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Community Energy Plan

Task 6 – Monitoring Plan

Final Report

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SETTING THE CONTEXT – MONITORING PLAN

The Problem

- Energy consumption and GHG emissions in HRM have increased by 18% and 12% respectively in the past five (5) years.
- Current business-as-usual models predict up to a 50% increase in energy consumption in HRM in the next twenty (20) years.
- Prices for conventional forms of energy are forecast to increase by 30% - 60% in the next twenty (20) years.
- HRM has committed to a 20% reduction in GHG emissions below 2002 levels by 2012.
- Currently, there is no consistent method to monitor and verify the success of GHG emission reduction measures.

HRM's Response

- HRM's 25-Year Regional Plan includes a vision of sustainability.
- HRM, along with NRCan, developed the terms of reference for this CEP which is to be a template for other municipalities across Canada.
- The CEP template includes the requirement for a monitoring program to ensure that progress against emission reduction targets can be monitored.

Expected Outcomes

- The plan actions from the implementation plan will be categorized based upon their ability to be monitored.
- The monitored actions can be regularly reported as they are implemented so it is readily apparent if progress is being made.
- The monitoring program can be part of the ongoing public outreach and education program of the CEP.

1 APPROACH

Ensuring that the recommended actions in the implementation plan translate into measurable and meaningful outcomes of energy savings, improved air quality and GHG emissions reductions is key to the success of this plan. To assist HRM to evaluate the success of the overall program and individual initiatives, it is recommended that a monitoring program be established to provide an ongoing status of program activity, successes and challenges. Monitoring activities can provide a feedback loop to program administrators as a means to support continuous improvement activities and may be used to support multiple objectives at the HRM. Energy savings may be measured to establish the cost effectiveness of initiatives in order to provide a basis for ongoing program funding.

Where regulations and standards are used to achieve energy savings, monitoring activities may be integrated with enforcement and compliance activities, to eliminate duplication of efforts. A logic model for the CEP implementation and monitoring activities is illustrated in Figure 1. Key to the success of implementation will be to define indicators and targets for critical components of inputs, outputs and outcomes. The Task 4 report analysis section outlines suggested indicators as well as key inputs, outputs, and expected outcomes. These indicators are further analysed in Table 3 of Section 5 in terms of the type of information that is required to measure them; the frequency of data collection as well as other sets of activities that are necessary to ensure a successful monitoring program.

