

2018 Corporate Energy and GHG Emissions Plan

City of Kelowna



Highlights of the 2018 Energy Plan

- ▶ Annual energy costs - **\$10.2M by 2022** (No Action)
- ▶ Annual energy costs - **\$9.3M by 2022** (Keep the Trend)
- ▶ Cost Avoidance of over **\$4.0M over the next 5 years**
 - ▶ With Opportunity to achieve more
- ▶ In the last 3 years (8+ projects)
 - ▶ \$135,000 reduction in utility costs ongoing every year
 - ▶ \$348,000 successfully achieved through rebates
- ▶ 2018 - LED Street lighting
 - ▶ Additional \$900,000 per year reduction in costs
 - ▶ \$673,000 FortisBC rebate

What is the Purpose of an Energy Management Plan?

- ▶ Energy management is the key to maximizing energy savings, improving asset value, reducing GHG emissions and minimizing costs within an organization
- ▶ An energy plan
 - ▶ Is an overview of an organization's energy use
 - ▶ Is a roadmap to achieving energy, GHG emission and cost reductions
 - ▶ Defines how energy is to be managed through standards, policies, and best practices, and
 - ▶ Can define opportunities or strategies for managing and reducing energy use
 - ▶ Is a document that allows for benchmarking success in the future

Why should we manage energy?

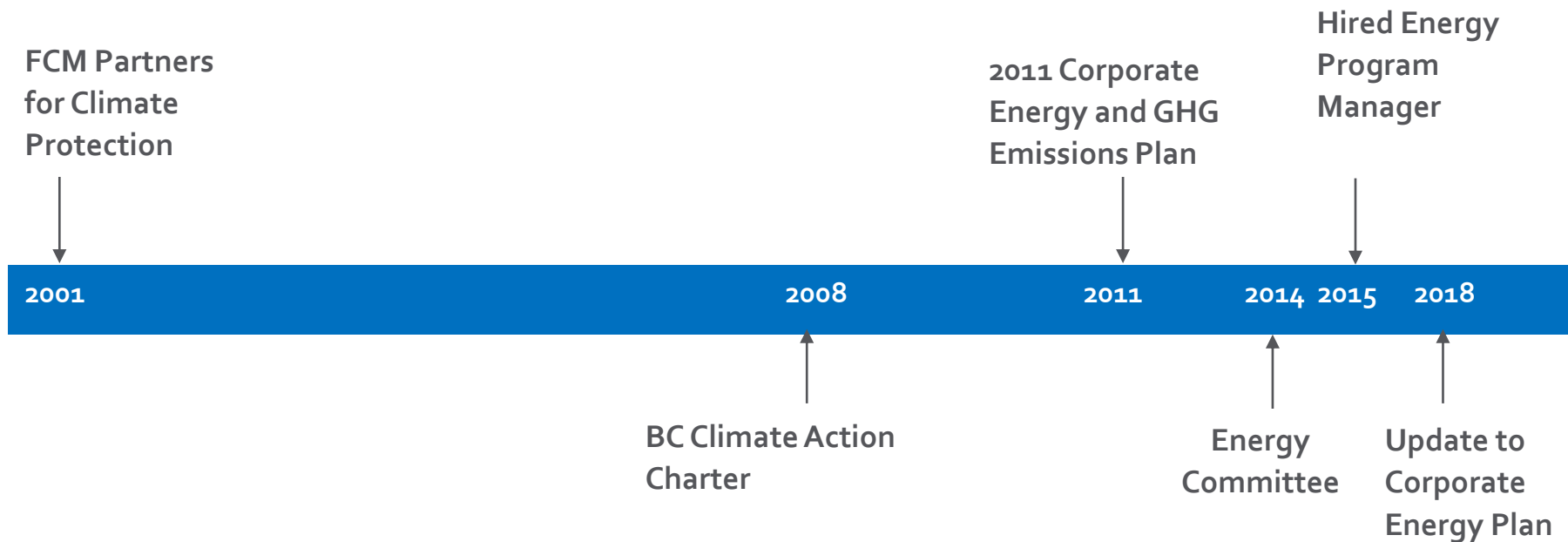
- ▶ Protect the environment from unnecessary harm
- ▶ Wasted energy results in increased energy costs
- ▶ Manages the risk associated with energy prices and supply shortages
- ▶ It's an investment opportunity
- ▶ Energy costs money (a lot of money!)



Corporate Info At a Glance

	Total Energy (GJ)	Total Energy Costs (\$)	Population	GHG Emissions (tonnes CO ₂ e)	Energy Cost per Capita (\$/person)	GHG emissions per capita
2011	317,435	\$7,721,984	117,312	8,147	\$66	0.069
2012	316,665	\$7,794,069	119,312	8,083	\$65	0.068
2013	303,210	\$8,242,325	120,663	7,793	\$68	0.065
2014	318,660	\$8,679,103	122,000	7,918	\$71	0.065
2015	312,073	\$8,285,107	123,500	7,600	\$67	0.062
2016	316,234	\$8,654,099	127,380	7,748	\$68	0.061

What has the City of Kelowna been doing?

