SUSTAINABILITY SOLUTIONSGROUP

North Cowichan
Climate Action and Energy Plan Update
Climate Change Background Notes

January 2020

Global, National, Regional, and Local Climate Change Action Direction

Municipalities and their organizations are rallying to the challenge of emissions reduction and climate change mitigation, recognizing that they have an important contribution to make to climate protection, and that many urban quality of life co-benefits can be gained through climate actions. According to C40, a leading global network of cities addressing climate change, approximately 70% of global emissions are under the direct or indirect control or influence of municipal governments.[1] This represents an amazing opportunity for municipalities to lead on climate action.

Global Trends Overview

Energy systems and technologies are changing rapidly, creating opportunities and challenges for municipalities. Examples of key trends include:

- **Governments increasingly support low or zero-carbon energy options**: Federal and provincial policies are increasingly adopting low or zero-carbon energy system approaches. This results in a shift from fossil fuel industry subsidy and investment to support for renewable energy and conservation activities.
- **Costing carbon creates new opportunities**: There is a growing market for carbon reductions as emitting become increasingly costly.
- **Renewable energy is more accessible than ever**: It is becoming easier for households and businesses to generate their own energy. Net-metering arrangements with power providers and the ease of establishing small utilities and energy resellers provide support for small-scale renewable energy projects. The costs of renewable energy technologies like wind turbines and solar photovoltaic systems keep dropping. Renewable energy system uptake is also spurred by new financing mechanisms.
- **Energy storage technologies are changing the grid**: Technologies like large lithium-ion batteries are already available for houses and businesses. Installations will increase rapidly as their costs continue to decline.

[1] C40 website: https://www.c40.org/why_cities

- **New models of electric vehicles are available every day**: Electric vehicle sales are increasing quickly across the country. EV ranges are increasing and charging options are more common, creating consumer security. As EV prices continue to decline and more models become available, EVs will increasingly displace internal combustion engine vehicles.
- **Heating systems remain a challenge, but new options are coming online**: Heat pumps continue to improve in efficiency and more models than ever are available. District energy is gaining traction as an efficient system for providing heating and cooling to communities, with the flexibility to add or subtract energy sources as required.
- **New financing strategies are increasing participation**: Municipalities and financial institutions are offering mechanisms that reduce financial barriers to energy retrofits and renewable technologies. PACE programs are a good example. Municipalities around the world are creating innovative policies and strategies to support or engage with these trends while advancing local priorities such as reducing air pollution, stimulating economic development and new employment opportunities, increasing the livability of the community, and improving affordability.

Global Climate Change Outlook

The Intergovernmental Panel on Climate Change (IPCC) convenes the work of thousands of the world's leading climate scientists. From its assessment reports governments can create GHG inventories and plans to mitigate and adapt to climate change.[2]

The global scientific consensus is that the activities we require and that we choose to live our day-to-day lives have direct consequences to our environment and climate; climate change is caused by human activity.[3] Human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate.[4]

Recent analysis shows that current government emissions reduction pledges are insufficient to meet the Paris Agreement goal, and the emissions trajectory of current policies misses the goal by a large margin. Limiting warming to 1.5°C implies reaching net zero CO2 emissions globally around 2050 and concurrent deep reductions in emissions of non-CO2 forcers, particularly methane.[5]

[2] Seto, K. C. et al. (2014). Human settlements, infrastructure and spatial planning. http://pure.iiasa.ac.at/11114

[3] More details on the relationship between climate change and greenhouse gases: www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter01_FINAL.pdf

[4] IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press. p.4. https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf

[5] 2018: Technical Summary. In: *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. https://www.ipcc.ch/sr15/technical-summary

Canada's International Commitments

Canada is a signatory to the Paris Agreement (2015), committing to set emissions reduction targets and submit progress reports to the United Nations Framework Convention on Climate Change (UNFCCC). The Paris Agreement aims to strengthen the global climate change response by keeping global temperature rise this century well below 2.0°C relative to pre-industrial levels, and to pursue efforts to limit temperature increase even further to 1.5°C, to avoid the severe climate change impacts projected to occur if 1.5°C of warming is surpassed.

