



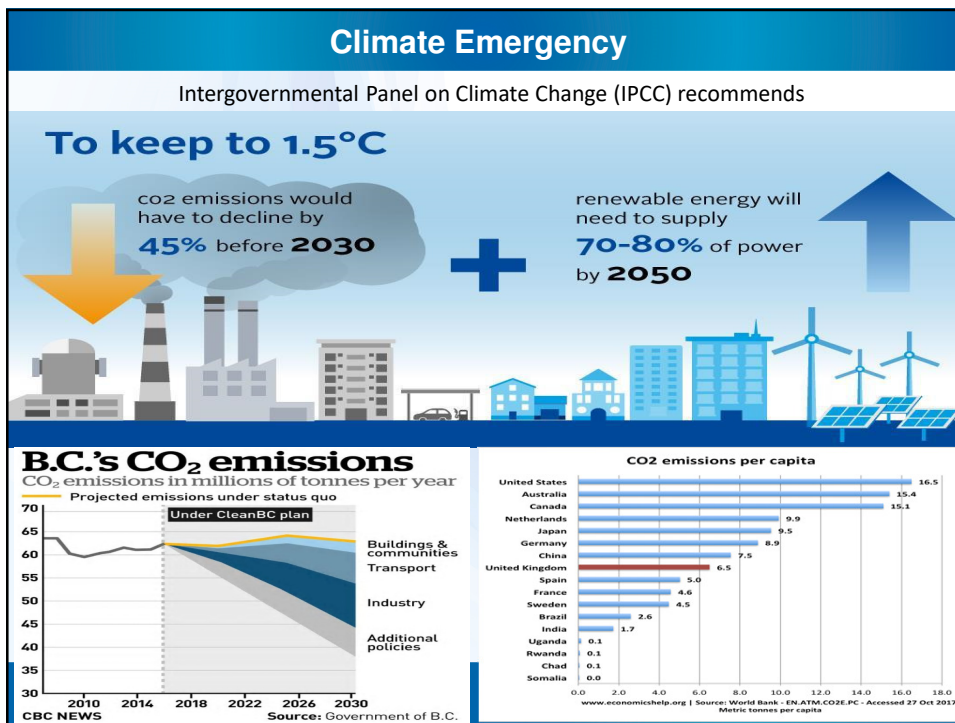
Corporate Energy and Emissions Management

Scott Pamminger, Manager, Infrastructure Planning and Energy

Purpose: An overview of the Corporate Energy and Emissions Program

- Support Council in meeting urgent environmental goals
- Our commitments
- Our situation
- Key program achievements
- Current opportunities and challenges
- Next steps





Corporate Commitment to Sustainability and Environmental Protection

2002 City joins the Federation of Canadian Municipalities **Partners for Climate Protection Program**

2007 City establishes a **Corporate Climate Change Plan** matching the Provincial Emissions Reduction targets of:

- ➔ **33% below 2007 GHG level by 2020**
- 80% below 2007 GHG level by 2050**
- Sustainability Committee formed to exchange ideas and coordinate projects

Signed the **Union of BC Municipalities Climate Action Charter** voluntarily committing to Lower Corporate Emissions and to become "carbon neutral" in our operations by 2012

- Requires reporting GHG emissions from operations of buildings and fleet

2008 City partners with BC Hydro **Commercial Energy Manager Program**

Community Commitment to Sustainability and Environmental Protection

2008 **Official Community Plan sets new GHG targets:**

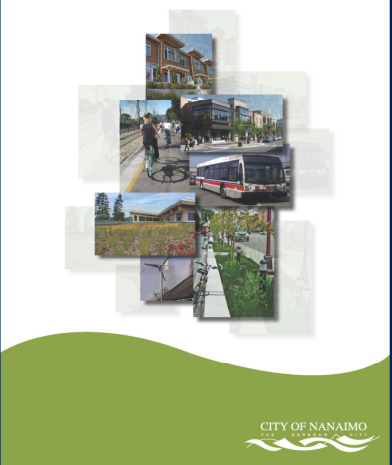
- *3% below 2007 GHG level by 2020*
- *39% below 2007 GHG level by 2050*

