infc.gc.ca/ip-pi/gtf-fte/gtf-fte-eng.html>
- Infrastructure Canada, I. C. (2014). *The Federal Gas Tax Fund: Permanent and predictable funding for municipalities*. Retrieved from <http://www.infrastructure.gc.ca/alt-format/pdf/GTF-FTE-20140905-eng.pdf>
- International Council for Local Environmental Initiatives, L. C. F. L. E. L. (2002). *Local Governments' Response to Agenda 21: Summary Report of Local Agenda 21 Survey with Regional Focus*. Toronto, ON: International Council for Local Environmental Initiatives

- (ICLEI) Canada.
- Jacobs, M. (1993). *The Green Economy: Environment, Sustainable Development and the Politics of the Future*. Vancouver, BC: UBC Press.
- Justice Law. (2015). *Constitution Acts, 1867 to 1982*. Retrieved from: <http://laws-lois.justice.gc.ca/eng/const/page-4.html#docCont>
- Kondyli, J. (2010). Measurement and evaluation of sustainable development. A composite indicator for the islands of the North Aegean region, Greece. *Environmental Impact Assessment Review*, 30(6), 347–356.
- Kulsum, A. (2012). *Getting to Green-A Sourcebook of Pollution Management Policy Tools for Growth and Competitiveness*. Washington, DC: World Bank Group.
- Latacz-Lohmann, U., & Schilizzi, S. (2014). Creating physical environmental asset accounts from markets for ecosystem conservation: A comment. *Ecological Economics*, 108, 266-268.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage Publications.
- Lindberg, C. M. (2007). Making Sustainability Happen: Market Mechanisms for Sustainable Neighbourhood Development. *Masters Thesis*. Department of Geography, Simon Fraser University, Burnaby, Canada.
- Lovins, A., Lovins, L. H., & Hawken, P. (1999). *Natural capitalism: creating the next industrial revolution*. Boston, MA: Little Brown and Co.
- Lyons, P. F., Taylor, P. C., Cipcigan, L. M., Trichakis, P., & Wilson, A. (2006). Small scale energy zones and the impacts of high concentrations of small scale embedded generators. In *Universities Power Engineering Conference, 2006. UPEC'06. Proceedings of the 41st International* (Vol. 1, pp. 128-132). IEEE.
- Lozano, R. (2008). Envisioning sustainability three-dimensionally. *Journal of Cleaner Production*, 16(2008), 1838–1846. <http://doi.org/10.1016/j.jclepro.2008.02.008>
- Marsalek, J. (2003). Road salts in urban stormwater: an emerging issue in stormwater management in cold climates. *Water Science & Technology*, 48(9), 61-70.
- Maser, C. (1997). *Sustainable Community Development: principles and concepts*. Delray Beach, FL: St Lucie Press.
- McRobie, G., & Ross, D. (1987). *A Feasibility Study for a Centre for Community Economic Development at Simon Fraser University*. Vancouver, BC: Community Economic Development Centre, Simon Fraser University.

