

# **Update on HRM Renewable Energy and Energy Efficiency Projects / Initiatives**



**Infrastructure and Asset Management  
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# A Brief History:



**\$6.8 million** invested over last 5 years  
...saving **\$1,214,000** per year

**Overall Return On Investment (ROI)**  
**on HRM Taxpayers dollars...18.75 %**

(ROI based on total project costs, savings, cost sharing (\$2.1M), avoided capital (\$1.485 M), energy escalation of 3%/year, no \$ value assigned to GHGs and maintenance savings)

# Corporate GHG Reductions



## COMMITMENT:

- **20%** Corporate GHG reduction of 2002 levels by **2012** (102,000 tonnes of CO<sub>2</sub>)
- **50%** of target has already been met (approximately 10,000 tonnes of CO<sub>2</sub>)



# Projects Range from small to **BIG**

**30 Vending Misers in Rec Centres**

**Cost: \$7,500**

**Savings: \$7,500**

**ROI\*: 85%**

**FACT:** There are over 2,000 pop machines in the HRM each costing over \$500 in electricity costs per year and emitting 4 tonnes of GHG each. HRM has 100 machines in its properties.



**\*ROI = Return on Investment**

# A few examples...

## 2005-2007 Transit Facility Energy Performance Contract



**FACT:** Project resulted in major improvement in air quality.

Lessons learned in retrofit to Burnside facility were applied to new garage in Ragged Lake.

**Phase 1** completed 2007

**Cost:** \$850K

**Savings:** \$200K

**ROI:** 27.6 %

**Phase 2** ongoing to be  
complete 2010

**Cost:** \$850K

**Savings:** \$100K

**ROI:** 16.9%

# LED Traffic Lights



**Cost: \$700K**

**Savings: \$150K**

**ROI: 30.5%**

## FACT:

- HRM has more than 250 intersections. In 2005 it cost \$250,000 in electricity to light these.
- LED last 15-20 years versus 2-3 for old lights.
- HRM had two maintenance staff replacing bulbs 5 days a week year round.



# Alderney 5

**FACT:** Alderney 5 is the world's first geothermal cold storage system. The project will save \$350,000 in annual utility costs (2008-09). \$800,000 will be avoided in replacement costs for air conditioning systems and heating equipment.



**Cost: \$3.6M**  
**Savings: \$350K**  
**ROI: 12.5%**

# Halifax North Memorial Library Lighting Retrofit 2005



## FACT:

- The electricity from the lighting retrofit was reduced by over 50%. The new lighting saw the brightness in foot candles increase from 14 to 80.

**Cost: \$30K**

**Savings: \$7K**

**ROI: 16.3%**

A photograph of the Halifax North Memorial Public Library building. The building is constructed of red brick and features a large, white, three-dimensional sign that reads "Halifax North Memorial Public Library". To the right of the main building is a glass-enclosed entrance. On the roof of the glass entrance, there is a statue of a man in a white uniform, possibly a nurse or a soldier, standing with his hands at his sides. The sky is a clear, bright blue.

Halifax North Memorial  
Public Library



# Gas Conversions to High Efficiency

## FACT:

- Dartmouth North Centre
- Northbrook School
- 150 Thornhill Drive
- King Street Fire Station
- Highfield Park Fire Station
- Woodside Fire Station
- Halifax Metro Centre
- Chief David P. MacKinnon Building



**Cost: \$750K**

**Savings: \$400K**

**ROI: 55.4%**



# Building Benchmarking (posted online)



[www.halifax.ca/environment/CorporateEnergyBenchmarks.html](http://www.halifax.ca/environment/CorporateEnergyBenchmarks.html)

**FACT:** By sharing energy benchmarks for individual sites in an accessible Excel format online, HRM hopes to encourage other municipalities to follow suit.

Microsoft Excel - Halifax Building Energy Data 2008 to 2009.xls

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Sheet Harbour Public Library - 22756 #7 Hwy.

2008/2009 Information		Electricity		Fuel Oil		Natural Gas	
Building or Building Group Name	Total Use (kWh)	Total Cost (\$)	eCO2 (t)	Total Use (L)	Total Cost (\$)	Total Use (GJ)	Total Cost (\$)
2nd Floor Duke Tower	563,497	50,626	469	40,502	25,413	809	0
Azadia School Bldg, 636 Sackville Dr	10,060	24,050	131	17,816	1,604	48	0
Aldermen Gate (including Library), 40 & 60 Aldermen Dr	3,635,205	327,941	3,166	0	0	12,290	624
Aldermen Landing - PO Box 725	714,411	63,190	620	18,307	16,305	49	0
All other buildings (approx 163 @ avg. 1000 sq. ft.)	0	0	0	0	0	0	0
Beechville Pkwy - 16 Dartmouth Rd	0	0	0	0	0	0	0
Beechville Pkwy Centre - 492 St. Margaret's Bay Rd	9,880	1,104	9	11,991	7,323	32	0
Bell Rd Police Station, 1690 Bell Rd + Hothouses, 5711 Sackville Dr	18,020	1,057	16	63,845	43,824.65	187	0
Bloomfield Centre, 2788 Agricola St	2,700	312	2	15,801	3,499	42	0
Bowling Arena - 15 Regus Road	482,820	43,905	419	40,273	24,336	108	0
Capt. William Spry Centre, 10 Kidston Rd	119,762	11,593	104	171,448	112,173	459	0
Centennial Area - 27 King Ave	157,043	13,795	126	51,762	34,667	129	0
Centennial Pool - 1970 Gottingen St	34,480	8,135	82	273,684	179,063	733	0
Central Commons Building, 6 Cogswell	0	0	0	12,915	8,268	35	0
Chocolate Lake Centre, 14 Purcell's Cove Rd	16,080	1,577	14	28,521	17,430	76	0
Crabapple Community Centre - 1655 Tollops St	0	0	0	0	0	0	0
Cole Harbour Place 51 Forest Hills Pkwy	0	0	0	0	0	0	0
Cole Harbour Public Library - 51 Forest Hills Pkwy	0	0	0	0	0	0	0
Community Projects - 3790 Macintosh	10,920	1,211	9	29,521	19,152	79	0
Dartmouth Ferry Terminal	110,640	9,694	96	26,740	23,477	72	0
Dartmouth North Comm - 134 Pinecrest Dr	0	0	0	0	0	0	0
Dartmouth Seniors Centre, 45 Oxbow Ave	42,480	5,752	57	0	0	0	0

