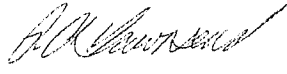


**Environment and Sustainability Committee  
March 3, 2011**

**TO:** Chair and Members of Environment and Sustainability Committee

**SUBMITTED BY:**   
Phillip Townsend, Director, Infrastructure and Asset Management

**DATE:** January 13, 2011

**SUBJECT:** Corporate Greenhouse Gas Emissions Reduction Plan

**ORIGIN**

This report originates from:

- Committee of Whole - September 1, 2005, Corporate Greenhouse Gas Emissions – Local Action Plan; and
- Regional Council - August 3, 2010, HRM Corporate Greenhouse Gas Inventory 2008.

**RECOMMENDATION**

It is recommended that the Environment and Sustainability Committee recommend that Halifax Regional Council:

1. Accept the 2011 Progress Report ,Attachment One;
2. Direct Staff to work with the Environment and Sustainability Committee to create a recommendation to Regional Council for a 2020 Emissions Reduction Target for corporate operations;
3. Direct Staff to complete a community greenhouse gas emissions inventory, which would lead to creating a recommendation to Regional Council for a 2020 Emissions Reduction Target for the community; and
4. Direct Staff, following Regional Council approval of 2020 Targets, to develop Emissions Reduction Plans to achieve these targets and perform corporate and community consultation on the development of these plans.

## **BACKGROUND**

As a policy under the Regional Plan, which acts as the Halifax Regional Municipality's (HRM) Integrated Community Sustainability Plan (a requirement for the receipt of Federal Gas Tax funding), the Emissions Reduction Functional Plan identified programs and methods to reduce the level of air pollutants and greenhouse gases. Human-induced greenhouse gas (GHG) emissions come from burning fuels such as gasoline, diesel, fuel oil, coal and natural gas. High levels of GHG emissions around the world are causing global climate change, which is already affecting sea levels and weather patterns in HRM. By curbing GHG emissions, HRM is helping to mitigate the effects of climate change.

In 2005, Regional Council approved the Corporate Local Action Plan created by Dillon Consulting:

<http://www.halifax.ca/environment/documents/HRMCorporateClimateLocalActionPlan.pdf>

HRM staff have completed, or almost completed, the majority of measures that were to take the municipality to its 2012 target of reducing greenhouse gases (GHGs) to 20% below 2002 levels by 2012. HRM staff now measure GHGs: The 2008 inventory was completed in the spring of 2010, and the 2009 and 2010 inventories will be completed this calendar year. It is now time to create a 2020 target and create a plan to achieve the new target.

This work has direct linkage to the Province of Nova Scotia Environmental Goals and Sustainable Prosperity Act. As per the attached Vision 2020 fact sheet (Attachment Two), this HRM policy impacts air quality, renewable energy, and energy efficiency commitments.

## **DISCUSSION**

As the Progress Report shows, HRM is continually reducing GHG emissions. This also results in reduced operating costs. The projects we undertake save the municipality money because GHG savings are usually associated with reduced fuel consumption.

As per the diagram on page 5 of the Progress Report, it is very likely that we will achieve the total GHG savings outlined in the Corporate Local Action Plan because of our efforts in the corporate building, vehicle fleet and lighting sectors. The Progress Report explains, however, that this achievement may not bring HRM to its absolute reduction target. With significantly underestimated 2002 data, it is difficult to say precisely how much eCO<sub>2</sub> HRM needs to save to reach 20% fewer annual GHG emissions than in 2002, but it is more than the 17,708 tonnes the Local Action Plan calls for.

Nevertheless, the Progress Report observes two positive trends:

1. HRM is becoming increasingly better and more efficient at delivering GHG reduction projects; and
2. HRM is increasing its financial capacity to deliver projects through the energy efficiency reserve. Because of these trends, staff has gained knowledge and experience that will

prove invaluable as they continue to reduce HRM's GHG emissions and its contribution to climate change.

Developing 2020 targets and plans will enable staff to continue to save operating dollars and reduce greenhouse gas emissions.

### **BUDGET IMPLICATIONS**

Creation of the 2020 Targets and 2020 plans are intended to be met within existing Sustainable Environment Management Office (SEMO) operating budget envelopes and delivered by internal staff.

### **FINANCIAL MANAGEMENT POLICIES / BUSINESS PLAN**

This report complies with the Municipality's Multi-Year Financial Strategy, the approved Operating, Project and Reserve budgets, policies and procedures regarding withdrawals from the utilization of Project and Operating reserves, as well as any relevant legislation.

### **COMMUNITY ENGAGEMENT**

Staff looks forward to community engagement on this work such as spending time discussing potential community-based actions that will contribute to reductions in community GHG emissions. Many of the actions that will ultimately end up in the plan, will be for residents and community action, so it is essential to engage the community to develop ideas and initiatives.

### **ALTERNATIVES**

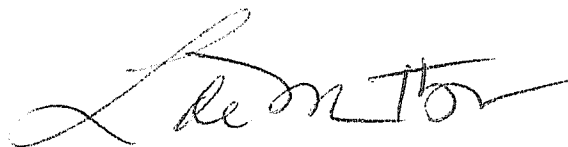
The committee may choose to not accept staff's recommendation. This is not recommended as this work is a requirement under Regional Plan and has strong linkage to provincial and federal policy and mandates which deliver funding opportunities to the municipality (Gas Tax Funding, EcoTrust Funding, Energy programs, Green Municipal Fund, etc.).

### **ATTACHMENTS**

Attachment One: Progress Report  
Attachment Two: 2020 Vision

A copy of this report can be obtained online at <http://www.halifax.ca/commcoun/cc.html> then choose the appropriate Community Council and meeting date, or by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Report Prepared by : Lauralee Sim, Environmental Performance Officer , SEMO, 490-3665



Financial Approval by: \_\_\_\_\_  
For Cathie O'Toole, CGA, Director of Finance, 490-6308

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# **Progress Report**

Greenhouse Gas Emission Reductions 2005-2011  
Halifax Regional Municipality

Prepared by Lauralee Sim, Environmental Performance Officer  
Sustainable Environment Management Office  
<http://www.halifax.ca/environment/semo.html>  
January, 2011

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## Acronyms Used in the Report

eCO <sub>2</sub>	Equivalent Carbon Dioxide
FCM	Federation of Canadian Municipalities
GHG	Greenhouse Gas
HRM	Halifax Regional Municipality
ICLEI	International Council for Local Environmental Initiatives
LAP	Local Action Plan
LED	Light-Emitting Diode
LEED	Leadership in Energy and Environmental Design
NG	Natural Gas
NSP	Nova Scotia Power
PCP	Partners for Climate Protection



## Greenhouse gases, Climate Change and HRM

### **Purpose of the Progress Report**

Climate change is one of the world's greatest challenges this century and HRM is one of the many municipalities across Canada that have committed to reducing their contribution to the issue by reaching greenhouse gas (GHG) reduction targets. The purpose of this report is to record HRM's actions that have reduced corporate GHG emissions since 2002 and to assess HRM's progress toward reaching its target of reducing corporate emissions to 20% below 2002 levels by 2012. This report can help HRM look beyond 2012 and guide the development of new targets for the future. The progress report can also be used to apply for formal recognition of Milestone 5 completion under the Federation of Canadian Municipalities' (FCM) Partners for Climate Protection (PCP) program.

The report begins by describing HRM's GHG story since 1997 and analysing HRM's overall progress. It then reviews GHG savings from buildings, vehicle fleet and lighting initiatives and highlights key lessons learned and areas of opportunity in each sector. Careful consideration of these lessons will be helpful to HRM for the future and to other municipalities beginning their GHG reduction plans and actions. The report concludes with final notes on the necessity of thinking beyond the 2012 target and beyond corporate reductions.

### **What are GHGs and Why Pay Attention to Them?**

Greenhouse gases have been naturally present in our atmosphere for millennia. They act as a blanket that enables plants and animals to survive where they otherwise would not. However, since the onset of the industrial revolution in the mid-nineteenth century, greenhouse gas levels in the Earth's atmosphere have risen at an unexpectedly high rate. The fossil fuels we burn (coal, oil and natural gas) to power electrical equipment, move vehicles and heat (and cool) spaces and water release GHGs into the atmosphere faster than the planet's natural systems can re-absorb them. After almost two centuries of emitting so many greenhouse gases, we are now feeling the effects of an intensified "greenhouse effect", which has led to what is commonly referred to as climate change. As global temperatures rise, HRM will see direct impacts such as sea level rise (HRM reviewed a number of scenarios and is using an estimated 73cm by 2100 in Halifax Harbour for planning purposes. Scenarios consider a combination of sea level rise and land subsistence along with projected emission scenarios by the IPCC, 2007<sup>1</sup>) and increased storm intensity (which, coupled with rising sea levels, could bring even more devastating results than recent Hurricanes Juan or Earl). See <http://www.halifax.ca/climate/ClimateChangeIntroduction.html> for more information about HRM and climate change impacts.