- Mebratu, D. (1998). Sustainability and sustainable development: historical and conceptual review. *Environmental Impact Assessment Review*, 18(6), 493–520.
[http://doi.org/10.1016/S0195-9255\(98\)00019-5](http://doi.org/10.1016/S0195-9255(98)00019-5)
- Merriam, S. B. (1998). *Qualitative research and case study applications in education*. San Francisco, CA: Jossey-Bass.
- Michelsen, A. M., McGuckin, J. T., & Stumpf, D. (1999). Nonprice Water Conservation Programs As A Demand Management Tool. *Journal of the American Water Resources Association*, 35(3), 593-602
- Ministry of Municipal Affairs and Housing. (2011). *SECTION 2: An Overview of Local Government*. Retrieved from <http://www.mah.gov.on.ca/Page8391.aspx>
- Miranda, M. L., & Aldy, J. E. (1998). Unit pricing of residential municipal solid waste: lessons from nine case study communities. *Journal of Environmental Management*, 52(1), 79-93.
- Montana Land Reliance (Trust), & Land Trust Exchange (US). (1982). *Private options: Tools and concepts for land conservation*. Island Press.
- Nakamura, K., & Kockelman, K. M. (2002). Congestion pricing and roadscape rationing: an application to the San Francisco Bay Bridge corridor. *Transportation Research Part A: Policy and Practice*, 36(5), 403-417.
- National Center for Environmental Economics. (2015). *Economic Incentives*. Retrieved from <http://yosemite.epa.gov/EE%5Cepa%5Ceed.nsf/webpages/EconomicIncentives.html#market>
- National Round Table on the Environment and the Economy. (2002). *Towards an Agenda for Ecological Tax Reform*. Ottawa, ON.
- Newell, R. G., & Stavins, R. N. (2003). Cost Heterogeneity and the Potential Savings from Market-Based Policies. *Journal of Regulatory Economics*, 23(1), 43–59.
<http://doi.org/10.1023/A:1021879330491>
- Osborne, D. (1993). Reinventing Government. *Public Productivity & Management Review*, 16(4), 349. <http://doi.org/10.2307/3381012>
- Pagiola, S., Bishop, J., & Landell-Mills, N. (2002). *Selling forest environmental services: market-based mechanisms for conservation and development*. New York: Taylor & Francis.
- Parenteau, R. (1994). Local action plans for sustainable communities. *Environment and Urbanization*.
- Parkinson, S., & Roseland, M. (2002). Leaders of the Pack: An analysis of the Canadian “Sustainable Communities” 2000 municipal competition. *Local Environment*, 7(4), 411–429.
<http://doi.org/10.1080/1354983022000027527>

- Patton, M. Q. (1990). *Qualitative evaluation and research methods (2nd ed.)*. Newbury Park, CA: Sage Publications.
- Pigou, A. C. (1920). *The economics of welfare*. Palgrave Macmillan.
- Pirard, R., & Lapeyre, R. (2014). Classifying market-based instruments for ecosystem services: A guide to the literature jungle. *Ecosystem Services*.
<http://doi.org/10.1016/j.ecoser.2014.06.005>
- Ready, M. J., & Ready, R. C. (1995). Optimal pricing of depletable, replaceable resources: the case of landfill tipping fees. *Journal of Environmental Economics and Management*, 28(3), 307-323.
- Rees, W. E. (1991). Economics, ecology and the limits of conventional analysis. *Journal of the Air & Waste Management Association*. <http://doi.org/10.1080/10473289.1991.10466926>
- Robert, K. W., Parris, T. M., & Leiserowitz, A. A. (2005). What is Sustainable Development? Goals, Indicators, Values and Practice. *Environment: Science and Policy for Sustainable Development*, 47(3), 8–21. <http://doi.org/10.1080/00139157.2005.10524444>
- Roseland, M. (2000). Sustainable community development: integrating environmental, economic and social objectives. *Progress in Planning*, 54(2), 73–132. [http://doi.org/10.1016/S0305-9006\(00\)00003-9](http://doi.org/10.1016/S0305-9006(00)00003-9)
- Roseland, M. (2012). *Toward sustainable communities: Solutions for citizens and their governments*. Gabriola Island: New Society Publishers.
- Sargent, J. H. (2002). Economics of Energy and the Environment: The Potential Role of Market-Based Instruments, The. *Canada - United States Law Journal*, 28, 499–510.
- Scoccimarro, M., & Collins, D. (2008). *Market Based Instruments Decision Support Tool*. Australian Government, Department of Natural Resource Management and Water. Brisbane: The State of Queensland.
- Selman, P. (1998). Local Agenda 21: substance or spin? *Journal of Environmental Planning and Management*, 41(5), 533–553. <http://doi.org/10.1080/09640569811443>
- Selman, P., & Parker, J. (1997). Citizenship, civicness and social capital in Local Agenda 21. *Local Environment*, 2(2), 171–184. <http://doi.org/10.1080/13549839708725522>
- Skouloudis, A., Evangelinos, K., & Kourmoussis, F. (2009). Development of an evaluation methodology for triple bottom line reports using international standards on reporting. *Journal of Environmental Management*, 44(2), 298–311.
- Statistic Canada. (2008) *Life in metropolitan areas*. Retrieved from:

<http://www.statcan.gc.ca/pub/11-008-x/2008001/article/10459-eng.htm>

- Statistic Canada. (2012) *Census metropolitan area (CMA) and census agglomeration (CA)*. Retrieved from: <http://www12.statcan.gc.ca/census-recensement/2011/ref/dict/geo009-eng.cfm>
- Stavins, R. N. (2003). Chapter 9 Experience with market-based environmental policy instruments. In *Handbook of Environmental Economics* (Vol. 1, pp. 355–435). Elsevier. [http://doi.org/10.1016/S1574-0099\(03\)01014-3](http://doi.org/10.1016/S1574-0099(03)01014-3)
- Stavins, R. N., & Whitehead, B. W. (1996). *The Next Generation of Market-Based Environmental Policies*. Retrieved from <http://www.rff.org/files/sharepoint/WorkImages/Download/RFF-DP-97-10.pdf>
- Stoneham, G., O'Keefe, A., Eigenraam, M., & Bain, D. (2012). Creating physical environmental asset accounts from markets for ecosystem conservation. *Ecological Economics*, 82, 114-122.
- Taylor, Allan. (2012). Indicators, Domains and Scoring Methods for a Canadian Community Sustainability Indicator Framework. *Masters Thesis*. Department of Environment and Resource Studies, University of Waterloo, Waterloo, Canada.
- Tindal, R., & Tindal, S. (2000). *Local Government in Canada: Fifth Edition*. Scarborough, ON: Nelson Thompson Learning.
- Thompson, D., & Bevan, A. (2010). *The Smart Budget Toolkit: Environmental Pricing Reform for Municipalities*. Ottawa: Sustainable Prosperity.
- Trichakis, P., Taylor, P. C., Coates, G., & Cipcigan, L. M. (2008). Distributed control approach for small-scale energy zones. *Proceedings of the Institution of Mechanical Engineers, Part A: Journal of Power and Energy*, 222(2), 137-147.
- United Nations. (2002). *Johannesburg Plan of Implementation*. Johannesburg: United Nations.
- United Nations. (2008). *United Nations millennium development goals*. Retrieved from <http://www.un.org/millenniumgoals/bkgd.shtml>
- United Nations. (n.d.). *RIO+20 United Nations conference on sustainable development*. Retrieved from <http://www.uncsd2012.org/rio20/index.php?menu=61>
- United Nations Sustainable Development. (2009). *Agenda 21*. Retrieved from <http://sustainabledevelopment.un.org/content/documents/Agenda21.pdf>
- Urbonas, B., & Stahre, P. (1993). *Stormwater: best management practices and detention for water quality, drainage and CSO management*. Englewood Cliffs: Prentice-Hall.

- Wackernagel, M., & Rees, W. E. (1997). Perceptual and structural barriers to investing in natural capital: Economics from an ecological footprint perspective. *Ecological Economics*, 20(1), 3–24. [http://doi.org/10.1016/S0921-8009\(96\)00077-8](http://doi.org/10.1016/S0921-8009(96)00077-8)
- Whitten, S., Van Bueren, M., & Collins, D. (2003). *An overview of market based instrument and environmental policy in Australia*. Presented at the th Annual National Australian Agricultural and Resource Economics Society Symposium, Canberra, AU.
- Williamson, I. P. (2001). Land administration “best practice” providing the infrastructure for land policy implementation. *Land Use Policy*, 18(4), 297–307. [http://doi.org/10.1016/S0264-8377\(01\)00021-7](http://doi.org/10.1016/S0264-8377(01)00021-7)
- Winston, C., & Shirley, C. (2010). *Alternate route: Toward efficient urban transportation*. Washington DC: Brookings Institution Press.
- World Commission on Environment and Development. (1987). *Our common future*. Oxford, UK: Oxford University Press.
- Wu, Y. J., & Rosen, M. A. (1999). Assessing and optimizing the economic and environmental impacts of cogeneration/district energy systems using an energy equilibrium model. *Applied energy*, 62(3), 141-154.
- Yatchew, A., & Baziliauskas, A. (2011). Ontario feed-in-tariff programs. *Energy Policy*, 39(7), 3885-3893.
- Yin, R. K. (2009). *Case study research: Design and methods*. London: Sage Publications.