Building Benchmarks 2008 to 09 / Comparison / Sheet1

<Corporate Energy Benchmarks> - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://www.halifax.ca/environment/CorporateEnergyBenchmarks.html>

Google corporate benchmarks - hrm

## Corporate Energy Benchmarks

In association with Earth Hour 2009, HRM has released corporate energy benchmarking data for its capital infrastructure collected between 2002 and 2008. Since 2002, HRM has implemented a detailed corporate benchmarking process for buildings to track and prioritize energy efficiency initiatives.

Halifax has recently been ranked the "Best Medium City" in Canada by Corporate Knights magazine, due in part to the municipality's dedication to sustainability. In 2008, corporately, HRM spent a total of \$8.4 million on energy consumption in buildings. Over the past several years, more than \$5 million has been spent on various corporate energy efficiency projects which save the municipality \$750,000 per year in energy costs. New energy efficiency projects and retrofits are ongoing to improve HRM's systems and reduce consumption.

Benchmarking data is often difficult for municipalities to calculate because of their complex organizational structure and variety of unique facilities, which typically include buildings such as rinks, community centers, fire stations and libraries. By sharing energy benchmarks for individual sites in an accessible Excel format online, HRM hopes to encourage other municipalities to follow suit. HRM seeks to lead by example sharing its approach and findings to serve as a municipal benchmarking resource.

Want to find out how much energy your local community centre uses? Click on the links below:

Energy Benchmarking Data 2007 (Excel spreadsheet)

# 2009 LED Street Lights Pilot

The trial lights can be found on:

- Robie Street - from Quinpool to South Street
- South Street and Main Street in Fairview

**FACT:** New breakthrough LED street lights being piloted are **made in Nova Scotia** by a Halifax company.

There are 40,000 streetlights in HRM which cost over \$5 million per year to operate.

285 lights provided by the Province of NS.



LED Roadway Lighting Limited



## Coming in 2009/2010:

	<u><b>COST</b></u>	<u><b>SAVING</b></u>	<u><b>ROI</b></u>
- Halifax City Hall	\$250K	\$50K	32.3%
- Centennial Pool	\$700K	\$80K	24.5%
- Sackville Sports Stadium	\$1.1M	\$150K	20.2%



**Bedford 4-Pad – Ice Heating Recovery**  
**100% FREE heating from waste heat**



**Energy Efficiency**  
**in New**  
**Construction**

**FACT: new rec facilities are**  
**adding cooling, but will**  
**consume 50-60% less**  
**energy/m<sup>2</sup> than older centres**

**Commissioning and Training**



**Canada Games Centre – Solar Heating**





Prospect Community Centre



**Geothermal**

**FACT: HRM has built and operated more geothermal buildings than anyone else in Atlantic Canada using over 150 boreholes.**

Gordon R. Snow Community Centre



East Dartmouth Community Centre





## **Initiatives at Scale: Some bumps along the road...**




**Wind Power:  
Wind Contracts 40%  
of Power Committed  
by Council in  
January 2007**

**District Energy:  
\$50M 2005-2006  
Community  
Energy Project**



# A project success at scale...

## Highland Energy: - Sackville Landfill (2MW)

A photograph showing a large grey truck with its rear bed raised, dumping a large pile of mixed waste (trash, plastic, etc.) into a landfill. The waste is falling from the truck into a deep pit filled with other waste. The sky is overcast.

**FACT:** Landfills emit methane which is 20x more powerful GHG than CO<sub>2</sub>. The Sackville Landfill is now avoiding emitting over 100,000 tonnes of GHG/year.

