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SUSTAINABILITY ALIGNMENT MANUAL:

Using Market-Based Instruments to Accelerate Sustainability Progress at the Local Level

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It is based on "Implementing Sustainable Community Plans through Market-Based Instruments", a thesis written by Ying Zhou, MES, supervised by Dr. Amelia Clarke at the University of Waterloo and Stephanie Cairns of Sustainable Prosperity. It also draws on "New Revenue and Cost-Savings through Operationalizing Sustainable Community Plans within Small Municipalities in Ontario", a thesis written by Reuben DeBoer, MES, supervised by Dr. Amelia Clarke.

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INTRODUCTION AND PURPOSE

More than 150 local governments in Ontario have adopted a Sustainable Community Plan (SCP)[1] – a plan to achieve environmental, social and economic goals, developed through public consultation and collaborative efforts between local government, businesses, NGOs and public sector partners.[2]

Implementing these SCPs will reduce pressure on the natural environment while creating economic and social benefits for these municipalities.

However, while many communities have adopted a SCP, they have had less success in implementing strategies that will allow them to achieve their plans' goals.[3] A continued gap between planning and implementation could lead to a lost opportunity for communities in Ontario and across the country.

Using market-based instruments (such as municipal fees, charges and taxes) can facilitate implementation efforts.

Market-based instruments, or MBIs, are tools that use market prices and other economic variables that provide incentives to landowners, developers, residents, and businesses for environmental protection. A municipality can use its fiscal tools such as fees, charges and municipal taxes to facilitate its sustainability plans.

By aligning the incentives of existing fiscal tools and/or by implementing new MBIs, a municipality can more easily achieve its sustainability goals.

A municipality sends powerful economic signals through its fees, charges, and local taxes. These have primarily been seen as revenue tools (e.g., development cost charges and municipal utility charges), but these MBIs also hold strong, albeit latent, incentive effects for a municipality's environmental performance.

So far MBIs have not been widely considered as key strategies for SCP implementation. While local governments hold significant environmental powers, they have historically only used pricing to achieve their environmental or sustainability objectives in a limited way.

Local governments also need to contain infrastructure spending and identify new sources of revenue. By increasing their use of MBIs, there is a potential to simultaneously address their environmental, spending and revenue challenges.

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1 See the Canadian Sustainability Plan Inventory at https://wagner.augustana.ualberta.ca/cspi

2 Clarke, A. (2014). Designing social partnerships for local sustainability strategy implementation. Seitanidi, M. & Crane, A. (Eds.). *Social Partnerships and Responsible Business A Research Handbook*. 79–102. London, UK: Routledge (Taylor and Francis).

3 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). Retrieved from: http://link.springer.com/article/10.1007%2Fs10551-011-0781-5 ;
Lindberg, C. M. (2007). *Making sustainability happen: Market mechanisms for sustainable neighbourhood development*. Master's Thesis. Department of Geography, Simon Fraser University, Burnaby, Canada. Retrieved from: http://summit.sfu.ca/item/2660

The Sustainability Alignment Manual (SAM) offers municipalities an inventory of market-based instruments that support the eight environmental topics most prevalent in SCPs:

- Transportation
- Water
- Wastewater and stormwater
- Solid waste
- Air quality and energy
- Land-use
- Climate change
- Food security
- Ecological diversity

The 70 market-based instruments (MBIs) listed in this manual fall within the mandates of local governments in Ontario.

This manual has four sections:

SECTION 1 explains how aligning municipal price signals can contribute to the municipal SCP implementation and revenue gaps.

SECTION 2 reviews the main families of market-based instruments (MBIs).

SECTION 3 contains inventories of local government MBIs for each of the eight most-prevalent topics within SCPs, and provides important considerations for their use.

SECTION 4 is a glossary of terms surrounding the MBIs listed in Section 3, offering a description of each MBI and the range of topics they can each support.

SECTION 1: ONTARIO MUNICIPALITIES ARE FACING IMPORTANT AND RELATED GAPS

Ontario's local governments are faced with two important and related gaps: (1) a sustainable community plan implementation gap and (2) a revenue gap. A proper alignment of municipal price signals can help to reconcile these two seemingly intractable agendas.