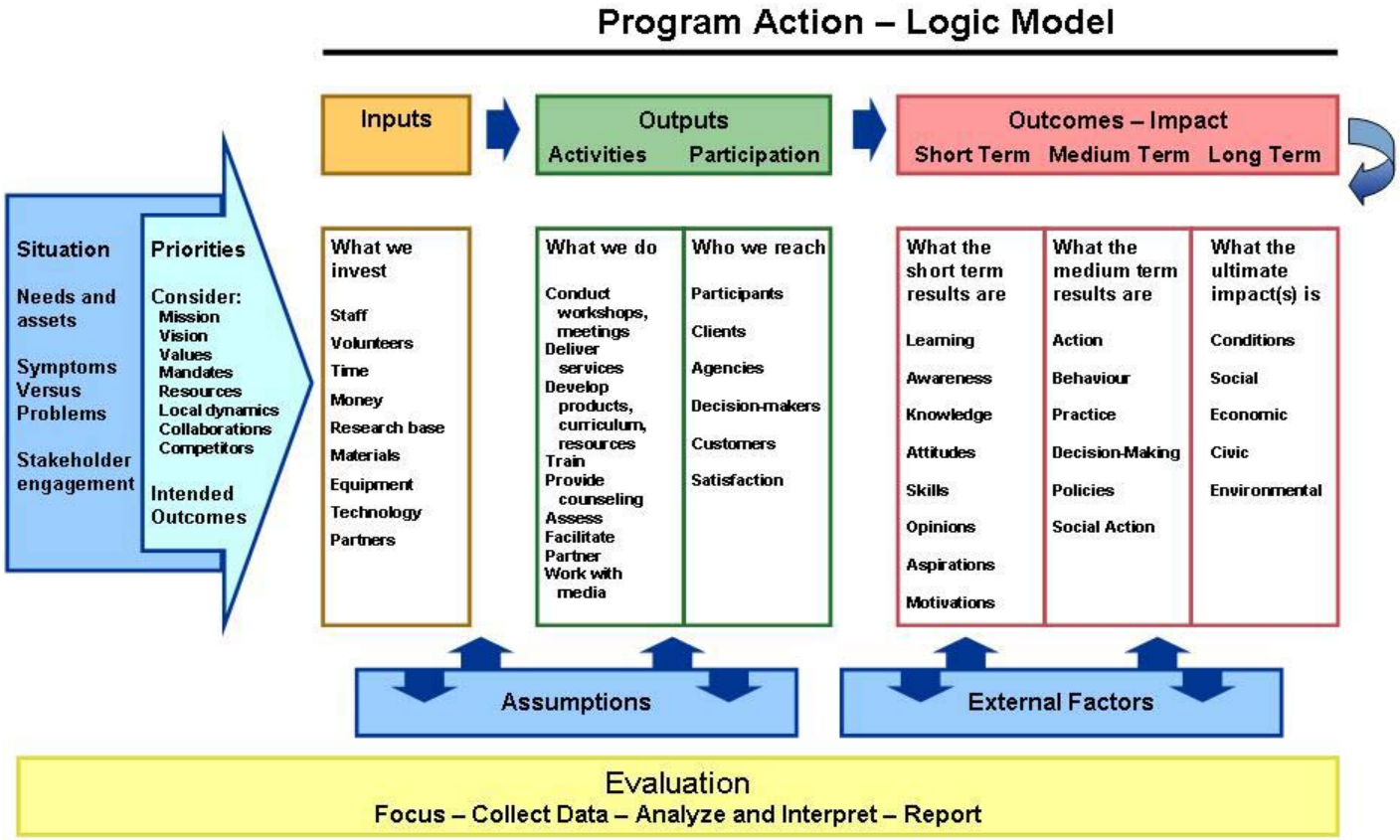

Figure 1. Logic Model to CEP implementation[1]

1.1 Monitoring Activities

Designing a monitoring program requires the designer to answer the following questions:

- What do you want to know?
- Indicator- How will you know it?
- Timing - When to collect data?
- Data collection - Who has the info/ methods for gathering the info?

Monitoring should require an assessment of both the inputs into a program or policy as well as the direct outputs and outcomes. Monitoring of inputs may include:

- Staff resource time;
- Number of partnerships formed or ongoing;
- Financial resource allocation; and
- Financial leverage ratio between HRM funds and external funds.

Monitoring of outputs may include:

- Delivery of programs, such as the number of the CEP actions that have been initiated and their status;
- Number of energy audits or building retrofits resulting from the CEP, or relative change in the number performed;
- Amount of educational materials produced; and
- Number of participants in programs or the relative change in participation levels.

Monitoring of impacts or outcomes may include aggregate as well as program specific behavioural changes and energy savings. Aggregate energy savings may be obtained for electricity, natural gas, oil, propane, and gasoline/diesel sales from utilities and suppliers. Monitoring of individual actions may be accomplished by direct measurement utilising the indicator provided for each action as shown in the matrix in Section 5. Table 1 below shows examples of the proposed monitoring parameters for selected actions under Goal 1 and Goal 5:

Table 1. Examples of Specific Indicators and Monitoring Requirements

Goal 1: Improve the Energy Efficiency of Buildings	
Corporate Action 1:	Retrofit of existing HRM buildings for energy efficiency improvements and the use of renewable energy systems, such as solar panels, with the recapitalization being paid from guaranteed energy savings.
Target Outcomes:	Overall corporate consumption reduction in energy of 25% or 180,000 GJ annually.
Indicator:	Energy savings per retrofitted building and for buildings aggregated.
Data Source and frequency of data collection:	Corporate energy bills analysed annually.