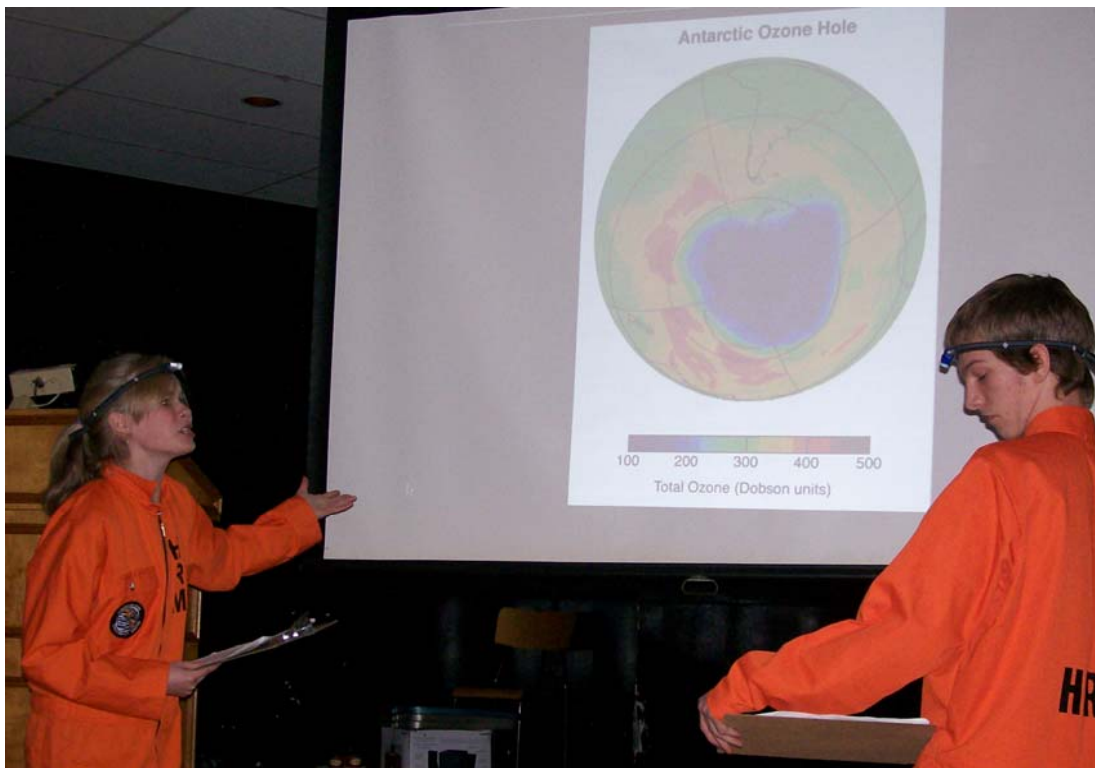
**Project also eliminated complaints from the neighbours.**

**The \$6.8 million in HRM Energy Efficiency projects have reduced...**

**... a total of 10,000 tonnes of GHG**

# Youth Leading By Example

## Adventure Earth Centre



Over 150 peer educators participating  
Hundreds of HRM school children receive the programs

**School-Based Programs**  
**Winter Treasures (Grade 3) -**  
Discover the magic of nature and endangered creatures.

**Cycle Savers (Grade 4) -** Decipher the ancient codes and join the club.

**Mysterious Encounters (Grade 5-6)**  
- Search for the secret formula for all life.

**Vision 20/20 (Grade 8) -** Explore, question and choose your vision of the future.

**MindShift (High School) -** Youth Educating Youth, Shifting to a Sustainable Culture.



# Sustainability Study Tour to Sweden

October 9-18, 2009



# Canada vs. Sweden





# Places Visited



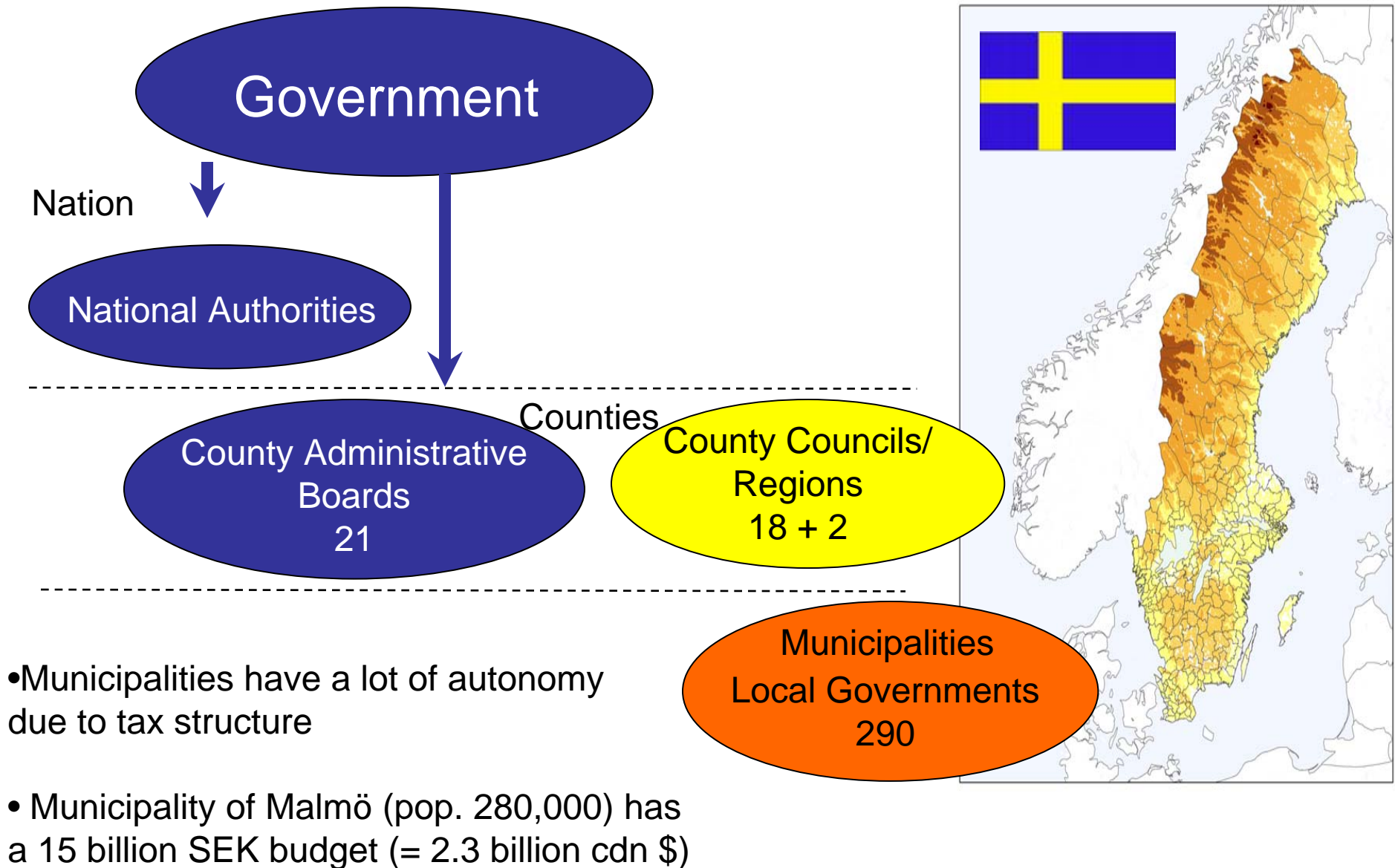
Malmö – Sweden's best bicycling city  
 Göteborg – a bustling port city  
 Sweden's third largest city. Population  
 400,000  
 Växjö – the greenest city in Europe  
 380,000  
 Stockholm – the Swedish city  
 Copenhagen, Denmark  
 Population 33,000