Appendices

Appendix A – Potential communities for the Case Study

Municipality	Region (if the municipality is lower tier)
Ajax	Durham
Barrie	
Brampton	Peel
Burlington	Halton
Greater Sudbury/ Grand Sudbury	
Hamilton	
Kingston	
Kitchener	Waterloo
Markham	York
Municipality of Chatham-Kent	
Richmond Hill	York

Appendix B - Information letter for the focus group

Initial E-mail

My name is Ying Zhou and I am a graduate student in Sustainability Management at the University of Waterloo. I am working with Dr. Amelia Clarke from the School for Environment, Enterprise and Development (SEED). My Master's thesis is "Implementing Sustainable Community Plans through Market-Based Instruments (MBIs)". The purpose of this research is to create a Sustainability Alignment Methodology (SAM) and scoring framework that help mitigate the gap between planning and implementation stage for sustainable community development. SAM is designed to review municipal price signal and identify the potential market-based instruments that help to implement a sustainable community plan.

I am looking for participants for my research. The desired participants would be municipal decision-makers and influencers with an interest in the sustainable community plan and market-based schemes for sustainability. I would like to introduce the Sustainability Alignment Methodology and gather your feedback and comments for improvement and revision. All responses during the focus group will be kept anonymous and participants will not be identified in my research unless permission is granted.

Please reply to this email to express your interest. I will send you more information upon receiving your reply.

This project was reviewed and received ethics clearance through the Office of Research Ethics at the University of Waterloo.

Thank you very much for your consideration.

Sincerely,

Ying Zhou

Masters of Environmental Studies Candidate in Sustainability Management
Faculty of Environment
University of Waterloo
Cell: 519 573 2138
Email: y53zhou@uwaterloo.ca

Appendix C - Detailed letter for the focus group

Date:

Dear (insert name of participant),

This letter is to inform you about a focus group for a Master's research study at University of Waterloo in partnership with Sustainable Prosperity.

Title of Project: Implementing Municipal Sustainability Plans through Market-Based Instruments (MBIs)

Organizers: *Dr. Amelia Clarke* (amelia.clarke@uwaterloo.ca)

Director of the Master of Environment and Business (MEB) Program; Assistant Professor
School for Environment, Enterprise and Development, University of Waterloo

Ying Zhou (y53zhou@uwaterloo.ca)

Masters of Environmental Studies Candidate
School for Environment, Enterprise and Development, University of Waterloo

Stephanie Cairns (scairns@sustainableprosperity.ca)

Managing Director, Sustainable Communities
Sustainable Prosperity

Funder: Metcalf Foundation (<http://metcalffoundation.com>)

This session focuses on Sustainability Alignment Methodology and will be co-facilitated by Stephanie Cairns and Dr. Amelia Clarke.

Participation in this session is voluntary and involves a half-day commitment to and discussion of the issues associated with market-based instruments. There are no known or anticipated risks to your participation in this session. You may decline answering any questions you feel you do not wish to answer and may decline contributing to the session in other ways if you so wish. Chatham House Rules will be used where the participants at the meeting are free to use information from the discussion, but is not allowed to reveal the identity the person making the comment. This ensures the openness of discussion during the focus group. Your name will not be identified with the input you give to this session.

Given the group format of this session we will ask you to keep in confidence information that identifies or could potentially identify a participant and/or his/her comments. If you have any questions about participation in this session, please feel free to discuss these by contacting Dr. Amelia Clarke (amelia.clarke@uwaterloo.ca) or Ying Zhou (y53zhou@uwaterloo.ca). If you are interested in receiving a copy of the thesis and/or SAM, indicate this on the consent form.

I would like to assure you that this study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee. However, the final decision about participation is yours. Should you have comments or concerns resulting from your participation in this study, please contact Dr. Maureen Nummelin in the Office of Research Ethics at 1-519-888-4567, Ext. 36005 or maureen.nummelin@uwaterloo.ca.

Thank you for your assistance with this project.

Yours sincerely,

Ying Zhou
Masters of Environmental Studies Candidate in Sustainability Management
Faculty of Environment
University of Waterloo
Cell: 519 573 2138
Email: y53zhou@uwaterloo.ca

Under the supervision of Dr. Amelia Clarke
School of Environment, Enterprise and Development (SEED)
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Project Website: <http://uwaterloo.ca/seed/LA21>

In Partnership with:

Stephanie Cairns
Managing Director, Sustainable Communities
Sustainable Prosperity
Telephone: (613) 562-5800 ext. 3342
Email: scairns@sustainableprosperity.ca
Website: <http://www.sustainableprosperity.ca>

Appendix D - Consent form

Consent of Participant

By signing this consent form, you are not waiving your legal rights or releasing the investigator(s) or involved institution(s) from their legal and professional responsibilities.