While many communities are adopting Sustainability Community Plans, they are less successful in implementing them

Local governments are at the frontlines of managing many of the environmental impacts of human activity—congestion, greenhouse gas emissions, air and water pollutants, waste, and loss of green space and agricultural land. As growing urban populations outstrip the capacity of existing urban boundaries and infrastructure, larger cities also face the negative social, environmental, health, economic and competitiveness effects of congestion and sprawling development.

To address these issues, Canadian communities have developed Sustainability Community Plans (SCPs), establishing their own sustainability goals. These goals are environmental, social and/or economic. They are tied to municipal areas of concern, such as energy use, neighbourhood and transportation planning and waste and water management. SCPs are developed through public consultation and collaborative efforts between local government, businesses, NGO and public sector partners. Multiple terms are used to refer to SCPs, such as: Local Agenda 21s, Integrated Community Sustainability Plans, Local Action Plans and others. More than 1,200 plans have been developed across the roughly 4000 communities in Canada.[4]

While approximately 25% of communities in the country have adopted an SCP, only a subset have been successful in implementing them. A continued SCP planning-implementation gap can lead to undesirable outcomes such as:[5]

- Reduced ability to achieve stated SCP goals;
- Lost opportunities as the SCP, its goals, and strategies become outdated; and
- Increased public skepticism in regards to sustainable community development.

Concurrently, municipal revenue structures, increased responsibilities and infrastructure deficits are stressing municipal budgets

Local governments in Ontario are responsible for the supply of diverse services. Some of the most important, as measured by expenditure, include transportation (roads and transit), environment (water, sewers and solid

4 Clarke, A. (2012). *Passing Go: Moving Beyond the Plan*. Ottawa: Federation of Canadian Municipalities.

5 Ibid;
Roseland, M. (2000). Sustainable community development: integrating environmental, economic, and social objectives. *Progress in Planning*, 54(2), 73–132. Retrieved from: http://www.sciencedirect.com/science/article/pii/S0305900600000039

waste), recreation and culture, and social services.[6]

Local governments are facing challenges in raising the financial resources to provide these services. While these responsibilities benefit different citizens in different ways, most of the costs of services are paid for by the general taxpayer, through property taxation. Property taxes account for almost half of municipal revenues.[7]

Other service costs are paid through user-fees, which direct the costs of services to those who benefit specifically from those services, and which require that the revenue be reinvested in those same services. While some municipal governments have increased their user-fee revenue sources, they are still no more than a small share of revenue when compared to property taxes.[8]

Local governments are also coping with gaping infrastructure deficits. Closing these deficits requires financing for the upgrading and replacement of aging roads, transit systems, and water and sewer infrastructure and also for services for new developments. The municipal infrastructure deficit is estimated to cost $123 billion across Canada; half of that is attributed to Ontario.[9]

To address this deficit, Ontario municipalities have begun to adopt infrastructure asset management (IAM) systems. These are strategic plans for the management and replacement of public infrastructure assets such as water treatment facilities, sewer lines, roads, utility grids, bridges, etc. As municipalities implement IAMs, they are identifying their needs for more systematic maintenance of infrastructure and strategies to replace aging infrastructure, with substantial challenges for present and future municipal financial sustainability. Promising approaches to meet this challenge include generating new revenue and containing costs through increased use of user-fees rather than property taxation.

The coupling of revenue structure with increased responsibilities of municipal governments, decaying infrastructure, and political reluctance to raising of property taxes, is placing a severe strain on municipal budgets and municipalities' ability to provide services.

Price incentives are the missing piece of the urban sustainability puzzle

The single-most important missing piece of this urban sustainability puzzle is getting the price signals right.[10] Even with the efforts from all SCP partners to support the development of sustainable communities, progress will be severely undermined as long as price signals incentivize unsustainable, rather than sustainable, urban decisions. For example, many municipalities still charge a flat rate for water consumption. Yet pricing of water is an impressively effective tool for water efficiency: water consumption by customers with flat rates is 52% higher than that by customers with volumetric rates.[11]

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6 Federation of Canadian Municipalities (FCM). (2012). *The state of Canada's cities and communities 2012*. Retrieved from: https://www.fcm.ca/Documents/reports/The_State_of_Canadas_Cities_and_Communities_2012_EN.pdf

7 Ibid.

8 Ibid.

9 Federation of Canadian Municipalities (FCM). (2012). *The state of municipal infrastructure: Regional snapshots*. Backgrounder. Retrieved from: http://www.canadainfrastructure.ca/downloads/news/The_State_of_Municipal_Infrastructure_Regional_Snapshots_EN.pdf