Despite the immensity of the global problem of climate change, every Canadian municipality has a significant role to play. The FCM estimates that municipal governments directly or indirectly influence about 44% of GHG emissions in Canada<sup>2</sup>. As the primary regulators of development and land use, municipalities shape the spatial

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<sup>1</sup> Forbes et al. (2009). Halifax harbour extreme water levels in the context of climate change: Scenarios for a 100-year planning horizon Prepared for Natural Resources Canada. <http://www.halifax.ca/regionalplanning/documents/OF6346final.pdf>

<sup>2</sup> EnviroEconomics. (2009). Act Locally: The Municipal Role in Fighting Climate Change. Prepared for the Federation of Canadian Municipalities. [http://www.fcm.ca//CMFiles/FCM\\_Climate\\_En\\_Final1RSG-1272009-2598.pdf](http://www.fcm.ca//CMFiles/FCM_Climate_En_Final1RSG-1272009-2598.pdf)

distribution of the economy, transportation system and energy use patterns. They also exert influence over waste management and building design. Finally, their high level of interaction with the community often makes engaging households and businesses easier for them than higher levels of government<sup>3</sup>. Preliminary approaches to municipal GHG reductions tend to centre on reducing energy demand for heating, cooling, transportation and power by increasing energy efficiency and simply using less. Another approach, replacing fossil fuel energy sources with renewable energy sources (solar, geothermal, wind, etc.), is becoming increasingly common. These approaches can all be associated with reduced fuel costs in the long term, so they ultimately not only save GHGs but they also save money.

### Measuring GHGs

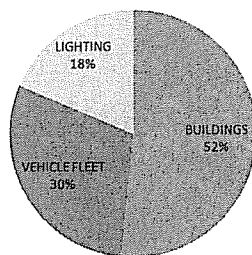
In order to effectively and strategically reduce its GHG emissions, HRM must know where its emissions are coming from. Measuring emissions and creating a baseline set of data enables a municipality to locate its most significant places for improvement and to track increases or decreases over time. By measuring emissions at a project level, HRM can evaluate the effectiveness of particular actions and learn where to put its efforts in future projects to gain further GHG savings. In a context where HRM has committed to actively reducing its emissions, GHG measurements are allowing GHG savings to play an increasing role in decision-making.

Most authorities recognize six greenhouse gases in the Earth’s atmosphere<sup>4</sup>. Like other local governments, however, HRM measures three primary GHGs: carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O) and methane (CH<sub>4</sub>) because they are the most significant sources of emissions in community and government operations. Because each GHG has a different level of impact on climate change, in order to compare the gases they are measured in equivalent CO<sub>2</sub> (eCO<sub>2</sub>) and reported in units of mass (usually tonnes in this report). For example, CH<sub>4</sub> has 21 times the impact of CO<sub>2</sub> so one tonne of CH<sub>4</sub> is equivalent to 21 tonnes of CO<sub>2</sub> (21 eCO<sub>2</sub>).

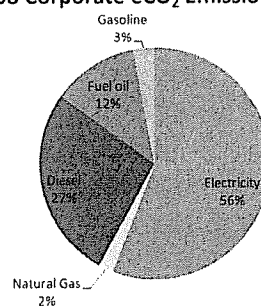
### Where Do HRM’s GHG Emissions Come From?

HRM corporate emissions primarily come from buildings, fleet and lighting (see below) and thus, HRM’s actions are categorized by these sectors in this report. In terms of source, electricity is responsible for the largest proportion of HRM corporate GHG emissions; a result of Nova Scotia’s significant reliance on burning coal to generate electricity<sup>5</sup>. GHG emissions also derive from diesel and gasoline (primarily used for transportation), fuel oil (used for heating and cooling buildings), and natural gas (used to heat buildings).

2008 Corporate eCO<sub>2</sub> Emissions by Sector<sup>6</sup>



2008 Corporate eCO<sub>2</sub> Emissions by Source<sup>7</sup>



<sup>3</sup> EnviroEconomics. (2009). Act Locally: The Municipal Role in Fighting Climate Change. Prepared for the Federation of Canadian Municipalities. [http://www.fcm.ca//CMFiles/FCM\\_Climate\\_En\\_Final1RSG-1272009-2598.pdf](http://www.fcm.ca//CMFiles/FCM_Climate_En_Final1RSG-1272009-2598.pdf)

<sup>4</sup> water vapour (H<sub>2</sub>O), carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), ozone (O<sub>3</sub>), chlorofluorocarbons (CFCs)

<sup>5</sup> Nova Scotia Department of Energy. (April 2010). Renewable Electricity Plan.

<http://www.gov.ns.ca/energy/resources/EM/renewable/renewable-electricity-plan.pdf>

<sup>6</sup> Miedema, Shannon. (May 2010). HRM Corporate Greenhouse Gas Emissions Inventory 2008.

<http://www.halifax.ca/environment/documents/HRMCorporateGHGEmissionsInventory2008May2010ReducedFile.pdf>

<sup>7</sup> Ibid.

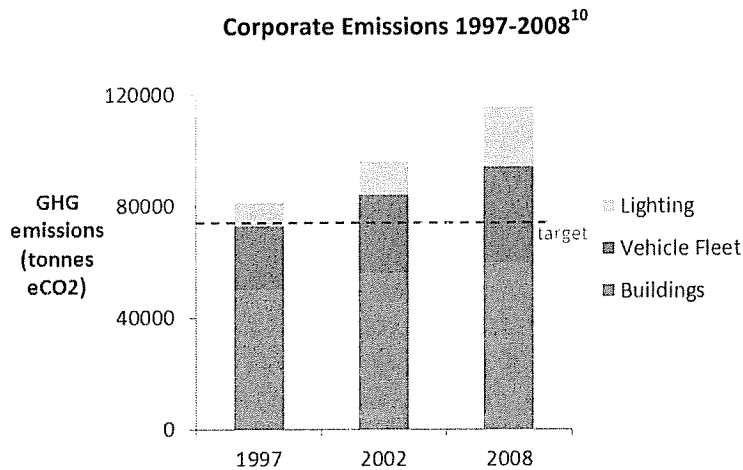




**Background**

1997 marked the first of several landmarks for HRM when it became one of the first cities in Canada to join FCM’s 20% Club and commit to reducing its GHGs 20% by 2012. The 20% Club evolved into “Partners for Climate Protection” (PCP), a joint initiative of the FCM and the International Council for Local Environmental Initiatives (ICLEI) that commits members to achieving five established milestones to reduce their corporate emissions and their community emissions<sup>8</sup>. By 2005, HRM had completed the first three milestones of the program in both the corporate and community spheres: it had completed GHG emissions inventories for the 1997 and 2002 fiscal years, refined its target to *20% below 2002 levels by 2012* and created two Local Action Plans (LAP) to Reduce GHG Emissions including one corporate LAP and one community LAP. HRM has been moving toward completion of milestone 4 (implementation of its LAPs) and is now ready to request formal recognition of milestone 5 completion in the corporate sphere.

As part of the PCP final milestone process, HRM carried out a 2008 corporate GHG inventory, which aimed to present a picture of GHG reduction progress. Unfortunately, the picture that emerged was not as good as many had hoped. Rather than revealing decreasing corporate emissions, the 2008 inventory showed that HRM was actually producing *20% more* emissions than in 2002 (see below)<sup>9</sup>.



<sup>8</sup> Federation of Canadian Municipalities. (2010). Partners for Climate Protection. <http://fmv.fcm.ca/Partners-for-Climate-Protection/> The five established milestones are: 1) an inventory of GHG emissions, 2) reduction targets, 3) construction of an action plan, 4) plan implementation and 5) the recording of results.

<sup>9</sup> Miedema, Shannon. (May 2010). HRM Corporate Greenhouse Gas Emissions Inventory 2008.

<http://www.halifax.ca/environment/documents/HRMCorporateGHGEmissionsInventory2008May2010ReducedFile.pdf>

<sup>10</sup> Note that in accordance with recent ICLEI GHG inventory protocol, this image does not include solid waste emissions. It also does not include wastewater and storm water emissions because Halifax Water has now become a separate entity from HRM. Transit emissions are included in the graph.

However, there was more to the story. First, data collection methods for 2008 were much more complex than for 2002. Therefore, while the 2008 inventory captured a more accurate picture of GHG emissions, it included more emissions sources. HRM now understands that its 2002 data was significantly underestimated. Unfortunately, with underestimated baseline data, assessing progress toward a corporate target is challenging (i.e. if HRM's actual emissions in 2002 were much higher than its estimated 2002 emissions, a 20% reduction would mean greater absolute reductions<sup>11</sup> than the LAP calls for). See the HRM Corporate Greenhouse Gas Emissions Inventory 2008 for more a more comprehensive discussion on the challenges of directly comparing HRM's 2002 and 2008 data<sup>12</sup>.