2012 **Community Sustainability Action Plan**



- Identifies community-based measures and initiatives

2019 **Emissions Reduction Reserve Fund**
(Community wide projects, plans and initiatives)

- *Reduce GHGs by 50% to 58% below 2010 levels by 2030*
- *Reduce GHGs by 94% to 107% below 2010 levels by 2050*




CITY OF NANAIMO
SUSTAINABLE COMMUNITIES


Corporate vs. Community GHGs

Corporate Emissions





Objective:
Carbon neutral operations since 2010
(Climate Action Charter)

Community Emissions



Objective:
Community in OCP
(LG Act, Bill 27 – 2008)

Community Energy and Emissions		
Actions		
Theme	Strategies	Examples
Land Use and Transportation	<ul style="list-style-type: none"> • Compact, Complete Community • Alternative and Active Transportation • Low Carbon Mobility 	<ul style="list-style-type: none"> • <i>Urban Containment Boundary</i> • <i>OCP</i> • <i>EV Charging</i> • <i>Fleet Greening</i>
Buildings	<ul style="list-style-type: none"> • Energy Efficient Existing Buildings • Energy Efficient New Buildings 	<ul style="list-style-type: none"> • <i>CleanBC Better Homes Rebate Program</i> • <i>Realtor Energy Efficiency Program</i> • <i>Rental Apartment Efficiency Program</i> • <i>CleanBC Commercial New Construction Program</i> • <i>Realtor Energy Efficiency Rebate</i> • <i>BC Energy Step Code</i>
Solid Waste	<ul style="list-style-type: none"> • Composting / Zero Waste 	



Corporate Role

- Social responsibility, and leadership in sustainable energy use

Goals and Objectives

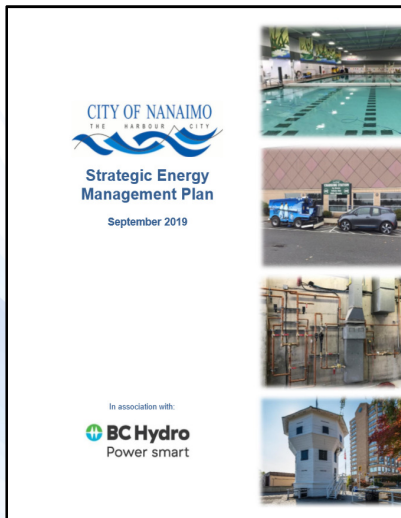
- Improve efficiency, reduce energy consumption and costs
- Switch from high-carbon fuels to cleaner fuel sources and electricity
- Reduce green-house-gas (GHG) emissions
- Increase the local renewable energy supply



Corporate Strategic Energy Management Plan - 2019 to 2023

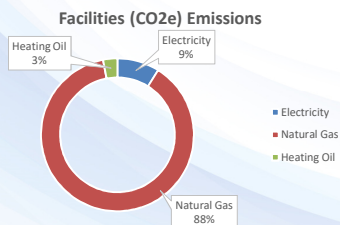
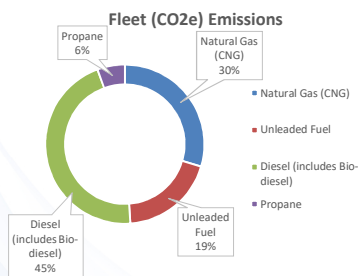
A forward looking **business plan** for how we intend to manage energy use:

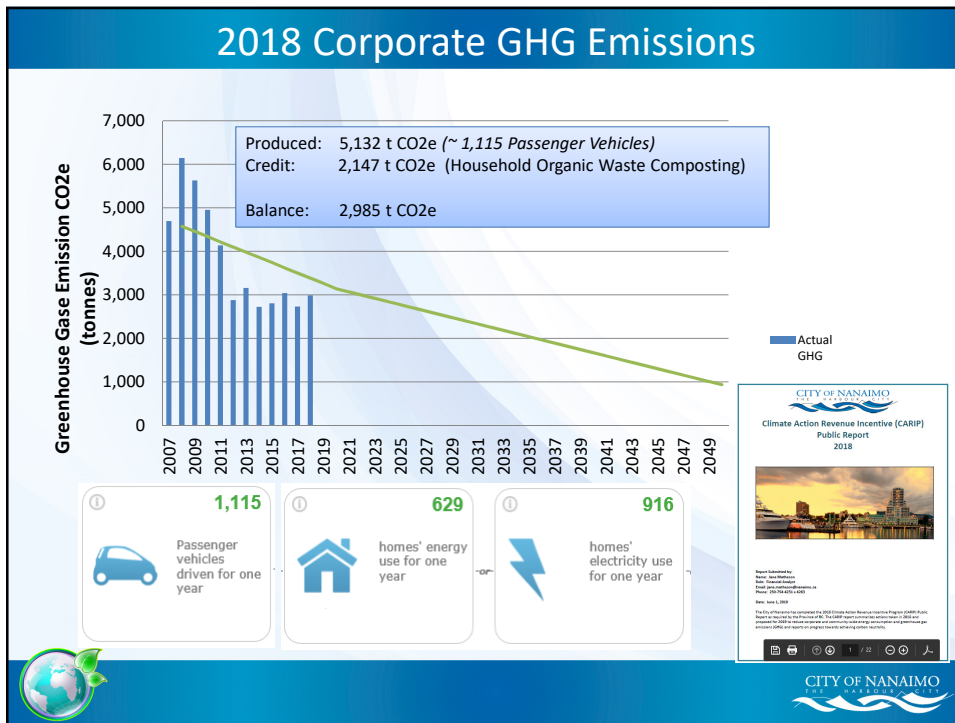
- ❖ What problems are we trying to solve?
- ❖ Where are we now?
- ❖ Where do we want to be? and why?
- ❖ How will we get there?
- ❖ Who should do what?
- ❖ What do we need?
- ❖ How are we doing?



CORPORATE EMISSIONS

2018 Emissions		CO2e Tonnes
FLEET	Natural Gas (CNG)	543
	Unleaded Fuel	356
	Diesel (includes Bio-diesel)	837
	Propane	103
	Total	1,839
FACILITIES	Electricity	243
	Natural Gas	2,397
	Heating Oil	82
Total	2,722	
EMPLOYEE MILEAGE		11
CONTRACTED SERVICES		560
GRAND TOTAL		5,132
Organic Waste Diversion (credit)		2,147
Net Balance (CARIP Report)		2,985
2020 GHG Target		3,146





Challenges and Opportunities

What has been done?

What needs to be done to increase efforts?



What can this look like?



Short payback (easier projects)
 Longer payback projects need support

Update the Energy Conservation & Management Policy to address energy and GHG emission reductions necessary to respond to climate change issues



Define needs and plan accordingly

Creative solutions with strong emphasis on *social, environmental, and risk* considerations

Increasing Clean Renewable Energy options – solar photovoltaic and thermal, wind, geothermal, tidal, waste heat recovery, biofuels, and biomass

Our Situation



Fire Rescue

Public Works

Development Services

Police Services

Corporate Services, Finance

CAO Office

Human Resources

Finance

OH & S

Engineering

Information Technology

Legislative Services

Parks, Recreation & Culture

City of Nanaimo 639 Permanent Staff



Current Energy Conservation Policy



- Annual Reduction Goal of 1% of the 2008 consumption: (234,000 kWh) Electricity, (573 GJ) Natural Gas
- BC Hydro Energy Manager Program (300,000 kWh) Electricity
- Sustainability Reserve – Energy Projects with simple payback of 8 years or less
- Lifecycle cost and cost benefit analysis for deciding energy projects




Significant Corporate Energy Uses

Building Sites:

- Office buildings
- Operations Facilities
(Public Works, Parks Operations, Water Treatment Plant, Water and Sewer Pump & Control Stations)
- Recreation & Parks Facilities
(Arenas, Pools, Field-houses, Change and Bathrooms)
- Fire Rescue
- Police
- Parkades