10 Ann Dale. *How do we translation research into action*. CRCResearch RRU video, 2:26. April 17, 2011. https://www.youtube.com/watch?v=tSmSrWsNFNk

11 Environment Canada. (2012). *2011 Municipal Water Pricing Report*. Retrieved from: http://www.allianceforwaterefficiency.org/uploadedFiles/Resource_Center/Library/Canada/2012_Provincial_Summaries/EnvironmentCanada-2011-WaterPricingReport.pdf

Adjusting the incentives sent through municipal fees, charges, and taxes can unleash financial incentive effects for environmental performance. Getting the prices right has the potential to:

- Reduce resource consumption and environmental impacts;
- More accurately (and thus more fairly) assign cost to those households who directly benefit from services, as opposed to general taxpayers;
- Reduce demand for new urban infrastructure and other municipal services (reduced economic burden on taxpayers); and
- Diversify and possibly amplify revenue sources for municipalities who are looking to shift away from heavy reliance on property taxes that neither grow with the economy nor distribute costs fairly.

Increasing implementation of market-based instruments is an effective and equitable way to achieve this shift.

SECTION 2: MARKET-BASED INSTRUMENTS AS TOOLS TO ACHIEVE THE GOALS OF SUSTAINABILITY COMMUNITY PLANS

Market-based instruments (MBIs) adjust market signals to better incorporate environmental and social costs and benefits that are not traditionally included in market transactions.

For example, in order to account for the environmental costs of over-disposal of waste, municipalities can implement volume-based solid waste pricing. This provides an incentive for waste reduction and waste diversion to recycling or composting. Vancouver has implemented such a policy through a user-fee based on the size of garbage containers. Other municipalities such as Kingston require a garbage bag tag for garbage disposal in excess of one container/bag per week. Such pricing policies also generate revenue, which puts less pressure on municipalities to support waste collection solely through property taxes. In the case of Vancouver, the garbage container user-fee led to a reduction of 5.7% of property tax because waste management could then be directly financed through the fee.[12]

Unlike traditional municipal regulations, most MBIs offer compliance flexibility and a continuous incentive for improvement. Flexibility arises from the fact that individuals and businesses have the choice in how they will respond to the MBI. When imposing a user-fee the household or business can comply by either paying the fee or avoiding it through altering their habits. A continuous financial incentive to reduce environmental harm encourages continuous improvement, whereas regulations only reduce environmental harm to the mandated level.[13]

12 City of Vancouver. (2006). *City of Vancouver Solid Waste Utility.* Retrieved from: http://www.recyc-quebec.gouv.qc.ca/Upload/Publications/MICI/RENDEZ-VOUS2006/12-CUnderwood_8nov.pdf

13 It is important to note that in some cases, regulations are preferred to market-based instruments. This is can be the case when critical thresholds or extreme damages from pollution exists. For more information see: Canada's Ecofiscal Commission. (2014). *Smart, practical, possible: Canadian options for greater economic and environmental prosperity*. Retrieved from: http://ecofiscal.ca/wp-content/uploads/2014/11/Ecofiscal-Report-November-2014.pdf

Both economic theory and actual experience suggest that for many (but not all) environmental issues, environmental targets can be met at a lower cost using market-based instruments than by using a traditional 'command and control' approach.[14,15]

For example, nutrient trading in Nottawasaga Valley in Ontario, resulted in cost-savings of $10 million compared to mandating reduction to point sources of pollution (such as waste water treatment plants).[16]

Local governments can implement price-based and right-based MBIs through their pre-existing authority to charge for services provided. Where regional municipalities provide services over areas that include more than one city or town, coordination is necessary to properly implement MBIs related to regional services.

There are three main families of MBIs:

1 **Price-based:** With price-based instruments, governments set a price on goods and services to reflect environmental and social costs. This price may be expressed as a subsidy, to reflect positive environmental and social benefits, or as a cost, to reflect negative environmental impacts. The market determines resulting change in consumption or production. Examples of this are volume-based water pricing or rain barrel rebates (rebates or subsidies lower the cost of action as opposed to increasing it with pricing).