Hosting 2009 COP15 Climate Summit

December 7-18, 2009



# Sweden's Democratic System



# Sweden/Canada

## Similarities & Differences

### Key Swedish Similarities

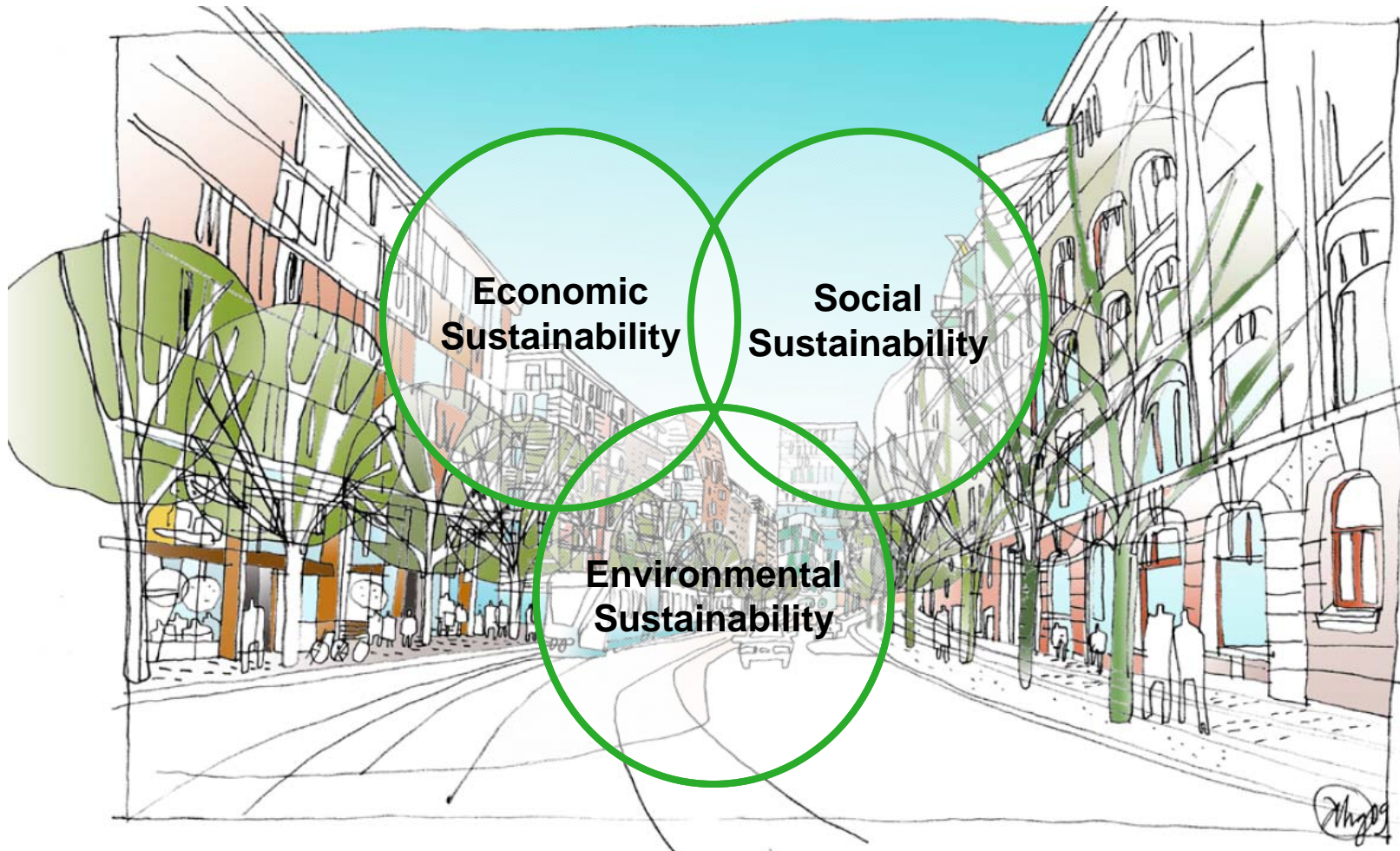
- Climate
- Topography
- Growing Season
- Industries
- Standard of Living



### Key Swedish Differences

- Tax Structure
- Municipal Autonomy
- Integration of sustainability in everyday decisions
- Attitudes toward climate change mitigation & adaptation