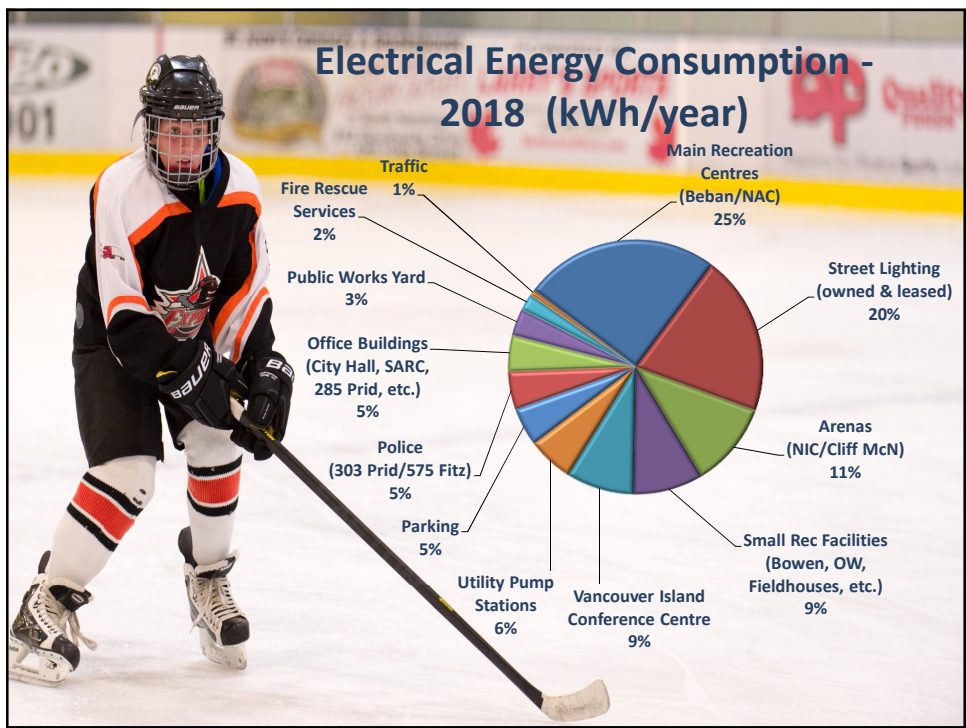
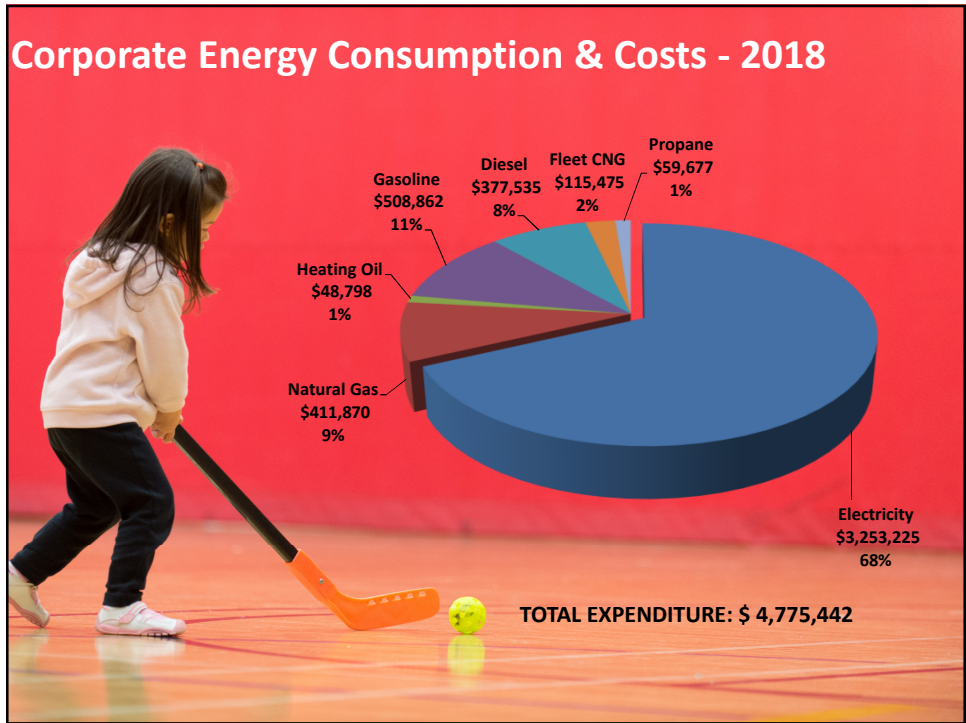
Additionally:

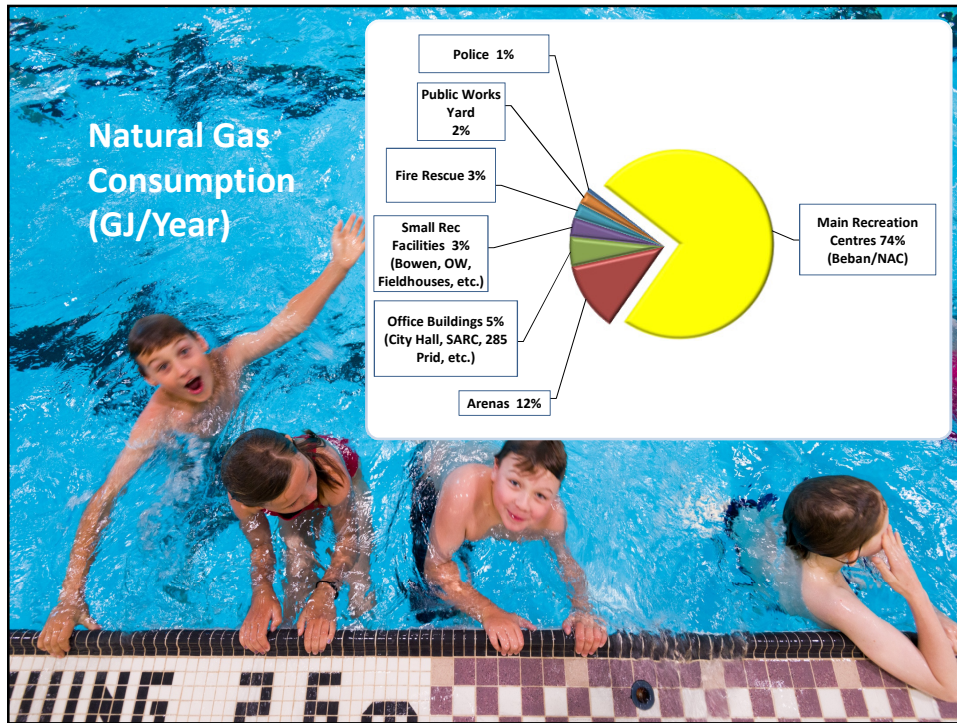
- Fleet
- 8,500 Street Lights












Key Program Achievements



CITY OF NANAIMO
2018

Beban Park Boiler Plant & HV1 Coils Replacement

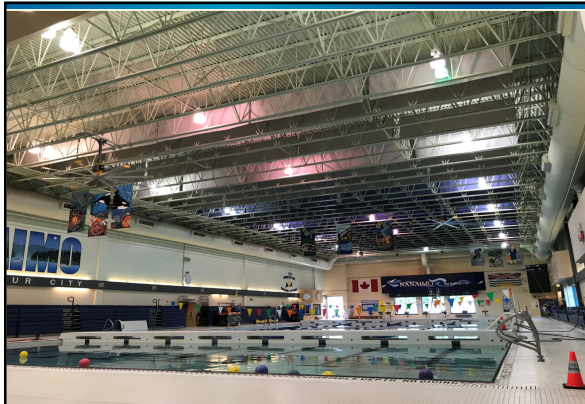
Estimated Savings

- 42% less natural gas
- 2% less electricity
- \$71,000 annually



Project Incentives

- \$114,900 from Fortis BC



New air stratification fans

New variable speed drives AHUs 1 & 2



NAC mechanical dehumidification system recommissioned

Controls upgrade



2019 Lighting Upgrades

Beban Park

- Pool overhead lighting of lap pool, leisure pool, teach pool and decks
- Social Centre Auditorium lights

Nanaimo Aquatic Centre

- Mechanical rooms, gymnasium, physiotherapy, reception area, multi-purpose rooms
- Exterior lights

Renewing assets and meeting sufficient lighting levels for code and regulatory requirements.