2 **Right-based:** With right-based instruments, governments determine a limit on the quantity or quality of a good. The limit is established and the trading of rights in a market determines the price. Revenue can be generated through the selling or auctioning of rights. An example of this is the South Nation River watershed water quality trading program in Ontario.[17]

3 **Market friction reduction:** Market friction reduction instruments are non-financial MBIs which aim to improve the functioning of markets through policies such as improving information or growing market demand. This type of MBI does not generate revenue. Examples are mandatory environmental labels, municipal sustainability procurement requirements, and community sustainability partnerships.[18]

Price-based MBIs are used in medium and large municipalities throughout Ontario. This includes water quality and quantity pricing, solid waste pricing, subsidies and rebates for water and energy retrofits and alternative transportation. In smaller municipalities in Ontario, initial reviews show that the majority of MBIs used are

14 Stavins, R. N. (2003). Experience with market-based environmental policy instruments. *Handbook of Environmental Economics.* 1, 355–435. Retrieved from http://www.sciencedirect.com/science/article/pii/S1574009903010143

15 In some cases, market-based instruments can work as a complement to regulations as opposed to a substitute. For more information see: Canada's Ecofiscal Commission. (2014). *Smart, practical, possible: Canadian options for greater economic and environmental prosperity*. Retrieved from: http://ecofiscal.ca/wp-content/uploads/2014/11/Ecofiscal-Report-November-2014.pdf

16 Green Analytics. (2013, March). *Conservation authorities in a changing economy: A green economy road map*. Retrieved from: http://www.greeneconomyroadmap.com/docs/CO_GE_Roadmap_Mar-25-2013.pdf ;Conservation Ontario. (2003). *Watershed economic incentives through phosphorus trading and water quality.* Retrieved from: http://www.conservationontario.ca/projects/pdf/reports/PHASE%20I/watershed_economic_incentives.pdf

17 Marcano, M. (2014). *Pricing water pollution: Water quality trading in Ontario*. Ottawa: Sustainable Prosperity. Retrieved from: http://www.sustainableprosperity.ca/blog/pricing-water-pollution-water-quality-trading-ontario

18 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.

information based (i.e., market frictions reduction MBIs).[19]

Reforming current policy signals can also align market signals with SCP goals. Many policies, procedures and programs currently used by municipalities can be modified to further the goals of SCPs. For example, if municipal decision-makers wanted to reduce urban sprawl, conserve green space or other land-use objectives, they could alter property tax rates or development charges to provide incentive for developers to build in the downtown or in pre-existing neighborhoods.[20]

SECTION 3: HOW THE SUSTAINABILITY ALIGNMENT MANUAL CAN HELP

The Sustainability Alignment Manual can help municipal decision-makers and influencers identify potential market-based instruments (MBIs) that can support the environmental objectives in their Sustainable Community Plan (SCP).

This manual aims to help close the gap between the planning and implementation of SCPs by supporting local governments to use MBIs.

MBIs are categorized into the eight environmental topics most prevalent in SCPs, listed by order of prevalence.[21] MBIs may support more than one SCP goal (for example, land use and ecological diversity) , and therefore may appear in multiple topics. They are visually coded according to MBI family (as discussed above):

- **Price-based MBIs**
- **Right-based MBIs**
- **Market-friction reduction MBIs**

Section 4 provides a description for each of the 70 MBIs inventoried in Section 3.

Important considerations when using this manual

This manual should be seen as a first step to the implementation process of MBIs to support the SCP goals established by a municipality. There exist important considerations in terms of the design of the MBI, the interaction of the policy within the local context and with existing policies, and the need for complementary processes and policies. These considerations include:

19 DeBoer, R. & Clarke, A. *Implementing sustainable community plans with market-based instruments:* A small community context. State of Knowledge Report, Sustainable Prosperity (forthcoming).

20 Sustainable Prosperity. (2013, October). Suburban sprawl: Exposing hidden costs, *identifying innovations.* Retrieved from: http://thecostofsprawl.com/report/SP_SuburbanSprawl_Oct2013_opt.pdf ;
Sustainable Prosperity. *How pricing can contribute to sustainability: Exploring urban form and wastewater management*. Price Works Series (forthcoming). ;
Sustainable Prosperity. *Incenting the nature of cities: Using market-based instruments for green infrastructure in Ontario.* (forthcoming).