# Foundations of Sustainability



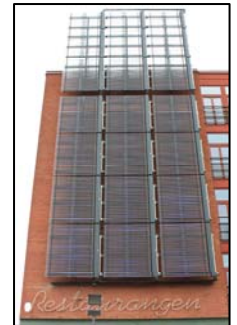


# Lessons Learned

## Transportation



## Energy



## Land Use Planning & Development



## Infrastructure



# Transportation

**Efficient, effective, and reliable buses, trams, light rail and intercity trains move large numbers of people on a daily basis thus reducing traffic. Mass transportation is easy and well used. Technology eases ticket purchase.**



**Train in Blekinge – a success story.** Commuter train Karlskrona-Copenhagen. 1.4 Million travels/yr in Blekinge (152,000 inhabitants)





# Active Transportation





# Energy



Utilizes Nova Scotian Wood Pellets



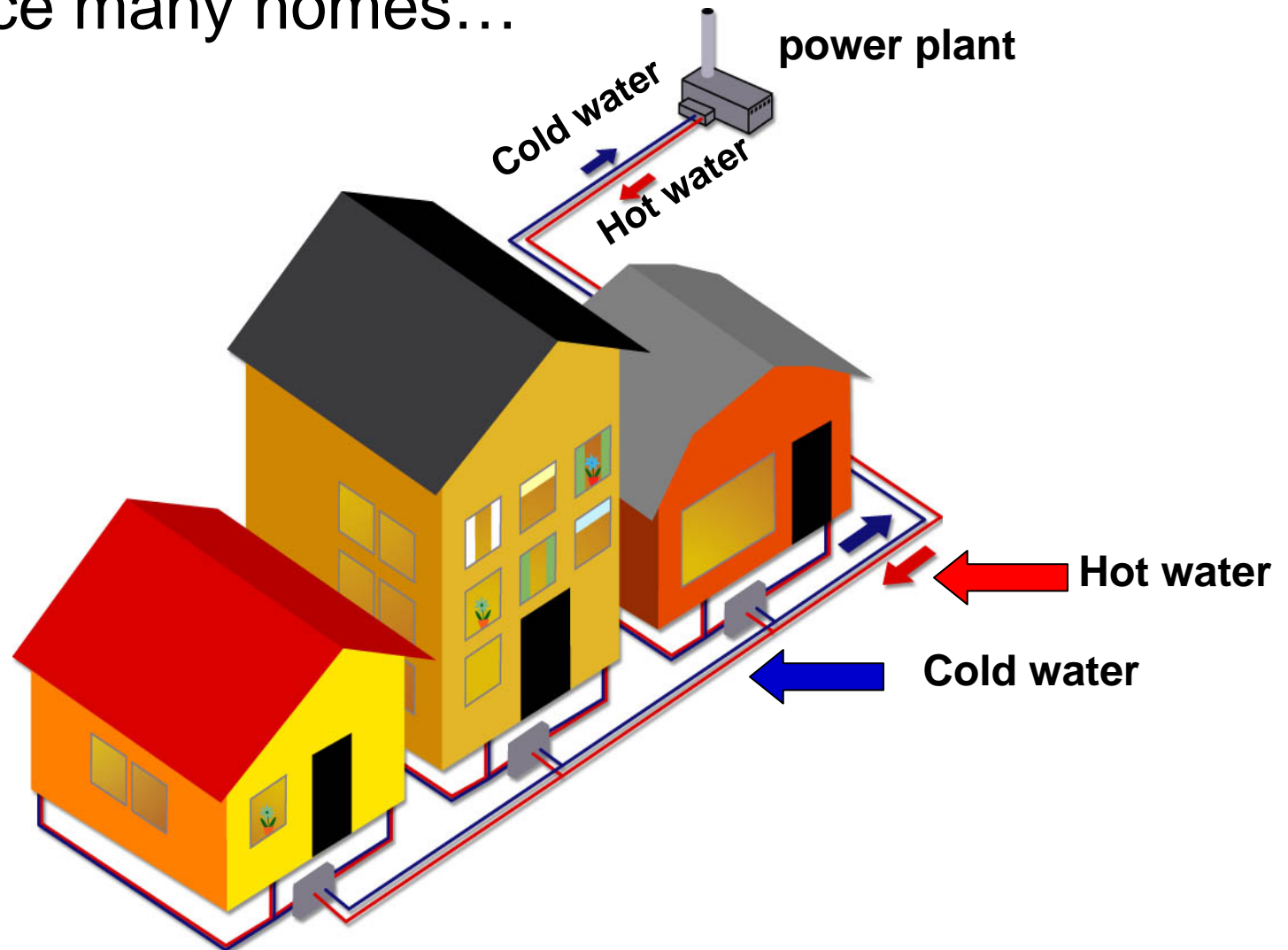
Wind project off the coast of Denmark

## Emphasis on Renewable Resources

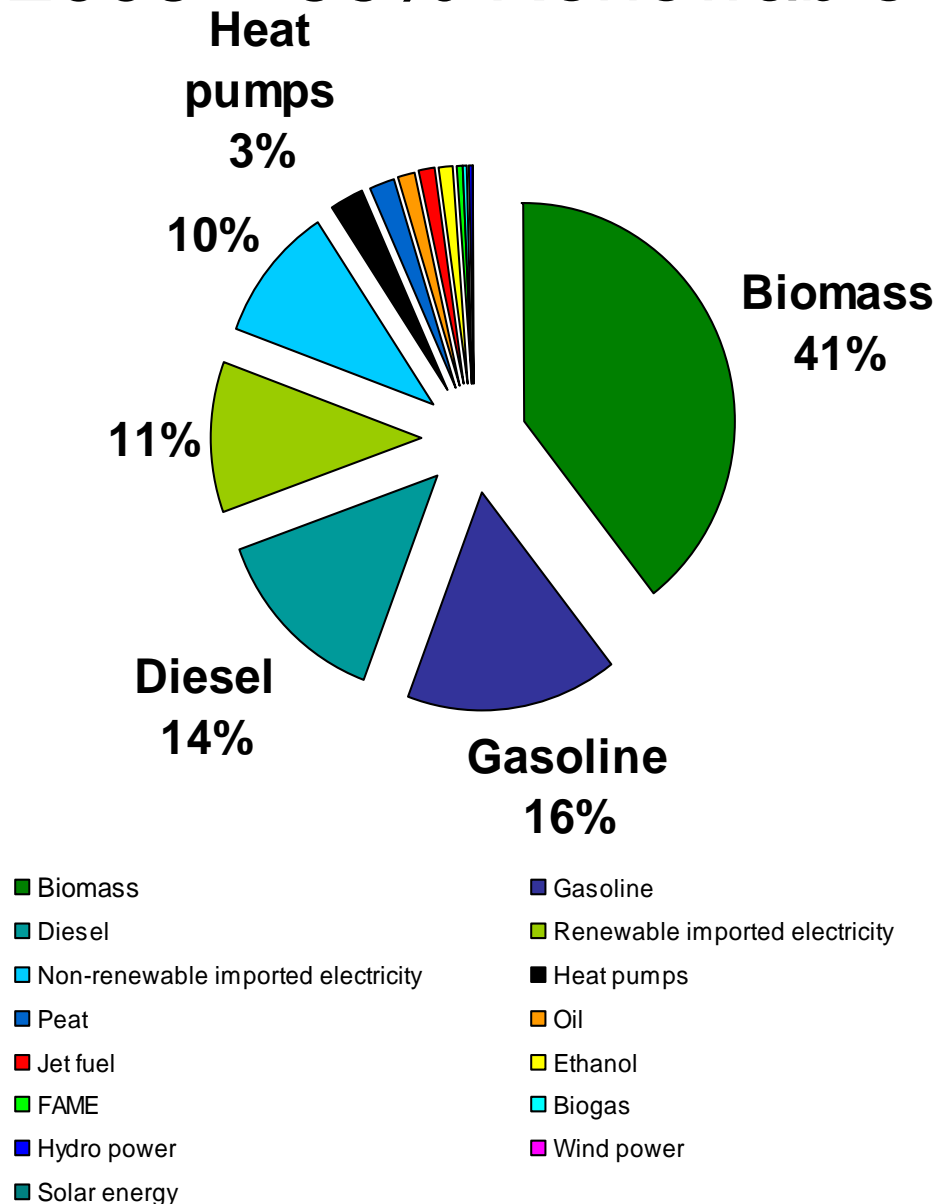
- District Heating
- Bioenergy
- Wooden & Passive Houses
- Solar
- Wind
- Växjö – Fossil Fuel Free
- University Courses

# This is district heating

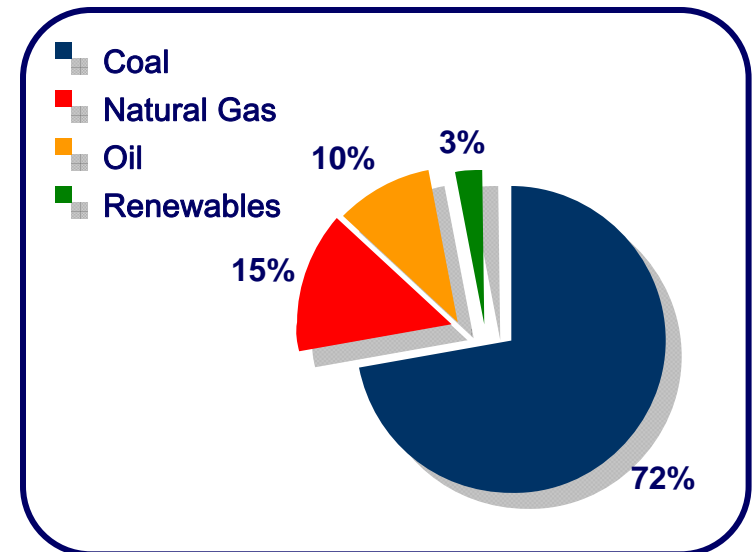
One furnace many homes...