Community Action 1:	Support existing programs to increase energy efficiency and consumption reduction in the residential sector.
Target Outcomes:	Increase the average residential EnerGuide rating in HRM by 30%. Increase participation rates in residential energy efficiency programs.
Indicator:	Average EnerGuide Rating in participating homes. Number of participating homes.
Data Source and frequency of data collection:	Natural Resources Canada analysed yearly.

Goal 5: Increase Efficiency of Infrastructure	
Corporate Action 3:	Ensure implementation of the greenhouse gas emission reduction plan for pumping stations.
Target Outcomes:	Reduced energy consumption (GJ) and operation and maintenance costs. Longer equipment service life and fewer unscheduled shutdowns.
Indicator:	Relative reduction in energy consumption from pumping stations.
Data Source and frequency of data collection:	Corporate energy bills analysed yearly - as well as before and after specific retrofits.

1.2 Implementation Status Report

An implementation status report should be completed on an annual basis. It will provide an overview of the status of individual actions, and where possible, estimates of the impacts, including program costs, impacts and cost effectiveness. Savings from individual activities may be aggregated to estimate overall estimates of the impact of the energy plan. Consistent with other jurisdictions it is recommended that monitoring be conducted as part of a "State of The Environment Report" or triple bottom line report.

1.3 Data Sources and Data Availability

Specific data sources to assist with monitoring activities are summarised below.

- Nova Scotia Power tracks electricity consumption by billing address and rate. HRM may work with the utility to access their data;
- Heritage Gas – serving Dartmouth currently and Halifax by 2008;
- Retail gasoline and diesel volumes (industry totals only) may be purchased from Kent Marketing;
- The Canadian Urban Transit Association (CUTA) generates statistics on public transit. Many of these statistics are relevant to the CEP as they demonstrate the impact of land use planning and transportation demand management activities. Some relevant statistics that could assist with monitoring of transit related actions are listed in Table 2.

Table 2. CUTA Statistics

• Service Area Population • Active Vehicles • Stored Vehicles • Peak Vehicles • Base Vehicles (Minimum number of revenue vehicles required for the weekday mid-day period) • Revenue Vehicle Kilometres • Total Vehicle Kilometres • Revenue Vehicle Hours • Total Vehicle Hours • Passenger Trips	• Regular Service Passenger Trips • Regular Service Passenger Kilometres • Auxiliary Service Passenger Trips • Fuel/Energy Expenses for Vehicles • Passengers per Capita • Passengers per Revenue Vehicle Hour • Amount of Service Revenue vehicle hours divided by service area population. • Average Speed • Vehicle Utilization - Total vehicle kilometres divided by number of active vehicles

2 MONITORING PLAN MATRIX

Ideally, each of the implementation actions, especially those that are programs, projects or activity-oriented actions should have a set of unique indicators that are measurable. Some of the indicators apply across several action items even though the corresponding monitoring activities are separate and different in scale. Consistent with the Logic Model described in Section 1, Table 3 below is a breakdown of monitoring indicators across applicable shortlist actions. In a summarized format, this matrix highlights the level of activity that will be required both at the corporate and at the community level; the specific quantifiable indicators to be monitored; the resources required to ensure effective monitoring; the type of data to be acquired and the recommended frequency at which data should be collected for analysis, comparison to benchmarks and determination as to whether adjustments to approach and goals are necessary. This way, it is ensured that the CEP becomes a dynamic tool whose goals remain continually relevant for the most benefit to the HRM community.