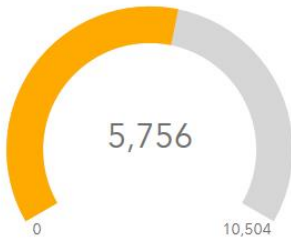


Energy Conservation Measures Implemented Since 2011

1. **City Fleet** - Addition of 20% Bio-fuel, 19 hybrid and 1 electric vehicles
2. **City Fleet** – AVL (GPS) Route Optimization and Anti-idling programs
3. **Wastewater Treatment Facility (2012)** - Process optimization reducing 660,000 kWh/yr (\$45,000/yr)
4. **Glenmore Landfill Admin Building (2014)** – low energy consuming facility (Solar thermal, earth tubes, passive ventilation)
5. **Rutland Arena (2016)** – Heat Recovery, Boiler Upgrade and Controls Optimization resulting in 2500 GJ/yr savings (\$30,000)
6. **Capital News Center (2016)** – Partnered with operations staff at the Capital News Center to upgrade to LED lighting – 660,000 kWh/yr savings
7. **Kelowna Police Services Building (2017)** – Energy Efficient Design (30% better than current building code – uses the same amount of energy as the old building, but has 2.5 times the floor area)
8. **LED streetlight retrofit project (2018)** - which will reduce street light electricity by more than 4,500,000 kWh/yr (62% reduction). Equivalent to the electricity use of over 400 homes per year.

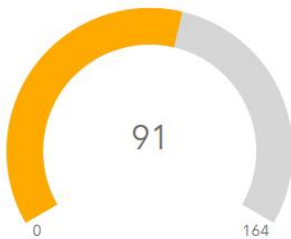
LED Street Light Retrofit

Fix1 Installs Completed



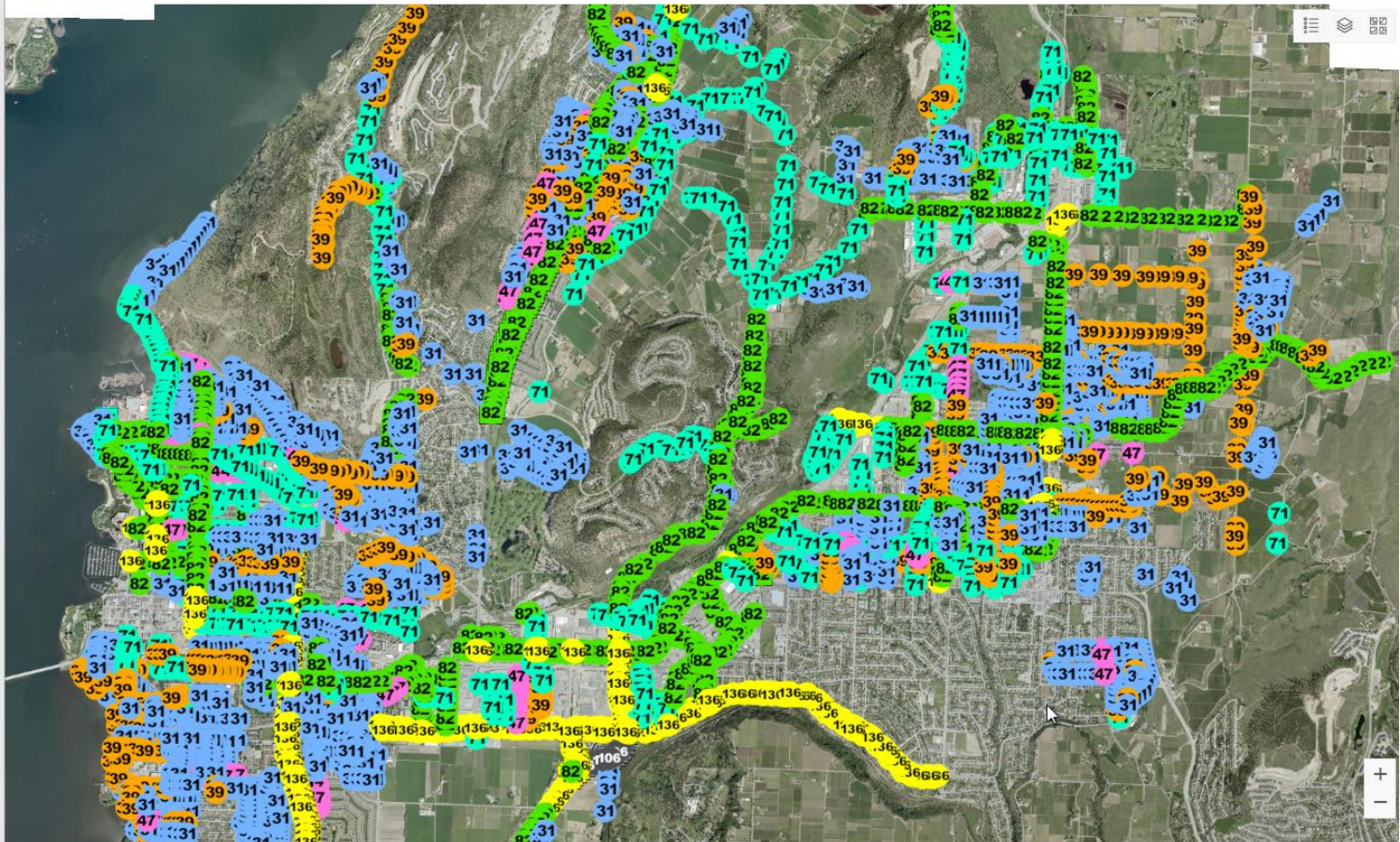
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Fix2 Installs Completed



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Monitor Installs



What has the City of Kelowna been doing?