I have read the information presented in the information letter about a study being conducted by *Ying Zhou* of the School for Environment, Enterprise and Development at the University of Waterloo, under the supervision of Dr. Amelia Clarke. I have had the opportunity to ask any questions related to this study, to receive satisfactory answers to my questions and to obtain any additional details I wanted. I am aware that I may withdraw from the study without penalty at any time by advising the researchers of this decision.

This project has been reviewed by and received ethics clearance through a University of Waterloo Research Ethics Committee. I was informed that if I have any comments or concerns resulting from my participation in this study, I may contact the Director, Office of Research Ethics at 519-888-4567 ext. 36005.

With full knowledge of all foregoing, I agree, of my own free will, to participate in this study.

Consent:	
1. I agree to participate in the study.	Yes <input type="checkbox"/> No <input type="checkbox"/>
2. I agree that my name may be included in a list of participants in the thesis.	Yes <input type="checkbox"/> No <input type="checkbox"/>
3. I agree to the use of quotations in the thesis and any publications, if validated.	Yes <input type="checkbox"/> No <input type="checkbox"/>
4. I agree to attend and participate in the focus group.	
5. I agree to the session being audio recorded.	Yes <input type="checkbox"/> No <input type="checkbox"/>
6. I would like a copy of the Sustainability Alignment Methodology (SAM) once it has been completed.	Yes <input type="checkbox"/> No <input type="checkbox"/>
7. I would like a copy of the thesis once it has been completed.	Yes <input type="checkbox"/> No <input type="checkbox"/>

Print Name

Title

Organization

Signature of Participant

Date

Appendix E – Feedback Form Questions

- 1) Comment of the usability of the SAM.
- 2) Are the MBIs appropriate? Anything missing or not relevant to municipalities?
- 3) What is your opinion on the usefulness of scoring? How to present scores in a “non-threatening” way?
- 4) Are the assessment criteria appropriate?
- 5) Other comments and recommendation.

Appendix F – Ethics Approval

Dear Researcher:

The recommended revisions/additional information requested in the ethics review of your ORE application:

Title: Implementing Community Sustainability Plan through Market-Based Instruments

ORE #: 20112

Collaborator: Stephanie Cairns (scairns@sustainableprosperity.ca)

Faculty Supervisor: Dr. Amelia Clarke (amelia.clarke@uwaterloo.ca)

Student Investigator: Ying Zhou (y53zhou@uwaterloo.ca)

have been reviewed and are considered acceptable. As a result, your application now has received full ethics clearance.

A signed copy of the Notification of Full Ethics Clearance will be sent to the Principal Investigator or Faculty Supervisor in the case of student research.

Note 1: This ethics clearance through a University of Waterloo Research Ethics Committee (REC) is valid for one year from the date shown on the certificate and is renewable annually. Renewal is through completion and ethics clearance of the Annual Progress Report for Continuing Research (ORE Form 105).

Note 2: This project must be conducted according to the application description and revised materials for which ethics clearance has been granted. All subsequent modifications to the project also must receive prior ethics clearance (i.e., Request for Ethics Clearance of a Modification, ORE Form 104) through the Office of Research Ethics and must not begin until notification has been received by the investigators.

Note 3: Researchers must submit a Progress Report on Continuing Human Research Projects (ORE Form 105) annually for all ongoing research projects or on the completion of the project. The Office of Research Ethics sends the ORE Form 105 for a project to the Principal Investigator or Faculty Supervisor for completion. If ethics clearance of an ongoing project is not renewed and consequently expires, the Office of Research Ethics may be obliged to notify Research Finance for their action in accordance with university and funding agency regulations.

Note 4: Any unanticipated event involving a participant that adversely affected the participant(s) must be reported immediately (i.e., within 1 business day of becoming aware of the event) to the ORE using ORE Form 106. Any unanticipated or unintentional change which may impact the research protocol, information-consent document or other study materials must be reported to the ORE within 7 days of the deviation using ORE Form 107.