Street and Parking Lot Lighting Upgrades



Nanaimo Ice Centre

- Parking lot lighting
- Exterior building lighting

City Wide


- Street Lighting - Phase 2
- Audit of BC Hydro leased lights


Phase 2

- 8 Areas
- 435 lights, \$211,649 + 89 lights (optional), \$46,929
- Wattage reduction: 42% 44,940 Watts (196,837 kWh)

Cool Water Ice Making

REALice De-aerator









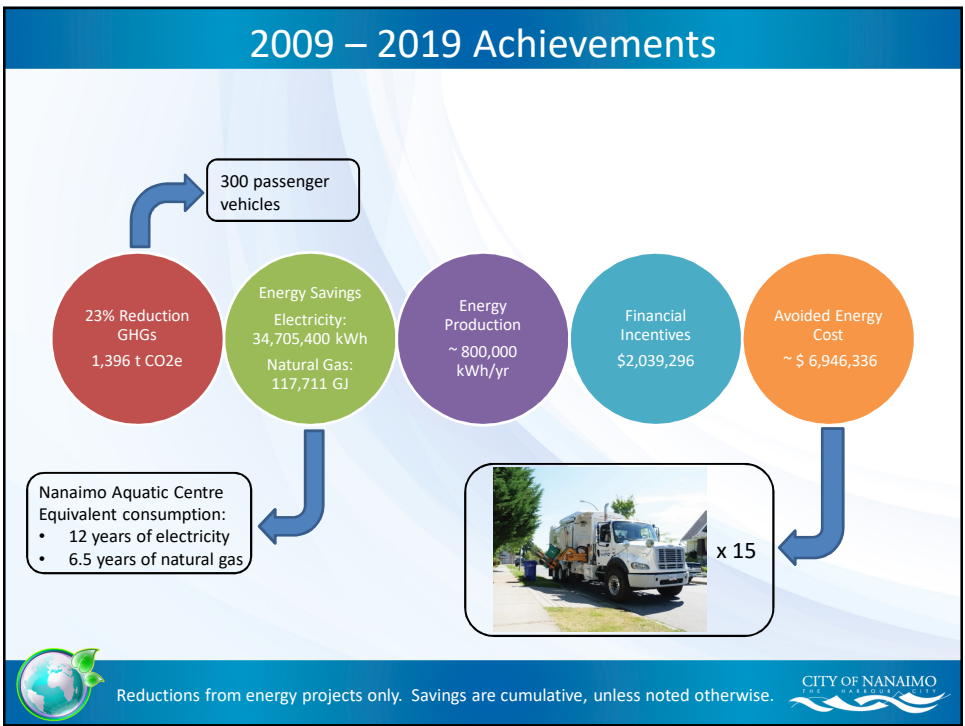
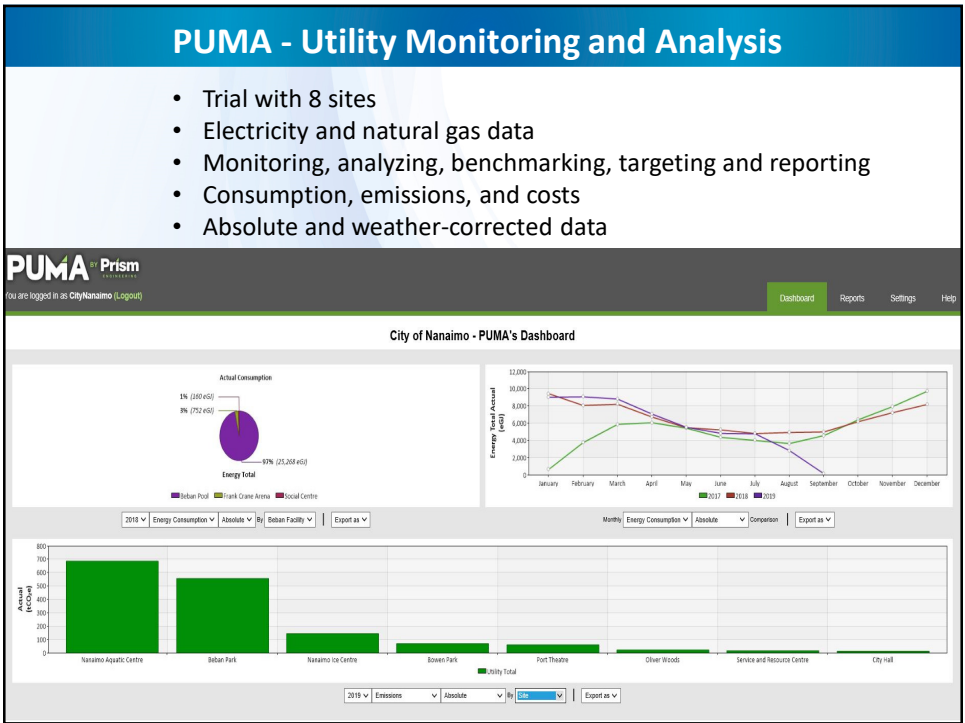
- Annual savings: **\$ 12,000** per ice sheet
- Energy Savings: ~ **400 GJ / 50,000 kWh / 98 t CO2** emissions
- FortisBC incentives: **\$ 20,000** per site