Since 2015:

Completed Projects (2015-2017)	Annual Energy Savings		Rebates
	(GJ)	(\$)	Achieved (\$)
Rutland Arena	2700	\$ 25,000	\$ 100,000
YLW Outdoor Lighting LED Upgrade	500	\$ 10,000	\$ 21,000
Cedar Creek Pump Replacement		\$ 12,000	
WTF Outdoor Lighting LED Upgrade	250	\$ 5,000	\$ 11,000
City Yards Boiler Upgrade	900	\$ 9,000	\$ 21,500
WTF Air Compressor Upgrade	670	\$ 13,000	\$ 28,000
Memorial Parkade	400	\$ 8,000	\$ 16,300
Kelowna Police Services	4,800	\$ 53,000	\$ 134,000
Energy Studies			\$ 16,200
Sub-total	10,200	\$ 135,000	\$ 348,000
Upcoming Projects (2018)			
LED Street light Upgrade	17,500	\$ 900,000	\$ 673,000
Total	27,700	\$1,035,000	\$ 1,021,000

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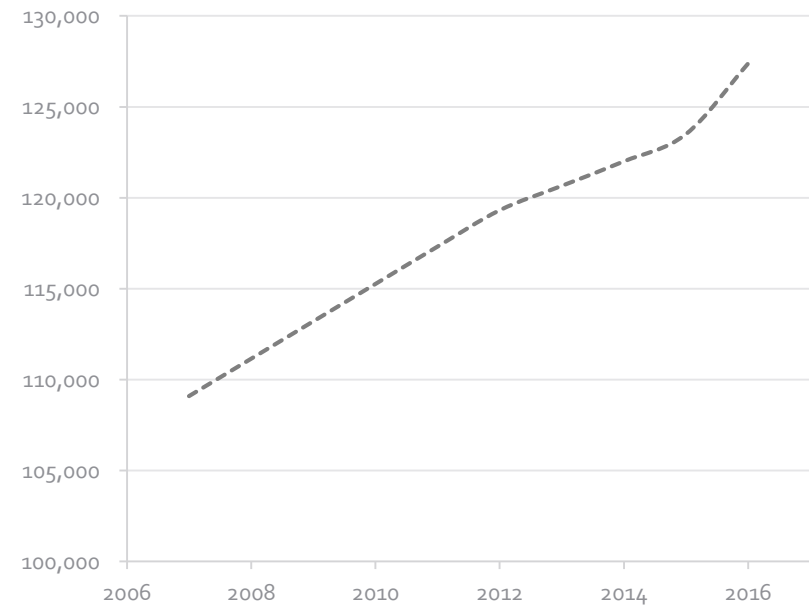
▶ Since 2015:

- ▶ Development Engineering - LED Street light bylaw amendment
- ▶ Exploring Natural Gas purchasing options
- ▶ Fleet – Business Case Evaluation for a CNG waste collection vehicle conversion
- ▶ Policy & Planning – Community Climate Action Plan Update
- ▶ Infrastructure Delivery – Successful Rebate and Grant applications
- ▶ UBCO – Exploring partnership funding opportunities
- ▶ Finance – Reviewing energy projects and the impact to utility budget forecasting
- ▶ An overall increased understanding of energy use

Understanding our Energy Use

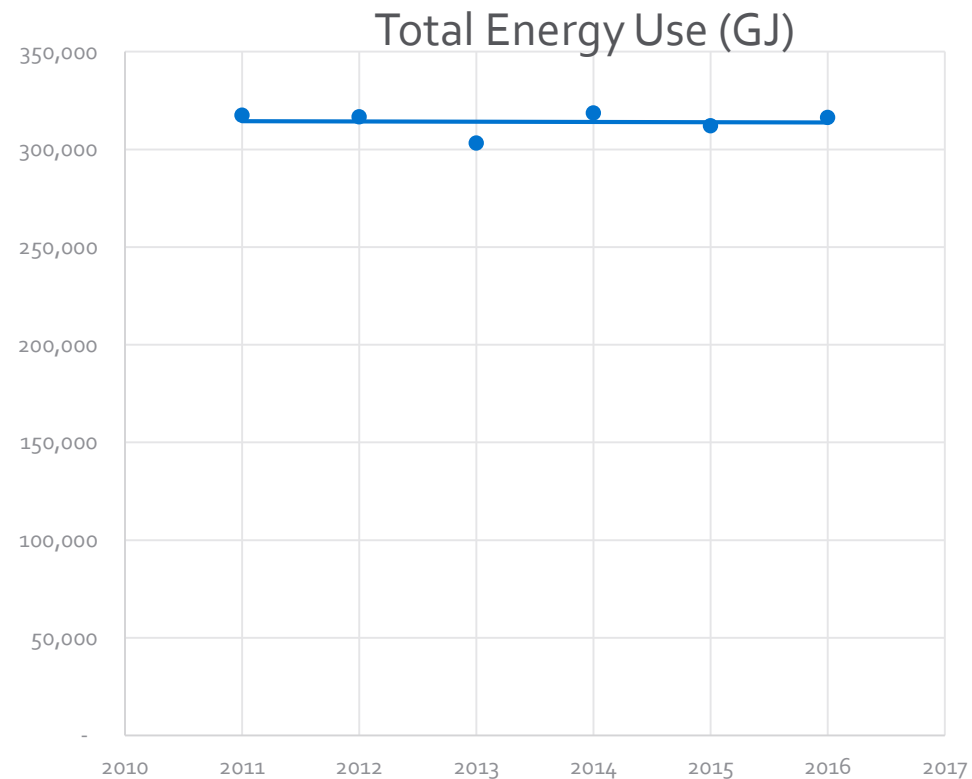
	2007	2016	% increase
Population	109,090	127,380	17%

Population Growth (2007-2016)