Second, several factors beyond HRM operations have influenced local GHG emissions. Some have facilitated GHG reductions while some have escalated challenges to GHG reductions:

- HRM, one of the fastest growing regions in Atlantic Canada, grew from a population of about 362,700 in 2002 to 398,000 in 2009 (9.7% growth in seven years) leading to an increased demand for municipal services.
- Generous funding for capital projects from higher levels of government has spurred construction in HRM over the last five years. Therefore, HRM will have built more new buildings than anticipated before the target date of 2012. Despite impressive improvements in energy efficiency measures, new buildings have increased HRM's corporate emissions.
- Metro Transit's fleet has expanded significantly since 2002, partly in response to the adoption of the 2006 Regional Plan that stressed the importance of public transit in a sustainable future for HRM. Metro Transit kilometres travelled and service hours increased immensely from 2002 to 2010 (86% increase in kilometres travelled and 48% increase in service hours). HRM has even constructed a second large transit garage to hold its expanding fleet. A growing fleet comes with growing emissions but when considered in the larger picture, more transit service will likely correspond with fewer community emissions from the transportation sector.
- Wind energy in the province has not developed as quickly as anticipated. Without this renewable source of electricity, Nova Scotia continues to rely heavily on coal-generated electricity, which produces high amounts of GHGs. Currently, almost 80% of the electricity consumed in Nova Scotia comes from coal, petroleum-coke or fuel oil<sup>13</sup>.
- The cost of non-renewable energy worldwide has risen, which has made energy efficiency projects more financially attractive.

Because of the challenges of directly comparing 2002 to 2008 data, this report compares *total GHG savings planned versus achieved* since 2002 in order to assess progress. As stated above, this approach cannot provide a complete assessment of HRM's progress toward its GHG target but the savings outlined in the 2005 Corporate LAP serve as a solid baseline in the absence of accurate 2002 data. The limitations of this method are reviewed in the final section of the report.

This approach allows for the inclusion of actions that have taken place/ will take place between HRM's most recent GHG inventory and the end of the 2010/11 fiscal year. Consequently, this analysis accounts for GHG reductions accomplished between April 2002 and March 2011.

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<sup>11</sup> Absolute reductions refer to reductions based on a specified quantity, rather than reductions based on a percentage or a per capita value.

<sup>12</sup> Miedema, Shannon. (May 2010). HRM Corporate Greenhouse Gas Emissions Inventory 2008.

<http://www.halifax.ca/environment/documents/HRMCorporateGHGEmissionsInventory2008May2010ReducedFile.pdf>

<sup>13</sup> Nova Scotia Department of Energy. (April 2010). Renewable Electricity Plan.

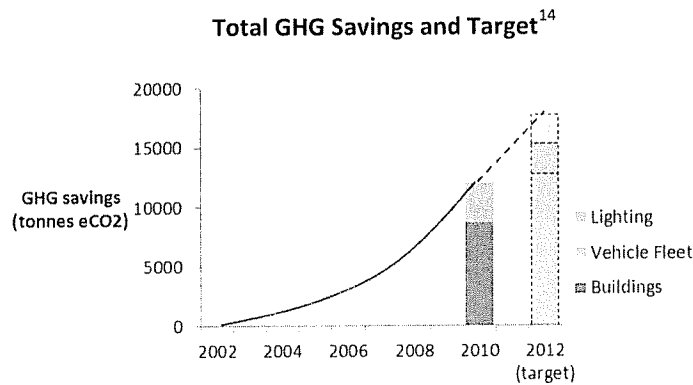
<http://www.gov.ns.ca/energy/resources/EM/renewable/renewable-electricity-plan.pdf>

Most GHG savings reported here are estimates based on staff interviews and where possible, fuel use before and after particular actions. Staff consultations also provided information on the status of GHG savings initiatives, lessons learned and future opportunities.

**Overall Corporate GHG Savings and HRM’s Target**

Collectively, all corporate actions to reduce GHGs since 2002 have resulted in at least 11,994 tonnes eCO<sub>2</sub> annual savings. Because the corporate LAP called for a total of 17,708 tonnes of eCO<sub>2</sub> annual savings, HRM has achieved 68% of the LAP savings two years before the target deadline.

If GHG savings were gained on a linear scale (an equal amount of savings achieved every year), HRM would not likely achieve its target; however, this has not been the case. Instead, new GHG savings have generally grown every year since 2002 implying that if this trend continues, it is possible that HRM will reach 17,708 tonnes eCO<sub>2</sub> savings by 2012. If staff keep up the determination and continue to build on lessons learned so far, there is a good chance HRM will achieve the savings the LAP called for by 2012.



Savings have been achieved in each of the three primary sectors responsible for GHG emissions: buildings, vehicle fleet and lighting.

**Building GHG Savings**

HRM is on track with its building GHG savings. HRM has achieved about 68% of its targeted savings and staff are confident that their knowledge and experience will propel them forward at a faster rate in the coming years.

**Vehicle Fleet GHG Savings**

Vehicle fleet savings are more challenging to track because the most significant savings have come from policy and behavioural changes that are more difficult to quantify. Nevertheless, vehicle initiatives are making a difference and HRM’s police, fire and municipal fleet have consumed less fuel every year since at least 2007.

Transit savings, while not discussed in the corporate LAP, warrant mention in this report because HRM has direct influence over certain aspects of transit emissions. Actions such as operator training, the purchase of more fuel-

<sup>14</sup> Despite a lack of data between 2002 and the present, the information in the “status” column in the appendices confirms that every year, a greater number of projects are completed. The red line on the graph represents estimated GHG savings from 2002 to 2011 based on this type of information.

efficient diesel technology and the installation of high efficiency thermal cooling systems in buses are responsible for avoiding more than 1700 annual tonnes eCO<sub>2</sub>.

### **Lighting GHG Savings**

Lighting is the only sector that will have surpassed its savings target two years early. The LAP called for 2442 annual tonnes eCO<sub>2</sub> savings but HRM will have reached 3300 annual tonnes eCO<sub>2</sub> savings by March 2011. With two years remaining, HRM has already overshoot its lighting target by 35%.

The three sections that follow provide a more detailed analysis of the savings achieved in each sector. Appendices A, B and C list all of HRM's corporate GHG reductions actions and their associated savings. It should be noted that some initiatives cannot be associated with measurable savings. For example, the outcomes of newly introduced policies and practices that limit GHG emissions (e.g. Anti-Idling, Vehicle Right Sizing Filter) are difficult to quantify and are therefore not represented in the graphs below despite their definite contribution to GHG savings. Therefore, HRM's actual savings are likely slightly greater than the savings portrayed in the report.

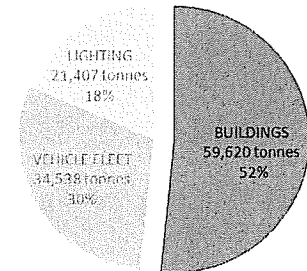
Additionally, other important actions that influence GHG levels but do not fall under any GHG inventory protocol are not included in this report. The destruction or preservation of urban forests falls into this category because of a forest's natural capacity to absorb CO<sub>2</sub> from the atmosphere. HRM is currently completing an Urban Forestry Master Plan that aims to protect and enhance HRM's urban forests. Efforts such as these will also positively affect the amount of GHGs the municipality emits.

The final section of the report discusses the value and the meaning of these savings, within the larger context of greenhouse gas measuring and reporting in HRM.



More than half of HRM's GHG emissions come from heating, cooling, and powering its buildings, which means that buildings represent a significant opportunity for GHG savings. In 2008, HRM buildings were responsible for 59,620 tonnes eCO<sub>2</sub>.

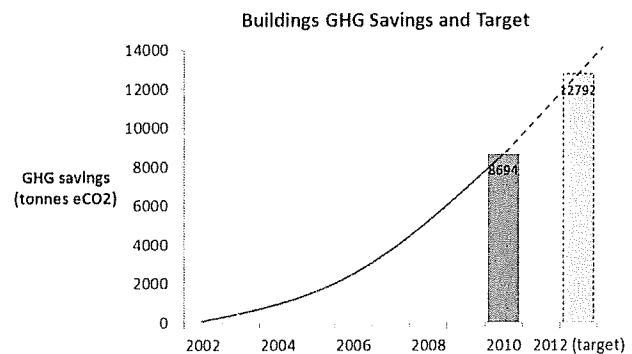
**HRM Corporate Emissions, 2008**



Acutely aware of growing GHG and energy issues, HRM staff have actively shifted their approach to designing and managing buildings over the last five years by focusing on improving energy performance. If it were not for their determination, HRM buildings would emit about 8,700 more tonnes of eCO<sub>2</sub> every year. By the end of the 2010/11 fiscal year, HRM will have achieved about 68% of the savings prescribed in the LAP. The momentum, experience and expertise that staff have gained thus far suggest that HRM's rate of GHG savings from buildings will only continue to increase into the future. Given this consideration, HRM is likely to meet its building GHG savings target by the end of the 2012/13 fiscal year.