Lighting Audits, Design Energy Studies

- Frank Crane Arena
- Cliff McNabb Arena
- Nanaimo Ice Centre
- City Hall
- Bowen Complex
- Oliver Woods Complex
- Nanaimo Aquatic Centre
- Fire Station #2
- Fire Station #3
- Fire Station #4
- Fire Headquarters
- VICC air source to water source heat recovery HP conversion study
- Fire Station #1 New Construction Agreement



Next Steps

- ✓ Update the Energy Conservation and Management Policy so that it aligns with targets set by City Council, and Provincial and Federal legislation or regulations
- ✓ Change Sustainability Funding project criteria to be more flexible
- ✓ Review and update of both the Corporate Climate Change Plan and the Community Sustainability Action Plan



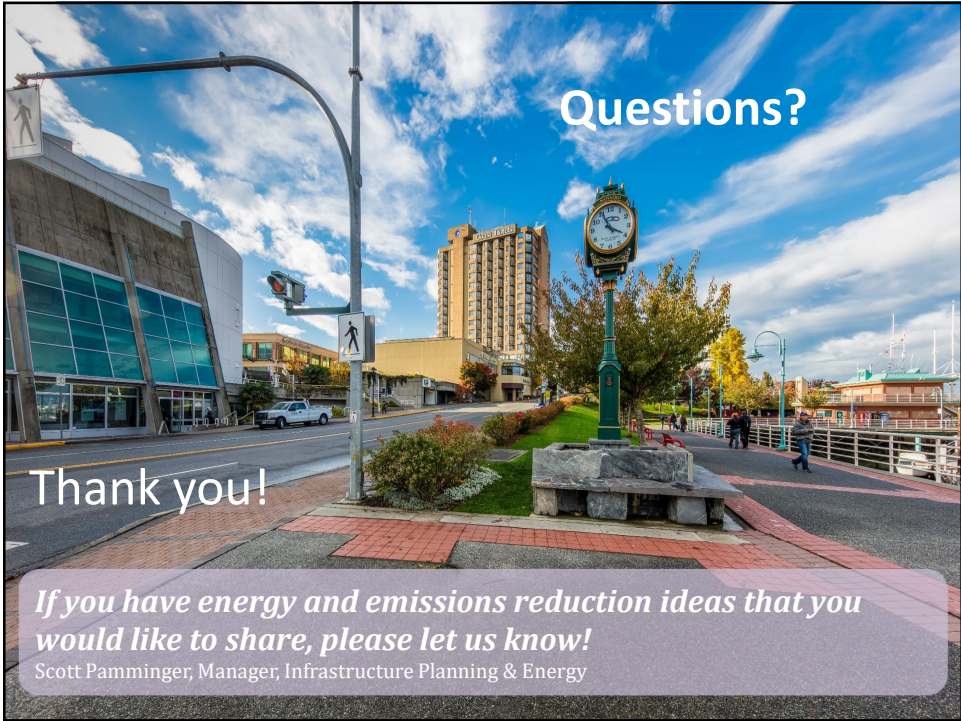
- ✓ Choose electric over carbon-based energy solutions, where practical and cost effective
- ✓ Pursue technological advancements in seeking energy solutions
- ✓ Support Fleet with a Green Fleet Strategy and EVs
- ✓ Develop renewable energy projects aimed at improving sustainability

Questions?