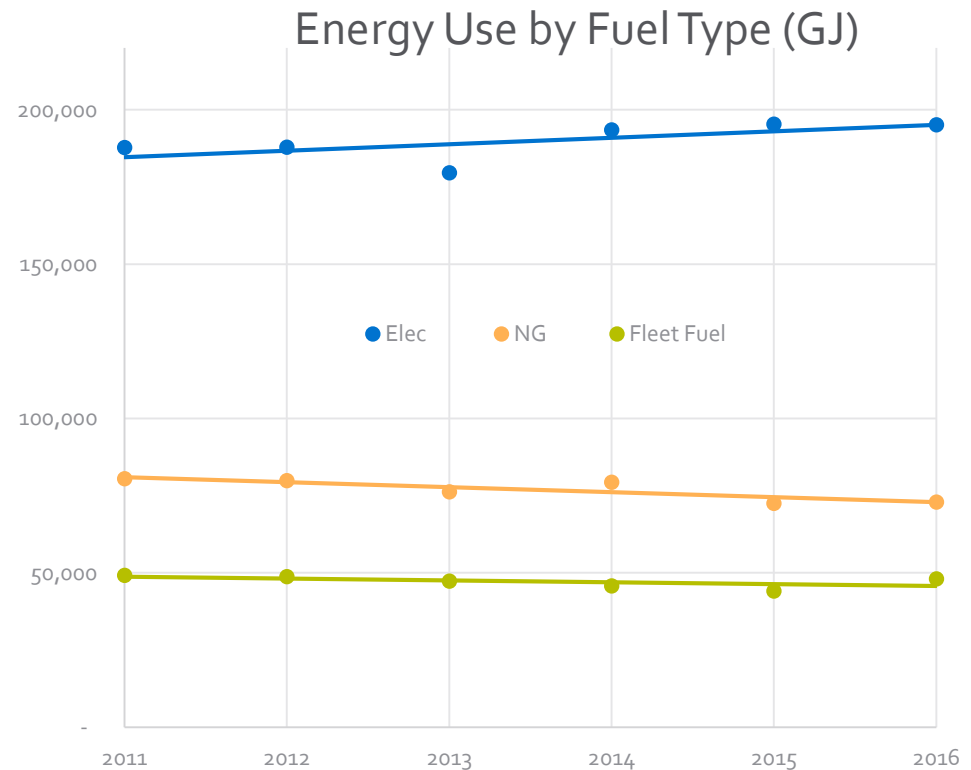
Understanding our Energy Use

	2007	2016	% increase
Population	109,090	127,380	17%
Total Energy Use	307,000 GJ	316,000 GJ	3%



Understanding our Energy Use

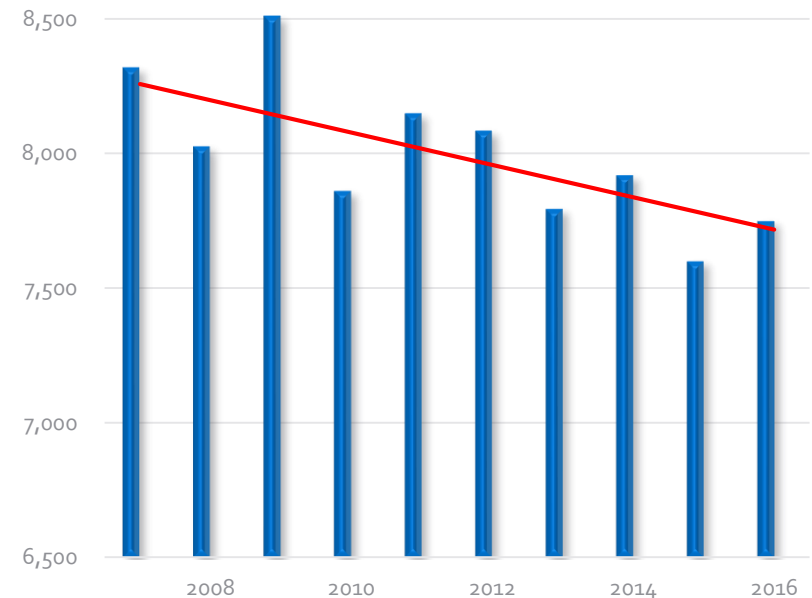
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Understanding our Energy Use

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GHG Emissions	8,317	7,748	-7%

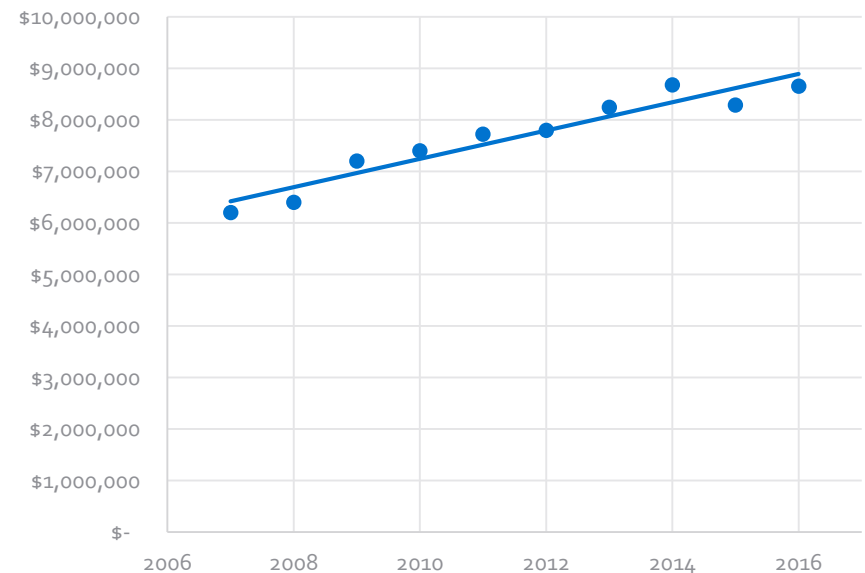
Corporate GHG Emissions (2007-2016)