**Retrofits**

More than 80% of current GHG savings from buildings are being derived from major and minor retrofits. Major retrofits such as natural gas conversions, refrigeration unit upgrades, lighting retrofits and heat recovery have taken place at several of HRM's largest buildings: Dartmouth Sportsplex, Metro Transit Facility (200 Ilesley Ave.), Alderney 5 Complex, Centennial Pool, Halifax Police Department, Sackville Sports Stadium and Cole Harbour Place. Collectively, these retrofits are saving HRM more than 4600 tonnes eCO<sub>2</sub> every year. See Appendix A for descriptions of energy upgrades at each of these buildings and their associated savings. Minor retrofits (including boiler replacement, insulation improvements, HVAC control upgrades, lighting retrofits, and the installation of vending misers) have contributed to almost 2600 tonnes eCO<sub>2</sub> savings.



**Natural Gas**

HRM is also currently converting several oil heating systems to natural gas (NG) heating systems. Though still a fossil fuel, the burning of NG emits less carbon dioxide per unit heat produced than oil or coal. It is therefore considered a "cleaner" fossil fuel. The distribution of NG is relatively new to HRM; in 2002, (HRM's baseline GHG year) the region did not have access to the gas but by the end of the 2010/11 fiscal year, about 16 HRM buildings (along with multiple private buildings) will generate heat from NG. Conversions (excluding conversions that have been part of major retrofits) are saving HRM almost 1500 tonnes eCO<sub>2</sub> annually.

## **New Buildings**

As a result of the availability of provincial and federal funding, HRM has significantly increased capital spending on new buildings over the last five years. However, HRM's high rate of new building construction is expected to slow down in the coming years. Though every new building contributes to more emissions and increases HRM's total GHG output, new building designs are incredibly energy efficient. Staff estimate that today's building designs are at least 25% more energy efficient than the status quo 5-10 years ago. Significant savings are the result of design features such as geothermal heating (five years ago, HRM had no geothermal systems and by March 2011, it will have seven systems), high efficiency natural gas boilers, and heat recovery systems (e.g. a system designed to use the heat produced from ice generation to heat water and space). See Appendix A for more details about new building energy savings and efficiency features. Besides the concrete GHG savings, one of the most important effects of designing and constructing innovative new buildings has been the experience and expertise gained within HRM staff. With every new project, staff learn enough from their successes and challenges to apply their experience to the next project. Simultaneously, the consulting and contracting community capacity has also been growing, which will not only continue to assist future HRM projects, but also continue to spur progressive building projects in other regions of Atlantic Canada.

The indicator that most represents the considerable shift at HRM is the now common practice of designing and building to LEED Silver standards (Leadership in Energy and Environmental Design<sup>15</sup>). Few gave the LEED rating system much credit in 2005 but in the intervening years, HRM staff have fully acknowledged the system's ability to force important discussions between designers and clients. LEED is not a perfect system (for example, it does not yet recognize geothermal energy) but staff have found it an extremely useful tool to ensure that new HRM buildings are much more energy efficient and user-friendly than the status quo.

## **Lessons Learned**

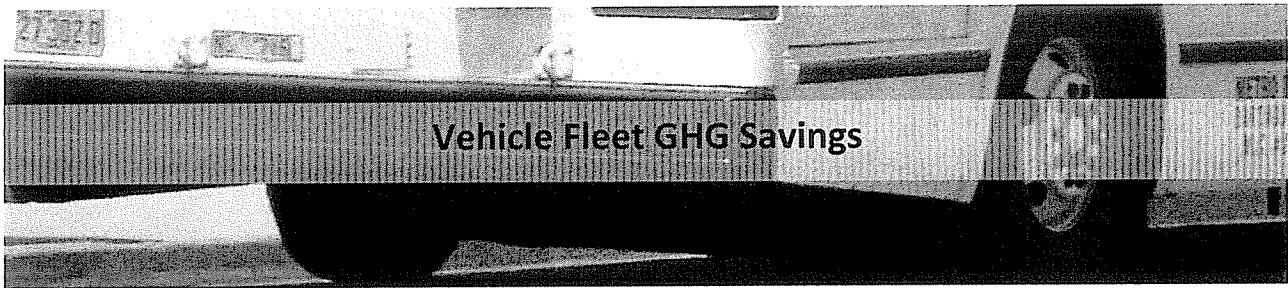
In the larger picture, HRM is now considered a leader in the region. The first step to gaining this status was hiring two internal energy auditors over the last six years. These positions have been integral to developing internal knowledge and capacity by investigating and implementing innovative energy projects, breaking down silos that separate business units, and kick-starting a building benchmarking procedure critical to monitoring HRM's progress. Outsourcing this work would not have produced the same results. Also essential to success has been the establishment of the Energy and Underground Services Reserve that fuels new energy projects with money saved from past energy projects (the reserve functions essentially as a piggy bank). As a sustainable source of funding, it ensures the availability of seed money to spark new energy projects.

Not only is HRM reducing its contribution to global climate change, but HRM's building energy improvements have also brought financial savings because of reduced fuel and electricity requirements. This has been particularly important in the context of rising energy costs. The millions of dollars HRM has spent on energy projects, have given its taxpayers a return on investment in the range of 18.75%. Communicating this type of result has made energy projects even more attractive and justifiable and therefore, likely to continue in the future.

While HRM Facility Development staff continue to improve energy performance from a technical perspective, it is also important for building users to help reduce GHGs. Turning off lights and computers and turning the heat down by just a few degrees would go a long way toward further reductions. There is opportunity for HRM to investigate various ways of promoting energy-saving behaviour to employees and other HRM-building users.

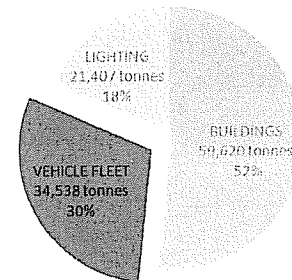
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<sup>15</sup> Information about LEED Canada can be found on the Canada Green Building Council website: <http://www.cagbc.org/>  
Retrieved January 23, 2011



About 30% of HRM’s corporate emissions derive from its vehicle fleet but of this 30%, only 22% come from police, fire and municipal vehicles. The remainder come from transit vehicles. Vehicle fleet GHG savings are more difficult to track than buildings or lighting because vehicle fleet initiatives at HRM have not been carried out in single, self-contained projects. Instead, most GHG savings have come from policy and procedural shifts. Even though the results of these shifts are more difficult to quantify, they represent a larger cultural shift in the organization and are likely to produce sustainable savings in the long term.

**HRM Corporate Emissions, 2008**



**Transforming HRM’s Fleet**

HRM’s fleet is transforming to become more fuel efficient. Smarter decisions about fleet purchases are being made with initiatives such as the Vehicle Right Sizing Filter and Life Cycle Analysis, which ensures that new vehicles are sized to match the use. The filter also ingrains fuel efficiency and emissions in the decision-making process. Fleet Services staff hope to augment the effects of this filter with the purchase of new computer software that will help track usage, maintenance and repairs to determine the ideal point at which to replace fleet vehicles. Additionally, they are developing a policy to ensure that under-utilized vehicles are reviewed and their necessity assessed.

HRM staff are also exploring alternative vehicles and fuels. 20-30 light gas vehicles have already been replaced with diesel units, which emit fewer GHGs per litre consumed than gasoline. HRM will be acquiring two hybrid SUVs before the end of the fiscal year and currently provides five Smart Cars for employee use.

**Shifting Driver Behaviour**

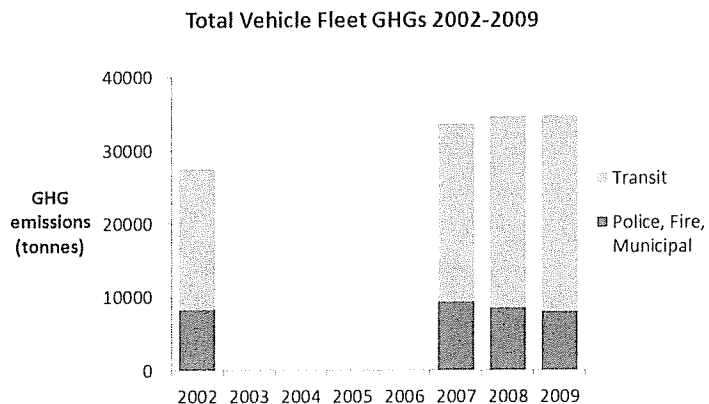
Other fleet initiatives are transforming the way HRM’s vehicles are driven. HRM has engaged Clean Nova Scotia to administer Fleet Wiser<sup>16</sup> and Drive Wiser<sup>17</sup> programs for HRM. While the implementation of the program has encountered several challenges, Clean Nova Scotia staff assert that each of the programs have the potential to lead to at least 5% fuel and GHG savings. Therefore, if administered across all fire, police and municipal services, HRM could see more than 400 annual tonnes eCO<sub>2</sub> savings if the programs are carried out and applied. These savings would also be associated with financial savings, so it is recommended that Fleet Services move forward with Clean Nova Scotia to implement these programs.