Canada has committed to achieving a 30% reduction in emissions below 2005 levels by 2030 under the Agreement. Canada's commitment is presented and updated in its Mid-century, Long-term, Low-greenhouse Gas Development Strategy[6] wherein a goal of reducing net emissions by 80% under 2005 levels by 2050 is also set.[7]

Canada's National Commitments

There are several policies issued by the federal government that guide provincial and municipal climate change efforts. Under federal jurisdiction, many of the national policies have direct relevance and application to climate change, energy, and emissions efforts in Banff National Park.

The Pan-Canadian Framework on Clean Growth and Climate Change

The Pan-Canadian Framework (2016) is a plan to grow the Canadian economy while reducing emissions and building resilience to adapt to a changing climate.[8] It summarizes Canada's approach to GHG emissions reduction by 2030, addressing clean technology, innovation, and jobs; carbon pricing mechanisms adapted to the specific circumstances of each Province and Territory; and in particular the realities of Canada's Indigenous peoples and Arctic and sub-Arctic regions.[9] The Framework provides climate action direction to provinces and cities and consists of several key themes:

- Carbon pricing;
- Complementary climate actions;
- Adaptation and building resilience;
- Clean technology, innovation and jobs;
- Reporting and transparency;
- Rights of Indigenous Peoples; and
- Collaboration.

The Pan-Canadian Framework is the umbrella direction under which provinces and municipalities make their climate change efforts.

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[6] Canada's Mid-century, Long-term, Low-greenhouse Gas Development Strategy, 2016: http://unfccc.int/files/focus/long-term_strategies/application/pdf/canadas_mid-century_long-term_strategy.pdf

[7] More information on the Government of Canada Paris Agreement: https://www.canada.ca/en/environment-climate-change/services/climate-change/paris-agreement.html

[8] Government of Canada. Pan-Canadian Framework on Clean Growth and Climate Change: http://publications.gc.ca/collections/collection_2017/eccc/En4-294-2016-eng.pdf

[9] Prime Minister's Office: http://pm.gc.ca/eng/news/2016/03/03/communique-canadas-first-ministers

Carbon Pricing

Following direction in the Pan Canadian Framework, the Greenhouse Gas Pollution Pricing Act (2018) has established a Canadian benchmark carbon price that begins at $20/tCO2e in 2019, rising to $50/tCO2e in 2022 and then $15/tCO2e per year each year until reaching $170/tonne in 2030. The federal carbon pollution pricing system has two parts:

- A trading system for large industry, known as the output-based pricing system; and
- A regulatory charge on fuel (fuel charge).

Provinces and Territories can implement their own carbon pricing that meets or exceeds this national benchmark (as BC has done, more below).

Provincial Commitments

Climate Change Accountability Act (CCAA) (2007)

(formerly *Greenhouse Gas Reduction Targets Act*)

BC's GHG emissions are to be reduced by at least 40 per cent below 2007 levels by 2030, 60 per cent by 2040, and 80 per cent by 2050. Starting in 2020, the province will report every even year on the risks to BC that could reasonably be expected from a changing climate, progress towards reducing those risks, actions to achieve that progress, and plans to continue progress.

Carbon Neutral Government – Program Requirements (2008)

Provided authority by the CCAA, all public sector organizations (PSOs) are to follow a five-step process to achieve carbon neutrality: measure, reduce, offset, report, and verify GHG emissions.

Carbon Tax Act (2008)

The escalating tax was phased in on July 1, 2008 starting at $35 per tonne of carbon dioxide equivalent emissions, increasing to $50 per tonne in 2021. Due to the pandemic, the tax will be held at $40/tonne for the foreseeable future. Revenue generated from the carbon tax is used to protect affordability, maintain industry competitiveness, and encourage new clean initiatives.