Understanding our Energy Use

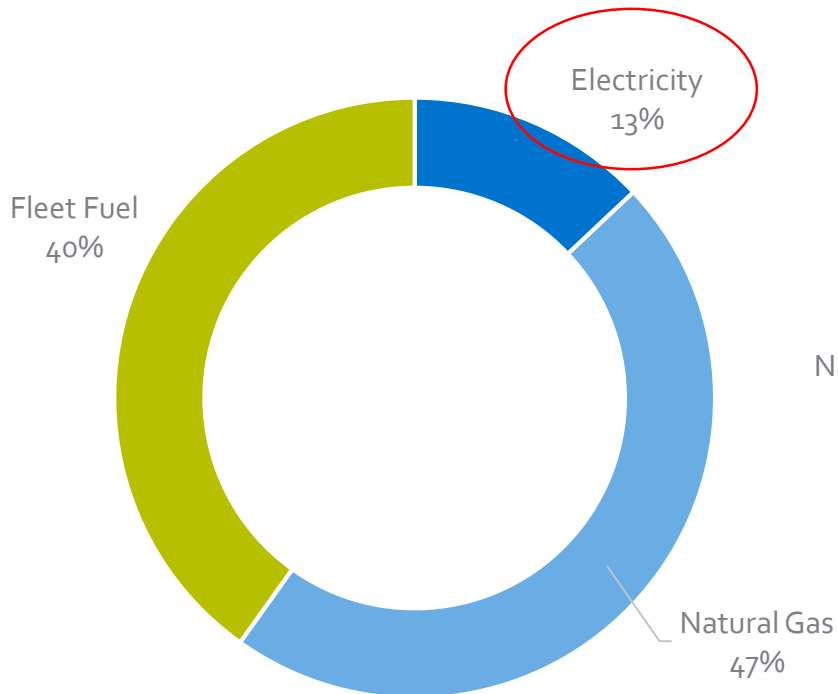
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Population	109,090	127,380	17%
Total Energy Use	307,000 GJ	316,000 GJ	3%
GHG Emissions	8,317	7,748	-7%
Total Energy Costs	\$6.20 million	\$8.65 million	40%

Corporate Energy Costs (2007-2016)