21 *University of Waterloo. Implementing sustainable community plans*. https://uwaterloo.ca/implementing-sustainable-community-plans/dissemination/sustainability-topics (accessed October 13, 2015)

- **The design of an MBI is important:** Implementing an MBI does not guarantee the cost-effective achievement of SCP goals. Multiple factors need to be taken into account when designing an MBI in a community, for example:
  - A proper understanding of the problem or goal is essential for the choice and design of a MBI;
  - Consideration of the interaction with existing policies, i.e., will the MBI act as a complementary or a substitute policy, or do existing policies counteract or contradict the incentives provided by the MBI;
  - Complementary policies or availability of alternatives can enhance behavioural response;
  - Proper assessment of regional context and regional coordination might prevent adverse effects from an MBI;
  - Communities should look to minimize administrative costs to maximize the potential of cost-savings.
- **Complementary communications and education:** Since the users of the MBIs are community residents and organisations, it is important for local governments to communicate about the purpose of each MBI and its link to their community's sustainability objectives.
- **Stakeholder engagement:** Implementation of each MBI affects multiple stakeholders. Therefore, local governments need to involve stakeholders into the design and implementation process to increase the transparency and accountability of the MBIs.
- **Comprehensive:** Consistent implementation of each MBI needs to be evaluated to ensure equity among the users.
- **Evaluation:** Regular evaluation, update and revision are important to ensure the efficiency and effectiveness of the MBIs in achieving environmental goals in the SCP.

Topic 1: MBIs to support transportation objectives

Transportation goals are the most common topic in SCPs, and transportation infrastructure is one of the main expenditure categories in municipal budgets. As such, transportation-related objectives can be supported by the implementation of MBIs. Excessive vehicle use generates negative impacts such as: congestion, sprawl, collisions, air pollution and greenhouse gas emissions. Transportation infrastructure, such as roads, is expensive to build and maintain. In Ontario, recent surveys estimate that a third of paved roads, bridges and culverts are in poor condition. The cumulative deficit for road and bridge infrastructure in 93 Ontario municipalities is more than $5 billion. Paved roads make up 80% of that deficit.[22]

The MBIs listed below can help ensure car users pay the full cost of car use, encourage shifting to active and public transport, and/or reduce the cost of low-emission, active, and public transportation options. Price signals to encourage more efficient use of transportation infrastructure can reduce the need for spending. Additional benefits can arise from the generation of dedicated revenue from quantity or price-based MBIs, which ease budget pressures.

Municipal departments responsible: Transportation, environmental services, planning or public works departments or a combination of these.

Topic	Sub-topics	MBIs
Transportation	Modal split	■ 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
	Active and public transportation	■ Subsidized bike parking ■ Subsidized security for cycling ■ Subsidies for transit pass ■ Public transit pricing
	Other	◆ Green public procurement ◆ Partnership approach ◆ Reporting requirements ◆ Other subsidies, funds and grants ■ Scrappage incentives

■ Price-based MBIs ● Right-based MBIs ◆ Market-friction reduction MBIs

22 Public Sector Digest. (2015). *The state of Ontario's roads and bridges: An analysis of 93 municipalities.* Retrieved from: https://www.amo.on.ca/AMO-PDFs/Gas_Tax/Roads-and-Bridges/Roads-and-Bridges-Study-March-2015.aspx

Topic 2: MBIs to help achieve water, wastewater and stormwater goals

Water quality is the second-most common goal in municipal SCPs. Water, wastewater, and stormwater systems are part of an integrated municipal water and wastewater system, in which high water consumption translates to increased volumes of wastewater to treat, and higher infrastructure, maintenance, and treatment costs. Both the overconsumption of water and the disposal of wastewater create environmental impacts such as resource depletion and threats to human and wildlife health.

Canadians are some of the biggest consumers of water and lowest payers of water sanitation services in the OECD[23], so there is a compelling case for implementing MBIs to incentivize water quantity and water quality conservation. The 2012 Commission on the Reform of Ontario's Public Services estimated that the upgrading of Ontario's water and wastewater infrastructure would require a $72 billion investment from 2005-2019.[24] Reduced demand for water, wastewater, and stormwater services, and the generation of dedicated new revenue for this infrastructure is therefore key to helping Ontario municipalities with these future obligations.

Municipal departments responsible: Municipal utilities, water or environmental services departments, either on their own in collaboration.

Topic	Sub-topics	MBIs
Water, Wastewater and Storm Water	Water quality	■ 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
	Water consumption and wastewater treatment	■ 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)	◆ Water source protection incentive programs or policy.
	Other	◆ Green public procurement ◆ Partnership approach ◆ Education programs ◆ Reporting requirements ■ Other subsidies, funds and grants

■ Price-based MBIs ● Right-based MBIs ◆ Market-friction reduction MBIs

23 Sustainable Prosperity. *How pricing can contribute to sustainability: Exploring urban form and wastewater management.* Price Works series (forthcoming).