Appendix G - Email thanking participants

Dear *(Insert Name of Participant)*,

I would like to thank you for your participation in this study. As a reminder, the purpose of my study is to create a Sustainability Alignment Methodology for municipalities. Ideally, the results will provide insights for the municipalities on the implementation of sustainable community plans through market-based instruments.

Please remember that you will only be identified in the thesis or any publications as a member of your municipal government, unless permission has been granted for identification in a participant list in the thesis. Once all the data are collected and analyzed for this project, I plan on sharing this information with the research community through seminars, conferences, presentations, journal articles and Sustainability Prosperity (SP) website. If you are interested in receiving more information regarding the results of this study, or if you have any questions or concerns, please contact me at either the phone number or e-mail address listed at the bottom of the page. When the study is completed, I will send the thesis and/or SAM to you if you requested it on your consent form. The study is expected to be completed by April 2015.

As with all University of Waterloo projects involving human participants, this project was reviewed by and received ethics clearance through, the Office of Research Ethics at the University of Waterloo. Should you have any comments or concerns resulting from your participation in this study, please contact Dr. Maureen Nummelin in the Office of Research Ethics at 1-519-888-4567, Ext. 36005 or maureen.nummelin@uwaterloo.ca.

Thank you for your assistance with this project.

Yours sincerely,

Ying Zhou
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Website: <http://www.sustainableprosperity.ca>

Appendix H – Glossary for SAM

MBIs	Description	Topics and Sub-topics
Agro-environmental subsidies	Subsidies that promote the conservation of ecological diversity by maintaining low-intensity farming practices.	Food security Ecological diversity
Alternate transportation demand management for new development	Use policies or programs that support public and active transportation and to influence how people travel.	Land use (land property development)
Anti-idling development charges	Surcharges for development or infrastructure that support idling.	Land use (land property development) Climate change and adaptation (adaptation) Air quality and energy (energy consumption and air emissions)
Anti-idling pay-per-use charges	User fees for infrastructure that support idling. For example, user fees or charges for drive-thru.	Transportation (modal split) Climate change and adaptation (mitigation) Air quality and energy (energy consumption and air emissions)
Asset Management	The way in which the acquisition, use and disposal of the assets (i.e. environmental capital) of an individual or a company are managed.	Land use (land property development) Climate change and adaptation (adaptation)
Awards and recognition program	Giving incentives to those have done something exceptional in conserving ecological diversity.	Ecological diversity
Bag tag program	A solid waste collection program where garbage bag tags are required for every container or bag of waste either collected at the curb or disposed of at the landfill site.	Solid waste (waste diversion)

MBIs	Description	Topics and Sub-topics
Certification program (e.g. smart salt application)	A program that ensures companies follow the certification standard while managing and reporting their operations. For example, smart salt application certification recognize companies that reduce the excess amount of salt application.	Water, wastewater and storm water (water quality)
Charges for BOD loads	Charges and surcharges for industrial users of waste treatment facilities that exceeds the Biochemical Oxygen Demand (BOD) guideline.	Water, wastewater and storm water (water quality)
Density bonus	A density bonus is an incentive-based tool that permits developers to increase the maximum allowable development on a property in exchange to promote conservation or improvement of natural resources and open space.	Land use (land property development)
Density-based property tax	Reduce tax rates on properties with high density and/or increase tax rates on properties that are low density.	Land use (land property development)
District energy programs	Programs that support the district energy system for distributing heat to a cluster of buildings that can include residential, commercial and industrial.	Solid waste (energy from waste) Air quality and energy (energy source)
Education programs	Programs that facilitates sharing of knowledge and learning of MBIs and sustainable community.	Water, wastewater and storm water (other)
Energy distribution zones	Distribution zone is a geographical area serviced with electricity from specific equipment within a local substation.	Air quality and energy (energy consumption and air emissions)
Environmental choice label	Labels that help identify products and services that have been independently certified to meet strict environmental standards.	Transportation (modal split) Solid waste (waste diversion) Air quality and energy (energy source) Food security