# Energy Supply to Växjö 2008 – 56% Renewable



# Nova Scotia Electricity Generation Mix – 3% Renewable

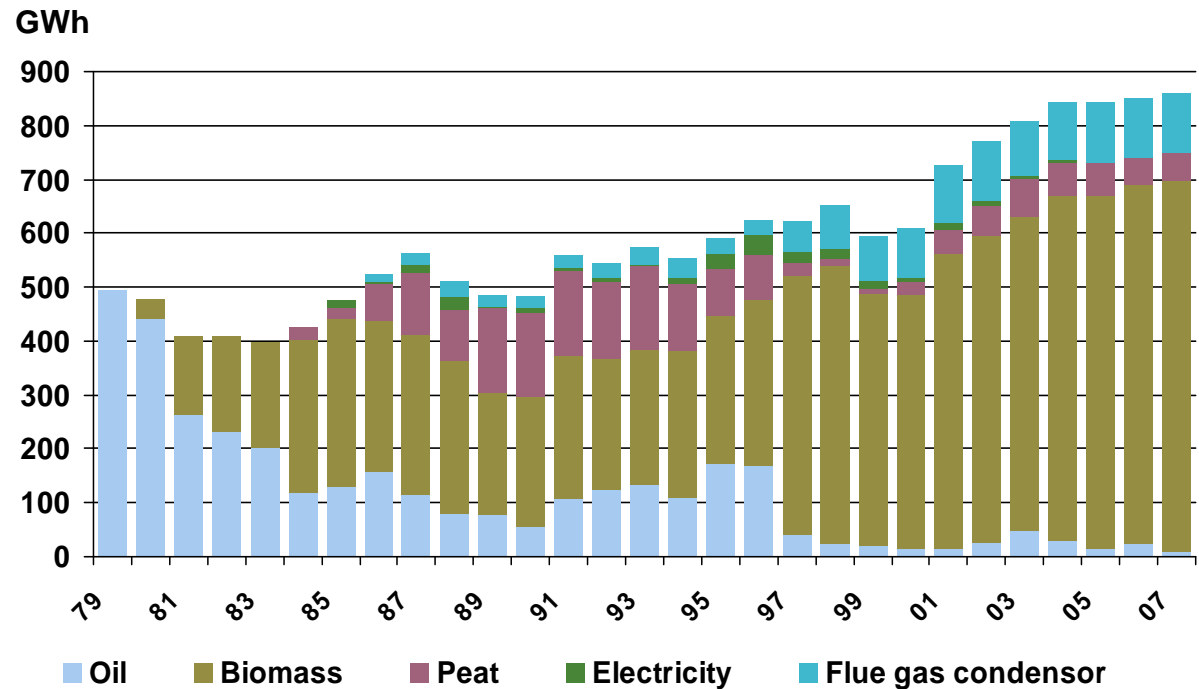


- Nova Scotia's greenhouse gas emissions total 20 MT
- 50% of emissions are from electricity generation alone
- Generation mix – highly dependant on coal
- Emissions constraints critical to reduce reliance on coal



# District Heating Success - Växjö

1980 District Heating from bio energy, 20 years later more than 90 % of the energy is renewable.



Växjö Energy Ltd

# 8 Story Apartment Buildings

## Passive Energy Construction



- No heating system
- Energy use 50% below national regulation
- District heating from biomass for warm water
- Air tightness, energy efficient windows, much insulation, heat recovery from waste water, individual metering

## Energy Efficient Wood



- Almost all wood
- Largest wooden project in Sweden
- Local renewable wood
- Individual metering

# Land Use Planning & Development

## Urban Redevelopment

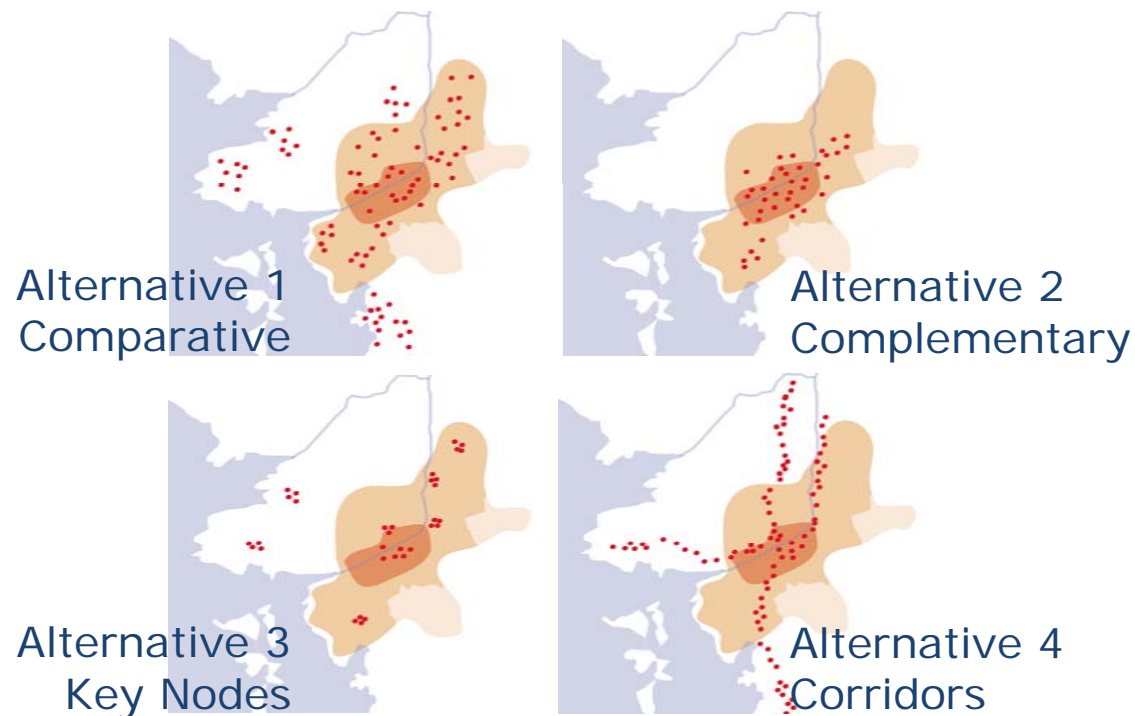
- Looma- climate change mitigation & adaptation
- Malmö – shipyard to housing
- Göteborg – growth similarities
- Million Unit Programme
- Award winning Gårdstensbostäder