Table 3. Corporate and Community Monitoring Plan Matrix

CORPORATE HRM					
KEY INDICATORS	EXPECTED OUTCOMES	ACTIVITIES/OUTPUTS	RELEVANT SHORTLIST ACTIONS	DATA COLLECTION PROTOCOL	
				TYPE	FREQUENCY
1. Energy bills from HRM owned buildings	1. Reduction in energy consumption 2. Reduction in GHG emissions 3. Minimized PM	1. Establish baseline energy use for Existing Buildings 2. Set energy reduction target by year across the municipality 3. Review subsequent energy bills and measure results quarterly 4. Compare actual and baseline – elevate level of retrofits if target is not achieved	1. Retrofit Existing Buildings	1. Energy used (GJ or kWh) 2. Convert to GHG (tonnes)	Every 3 months
1. Equivalent GHG emissions	1. Reduction in GHG emissions	1. Measure (calculate) attributable GHG emissions from energy quantities being used 2. Compare to 2002 emissions inventory and report 3. Increase level of effort in action implementation and aggression and repeat steps 1 and 2 in the following year	All actions expected to lead to GHG emission reduction	1. GHG emissions (tonnes)	Energy use data from all municipal departments to be combined annually to assess total GHG reduction
Projected construction and operational energy requirements for buildings	Reduction in projected energy requirements in construction and building operational costs	1. Utilize software to simulate energy use projection for construction and operation to establish benchmark 2. Measure actual energy use in post construction and compare with simulation results 3. Adjust approach if target is not achieved	1. Require higher standards of energy efficiency for buildings.	1. Projected energy use (GJ) and cost savings 2. Actual energy use after construction (GJ)	Actual energy use and costs to be tracked annually
Energy consumed by vehicle fleet and fleet maintenance costs	1. Reduction in fuel consumption 2. Reduced maintenance costs	1. Develop a fleet operation and energy cost database 2. Record fuel related and maintenance costs separately. 3. Set target and measure rate of reduction in costs over previous years 4. Intensify training and make continual improvements to procurement policy in the subsequent years until target is reached.	1. Right-size municipal fleet and designate more vehicles for multi-use 2. Implement driver training for HRM's fleet drivers	1. Fuel consumed in liters or GJ 2. Savings in maintenance costs ($)	Every six months

CORPORATE HRM					
KEY INDICATORS	EXPECTED OUTCOMES	ACTIVITIES/OUTPUTS	RELEVANT SHORTLIST ACTIONS	DATA COLLECTION PROTOCOL	
				TYPE	FREQUENCY
1. Participation rate in carpooling 2. Active transportation mix and mode share	1. Reduction in energy use 2. Reduction in GHG, NOx and smog 3. Increase in the quality of living	1. Establish current participation level from HRM staff 2. Set reduction target in corporate GHG transportation related GHG inventory 3. Infer reduction in energy use and emissions annually based on indicator measurement	1. Support HRM's Commuter Trip Reduction Program	1. Percent of HRM staff taking part in active transportation 2. Equivalent fuel and emissions savings	Participation rates should be monitored on the continuous basis. Fuel and emissions to be tracked quarterly
1. Alternative fuel mix in corporate HRM vehicle fleet	1. More fuel-efficient vehicles leading to reduction in energy use and emissions 2. Increase in alternative and renewable fuel types for municipal fleet	1. Build a database of HRM vehicle fleet by count and fuel use 2. Set specific targets for what proportion of vehicles to be on alternative fuel and by what year (e.g. all trucks on B-10 by 2010 and all cars on E-85 by 2012) 3. Measure results at end of period and compare to target	1. Purchase and showcase alternative fuel vehicles	1. Number of vehicles classified by fuel type 2. No. of vehicles considered more efficient (e.g. hybrid)	TBD
1. Energy use by street lights and traffic lights	1. Reduction in energy consumed 2. Inherent reduction in GHG emissions attributable to street and traffic lights	1. Obtain some control of all street lights, sports fields and parks lighting and record number and total wattage – partner with NSPI if beneficial 2. Determine baseline energy use from previous years 3. Set target energy reduction achievable from new lighting standard and LED traffic signals 4. Measure energy consumption annually and compare to target, then report results	1. Create a streetlight efficiency strategy including standards, etc 2. Restore the commitment to the LED Traffic Signals Program	1. Count and percentage of street lights upgraded to new standard 2. Count and percentage of traffic lights converted to LED 3. Approximate energy/cost savings	Annually
1. Energy bills for HRM pumping stations	1. Reduction in energy consumption 2. Reduction in energy expenditure 3. Reduction in GHG emissions	1. Establish baseline total pumping station energy use from latest bills 2. Set reduction target as per the implementation actions 3. Collect energy use data and analyse 4. Compare to target or baseline and report	1. Ensure implementation of the GHG Reduction Plan for pumping stations 2. Explore options to encourage water conservation	Energy quantities (kWh) and cost ($) attributable to water and waste water pumping alone, including diesel from backup generators	Semi-annually