MBIs	Description	Topics and Sub-topics
		Ecological diversity
Environmental fund	Funding for environmental initiatives.	Ecological diversity
Environmental land acquisition	A taxpayer funded land acquisition and conservation strategy.	Land use (green spaces) Ecological diversity
Farm subsidies	Governmental subsidies for farmers and agribusinesses to supplement their income, manage the supply of agricultural commodities and influence the cost and supply of such commodities.	Food security
Farm waste and bio-solids management programs	Programs that manage the application and disposal of biosolids.	Solid waste (waste disposal)
Funds to support environmental infrastructure	Financial support program for various environmental infrastructure projects.	Climate Change (adaptation)
Funds to support waste for thermal heating and fuels	Financial support program for using waste from the community as the source for heating and fuel.	Solid waste (energy from waste)
Funds to support water, wastewater treatment infrastructure	Financial support for water, wastewater treatment infrastructure upgrade and maintenance.	Water, wastewater and storm water (water consumption and wastewater treatment)
Green public procurement	A process whereby public authorities seek to reduce the negative environmental impacts caused by the purchasing of goods, services and works with tax payer money.	Transportation (other) Water, wastewater and storm water (other) Solid waste (other) Air quality and energy (other) Climate change and adaptation (adaptation) Land use (other) Food security Ecological diversity
High density residential disposal programs	Programs that enhanced waste diversion by increase recycling and composting efforts for high-density residential areas.	Solid waste (waste disposal)

MBIs	Description	Topics and Sub-topics
Hybrid/EV parking locations	Designated parking locations for hybrid or electric vehicle.	Transportation (modal split)
Incentive for bio-swales	Incentive and rewards for residents and homeowners, associations that obtain bio-swales to remove silt and pollution from surface runoff water.	Climate change and adaptation (adaptation) Water, wastewater and storm water (water quality) Ecological diversity
Incentive for urban canopy	Incentive and rewards for residents and homeowners associations to obtain new trees to be planted.	Climate change and adaptation (adaptation) Land use (green spaces) Ecological diversity
Land drainage grants	Financial support for installing private subsurface tile drainage systems on agricultural land.	Food security
Land trust	Non-profit, charitable organizations which have as one of their core activities the acquisition of land for the purpose of conservation.	Land use (green spaces) Ecological diversity
Land use pricing (i.e. aggregate land use vs. lands for farming)	Value of the plot of land and the revenues generated from the using the land.	Food security
Land-value taxation	Taxes are imposed on the value of the plot of land based on the type and use of the land.	Land use (land property development)
Licensing commercial parking space	Parking permits and license issued for new commercial development	Transportation (modal split)
Micro-fit programs	Program for homeowners and other eligible participants with the opportunity to develop a small renewable electricity generation project.	Air quality and energy (energy source)
Nitrogen levy	Charges imposed on nitrogen emission or nitrogen discharges in effluent.	Water, wastewater and storm water (water quality) Food security

MBIs	Description	Topics and Sub-topics
Other subsidies, funds and grants	Other financial supports provided by the community toward sustainability efforts.	Transportation (other) Water, wastewater and storm water (other) Solid waste (other) Air quality and energy (other) Climate change and adaptation (adaptation) Land use (other) Food security Ecological diversity
Parking pricing	Fees imposed on parking at various locations within the community.	Transportation (modal split)
Partnership approach	An approach where agreements and actions are made by consenting <u>organizations</u> to share <u>resources</u> to accomplish a mutual goal.	Transportation (other) Water, wastewater and storm water (other) Solid waste (other) Air quality and energy (other) Climate change and adaptation (adaptation) Land use (other) Food security Ecological diversity
Pay for ecological services	Incentives offered to farmers or landowners in exchange for managing their land to provide some sort of ecological service.	Land use (green spaces) Ecological diversity
Phosphorous levy	Charges imposed on phosphorous emission or phosphorous discharge in effluent.	Water, wastewater and storm water (water quality) Food security
Peak-period licensing	License that grant peak period vehicle for	
Product labeling requirements	Standards for basic packaging and labeling for products.	Solid waste (waste diversion)
Public and education events	Community-wide events that facilitates sharing of knowledge and learning of MBIs and sustainable community.	Food security
Public transit pricing	Fares for public transportation.	Transportation (active and public transportation)