Further savings have been derived from an anti-idling campaign and internal policy to restrict idling to a maximum of one minute and to prohibit HRM staff from using drive-through services while operating HRM vehicles. Fleet Services is currently developing a policy to restrict employees from taking HRM vehicles home. This policy will restrict excessive and unnecessary trips and will therefore save fuel and avoid GHG emissions.

<sup>16</sup> Clean Nova Scotia. FleetWiser. Retrieved January 21, 2011: [http://www.clean.ns.ca/content/Sustainable\\_Fleet](http://www.clean.ns.ca/content/Sustainable_Fleet)

<sup>17</sup> Clean Nova Scotia. DriveWiser. Retrieved January 21, 2011: <http://www.clean.ns.ca/content/DriveWiseR>

Despite the fact that HRM’s fleet savings to date have been difficult to quantify, fleet initiatives are indeed reducing fuel consumption and GHG emissions. HRM’s police, fire and municipal fleet, have consumed less fuel every year since at least 2007 (see right). Given that many of the actions listed in Appendix B are still in progress, HRM can expect to continue to see fleet GHG savings in the coming years.



While HRM’s large land mass requires that many buildings are distributed across the region, transportation costs (financial, energy and GHG costs) should be considered when siting new facilities or relocating existing ones. The integration of this type of thinking into office and facility siting will further support the GHG reductions already being made within the fleet sector.

### Transit

About 78% of HRM’s vehicle emissions come from transit vehicles. In fact, Metro Transit vehicles were responsible for 23% of all corporate emissions in 2008, making transit a key venue for GHG reductions. However, transit is a prime example of the intricate link between corporate and community emissions. Whereas increased transit service will result in greater corporate emissions, it will also lead to fewer community emissions from the transportation sector (from residents choosing to ride a bus over driving a single-occupancy personal motor-vehicle). Transit emission reductions were considered in HRM’s *Community LAP*, but because HRM has direct influence on emissions from transit vehicles, some reduction initiatives are included in the progress report (particularly, those related to its fleet and operations).

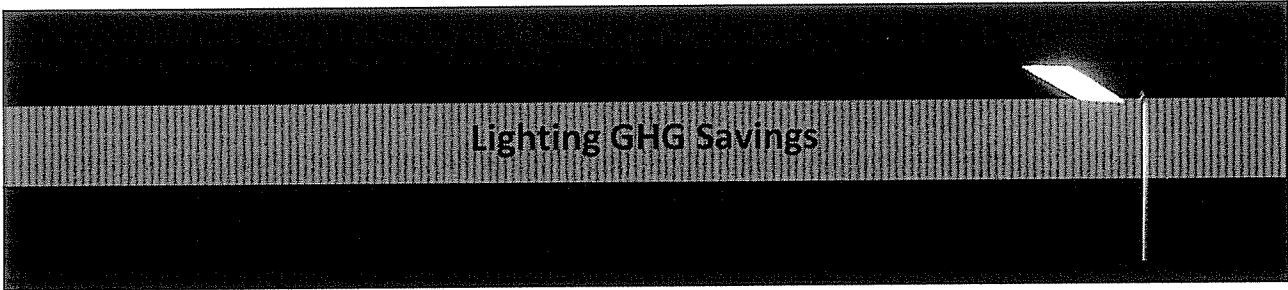
HRM’s most significant GHG savings come from a new transit operator program called Smart Driver. Under the program, transit operators learn driving techniques that save fuel and avoid excess GHGs (e.g. reduced idling techniques, ideal acceleration rates). Metro Transit is hoping to train all of its operators by the new fiscal year. A pilot project in 2010 demonstrated a 6% improvement in fuel economy and when this is applied to the entire fleet, Metro Transit will likely see GHG savings in the range of 1600 annual tonnes of eCO<sub>2</sub>.

In addition to operator training, Metro Transit’s fleet is continuously becoming more fuel efficient. Improvements in North American diesel engine technology have resulted in fewer GHG emissions per kilometer travelled, implying that as Metro Transit replaces old buses with new units, its fleet will emit fewer GHGs per bus on average. In fact, new diesel technology saves almost as much fuel as modern hybrid technology. Metro Transit currently operates two hybrid buses but expects that its future fleet will consist primarily of efficient diesel vehicles rather than hybrid units.

Finally, Metro Transit is installing “mini-hybrid” systems in some of its vehicles. The system is a high efficiency thermal cooling system for municipal buses that reduces fuel consumption by about 10%. HRM will have installed 12 systems by the end of the fiscal year, which will save about 102 tonnes eCO<sub>2</sub> in total.

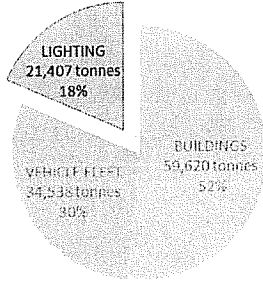
By the end of March, 2011, Metro Transit will be avoiding more than 1700 annual tonnes eCO<sub>2</sub>. See Appendix B for details about each initiative and associated GHG savings.





Street lights, traffic signals and sportsfield lights are collectively responsible for about 18%, (21,407 tonnes eCO<sub>2</sub> in 2008) of HRM’s corporate GHG emissions. While HRM does not have direct control over the sources of energy used to generate the electricity required to operate these outdoor lights, HRM can influence how efficiently its lights use the electricity. So far, HRM’s primary GHG savings have come from new technology made available in the last five years: high efficiency LED (Light-Emitting Diode) traffic lights and LED street lights. By the end of the current fiscal year, HRM will be saving a total of 3300 tonnes annually, which is 35% more than the lighting GHG savings called for in the LAP.

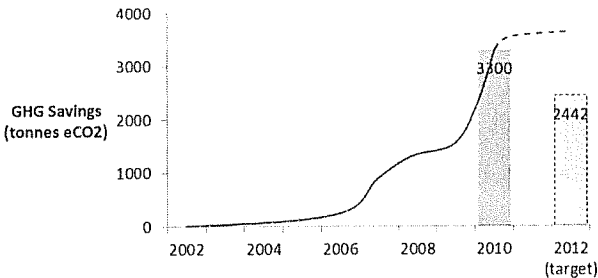
**HRM Corporate Emissions, 2008**



**Traffic Signals**

LED traffic signal lamps are about 84% more efficient than equivalent incandescent lamps. By the end of March, 2011, all of HRM’s approximately 260 traffic signals will have been converted to LED technology, which will save the municipality about 2,371 tonnes eCO<sub>2</sub> every year.

**Lighting GHG savings and Target**



**Street Lights**

The 2500 LED street light conversions that will have been completed by March, 2011 will avoid an additional 929 tonnes eCO<sub>2</sub>. LED street lights reduce energy consumption by an average of about 60% over traditional incandescent lamps.

If all of the 15,000 HRM-owned and operated street lights within its boundaries were to be converted, the municipality could avoid 5574 tonnes eCO<sub>2</sub>. High costs and long payback periods however, are significant barriers to more conversions. Fortunately, other entities are interested in similar projects. First, a local firm, LED Roadway, recently requested funding from the Sustainable Development Technology Canada (a foundation created by the federal government to finance and support new, clean technologies) to test new specialized LED street light technology that comes with the possibility of greater control over lighting levels. With the ability to dim street lights, HRM could save electricity, money and GHGs by reducing lighting levels when possible, and therefore reduce total electricity demand. If granted funding, the local firm will convert 2400 incandescent HRM street lights to the new technology. Second, Nova Scotia Power (NSP) is considering converting its street lights across the province to LED lamps. Of the 40,000 street lights in HRM, NSP owns about 25,000 units (HRM owns and operates the remaining 15,000), but because HRM covers the cost of electricity and these units are included in the corporate GHG inventory, NSP’s LED initiative would have significant impacts in HRM. The conversion of 25,000 incandescent lamps to LED lamps would save about 9290 tonnes eCO<sub>2</sub> annually.

### **Sportsfield Lights**

HRM has not yet implemented any sportsfield lighting initiatives that would bring energy savings. Sportsfields require higher lighting levels than streets and LED technology cannot currently produce the required sportsfield levels. GHG savings from sportsfield lighting will therefore likely come from changes in how HRM *manages* this type of lighting, rather than lamp conversions. For example, sportsfield lights are turned on with an automated control system and cannot be turned off unless a staff member is physically present at the field to turn the switch. While HRM has not yet invested in a control system that would allow staff to manage lights from a central office, the technology to do so currently exists and is being used in other cities. This is one avenue to explore to achieve further GHG savings from lighting.

### **Policy**

Besides the hard GHG savings accumulated from LED technology, HRM is also working on adjusting the current Sub-division Bylaw to require developers to install LED street lights and accommodate underground wires in new subdivisions. The LED street lights will reduce electricity demand and the underground wiring requirement would force developers to design more efficient street lighting.