Corporate HRM					
Key Indicators	Expected Outcomes	Activities/Outputs	Relevant Shortlist Actions	Data Collection Protocol	
				Type	Frequency
1. Natural gas availability and use in HRM 2. Level of use of renewable energy sources in HRM	1. Reduction in the use of GHG intensive energy sources – reduced GHG emission 2. Increased community participation and embracing of alternative and renewable energy use	1. Note current level of use of NatGas and Renewables in HRM operations 2. Draw a target consumption level of use within 2 years 3. Review achieved level of conversion to NatGas and adopted renewables within HRM facilities after 2 yrs and compare to the 2-year target 4. Measure tonnes of GHG avoided and report results	1. Participate in expanding natural gas availability in HRM 2. Explore the possibility for green power purchases 3. Consider co-sponsoring renewable energy projects in Nova Scotia	1. Number of customers utilizing NatGas and amounts used (cm3 or GJ) 2. No of people and businesses using renewable sources of energy (wind, solar, biomass) and amounts used 3. Equivalent CO2 avoided by using renewables (tonnes)	Semi-annually

Community HRM					
Key Indicators	Expected Outcomes	Activities/Outputs	Relevant Shortlist Actions	Data Collection Protocol	
				Type	Frequency
1. Community energy bills by sector 2. Proportion of buildings with EnerGuide rating 3. No of homes built to R-2000 std	1. Reduction in energy consumption 2. Reduction in GHG emissions 3. Increased participation in energy conservation	1. Establish baseline energy use for existing residential, commercial, industrial and institutional buildings 2. Establish average EnerGuide score for building stock 3. Set energy reduction target and EnerGuide target score by year and by building type across the community 4. Track increase in new applications to EnerGuide program assistance office 5. Review subsequent energy bills and measure results annually 6. Obtain updated EnerGuide aggregate score for the municipality	1. Support existing programs to increase energy efficiency 2. Adjust the building permit fee structure to provide incentives 3. Promote currently available incentives for non-residential 4. Use municipal code by-law as lever for EnerGuide support	1. Energy used (GJ or kWh) 2. Convert to GHG (tonnes) 3. EnerGuide average score change 4. Number of applications for EnerGuide program assistance	Annually