24 Ibid.

Topic 3: MBIs to support solid waste goals

The creation of solid waste has environmental impact from raw material extraction to manufacture, distribution, use, and disposal. Municipalities manage landfills, with associated environmental impacts of land use, leachate risks, methane emissions, air emissions, and greenhouse gas emissions from waste collection. Programs to encourage the proper reuse or recovery of materials or energy from waste can reduce the lifecycle impacts of material use, while providing inputs to economic activities such as recycling. However, waste prevention is the most-favoured option in the hierarchy of waste management actions.

The use of solid waste-related MBIs can provide both the incentives for the reduction of waste generation as well as the diversion of waste for composting, recycling or energy generation by residential and non-residential sources. Municipal cost-savings can arise from this reduced waste generation and increased diversion.[25]

Municipal departments responsible: Solid waste management, or environmental services departments, or a combination of these.

Topic	Sub-topics	MBIs
Solid Waste	Waste diversion	■ Waste pricing ■ Scrappage incentives ■ Subsidies for reusable water bottle ◆ Product labeling requirements ◆ Environmental choice label ● Bag tag program
	Waste disposal	■ Residential waste tipping fees ◆ Farm waste and bio-solids management programs ◆ High density residential disposal programs
	Energy from waste	◆ District energy programs ■ Funds to support waste for thermal heating and fuels
	Other	◆ Green public procurement ◆ Partnership approach ◆ Reporting requirements ■ Other subsidies, funds and grants

■ Price-based MBIs ● Right-based MBIs ◆ Market-friction reduction MBIs

25 Kelleher, M., Robins, J., Dixie, J. (2005). *Taking out the trash: How to allocate the costs fairly.* C.D. Howe Institute Commentary. Retrieved from:https://www.cdhowe.org/pdf/commentary_213.pdf

Topic 4: MBIs to help achieve air quality and energy goals

For most Ontario municipalities, air quality falls under provincial jurisdiction (with the exception of Toronto, a charter city). Given the interplay between local air quality and energy use, most municipalities can target air quality (as well as climate change mitigation) indirectly through energy. Air pollutants such as particulate emissions, carbon monoxide and others cause smog which is responsible for 9,500 premature deaths per year in Ontario according to the Ontario Medical Association.[26]

The MBIs listed below can help alleviate these impacts by reducing energy use and by encouraging retrofits of energy systems.

Municipal departments responsible[27]: Municipal utilities, energy, environment services or planning departments, either on their own or in collaboration.

Topic	Sub-topics	MBIs
Air Quality and Energy	Energy source	■ Subsidies for renewable energy/ district energy ◆ Environmental choice label ◆ Micro-fit program ◆ District energy program
	Energy consumption, distribution and air emissions	■ Utilities price structure (gas) ■ Anti-idling development charges ■ Anti-idling pay-per-use charges ◆ Energy distribution zones
	Other	◆ Green public procurement ◆ Partnership approach ◆ Reporting requirements ■ Other subsidies, funds and grants

■ Price-based MBIs ● Right-based MBIs ◆ Market-friction reduction MBIs

26 Ontario Medical Association. *Local premature smog deaths in Ontario.* https://www.oma.org/HEALTHPROMOTION/SMOG/Pages/LocalPrematureSmogDeaths.aspx (accessed September 28, 2015).

27 Many aspects of air quality and energy policy lie in provincial hands, however municipalities are important partners for provincial authorities looking to implement energy related MBIs established at the provincial level.

Topic 5: MBIs to support land-use objectives

The size of the built area and density of a municipality are important factors in determining its environmental impacts related to land-use. Low density urban form is associated with increased vehicle dependency which is linked to traffic congestion, smog, and greenhouse gas emissions; mounting costs of servicing suburbs; and loss of greenspace and farmland.[28]

Land-use MBIs aim at encouraging higher density land-use, with associated environmental benefits and municipal savings. They encourage development in areas with existing services, such as roads, water and wastewater systems, retail, schools and employment. Existing municipal pricing tools, such as property taxes and development charges, can be altered in order to integrate these environmental considerations.

Municipal departments responsible: Municipal planning and infrastructure departments.