### **Lessons Learned**

HRM staff stress that the 3300 tonnes eCO<sub>2</sub> savings accomplished so far could not have been achieved alone. They attribute HRM's success to acting quickly on funding opportunities as they have arisen. For example, the payback period for the street light conversions would have been about 12 years if HRM had covered 100% of the costs. By obtaining funding from the provincial government and NSP, however, HRM reduced the payback period to 5-6 years, which was more palatable under a tight municipal budget. Staff will continue to seek unique funding opportunities to continue reducing lighting energy demands.



## Moving Forward

HRM is becoming increasingly better and more efficient at delivering GHG reduction projects. Already, HRM has seen its small projects lead to bigger and more ambitious initiatives. HRM is also increasing its financial capacity to deliver these types of projects through its continuously growing energy efficiency reserve piggybank. These trends have ensured that GHG savings have not grown linearly, but rather, increased exponentially. With reason to believe that these trends will continue, HRM is likely to achieve the total GHG savings the Corporate LAP called for.

However, by just reaching its “savings target”, HRM will *not* achieve its GHG reduction target of 20% below 2002 levels by 2012. With significantly underestimated 2002 data, it is difficult to say precisely how much eCO<sub>2</sub> HRM needs to save to reach its target, but it is certainly more than the 17,708 tonnes the LAP called for (which was to reduce HRM’s absolute emissions to 18.4% below the estimated 2002 levels).

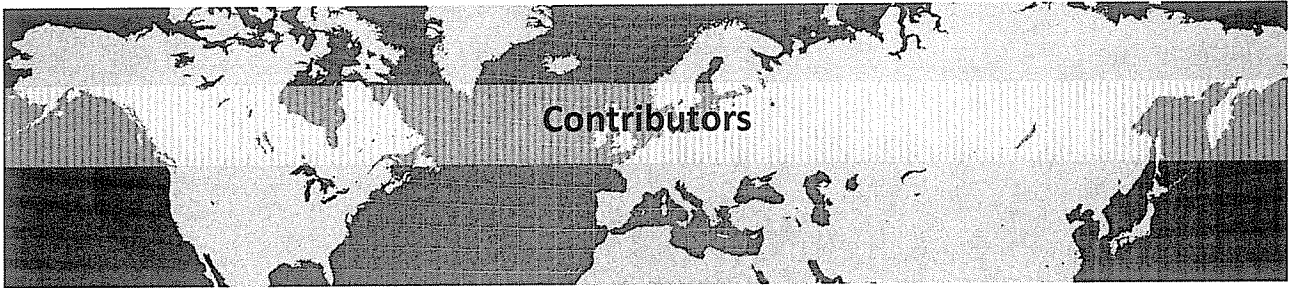
HRM must strive to achieve its target in absolute terms because the planet and its atmosphere are only affected by actual emissions produced, regardless of population growth or economic factors that might spur building construction. In other words, the quantity of emissions avoided does not matter; rather, *absolute* emissions are the bottom line. While a lack of accurate data did not permit a focus on absolute reductions in this report, continued GHG measurements in the coming years will permit stronger analyses and give the municipality a clearer picture of areas of opportunity.

Looking beyond 2012, HRM should now focus on setting a new target for 2020. First, HRM should consider adjusting the base year from 2002 to 2008. The higher quality baseline data will enable HRM to set an ambitious but achievable target, develop a realistic action plan to reach the target and better assess progress along the way. Second, HRM should look to the Province of Nova Scotia for guidance. The Province has a legislated target of reducing GHG emissions to at least 10% below 1990 levels by 2020. It is also aiming to see 25% of its electricity generated from renewable sources by 2015. As the largest municipality in Nova Scotia, HRM should align its goals with provincial targets to help achieve success on a larger scale. Third, HRM should consider excluding transit emissions from its target because transit service expansions (which are usually associated with increases in emissions) help reduce transportation emissions from the community. Slight increases in transit emissions are therefore acceptable. After setting a target, HRM must develop a corporate action plan to help it achieve its goal. This progress report outlines several opportunities for further reductions in each sector and therefore, offers a place to start.

As HRM continues to get its house in order, it is already beginning to boost its efforts to influence the community sphere through integrating land use and transportation planning, influencing the design and construction market, and creating unique programs for community members and businesses to participate in. Given that 98% of emissions in the region fall under the responsibility of the community rather than municipal operations, the community is where the most significant changes must occur. HRM must soon update its community GHG

inventory. Similar to the corporate process, HRM can then assess the community's progress on LAP implementation, establish a 2020 target, and engage the community to develop a plan to get there.

There is no doubt that HRM has come a long way and that its staff have gained experience and knowledge that will prove invaluable as it continues to reduce corporate GHG emissions. With continued effort, HRM can do its part to mitigate the effects of climate change and inspire its residents and other municipalities to do the same.



**Thanks to all who participated in gathering information critical to this progress report.**

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## Appendix A: Building GHG Reduction Initiatives and Savings

Initiative (LAP actions indicated)	Status	Description	Annual eCO <sub>2</sub> savings (tonnes)	Notes
<b>Major Projects</b>				
Dartmouth Sportsplex (B1, B5, B15b)	Complete	Installation of Jet Ice to raise freezing temp of water (1996), energy management computer on pool HVAC system (1997), lighting retrofit (2000), refrigeration plant heat recovery system (2001), retrofit of pool HVAC dampers (1999), door retrofits (1999-2004), electric eye showers (2002), electronic time urinal flushes (2003), refrigeration plant retrofit (2003), oil to NG (2008)	1100	1100 annual tonnes from the retrofits achieved since 2002. A large portion of these savings are from the NG conversion and the refrigeration plant retrofit
Metro Transit Facility Energy Performance Contract (B4, B15b)	Phase 1 is complete; Phase 2 to be complete by the end of 2010	After the completion of both phase 1 and 2, the Metro Transit Facility will have seen: oil to NG conversion, lighting retrofits in offices and garage, replacement of air handling units with new units that recover heat, paint shop conversion from propane to NG, replacement of A/C unit with more efficient unit.	1100	550 tonnes from phase 1, 650 tonnes from phase 2
Alderney 5 (B10, B15a1, B15b)	Virtually complete; two more buildings to be added to cooling system	Oil to NG conversion, geothermal cooling, lighting retrofits in Alderney Gate and Ferry Terminal	900	50 more tonnes will be saved after adding remaining two buildings to geothermal cooling system
Centennial Pool and Halifax Police Department (B15a1, B15b)	To be complete by March 2011	Oil to NG conversion, heat recovery from pool to heat water and space, district heating, solar heating	446	180 tonnes from pool, 201 from HPD, 65 tonnes for solar heating
Sackville Sports Stadium (B15a1)	Phase 1 to be complete by March 2011; Phase 2 to be complete by March 2012.	New energy management system, new pool dehumidification/heat recovery, lighting retrofit	80	80 tonnes of savings from phase 1; phase 2 will bring 300 tonnes of savings
Cole Harbour Place (B15a1)	Complete	Oil to NG conversion, new energy management system, lighting retrofit, heat recovery to heat water and space	1000	
<b>Total GHG savings from major projects 2002-2011</b>			<b>4626</b>	

### Natural Gas (NG) conversions

Oil to NG conversions (B9, B15a2, B15b)	Complete	Woodside Fire Stn; Kings St fire Stn; Highfield Park Fire Stn; Dartmouth North Community Centre; Public Gardens Greenhouses; Northbrook Community Centre/School; 150 Thornhill Dr. (Metro Transit Garage)	399	Does not include NG conversions in major projects.
Oil to NG conversions (B9, B15a2, B15b)	To be complete by March 2011	Halifax Ferry Terminal, St. Andrew's Community Centre	79	
Halifax Metro Centre (B15a1, B15b)	Complete	Oil to NG conversion	1000	HRM does not operate the Metro Centre but gave money for the conversion.
<b>Total GHG savings from NG conversions excluding major projects</b>			<b>1478</b>	

### Minor Retrofits

North Branch Library (B2)	Complete	Lighting retrofit	60	North Branch Library was one of HRM's few stand-alone lighting retrofits.
Efficiency NS-funded lighting retrofits (B14)	To be complete by end of the current fiscal year	40 small buildings will undergo lighting retrofits this year under Efficiency Nova Scotia's "Small Business Lighting Solutions" program.	1500	Efficiency Nova Scotia is covering 80% of the costs to replace old light bulbs with new efficient ones.
Vending Misers	Installed at 30 vending machines in HRM buildings	Vending misers are small pieces of equipment that power down vending machines when no motion is detected and repower the machine only when needed.	30	Vending misers have had minimal impacts on our overall corporate GHGs but when applied to the community, 10,000 tonnes eCO <sub>2</sub> could be saved (i.e. if all vending machines in HRM, both public and private, were to use vending misers).
General building retrofits (B3, B15a1, B15a2)	Complete	Various efficiency measures (high efficiency boilers, insulation, new windows, HVAC controls, lighting) have been implemented in several small buildings including five fire stations and the Captain Spry Community Centre.	1000	
<b>Total GHG savings from energy efficiency projects</b>			<b>2590</b>	