COMMUNITY HRM					
KEY INDICATORS	EXPECTED OUTCOMES	ACTIVITIES/OUTPUTS	RELEVANT SHORTLIST ACTIONS	DATA COLLECTION PROTOCOL	
				TYPE	FREQUENCY
		7. Measure post implementation results and compare actual and target building performance			
1. Equivalent GHG emissions 2. Public transit ridership 3. Increase in use of alternative transportation	1. Reduction in GHG emissions 2. Reduction in traffic congestion	1. Measure (calculate) attributable GHG emissions from energy quantities being used (baseline) 2. Conduct further research where necessary 3. Conduct public surveys and establish participation and ridership rates 4. Identify roadblocks and adjust implementation plan accordingly 5. Note rate of increase of bicycle lanes 6. Compare emissions to the baseline (2002) emissions inventory and report	1. Expand public transit services 2. Encourage implementation of the Active Transportation Plan 3. Consider restructuring HRM's taxi zoning for greater efficiency	1. GHG emissions (tonnes) 2. % of people bicycling to work 3. % of people taking public transit	Annually
Industrial participation rate in energy efficiency initiatives	1. Increased energy efficiencies in industrial processes 2. Overall reduction in industrial energy use 3. Reduction in industrial GHG emissions 4. Recoverable industrial waste heat energy (new energy and revenue source)	1. Establish energy use and GHG emissions for the industrial sector for baseline. 2. Record the level of partnering between industrial sector and other community sectors. 3. Set a (recommended) target partnering and participation required within an established timeline. 4. Determine the amount of energy and emissions displaced by recovered industrial waste and residual heat energy 5. Measure and document results 6. Adjust target and utilize all opportunities remaining to increase industrial participation further.	1. Promote industrial process heat recovery 2. Promote activities to focus improvement on efficiencies within HRM based industrial processes 3. Conduct an inventory of sources of industrial waste heat for use by adjacent others.	1. Count of industrial businesses signing up for initiatives 2. Amount of energy collected from waste heat streams (kWh or GJ) 3. Estimated GHG emission reduction	Every 4 to 6 months
New developments with energy considerations	1. A broader interest by developers to place energy considerations higher in their priority hierarchy	1. TBD	1. Include energy considerations in the Urban Design Guidelines as a mechanism for …	Track number of applications specifically for energy considerations in developments.	Continuously and assess impact annually

COMMUNITY HRM					
KEY INDICATORS	EXPECTED OUTCOMES	ACTIVITIES/OUTPUTS	RELEVANT SHORTLIST ACTIONS	DATA COLLECTION PROTOCOL	
				TYPE	FREQUENCY
	2. Increase in the number of development permit applications with energy considerations 3. Reduction in energy use and GHG emissions		2. Influence the community visioning exercises and the resulting guidelines for community development to include energy considerations	Estimate energy demand (GJ) reduction resulting from energy considerations per application	
Development activity in the under-utilized areas within Business Parks	1. Increased energy conservation 2. Avoided expenditure in infrastructure expansion 3. Increase in use of productive land and agricultural economic activity 4. Map of opportunity sites for development	1. TBD	1. Provide an inventory and plan for opportunity sites 2. Provide opportunities for local food production and small scale food retail through urban agriculture …	Number of rehabilitated and redeveloped sites as fraction of total opportunity sites.	Continuously
1. Level of use of alternative and renewable energy sources in HRM 2. Level of methane production from landfills	1. Increased use of renewables and NatGas 2. Reduction in energy use 3. Reduction in GHG emission and other emissions 4. Increased employment in HRM 5. Improved self-sustenance in energy	1. Derive benchmark for current (base) level of use of renewables 2. Set target for expected increase per renewable energy type (e.g. 300 MW wind by 2010) 3. Update adoption rate and compare with targets 4. Send feedback to implementation manager and adjust targets accordingly	1. Biomass or MSW residuals for cogeneration plants or district heating 2. AD plant for processing organic ICI 3. Continue support for the Wind Energy Master Plan process 4. Encourage use of solar panels 5. Assess small hydro potential for HRM	Actual amount of renewable energy generated (GJ) Equivalent GHG displaced (tonnes)	Once every year until established targets have been reached