Greenhouse Gas Emission Reporting Regulation (2016)

This Regulation requires industrial operations emitting over 10,000 tCO_2e/year to report their GHG pollution annually. Operations emitting over 25,000 tCO_2e are required to have their emission reports independently verified.

Clean Energy Act (2010)

The *Clean Energy Act* sets provincial energy objectives and mechanisms related to electricity self-sufficiency, clean and renewable energy, energy efficiency, greenhouse gas emission reductions and fuel switching to lower-carbon-intensity energy. The Act has three priority areas:

1. Ensuring Electricity Self-Sufficiency at Low Rates
2. Harnessing B.C.’s Clean Power Potential to Create Jobs in every Region
3. Strengthening Environmental Stewardship and Reducing Greenhouse Gases

These provincial priority areas translate to clean energy, clean transportation, energy efficient building, and decrease solid waste direction at the municipal level.

Greenhouse Gas Reduction (Renewable and Low Carbon Fuel Requirements) Act (2008)

This Act sets requirements for the use of renewables in transportation fuel blends and fulfills B.C.'s commitment to adopt a low-carbon fuel standard similar to that of California. The Act provides authority for the Renewable and Low Carbon Fuel Requirements Regulation (enacted in December 2009), which is decreasing the amount of carbon in B.C.'s transportation fuels.

Greenhouse Gas Reduction (Emissions Standards) Statutes Amendment Act (2008)

This Act focuses on reducing GHG emissions from certain industrial operations while increasing opportunities in the bioenergy sector. For example, waste-management operations (including landfills, composting facilities and sewage treatment plants) are required to manage GHGs by reducing emissions or capturing them. They then have the option of realizing the economic opportunity presented by the waste's energy-generating potential. The *Act* provided authority for the Landfill Gas Management Regulation (2009). Additionally, the *Act* enables regulation of zero and net-zero GHG emissions for electricity generation.

Local Government (Green Communities) Statutes Amendment Act (2008)

This Act, referred to as Bill 27, gives local governments legislative power in reducing greenhouse gas emissions, conserving energy, and working towards creating more compact and sustainable communities. The amendments require GHG emission reduction targets in local Official Community Plans and Regional Growth Strategies and supporting policies and actions. It also includes the Climate Action Revenue Incentive Program (CARIP), which is a conditional grant program that provides funding to local governments equal to 100% of the carbon taxes they pay directly to support municipal operations. Conditions include being a signatory of the Climate Action Charter and reporting annually on climate actions taken and progress on carbon neutrality.

Climate Action Charter (2007)

The Province continues to collaborate with local governments through a voluntary agreement known as the Climate Action Charter. Almost every local government in B.C. is a signatory. Initiated at the Union of B.C. Municipalities (UBCM) Conference in 2007, local governments commit to taking climate actions, including:

- Becoming carbon neutral in their corporate operations;
- Measuring community-wide emissions; and
- Creating complete, compact, energy-efficient urban and rural communities.

Energy Efficiency Act (1996)

This Act sets energy performance standards for devices that use, control or affect the use of energy, such as household appliances, heating and cooling systems, lighting, and some industrial equipment.