## New Buildings

LEED Silver standard for new buildings (B15c)	Ongoing	Building to LEED Silver standards is now common practice for new HRM buildings.	-	This practice represents a significant corporate culture shift over the last five years. Staff recognize that LEED is not a perfect measure of the ideal building but they understand that it is a useful tool. They also note that LEED does not always imply fewer GHGs (e.g. large glass buildings require more heat than a well-insulated building in cold climates; geothermal technology does not garner any points).
Geothermal heating in new buildings (B11, B15c)	4 complete at end of 2010; 3 to be complete by March 2011	Gordon Snow, East Dartmouth Community Centre, Prospect Road, Alderney 5 (geothermal cooling)	-	HRM is a leader in the region. Five years ago, HRM had no geothermal projects.
New energy efficient buildings	Ongoing	e.g. Canada Games Centre (LEED Silver, 200 solar panels water heating, solar air ducts, high efficiency NG boilers, heat recapture, heat pumps); 4-Pad Arena/BMO Centre (heat recovery, NG boilers); Ragged Lake Transit Facility (LEED Silver, reduced lighting demand)	-	Most new buildings are contributing to increasing HRM's total GHGs but their design lessens their impacts on corporate GHGs.
Overall new building savings			25%	HRM's new buildings are using at least 25% less energy than they would if HRM staff were not actively trying to reduce corporate building energy demands

## Other initiatives (administrative, and policy)

Building rationalization program (B6)	To be completed by end of March 2011	The Building Rationalization Program is an effort to investigate buildings in HRM's inventory to assess which buildings are under HRM's responsibility.	-	Additional buildings in HRM's inventory affects the amount of emissions in its GHG inventory.
Wind Energy Regulations (long term goal in LAP)	Proposed plan amendments will go to Council in early 2011	HRM is working on new wind energy regulations that will clarify where and how small and large scale wind turbines can be built in HRM. The proposed amendments to Land Use By-laws will make it easier to develop wind turbines under some conditions and therefore promote the use of this renewable source of energy.	-	



**Investigated but not currently implemented**

Six Energy Performance Contracts (EPCs) (B8)	EPCs have not been implemented	LAP calls for EPCs at City Hall, Halifax Police Station, Halifax Main Library, Eric Spicer Building, Alderney Gate Complex, and Captain Spry Building.	HRM is continuing to improve energy performance on its own, which has proven more effective than outsourcing energy efficiency projects through EPCs. Several of the buildings recommended for EPCs have undergone retrofits through other mechanisms.
Biofuel in buildings (B12)	Investigated but not implemented	LAP suggested using biofuel rather than oil to heat municipal buildings.	HRM carried out trials and research to understand the implications of using biofuel instead of oil to heat buildings. Staff found that the operational risks did not outweigh the financial and energy/GHG return.
Waste oil recovery for use in boilers (B13)	Investigated but not implemented	At the time of the LAP's development, HRM staff were looking into re-using waste vehicle oil to heat buildings (for example, re-using oil from buses to heat the transit garage). At the time of the LAP's development, HRM could have purchased a portion of their electricity from NSP as green power (it could purchase a block of wind energy to be delivered to the power grid system where it would displace an equal amount of electricity derived from fossil fuel).	Staff ultimately found the payback too small for the level of effort required to put an oil-reuse system in place.
Green power purchase (B16)	No longer available	At the time of the LAP's development, HRM was discussing the creation of the first of three "energy nodes" that would form a skeleton community district energy system.	Green power in this form is no longer available from NSP.
Community Energy project (B7, B15b)	Investigated but not implemented	The LAP suggests gathering basic info to track progress on energy initiatives (turning off lights, computers, etc.), paper, transport, and procurement of office equipment.	Funding issues halted the project but the discussion led to other positive projects and relationships.
Green office/employee policy (B17)	Not completed	2005 LAP suggests tracking building energy features like utility bills and trends, reviewing skin and exterior insulation values, inspection of doors, walls and window conditions, checking building mechanical equipment and systems and electrical equipment systems.	While these types of initiatives have not yet been carried out, they have potential to significantly affect a building's GHG emissions.
Buildings Energy Management Plan (B15a, Appendix D of LAP)	Not completed in a formal manner		HRM does this as best as it can on an ongoing basis but does not have the staff resources to thoroughly inspect all corporate buildings with an energy efficiency lens.

## Appendix B: Vehicle Fleet GHG Reduction Initiatives

Initiative (LAP actions indicated)	Status	Description	Annual eCO <sub>2</sub> savings (tonnes)	Notes
<b>Transforming HRM's Fleet</b>				
Replace gas vehicles with diesel units (VF2)	20-30 vehicles will have been replaced by the end of the current fiscal year	HRM has begun replacing light duty gas vehicles with diesel units.	-	Savings directly attributed to this initiative are difficult to estimate because of the range of distances various vehicles travel and the range of fuel they consume.
Explore alternative fuels and vehicles (VF8)	Ongoing	HRM will be acquiring two hybrid SUVs before the end of the fiscal year. HRM staff have also investigated using compressed natural gas to fuel motor vehicles but the infrastructure costs are currently far too great to justify the investment.	-	Savings have not been recorded yet and are difficult to predict.
Smart Cars	Five Smart Cars purchased	When an employee drives a Smart Car to a meeting rather than, for example an SUV, they are responsible for fewer GHG emissions. HRM is currently examining the benefits of the Smart Cars and ways to better promote their use to employees.	-	GHG savings are difficult to estimate because it is hard to know whether a Smart Car trip would have otherwise been taken in a car, an SUV, transit, other mode, or even taken at all. The primary purpose of the Smart Car fleet is to offer a way of getting to and from work-related meetings so that staff can walk, cycle or ride the bus to work (and not feel that they need a personal vehicle for work purposes).
Vehicle Right Sizing Filter and Life Cycle Analysis (VF10)	Filter is currently being used	The Vehicle Right-Sizing Filter was designed to ensure that HRM purchases vehicles that are appropriately sized for the intended use. It includes an SUV justification form that ensures a real need for an SUV before its purchase. The Life Cycle Analysis ensures that vehicle purchase decisions are made with fuel efficiency and emissions in mind.	-	GHG savings are difficult to estimate. After being used for about one year, HRM is already seeing a shift in how we purchase vehicles.
Vehicle Use Policy (VF1, VF6)	Policy currently being developed	Since 2002, HRM's fleet has grown by about 100 vehicles to meet increasing community service demands. However, staff are currently developing a Vehicle Use Policy that could lead to fleet downsizing. For example, one vehicle may adequately replace three vehicles that travel less than 10,000km/year.	-	Generally, replacing vehicles will reduce overall fleet emissions because newer models are usually more efficient. Greater fuel efficiency also implies greater cost savings.
Improve vehicle efficiency with computer software (VF4, VF10)	RFP currently soliciting proposals	HRM would like to invest in software that would help track vehicle usage, maintenance and repairs in order to determine the ideal point at which to replace fleet vehicles.	-	

## Shifting Driver Behaviour

<p>Adopt an HRM fleet driver training program (VF5)</p>	<p>In progress but may not be complete by March 2011.</p>	<p>HRM has engaged with Clean Nova Scotia to implement FleetWiser and DriveWiser programs. The programs would instruct fleet managers and supervisors on how to manage vehicles to achieve maximum fuel efficiency and municipal operations drivers on driving techniques to improve fuel efficiency. Clean Nova Scotia expects the program to realize at least 5% fuel (and GHG) savings. If the techniques were applied to the entire municipal operations fleet which generally produces emissions in the range of 5000 tonnes, a 5% savings would lead to 250 tonnes eCO<sub>2</sub> savings per year. If applied to all municipal, police and fire vehicles, HRM could see more than 400 tonnes eCO<sub>2</sub> savings per year.</p>	<p>As of Dec 2010, Clean Nova Scotia had gathered baseline fuel consumption data and given two municipal planning supervisor workshops. Clean Nova Scotia hopes to run a pilot project over the next few months and monitor fuel savings in 8-16 light duty vehicles.</p>
<p>Anti-idling campaign and policy (VF7, VF10)</p>	<p>Community-wide anti-idling campaign in 2006; Internal policy adopted in 2008.</p>	<p>HRM has adopted an anti-idling policy for all employees using HRM vehicles, including transit vehicles. Its central idling limitation states that "vehicles shall be shut down whenever idling periods are expected to exceed one (1) minute". HRM also used community-based social marketing to conduct a community-wide anti-idling campaign in 2006.</p>	<p>GHG savings are difficult to estimate because the reduction in idling is nearly impossible to quantify. However, several staff members claim to have witnessed a shift in behaviour, which indicates at least partial compliance with the policy</p>
<p>Reduce unnecessary vehicle use (VF5)</p>	<p>Policy currently being developed</p>	<p>Staff are currently developing a policy that would restrict employees from taking HRM vehicles home. This policy would restrict excessive trips in HRM vehicles and therefore save fuel and avoid GHG emissions.</p>	<p></p>