COMMUNITY HRM					
KEY INDICATORS	EXPECTED OUTCOMES	ACTIVITIES/OUTPUTS	RELEVANT SHORTLIST ACTIONS	DATA COLLECTION PROTOCOL	
				TYPE	FREQUENCY
			6. Encourage natural conversion for industrial boiler plants (Dal, CDHA)		
1. More customer electricity self generation 2. New NSPI rate classes	1. Lower overall intensity factor 2. Reduced dependence on fossils for electricity	1. Monitor the public and stakeholder reaction for increased metering limit 2. Track activity from potential IPPs 3. Measure level of infusion of self-generated energy	1. Increase the allowable NSPI metering limit to 800 kW	1. Percentage of population subscribing to be provided by IPPs. 2. Number of applications to become IPP. 3. Actual number of generation plants being setup and their capacities (kW)	Continuously
1. More inquiries about the CEP 2. Number of hits on the CEP information website 3. Level of cooperation on energy conservation issues across private, NGO and community sectors	1. Higher quality of life in HRM	1. TBD	1. Create recognition of the CEP 2. Work with the development and construction sectors to identify target markets for new education programs 3. Work with NGOs in promoting their education programs within schools 4. Encourage implementation of public awareness programs using creative strategies.		

2.1 Monitoring Case Studies

Three Case Studies are presented below on energy monitoring initiatives in Canadian municipalities that, though not comparable in size to the HRM, have implemented similar energy plan strategies. These include:

- The Resort Municipality of Whistler, British Columbia;
- The City of Richmond, British Columbia; and
- The City of Saskatoon, Saskatchewan.

As a basis to understand monitoring, these case studies present information on:

- A general description of the monitoring program;
- How progress is being measured;
- Data Sources;
- Frequency of measure; and
- Observed trends.

A growing trend is for monitoring activities to be consolidated within a state of the environment report (SOER) or triple bottom line reporting initiatives. Discussions at the federal level suggest that a set of key performance indicators are under development as part of a community energy benchmarking and archetyping initiative, however, those indicators and monitoring protocols have not been finalised.

3 WHISTLER 2020 MONITORING PROGRAM[1]

3.1 About the Monitoring Program and Indicators Used

In 2006, the Resort Municipality of Whistler (RMOW) developed Whistler2020 - the community's vision, strategies and process for achieving a successful and sustainable future. Whistler2020's Monitoring Program tracks and reports the status and progress toward the Whistler2020 Vision through core, strategy and context indicators. The program tracks nineteen indicators to inform decision-making.

The relevant indicators to HRM's CEP from this example are the energy, development footprint and transport indicators.

3.2 How It Is Measured

3.2.1 Energy

Total Primary Energy Used: Total energy used includes the energy employed to create the electricity delivered, the energy used to generate space and water heating/cooling, as well as transportation energy for some of the larger fleets of vehicles in Whistler. Not included is the private vehicle transportation energy in Whistler (estimated in 2000 to represent an additional 50%) as well as the embodied energy of the products used in the community.

The total primary energy used is based on the sum all energy source inputs at the point of generation or use (thermal plant, hydro site, gas stove etc.) as well as the transport energy from Whistler's fleet vehicles filling up at the RMOW, WAVE and Whistler/Blackcomb fuel stations.

3.2.2 Development Footprint

Total Developed and Developable Area in Whistler: The physical footprint of Whistler's developed area is calculated for this indicator. Developed areas include the area within the boundaries of all zoned land except for those areas zoned as parks, protected areas or extremely low density parcels of land. Please note that many roads (including Highway 99) are not included in the calculation.

3.2.3 Transport

Registered Passenger Vehicles: Personal cars and trucks in British Columbia are required to carry insurance when in use. This indicator reports on the number of non-commercial vehicles registered with insurance in Whistler.

[1] www.whistler2020.ca

Transit Proximity: The proportion of dwelling units (parcels) that are within 300 meters of quality public transit. "Quality" transit is defined as a transit stop with a bus every 15 minutes during peak times, and service until at least 12:00 AM. Results may be slightly over or understated as some single parcels have more than one dwelling unit.

3.3 Data Sources

3.3.1 Energy

RMOW, Whistler Blackcomb, WAVE, BC Hydro, Terasen

3.3.2 Development Footprint

RMOW

3.3.3 Transport

Registered Passenger Vehicles: ICBC – Insurance Corporation of British Columbia

Transit Proximity: RMOW

3.4 Frequency of Measure

All three are measured and reported annually.