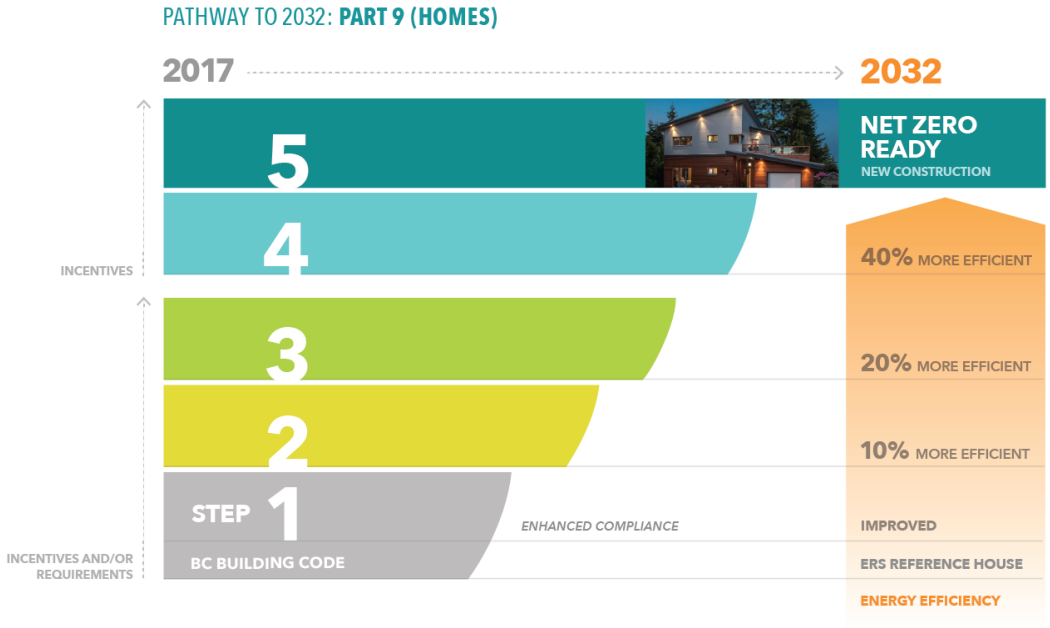
Building Code Amendments and Regulations (2014)

In December 2014, the B.C. Building Code introduced new energy-efficiency requirements for houses and small buildings. These include the Solar Hot Water Ready requirement, a provincial regulation that

communities can voluntarily adopt. It requires new single-family homes in adoptive communities to be built to accommodate installation of solar hot water systems.

BC Step Code

BC has a goal for all new buildings to be net-zero energy ready by 2032. The Step Code is an optional compliance path in the BC Building Code that local governments may use to incentivize or require a level of energy efficiency in new construction that goes above and beyond the requirements of the BC Building Code. Builders may voluntarily use the BC Energy Step Code as a new compliance path for meeting the energy-efficiency requirements of the BC Building Code.



CleanBC Communities Fund[10]

The fund provides provincial and federal funding for projects that will focus on the management of renewable energy, access to clean-energy transportation, improved energy efficiency of buildings and the generation of clean energy.

Energy Ministry Programming

Energy ministry programming supports local governments and Indigenous communities transitioning their energy systems toward cleaner, low-carbon options, e.g. CELP Community Energy Solutions such as efficiency retrofits and district energy and CEV Charging Infrastructure Program.

Transportation Ministry Funding

Transportation Ministry funding is available to local governments, e.g. the BikeBC program, to support capital expenditures on improvements to community infrastructure. Additional funding is being made available to municipalities and indigenous communities via the federal Investing in Canada Infrastructure Program.

BC Preliminary Strategic Climate Risk Assessment (2019)[11]

The climate risk assessment evaluates the likelihood of 15 climate risk events that could occur in B.C. along with their health, social, economic and environmental consequences. It is the first report of its kind in Canada to examine provincial-scale climate risks. Key findings include:

- The greatest risks to B.C. are severe wildfire season, seasonal water shortage, heat wave, ocean acidification, glacier loss, and long-term water shortage.
- Other risks that have the potential to result in significant consequences include severe river flooding and severe coastal storm surge, although these events are less likely to occur.
- Nearly all risk event scenarios (except moderate flooding and extreme precipitation and landslide) would have major province-wide consequences in at least one category.

Regional Commitments and Work

The Cowichan Valley Regional District is a signatory of the BC Climate Action Charter and a member of FCM's PCP program. The District has achieved carbon neutrality in its operations since 2015. CVRD has a Strategic Energy Management Plan[12] for municipal buildings and completed a Regional Energy Strategy several years ago that identifies local renewable energy generation opportunities.