## Transit

<p>Transit vehicle replacements</p>	<p>Ongoing</p>	<p>Diesel engine efficiency improvements over the last few decades have resulted in fewer GHG emissions per km travelled. Therefore, as transit buses are replaced with newer, more efficient units, HRM's transit fleet will emit an average of fewer GHGs per unit. New diesel engine buses save almost as much fuel as hybrid buses.</p>	<p>GHG savings are difficult to estimate. New heavy-duty vehicle greenhouse gas emission regulations (proposed for 2014 and newer models) will further improve transit-related emissions.</p>
<p>Mini-hybrid systems for buses</p>	<p>Systems installed in 4 buses; 8 more to be installed by March 2011</p>	<p>The Mini-Hybrid Thermal System is a high efficiency, next generation thermal cooling system for municipal transit. Retrofitted transit vehicles use up to 10% less fuel and therefore, save about 10% GHGs.</p>	<p>The 12 systems save a total of about 102 tonnes eCO<sub>2</sub> annually. Each system saves an average of 3100 L fuel per year (37200 L total), which would produce 102 eCO<sub>2</sub> tonnes.</p>

Hybrid buses	Two hybrid buses are currently in use	With help from the provincial government, Metro Transit put 2 hybrid buses on HRM streets in March 2010. The hybrid buses use up to 30% less fuel than regular buses.	46
Transit operator training program (VF5)	Currently training new drivers and will bring in all operators by new fiscal year	The Smart Driver Program teaches transit operators efficient driving techniques that save fuel and GHGs.	1638
<b>Total GHG savings from transit</b>			<b>1786</b>

Expected tonnes eCO<sub>2</sub> from transit in 2010/11 = 27306 (based on estimated 10,000,000L of fuel consumed). 6% of total transit fleet eCO<sub>2</sub> is 1638 tonnes.

**Investigated but not currently implemented**

Biodiesel fuel initiative (VF3)	Initiated but terminated when supplier could no longer provide the fuel	HRM began using biodiesel in its fleet in 2004. After sorting through quality issues, fleet services recognized that the fuel did emit fewer GHG emissions than regular diesel. Unfortunately, HRM's supplier no longer produces the fuel so HRM diesel vehicles are once again using regular diesel.	-
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Note that commuter initiatives such as commuter trip reduction program and parking incentives for alternative fuel or vehicle use are not included because emissions associated with these activities will be included in community inventories and action plans in the future.

## Appendix C: Lighting GHG Reduction Initiatives and Savings

Initiative (LAP actions indicated)	Status	Description	Annual eCO <sub>2</sub> savings (tonnes)	Notes
<b>More efficient lighting</b>				
LED traffic signal program (SL1, SL2, SL5)	All HRM traffic signals will have been converted by March 2011	LED traffic signal lamps save up to 85% power. Beginning four years ago, HRM began converting all of its approximately 260 traffic signals (set of lights at an intersection) to LED lamps with the help of provincial and NSP funding.	2371	993.8 tonnes were saved from the conversion of the first 109 signals and 1376.8 tonnes are being saved from remaining 151 signals.
LED street lights	300 street lights converted to LED in 2008; 2200 more to be converted by March 2011	LED technology in street lights is relatively new. By March 2011, HRM will have converted about 2500 of the 15,000 street lights it owns and operates (16.7%).	929	HRM's street light GHG savings have come from two sets of conversions: 111.5 tonnes from the first 300 conversions and 817.7 tonnes from the next 2200 conversions. HRM pays to power an additional 25,000 street lights within its boundaries that NSP owns. Note that NSP is considering converting its lights in the rest of HRM and the province to LED over ten years, which would save HRM even more GHGs.
<b>TOTAL</b>			<b>3300</b>	<b>This is 35% more than what the 2005 LAP called for</b>

### Changing policy

Regulations for new subdivisions (SL8)	In progress	Staff are working on proposed Sub-division Bylaw amendments that would require developers to plan for underground wires and LED street lights. An underground wiring requirement would force developers to design street lighting more efficiently.	-
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### Investigated but not currently implemented

Solar-powered bus stop lighting (SL3)	Pilot project initiated	In 2005, HRM piloted Carmanah Technologies solar-powered LED bus stop lighting system i-STOP on bus stop poles. Unfortunately vandalism deterred staff from purchasing more and extending the project.	-
Solar-powered transit shelter lighting (SL4)	Pilot project initiated	Metro Transit has purchased one solar-powered light to date. Solar powered lighting is generally offered as an extra option by transit shelter manufacturers but at a significant cost. HRM has not committed to purchasing more solar lighting at this time.	-

Solar LED street light technology is currently available but it comes at a significant cost. While solar may be useful in remote areas, there is no economic justification for their purchase in serviced areas at the present. Their payback period is much longer than electric LED technology.	-	Not initiated
HRM has not reduced its lighting operation times because it follows national guidelines in order to avoid liability issues. The national guidelines are currently being reviewed but are out of HRM's control. However, new street light technology that will allow greater control over lighting, including the ability to dim street lights may contribute to more savings. A local firm, LED Roadway, has recently applied to Sustainable Development Technology Canada for funding to test this new technology in 2400 street lights in HRM. Should this initiative successfully go forward, it could more than double the street light GHG savings HRM has already seen.	-	-
Reducing lighting operations by 15 minutes per day was expected to save up to 228 tonnes per year, according to the LAP.	-	Not initiated
Decrease hours of operation (SL6)	-	-

# N O V A S C O T I A ' S 2020 VISION

**Nova Scotia aims to have one of the cleanest and most sustainable environments in the world by 2020.**

This commitment was adopted in the Environmental Goals and Sustainable Prosperity Act, proclaimed in June 2007. The act sets out 21 far-reaching goals for the province, ranging from reduced air emissions and waste, to new energy standards for buildings and increased protection of our land and water. These goals are outlined below.

## **Ecosystem Protection**

**Protecting our most valuable assets—our natural environment**

- Legally protect 12% of the total land mass of the province by 2015
- Adopt strategies to ensure the sustainability of forestry, mining, parks, and biodiversity by 2010
- Establish a policy to prevent net loss of wetlands by 2009

## **Air Emissions**

**Doing our part to fight climate change and improve the air we breathe**

- Reduce GHG emissions to at least 10% below 1990 levels by 2020
- Adopt emissions standards for new vehicles by 2010
- Reduce nitrogen oxide emissions by 20% (from 2000 levels) by 2009
- Reduce sulphur dioxide emissions by 50% (from sources existing in 2001) by 2010
- Reduce mercury emissions by 70% (from 2001 levels) by 2010
- Meet the Canada-wide standard for airborne fine particulate matter by 2010
- Meet the Canada-wide standard for ground-level ozone (which contributes to smog) by 2010

## **Renewable Energy**

**Tapping into nature's source of energy**

- Obtain 18.5% of Nova Scotia's total electricity needs from renewable sources by 2013

## **Water Quality**

**Restoring, preserving, and managing our precious water resources**

- Develop a comprehensive water-resource management strategy by 2010
- Provide at least primary treatment to all wastewater treatment facility discharges by 2017
- Meet operating guidelines for all septage treatment facilities by 2011
- All municipal public drinking water supplies will meet the province's treatment standards by 2008

## **Contaminated Sites**

**Building our economy by renewing our land**

- Develop regulatory tools to stimulate redevelopment of contaminated land by 2010

## **Solid Waste**

**Continuing to be an international leader in solid waste management**

- Reduce Nova Scotia's solid waste disposal rate to no more than 300 kg/person per year (38% reduction from 2006 levels) by 2015

## **Sustainable Purchasing**

**Leading the way in the purchase of environmentally and socially responsible goods and services**

- Develop and adopt a sustainable procurement policy for government departments by January 1, 2009

## **Energy-Efficient Buildings**

**Saving money and energy in our buildings at work, home, and play**

- Require all new residential dwellings in the province to display an EnerGuide rating by 2008 (EnerGuide is a national energy efficiency rating, from 1 to 100. The higher the number, the higher the efficiency.)
- Require an EnerGuide rating of 80 on all new residential dwellings by 2011
- Construct a green-certified government building as a demonstration facility by 2015

## **Achieving the 2020 Vision**

The province will be developing new strategies and policies to advance its 2020 Vision in co-operation with other levels of government, private industry, and the public. The Minister of Environment and Labour will report annually to the House of Assembly on progress made toward the goals.

Achieving the province's vision will require effort and commitment from all Nova Scotians. We are confident that we can live up to the challenge. The future prosperity of our economy and ecosystems depends on it.

*This is an overview of the Environmental Goals and Sustainable Prosperity Act. It is not intended to be a complete description and is not binding on the Crown. Please refer to the official version of the legislation, which is available online through the Nova Scotia Legislature website.*