MBIs	Description	Topics and Sub-topics
Reporting requirements	Standards for reporting on economic, environmental, social and governance performance	Transportation (other) Water, wastewater and storm water (other) Solid waste (other) Air quality and energy (other) Climate change and adaptation (adaptation) Land use (other) Ecological diversity
Residential waste tipping fees	Fees that are assessed to residential waste being disposed	Solid waste (waste disposal)
Scrappage incentives	A program to promote the replacement of old vehicles with modern vehicles	Transportation (other) Solid waste (waste diversion)
Storm water utilities fees/charges	Fees charges based on property type and size of impervious area, to account for the varying degrees of water runoff generated from properties that use the system.	Water, wastewater and storm water (water consumption and wastewater treatment)
Storm water management	Managing the quantity and quality of storm water using best-management practice under set environmental criteria.	Water, wastewater and storm water (water consumption and wastewater treatment) Climate change and adaptation (adaptation)
Subsidies for cleaner/energy-efficient vehicles	Governmental subsidies for farmers and agribusinesses to supplement their income, manage the supply of agricultural commodities and influence the cost and supply of such commodities.	Transportation (modal split) Climate change and adaptation (mitigation) Air quality and energy (energy consumption and air emissions)
Subsidies for environmental assessment	Subsidies for new development projects if environmental impact assessment.	Land use (land property development)
Subsidies for local food markets	Governmental subsidies for farmers and agribusinesses sell their at local marketplace.	Food security
Subsidies for rain barrels	Subsidies or incentive for installing rain barrels to divert runoffs.	Water, wastewater and storm water (water consumption and wastewater treatment)

MBIs	Description	Topics and Sub-topics
Subsidies for reusable water bottle	Incentive for individuals to use reusable water bottle at workplace.	Solid waste (waste diversion)
Subsidies/incentive for carpool	Incentive for individuals to share rides to workplace.	Transportation (modal split)
Subsidize security for cycling	Governmental funds toward infrastructures that supports cycling. For example, bike racks, bike lanes, etc.	Transportation (active and public transportation)
Subsidized bike parking	Designated free parking locations for bikes.	Transportation (active and public transportation)
Subsidies for renewable energy/district energy	Governmental subsidies support renewable energy source or support district energy system for distributing heat to a cluster of buildings that can include residential, commercial and industrial.	Air quality and energy (energy source) Climate change and adaptation (mitigation)
Tax increment financing (i.e. Brownfield)	A public financing method that is used as a subsidy for redevelopment, infrastructure and other community-improvement projects in many countries, especially for brownfield development	Land use (land property development)
Tax relief for natural areas (forest stewardship)	Remission of a proportion of property tax if the property owners are conserving natural areas such as forests.	Land use (green spaces) Ecological diversity
Tolls (road, area, high occupancy tolls)	A pay-per-use fee for roads, various areas and highways	Transportation (modal split)
Subsidies for transit pass	Governmental subsidies to decrease the price of the transit prices to increase user rates.	Transportation (active and public transportation)
Tree cultivation/conservation program	A program that supports tree planting and protections of forested areas.	Land use (green spaces) Ecological diversity

MBIs	Description	Topics and Sub-topics
TSS charges	Charges and surcharges for industrial users of waste treatment facilities that exceeds the regulated level for bacterial toxin.	Water, wastewater and storm water (water quality)
Utility pricing (gas)	Charges for natural gas energy and heating.	Air quality and energy (energy consumption and air emissions)
Waste pricing	Charges for garbage disposal.	Solid waste (waste diversion)
Water pricing	Charges for water use.	Water, wastewater and storm water (water consumption and wastewater treatment)
Water quality permit trading	An approach to achieve water quality goals more efficiently by allow facilities facing higher pollution control costs to meet their regulatory obligations by purchasing environmentally equivalent (or superior) pollution reductions from another source at lower cost, thus achieving the same water quality improvement at lower overall cost.	Water, wastewater and storm water (water quality)
Water quality program	A Program that help balance needs of the environment have been balanced with other production and land use needs.	Water, wastewater and storm water (water quality)
Water rebates	Incentives for properties that have more infrastructures to divert runoffs.	Water, wastewater and storm water (water consumption and wastewater treatment)
Water source protection programs	Programs that support protection of water resources, such as lakes, rivers.	Water, wastewater and storm water (water source)