3.5 Trend

3.5.1 Energy

Whistler's primary energy, decreased year to year, but continued to increase based on three-year average to 2006. Total primary energy use in 2006 was 2,134 million GJ (HRM was approximately 63 million GJ).

3.5.2 Development Footprint

Though the development footprint remained stable at 1,014 ha between 2005 and 2006, the three year average trend increased slightly between 2004 and 2005.

4 CITY OF RICHMOND 2005 STATE OF THE ENVIRONMENT UPDATE REPORT[2]

4.1 About the Monitoring Program and Indicators Used

The 2005 State of the Environment Update Report is the second update since the original baseline report was completed in 1998. The report is a monitoring mechanism on the City's environmental health and the pressures on the environment that result from urban activity. The program report on twenty-seven (27) indicators organized into eight (8) categories. For each indicator a number of questions are explored such as:

- Why is this indicator important?
- What is being measured?
- What is happening?
- How do we compare to other similar communities?
- What is being done?
- Looking forward
- What can citizens do?
- An overall summary of the status, trend and the outlook.

The relevant indicators to HRM's CEP are the energy, and transport indicators.

4.2 How It Is Measured

4.2.1 Energy

This indicator shows how much energy is used by residential consumers in Richmond. At present, only data for electricity is available and is measured in kilowatt-hours (kWh) of electricity.

4.2.2 Transport

Transportation Mode for Journey-to-Work Trips: Mode share, journey-to-work trips taken by car, truck or van as a driver or passenger, walking, cycling, public transit, and other modes.

Passenger Vehicles: Per capita registered and insured vehicle rate of passenger and total vehicles registered in Richmond.

[2] http://www.richmond.ca/services/environment/policies/soe/2005update.htm

4.3 Data Sources

4.3.1 Energy

BC Hydro

4.3.2 Transport

Transportation Mode for Journey-to-Work Trips: Census data

Passenger Vehicles: ICBC – Insurance Corporation of British Columbia

4.4 Frequency of Measure

1998, 2001, and 2005.

4.5 Trend

4.5.1 Energy

Per capita energy (electricity) usage has remained unchanged over the last few years, but total energy use has increased with population growth.

4.5.2 Transport

Passenger Vehicles: The total passenger and commercial registered and insured vehicle rate has remained relatively stable at approximately 0.66 to 0.68 vehicles per capita from 2000 to 2005.

4.6 Non Conformance and Corrective Action

Policy options used to achieve energy savings utilise information, education and standards. Pricing, such as a public goods charge for energy, a cap and trade scheme or other economic instruments may be used to augment currently proposed policies in the event of non-compliance.

5 CITY OF SASKATOON 2001 STATE OF THE ENVIRONMENT REPORT[3]

5.1 About the Monitoring Program and Indicators Used

The City of Saskatoon State of the Environment Report assesses how well Saskatoon is achieving the goals of urban sustainability by evaluating sustainability indicators of environmental health. The Report was initially developed in 2001 and was updated in 2006/07

The relevant indicators to HRM's CEP are the energy, and transport indicators.

5.2 How It Is Measured

5.2.1 Energy

Residential and commercial electricity and natural gas consumption are measured using utility energy sales.

5.2.2 Transport

Transportation Mode for Journey-to-Work Trips: Mode share, journey-to-work trips taken by car, truck or van as a driver or passenger, walking, cycling, public transit, and other modes was obtained from the CUTA database.

Passenger Vehicles: Per capita registered and insured vehicle rate of passenger and total vehicles registered in Saskatoon.

5.3 Data Sources

5.3.1 Energy

Electricity - City of Saskatoon, Electrical Services Branch; Natural Gas - SaskEnergy.

5.3.2 Transport

Transportation Mode for Journey-to-Work Trips: Census data

Passenger Vehicles: City of Saskatoon

[3] www.city.saskatoon.sk.ca/org/clerks_office/committees/seac/seac_2001_soe.pdf

5.4 Frequency of Measure

1998 and 2001.