The New Normal Cowichan project[13] is currently underway to assess climate effects and risks, and to develop a climate change adaptation and mitigation strategy. The Phase 1 report is available, which

[10] https://www2.gov.bc.ca/gov/content/transportation/funding-engagement-permits/funding-grants/investing-in-canada-infrastructure-program/green-infrastructure/cleanbc-communities-fund
[11] Summary document: https://www2.gov.bc.ca/assets/gov/environment/climate-change/adaptation/climate-risk-summary.pdf
[12] https://bc-cowichanvalley2.civicplus.com/DocumentCenter/View/77554/CVRD_SEMP_2015?bidId=
[13] https://www.cvrd.bc.ca/2101/Climate-Change

provides a detailed description of expected climate changes in the valley (data primarily sourced from Pacific Climate Impacts Consortium).[14] CVRD has various climate change mitigation and adaptation efforts underway, as well as related emergency preparedness efforts.

Incentives and Subsidy Programs

Federal Programs

The Federal Incentives for Zero-Emission Vehicles program offers rebates on EV purchases, varying by vehicle class.

Provincial Programs

In addition to climate change action enabling legislation, the Province also offers energy efficiency incentive programs under its cleanBC programming.[15] Rebates and incentives are offered for new and existing homes.

The Province's Clean Energy Vehicles for BC (CEVforBC) program offers battery electric, fuel cell, and hybrid electric vehicle purchase subsidies.

Corporate Programs

BC Hydro Programs

BC Hydro offers a variety of energy efficiency programming to home and business owners, those interested in owning electric vehicles, and communities.

Home renovation rebates

- Heat pump retrofits
- Water heater tank upgrades
- Insulation and windows upgrades
- Fireplace upgrades
- Energy assessments
- Energy efficient appliance upgrades

Business programs

- Strategic Energy Management program membership and support
- Leaders in Energy Management Program
    - Energy Manager Associates Program
- Commercial Energy Management Assessment program
- Energy performance contracts (for facilities managers)
- Continuous Optimization program (for large buildings)

[14] https://www.cvrd.bc.ca/DocumentCenter/View/81884/Climate-Projections-Report?bidId=
[15] https://betterhomesbc.ca/

- Energy studies and audits
- Industrial project incentives (for industrial customers using over 500 MWh/year)

Electric vehicles

- Home, apartment, and workplace charger rebates

Communities

- Sustainable Communities program
- Community energy managers
- Community energy and emissions planning support
- Social housing retrofit support program
- Indigenous community energy efficiency training programs

Fortis BC Programs

Like BC Hydro – and often in partnership with BC Hydro – Fortis BC offers energy efficiency rebate programs including:

- Insulation upgrade rebates
- Natural gas furnace upgrade rebates
- Natural gas water heater rebates
- Appliance maintenance rebates
- Bathroom fan and showerhead rebates (ENERGY STAR)
- Clothes washer and dryer rebates (ENERGY STAR)
- Home EV charging station rebates
- Home energy evaluations
- Heat pump rebates and loans
- Furnace and boiler rebates
- Home renovation rebates
- Lighting upgrades rebates
- New home construction rebates for energy efficiency
- Windows and doors rebates

Estimated Climate Changes for the Cowichan Valley

Climate change modelling estimates a median increase of 1.6°C to the annual mean temperature in the Cowichan Valley by 2050. This is accompanied by a 6% increase in annual precipitation, although summer precipitation amounts will decrease by 18%. Annual snowfall in the region is expected to decrease substantially, resulting in much reduced winter snowpack. The median heating degree days will decrease by 548.

Local climate impacts expected to accompany these changes include:

- Fewer heating degree days will decrease heating demand in winter months;
- Increased growing degree days and fewer frost days will result in longer growing seasons;
- Hotter springs and summers may allow traditionally more southern crops to be grown in the region;
- Warmer annual mean temperatures will result in flora and fauna species migration, with some currently local species moving north and species currently south of the bioclimatic region moving into the Cowichan Valley;
- Wetter winters and springs will increase flood risk frequency and severity as well as landslide risk;
- Decreased snowpack will mean less water for the summer months, increasing drought risk;
- Warmer temperatures and more humid air from increased rainfall in the winter and spring months will result in greater air front variances, resulting in more frequent and intense storms;
- Expected sea level rise will increase coastal erosion rates and seawater ingress to low-lying areas, with a risk of salinating agricultural soils and impacting crop production;
- Expected sea level rise will result in higher storm surges; and
- Increased drought will increase wildfire risk and wildfire smoke presence and airborne particulate pollutants.