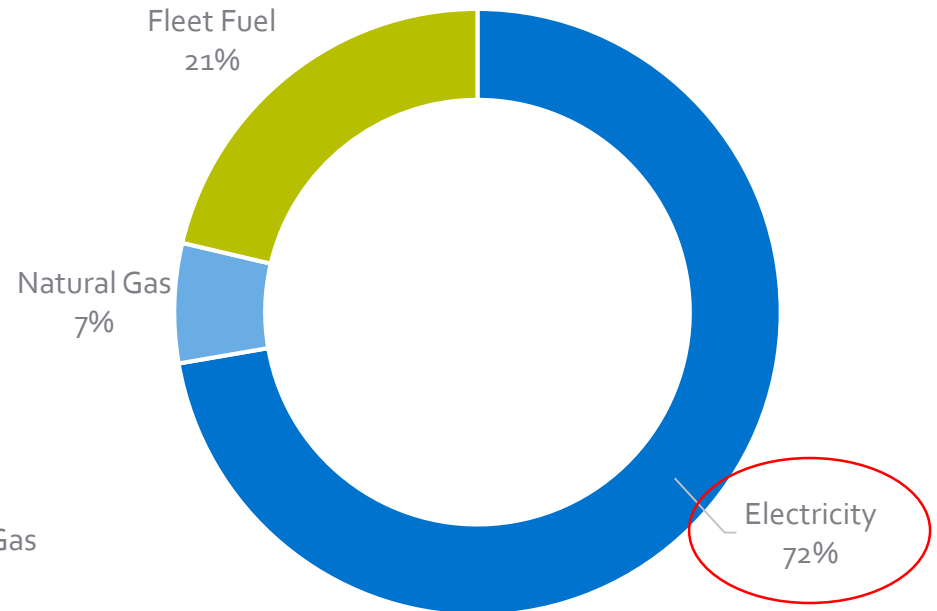


Understanding our Energy Use

GHG Emissions by Fuel Type



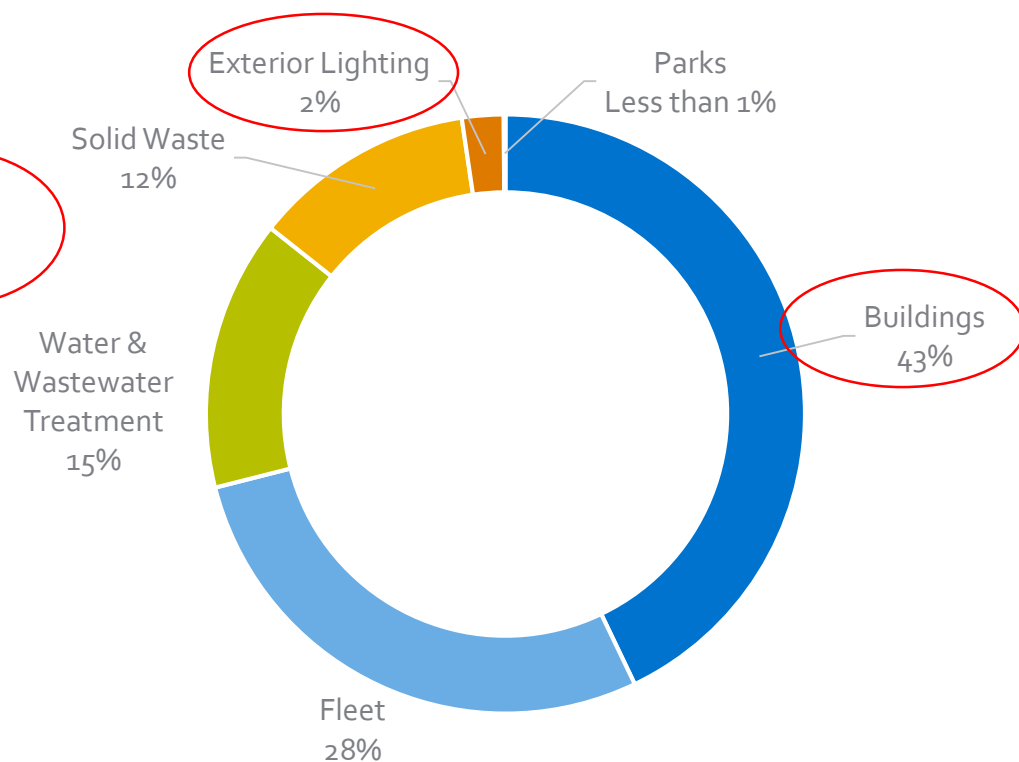
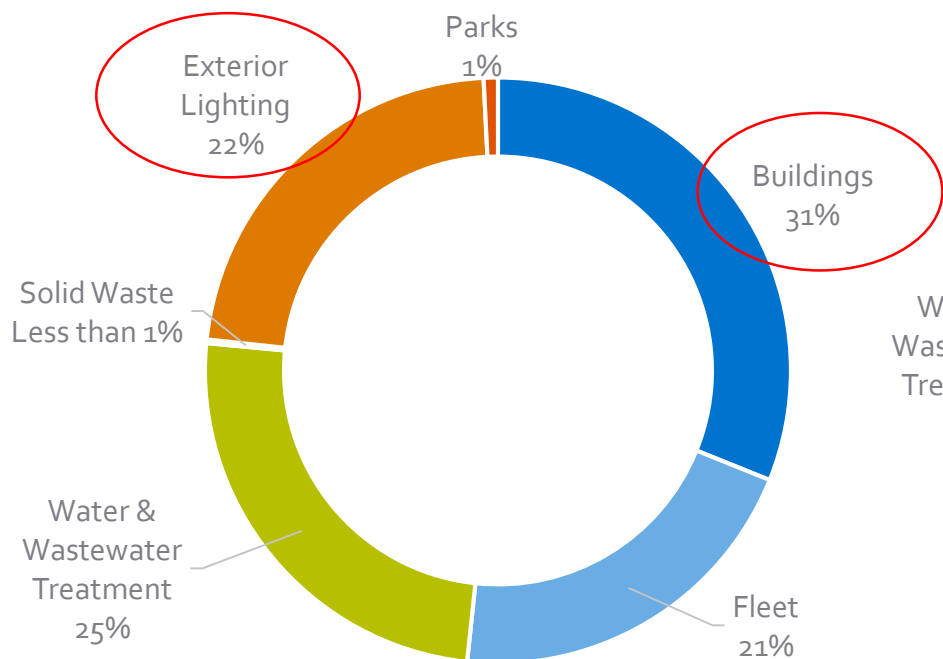
Costs by Fuel Type