Thank you!

If you have energy and emissions reduction ideas that you would like to share, please let us know!



Scott Paminger, Manager, Infrastructure Planning & Energy



Yearly Performance

	Electricity (kWh)	Natural Gas (GJ)	Emissions (CO2e) (Tonnes)	Annual Savings (\$)	Incentives Received (\$)
Annual Targets	234,000	573			
Year					
2016	246,223	624	47	\$36,688	\$114,188
2017	787,878	3,876	215	\$105,574	\$100,921
2018	597,096	6,700	355	\$128,508	\$151,015
2019	814,089	935	65	\$84,311	\$111,160
TOTAL	2,445,286	12,135	682	\$355,081	\$477,284

Annual Targets based on 1% of 2008 Electricity and Nat. Gas Consumption

Energy Project Investments and Cumulative Savings (Cost Avoidance)

Year	Projects Electrical Energy Savings (kWh)	Energy Production (kWh)	Natural Gas (GJ)	Oil (Litres)	GHG (tCO2e)	Projects Electrical Energy Savings (\$)	Energy Production Revenue (\$)	Power Factor (\$)	LOS Credits (\$)	MOS Credits (\$)	Natural Gas (\$)	Oil (\$)	GHG Offsets Saved (\$)	Total Cost Avoidance (\$)	Sustainability Funded Project Costs (\$)	Other Dept Funded Project Costs (\$)	Incentives Received for Projects & EM (\$)	Total Energy Project Costs (\$)	Net Project Costs After Incentives (\$)	% of Electric Target	% of Nat Gas Target	% of GHG Target	
2009	183,092	0	2,578	0	136	11,901	0	6,485	0	0	36,092	0	3,388	57,866	88,058	58,441	64,627	146,499	81,872	78	450	45	
2010	521,875	0	420	4,679	46	33,922	0	957	0	0	5,880	3,509	1,155	45,423	95,718	73,871	134,350	169,589	35,239	223	73	15	
2011	814,468	0	3,984	7,388	242	57,013	0	0	44,980	0	55,776	5,541	6,052	169,362	397,084	272,825	220,692	669,909	449,217	348	695	80	
2012	859,307	0	950	9,083	93	60,151	0	1,724	38,462	0	13,300	6,812	2,329	122,779	151,875	975,295	205,712	1,127,170	921,458	172	166	31	
2013	347,992	0	327	14,892	67	27,839	0	0	69,600	0	4,578	3,723	1,666	107,406	301,143	138,510	83,653	439,653	356,000	70	57	22	
2014	77,488	511,220	4	1,527	6	6,974	52,877	0	18,291	0	56	1,573	156	27,050	94,040	112,532	119,295	206,572	87,277	33	1	2	
2015	990,063	686,720	2,185	0	133	94,056	74,323	2,240	23,091	27,575	22,943	0	3,330	173,235	551,053	1,424,464	44,555	1,975,517	1,930,962	423	381	44	
2016	261,223	803,440	624	0	38	36,443	86,454	750	44,581	29,617	6,552	0	939	118,882	166,507	338,584	180,391	505,091	324,700	112	109	12	
2017	787,878	880,510	3,876	0	215	105,574	99,149	842	23,337	18,182	40,698	0	5,375	194,008	158,422	404,317	129,108	562,739	433,631	337	676	71	
2018	597,096	801,620	6,700	0	355	128,508	91,458	0			70,350	0	8,875	207,733	208,009	809,721	98,515	1,017,730	915,215	255	1169	117	
2019	814,089	755,760	935	0	66	84,311	87,797	0			9,818	0	1,640	95,768	281,331	321,197	58,660	602,528	543,868	348	163	22	
2020																		42,700					
Subtotal	6,254,571	3,683,510	22,583	37,569	1,396	646,692	404,261	12,998	262,341	75,374	266,042	21,159	34,905	1,319,510	2,535,940	4,929,757	1,339,558	7,422,997	6,083,439				
Cumulative Total	34,705,424	13,959,450	117,711	299,355	7,617	2,975,276	1,515,057	111,422	1,673,249	310,889	1,510,110	174,960	190,431	6,946,336									