Topic	Sub-topics	MBIs
Land Use	Land property development	■ Anti-idling development charges ■ Density bonus ■ Density-based development cost charges ■ Density-based property tax ■ Land-value taxation ■ Tax increment financing (i.e. Brownfield) ■ Subsidies for environmental assessment ◆ Alternate transportation demand management for new development
	Green Spaces	■ 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	◆ Green public procurement ◆ Partnership approach ◆ Reporting requirements ■ Other subsidies, funds and grants

■ Price-based MBIs ● Right-based MBIs ◆ Market-friction reduction MBIs

28 Sustainable Prosperity. *Incenting the nature of cities: Using market-based instruments for green infrastructure in Ontario.* (forthcoming).

Topic 6: MBIs to help achieve climate change objectives

While major greenhouse gas abatement MBIs fall under provincial or national jurisdiction, local governments directly or indirectly influence up to half of Canada's greenhouse gas emissions.[29] Municipalities control land use and transportation, and implement building standards. As the province of Ontario identified that significant reductions in GHGs will need to come from transportation and buildings, municipalities play central role in climate change mitigation.[30] Many MBIs useful for reducing municipal GHG emissions are also listed under the topics of transportation, solid waste, air quality and energy and land-use.

In terms of climate change adaptation, MBIs can provide incentives to build communities that are more resilient to extreme weather events. For example, the promotion of green infrastructure for better storm water management or incentives for urban canopy can help alleviate the impacts of overland flooding.

Municipal departments responsible: Planning, public works, public health, community services, and environmental services departments.

Topic	Sub-topics	MBIs
Climate Change	Mitigation	■ Anti-idling development charges ■ Anti-idling pay-per-use charges ■ Subsidy for renewable energy/ district energy
	Adaptation	◆ Storm water management ◆ Partnership approach ◆ Reporting requirements ◆ Green public procurement ■ Incentive for urban canopy ■ Incentive for bio-swales ■ Environmental infrastructure-based development charges ■ Funds to support environmental infrastructure ■ Other subsidies, funds and grants

■ Price-based MBIs ● Right-based MBIs ◆ Market-friction reduction MBIs

29 Federation of Canadian Municipalities. *About Climate Change.* http://www.fcm.ca/home/programs/partners-for-climate-protection/about-climate-change.htm (accessed September 28, 2015)

30 Association of Municipalities of Ontario. (2015). *Ontario municipal governments and climate change: A partnership for a low carbon future.* Retrieved from: http://www.amo.on.ca/AMO-PDFs/Reports/2015/Climate-Change-Submission-2015-09-15-RPT.aspx

Topic 7: MBIs to support food security objectives

Municipalities can contribute to local and regional food security through information and education programs to promote their local food economy, and support for local food markets. Equally important, land use pricing and subsidies can support local farming activities.

Municipal departments responsible: Public health, public works, and environmental services departments.

Topic	Sub-topics	MBIs
Food Security		■ Agro-environmental subsidies ■ Farm subsidies ■ 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

■ Price-based MBIs ● Right-based MBIs ◆ Market-friction reduction MBIs

Topic 8: MBIs to support ecological diversity goals

Municipal power over land-use patterns (including the protection of ecologically sensitive areas) positions them as critical actors in the preservation of ecological diversity.

Municipal departments responsible: Environmental services, community services, planning and public works departments.

Topic	Sub-topics	MBIs
Ecological Diversity		■ 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

■ Price-based MBIs ● Right-based MBIs ◆ Market-friction reduction MBIs

SECTION 4: GLOSSARY OF MBIs

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)

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 development cost charges	Differentiated levies by municipalities on developers for the costs related to infrastructure requirements for new growth, with lower levies for central neighbourhoods, and higher levies for unserviced lots.	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 Ecological diversity
Environmental fund	Funding for environmental initiatives.	Ecological diversity
Environmental infrastructure-based development charges	Differentiated levies by municipalities on developers, with lower levies for developments incorporating environmental infrastructure such as green roofs.	Climate change (adaptation)
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)
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 v.s. 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
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 organizations to share resources 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 travel permission for vehicles.	Transportation (modal split)
Product labeling requirements	Standards for basic packaging and labelling 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)
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 cleaner/ energy-efficient vehicles	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 to sell 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)
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 conversing 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)
Subsides 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 support tree planting and protections of forested areas.	Land use (green spaces) Ecological diversity
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)

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