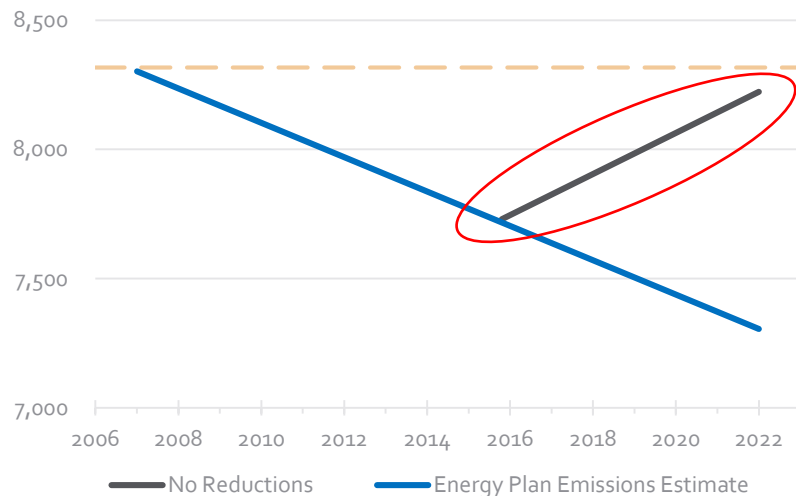
Understanding our Energy Use

Costs by Operational Sector

Emissions by Operational Sector



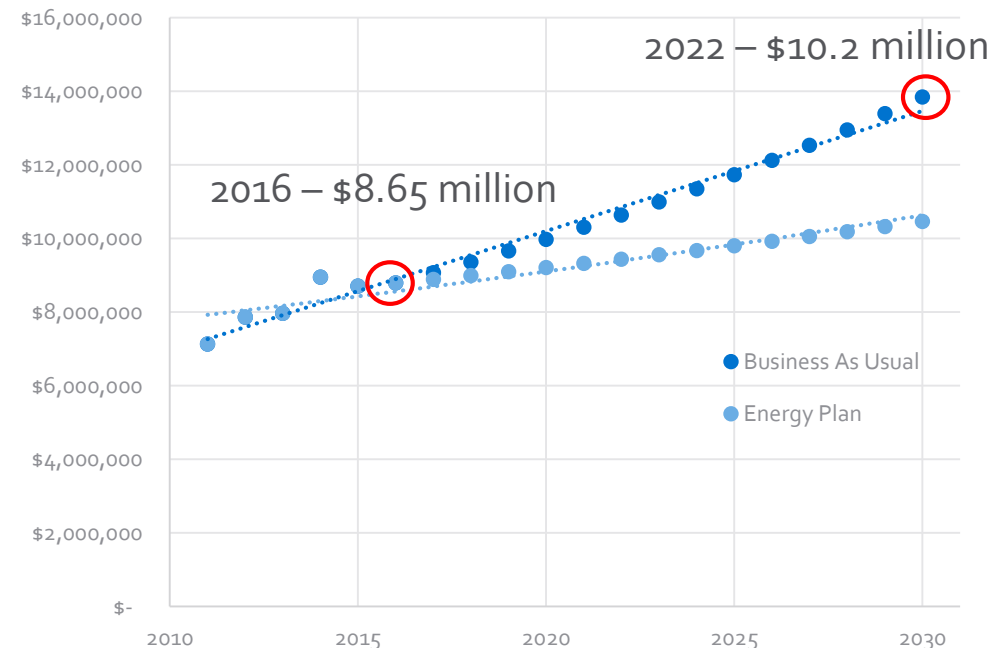
Looking Forward (2018 and Beyond)



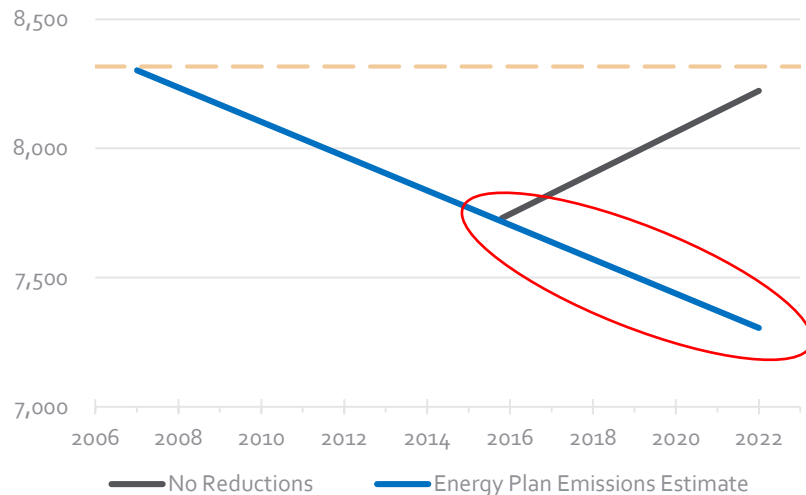
Conservative estimate if we do nothing:
1% increase per year

Population estimated to increase by 12% by 2022

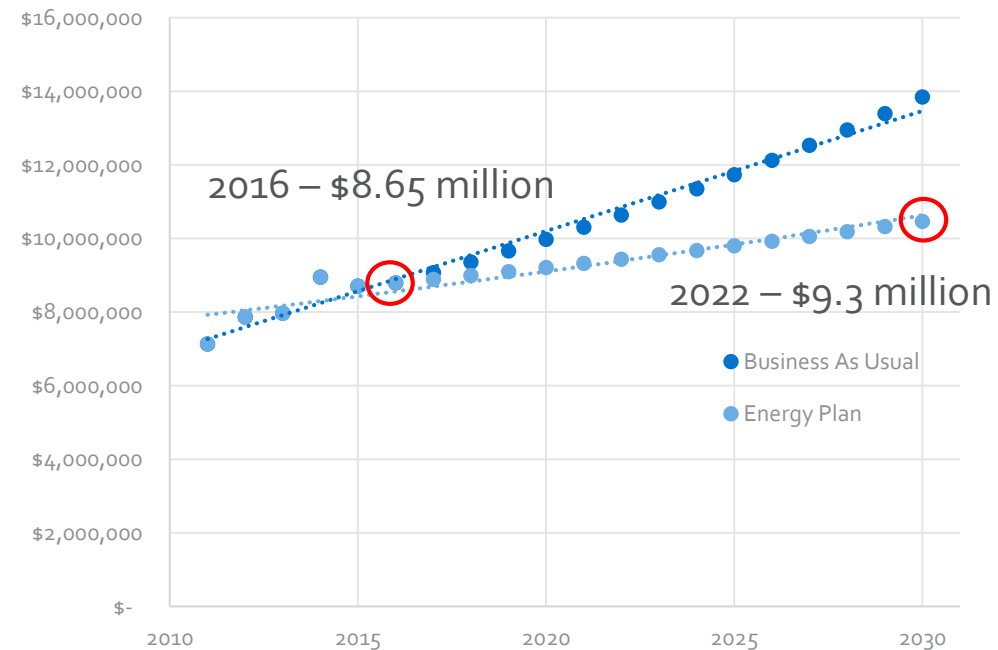
Electricity costs estimated to increase by 3% per year



Looking Forward (2018 and Beyond)