The following tables summarizes the expected climate changes in the region.

Summary of climate change for the Cowichan Valley in the 2050s.[16]

Climate Variable	Season	Projected Change from 1961-1990 Baseline	
		Ensemble Median	Range (10th to 90th percentile)
Mean Temperature (°C)	Annual	+1.6 °C	+1.0 °C to +2.3 °C
Precipitation (%)	Annual Summer Winter	+6% -18% +5%	-2% to +12% -28% to +1% -4% to +15%
Snowfall* (%)	Winter Spring	-39% -53%	-59% to -22% -71% to -18%
Growing Degree Days* (degree days)	Annual	+430 degree days	+247 to +628 degree days
Heating Degree Days* (degree days)	Annual	-548 degree days	-772 to -323 degree days
Frost-Free Days* (days)	Annual	+16 days	+11 to +24 days

* These values are derived from temperature and precipitation.

[16] Pacific Climate Impacts Consortium data: http://www.plan2adapt.ca/tools/planners?pr=10&ts=8&toy=16

Climate Action Progress in North Cowichan

Since the CAEP's completion in 2014, North Cowichan has undertaken a variety of initiatives to implement its recommendations. Progress is recorded in the Climate Action NRG Plan Tracker. The following is a brief overview of these initiatives.

Transportation

- Right-sizing corporate fleet after fleet management review
- Some fleet EVs are in operation and charging stations have been installed: Crofton, Waterwheel Square, and Regional Visitor Centre
- A Bike Network Plan has been completed

Actions Implementation Status

Out of 16 "sub-actions":

Complete	Ongoing	Not Started	Re-evaluate/Unknown
5	5	3	3

Land-use

- A new Zoning Bylaw focuses new development in core developed areas
- A Parks and Trails Master Plan has been produced, recommending trail connections, extensions, and multi-modal connections
- Local area plans for University Village, Chemainus and Crofton have been adopted, with town center improvements in Crofton and University Village

Out of 31 "sub-actions":

Complete	Ongoing	Not Started	Re-evaluate/Unknown
7	14	6	4

Energy

- The Corporate Energy Program has had success reducing municipal energy use
- Several energy efficiency improvements have been made to civic facilities
- Ornamental streetlights have been converted to LED models

Out of 16 "sub-actions":

Complete	Ongoing	Not Started	Re-evaluate/Unknown
2	9	3	1 (+1 cancelled)

Agriculture

- A food forest has been established in Chemainus at the old school site
- The Bonsall Creek Watershed Management Plan is being implemented with municipal funding support

Out of 16 “sub-actions”:

Complete	Ongoing	Not Started	Re-evaluate/Unknown
3	2	8	3

Forestry

- A no net-loss policy has been established for the Municipal Forest Reserve. Additional lands are also periodically considered for purchase to add to the reserve.
- A bio-solids land application agreement with VIU applies Municipal Wastewater biosolids on the Universities woodlot in Nanaimo to facilitate increased tree growth

Out of 9 “sub-actions”:

Complete	Ongoing	Not Started	Re-evaluate/Unknown
3	2	4	-

Adaptation

- Diking projects have been completed, in partnership with Cowichan Tribes, City of Duncan and the CVRD
- An asset management review has been undertaken to assess infrastructure status

Out of 4 “sub-actions”:

Complete	Ongoing	Not Started	Re-evaluate/Unknown
-	4	-	-

Financing

- The CAEP Reserve Fund has been established, seeded with property tax funding, and has been used for municipal and community energy projects over the past 4 years

Out of 3 “sub-actions”:

Complete	Ongoing	Not Started	Re-evaluate/Unknown
1	1	1	-