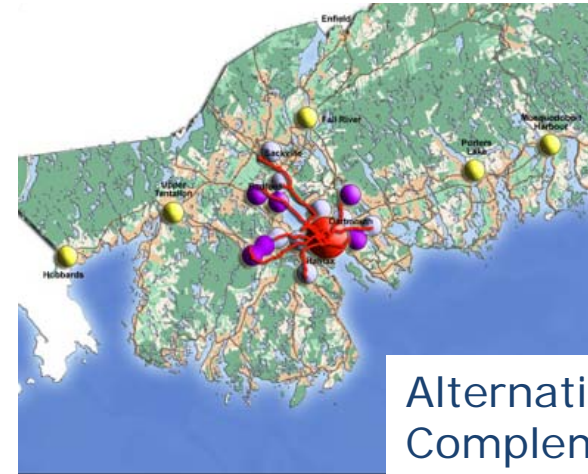


# Göteborg Growth Principles

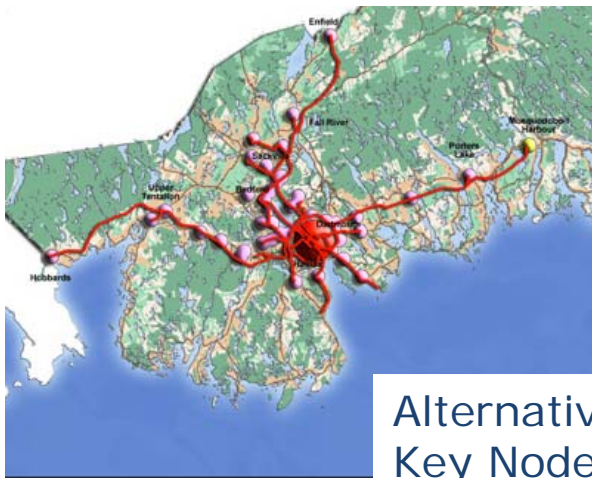
What type of growth best meets the city's goals?



# Very Similar to HRM Alternatives for Growth...



Alternative 2  
Complementary



Alternative 3  
Key Nodes



Alternative 4  
Corridors

# Innovative Infrastructure



Solid Waste, Recycling & Organics Bins



Vacuum suction of solid waste & organics

- Solid Waste Management
- Recycling
- Biofuel
- Underground Utilities
- Parking Charges
- Port of Göteborg – Energy saving measures & cargo distribution



Solid Waste, Recycling & Organics Shed



# More Innovative Infrastructure



- Storm Water Management
- Öresund Region – Regional Sustainable Transportation Planning \$1 billion bridge to Denmark, intercity tunnel project
- Importance of green & recreational spaces



# Next Steps?

- Regional Plan Review
- Energy Efficient Opportunities
- ???





# Opportunities for Regional Plan Review: **“Fiscal, Social and Environmental Sustainability”**

Reinforced the need & benefits of HRM’s Regional Plan

## **1. SETTLEMENT:**

LEED-style building and neighbourhood standards, Solar orientation, Green site design (stormwater run-off, permeable paving, etc.), District heating w/renewables, Sewage heat recovery, Energy standards, Community gardens, Land conservancy, Increased density, Mixed Use/Complete neighbourhoods, Open space & parks, Affordable Housing, Heritage protection...



## **2. MOVEMENT:**

Transit, Active transportation infrastructure (bike lanes, waterfront trails, sidewalk/streetscape improvements & investment), Green taxis, Airport transit, Increased connectivity, Pricing signals (user pay, congestion pricing, parking fees, bridge tolls, etc.) Car-share/Ride-share, Downtown circulator shuttle, Right-of-way and pavement width reduction...





# Opportunities for Regional Plan Review: “Fiscal, Social and Environmental Sustainability”

## 3. FOCUS ON THE CORE:

More people living and working in the core. Removal of regulatory barriers to densification, Complete neighbourhoods, Recreation & open space, Undergrounding of utilities, Public realm improvements, District heating & cooling, Heritage tax incentives...



## 4. GOVERNANCE:

Sustainability leadership, Fiscal responsibility, Greening of HRM operations & corporate culture, Sustainability performance measures, Intergovernmental action, Necessary HRM Charter, Plan and by-law and building code amendments...



# Inspiring Sustainability Ideas

Started	Options	Low Cost	Med Cost	High cost
No	Building energy classification system tied to deed transfer	X		
No	Flood mitigation requirements – new construction	X		
No	Small scale district heating – wood chips	X		
No	Construction of Passive buildings	X		
No	Free parking for environmental cars – HRM might offer one staff person/community a draw for a hybrid	X		
No	Serve only locally grown foods at corporate events	X		
No	Community financial participation in wind projects	?	?	?
No	Opening of grid	?	?	?
No	LEED (or LEED like) style classification system – cheaper & faster. New construction and Neighbourhoods	X		
Yes	Place green building symbols on the exterior of HRM corporate buildings	X		
No	Cabs and fleets mandated to be fuel efficient	X		
No	Compulsory connection to District Energy (N. Vancouver)	X		
No	No Provincial Tax on renewables.			X

# Inspiring Sustainability Ideas con't

Started	Options	Low Cost	Med Cost	High cost
No	Individual metering of heat in student housing		X	
Yes	Continued expansion of bicycle paths		X	
No	Solar hot water panels standard on new HRM buildings or minimum renewable energy requirement		X	
No	Solar panels HRM – leasing requirement		X	
No	Taxi GPS positioning system for more efficient transportation (potential 20% reduction)	X		
Yes	Geothermal projects		X	
Yes	Sewage heat recovery		X	
No	Circulate Province of Nova Scotia Heat Efficiency date to staff in pay envelope	X		
No	DME as fuel source			
No	Building orientation requirements in LUB	X		
No	More wood in construction- tax reduction 1 <sup>st</sup> yr.			
Yes	District heat at Library/Centennial Pool			



# Questions?