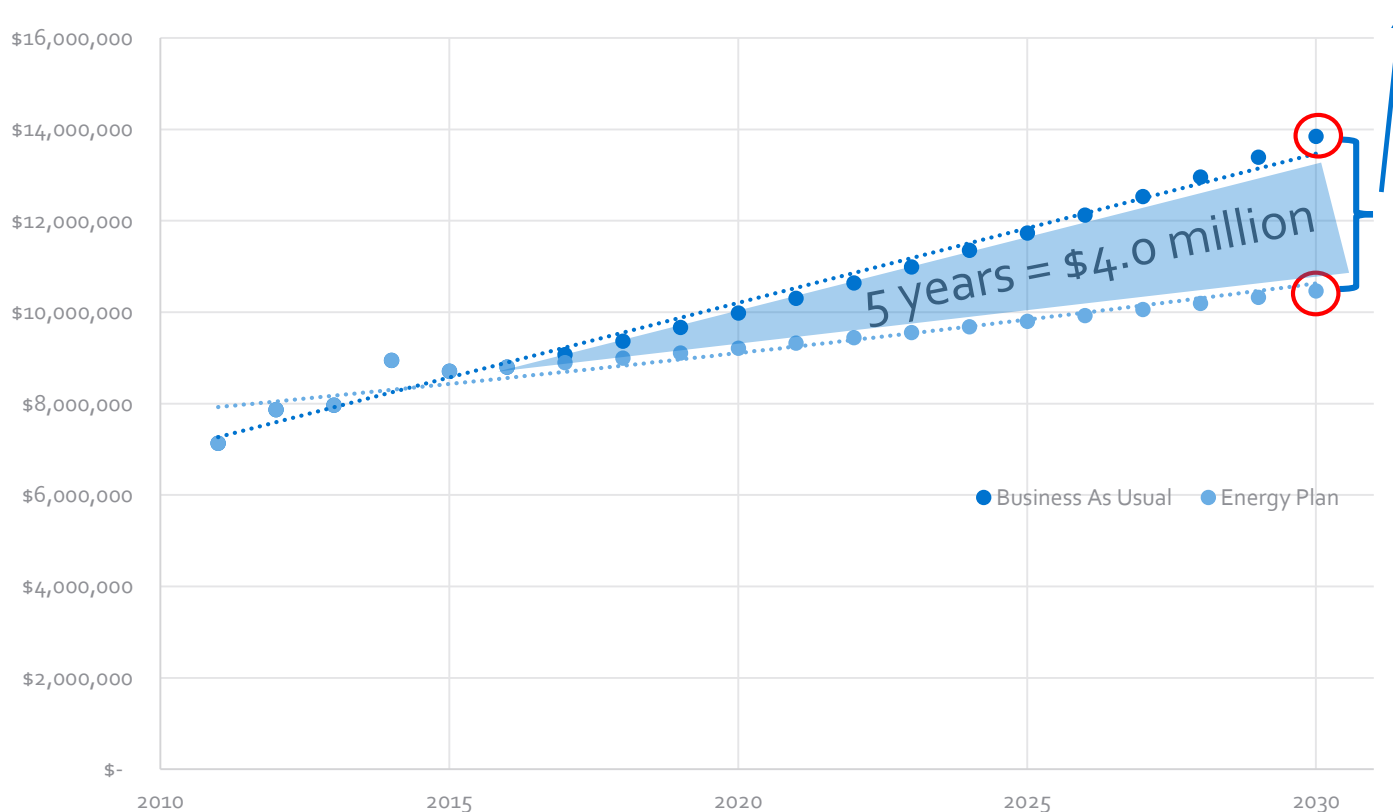


We can continue the same trend:
1% reduction per year



Looking Forward (2018 and Beyond)

Cost Avoidance of \$1.2 million



How Do We Get There?

▶ Energy Committee

- ▶ City staff with the ability to affect change to energy use,
 - ▶ A great source of experience and expertise to help guide strategic decisions regarding corporate energy use,
 - ▶ Tasked with evaluating and prioritizing energy projects
 - ▶ Overseeing the Energy Carbon Reserve and recommending expenditures
 - ▶ Understanding corporate energy use, new technologies and industry best practices
 - ▶ Developing policies and standards
 - ▶ Project development, Business case analysis & Project delivery

How Do We Get There?

- ▶ Understanding our Energy Use Profile
 - ▶ Weather normalization
 - ▶ Detailed Energy Audit Analysis
- ▶ Green Building Policy
 - ▶ Define energy use for new facilities
- ▶ Funding Sources
 - ▶ Revolving Green Fund
- ▶ Long Term Capital Plan
 - ▶ Avoid missed opportunities with new and changing infrastructure
 - ▶ Airport Expansion
 - ▶ Water and Wastewater Treatment Expansions



Energy Policy Recommendations

1. That the City will set a target to reduce corporate GHG emissions by 12% below 2007 levels by 2022
2. That the City adopt the requirement of Energy Modelling & Airtightness testing for the construction of civic facilities.

Future Recommendations

1. The Energy Committee will return with recommendations on
 - a. Energy use targets for the construction of new civic facilities
 - b. Energy use targets for existing civic facilities
 - c. A funding strategy for achieving further energy, GHG, and cost reduction initiatives (Potential Revolving Green Fund),
 - d. A strategy to ensure the long term impacts of energy as part of the capital planning process
 - e. Additional policies that outline minimum energy standards for each operational sector
 - ▶ (Buildings, Fleet, Parks, Lighting, Water Treatment, Solid Waste)

Summary

▶ Economic benefits

- ▶ Annual savings from projects to date - \$1M
- ▶ Potential to avoid \$1.2M by 2022
 - ▶ (\$4.0M over next 5 years)

▶ There's a lot of opportunity beyond what's been highlighted in the plan

- ▶ However, the “quick win” and “low hanging fruit” opportunities have almost been exhausted
- ▶ More effort and in-depth analysis will be required to achieve savings moving forward
- ▶ Increased focus on long term planning to avoid “missed opportunities”
- ▶ Energy budget will require additional oversight moving forward as utility rates increase
- ▶ Cost avoidance is where the biggest savings will come from
- ▶ “Shovel-ready” projects need to be developed, which can be in place to align with grant opportunities as they arise.



Questions?

For more information, visit kelowna.ca.