City of Bellingham

Climate Protection Action Plan

Greenhouse Gas Monitoring Report

Emissions Reduction Measures
2018 Update





A Letter from Mayor Linville

More than ever before, local governments have the responsibility to protect our environment. As federal and state support dwindles, cities are on the front line. I am proud to support a vision of using clean and renewable energy in our community.

As Mayor of Bellingham and a former Washington State Legislator, I know firsthand the harmful effects that pollution, the high cost of energy, and climate change have on residents and families throughout Bellingham and Washington state. I have worked on environmental issues for more than 20 years. I was a sponsor and key negotiator for new state pipeline-safety laws after the tragic pipeline spill that killed three young people in Bellingham. I created the state's LIFT (Local Infrastructure Funding Tool) program and secured $25 million in state matching funds to help clean up Bellingham's waterfront after decades of industrial use. I sponsored the Landscape Management Plan, which was created to protect Lake Whatcom. I also was an original member of Governor Gregoire's first climate action council.

Throughout my years of service, I have never lost focus on the goal: To create a better place for our children and grandchildren. In 2007, Bellingham was recognized by the U.S. Environmental Protection Agency as the state's first Green Power Community. Since then, the City of Bellingham has continued to invest in sustainability, and we have a lot to be proud of on our progress towards providing a healthy community.

- City of Bellingham street lights are now all LED, resulting in brighter, safer streets -- as well as an annual energy savings of approximately $200,000 and a hefty $442,443 rebate check from Puget Sound Energy.
- Because transportation accounts for more than a third of our greenhouse gas emissions, we now have 12 hybrid and electric vehicles and plan to purchase more as we renew our fleet.
- We continue to implement the City's Bicycle and Pedestrian Master Plans, which make travel by foot and bike more accessible and interconnected.
- The City funded $9 million to the Whatcom Transportation Authority's Enhanced Transit Service, including Sunday services, from 2010 to 2016.
- We are getting guidance on the best placement for solar panels, which will be possible thanks in part to a $760,000 grant from the Northwest Clean Air Agency.
- This year, we began planning for resource recovery of biosolids to replace incineration at the Post Point Wastewater Treatment Plant.
- And finally, as Mayor I have demonstrated the City's commitment on the international stage by joining the U.S. Climate Mayors as well as the Global Covenant of Mayors for Climate and Energy to uphold the Paris Climate Agreement goals.

We are committed to working towards our climate reduction targets, pursuing actions that will achieve those targets to reduce emissions, and reporting back on progress to our community. I believe that this updated Climate Action Plan will help lead the transition away from fossil fuels to renewable energy, and at the same time improve the lives of our residents and visitors, grow our local economy, and create a more sustainable and equitable future for Bellingham.

Contents

List of Figures

List of Tables

Acknowledgements

This report required the effort of many people across many City departments and other organizations. Thanks to all those who assisted in this process.

Nathan Rice, Primary Author
Kulshan Services

City of Bellingham staff

Anitra Accetturo

Freeman Anthony

Larry Bateman

Kim Brown

Jennifer Corfee

Myron Carlson

Ted Carlson

Chris Comeau

Clare Fogelsong

Mark Gardner

Riley Grant

Rob Johnson

Eric Johnston

Renee LaCroix

Cynthia May

Scott Moses

Chad Schulhauser

Clark Williams

ICLEI staff

Michael Steinhoff

J.R. Killigrew

Puget Sound Energy

Kim Gray

Heather Mulligan

Melvin Lie

Nick Hartrich

Cascade Natural Gas

Monica Cowlishaw

Amanda Sargent

Other contributors:

Jeff Aslan, *Sustainable Connections*

Jordan Beaudin, *Sustainable Connections*

Orion Eaton, *Sustainable Connections*

Rose Lathrop, *Sustainable Connections*

Alex Ramel, *Stand*

Seth Vidaña, *WWU Office of Sustainability*

Joel Swisher, *WWU Institute for Energy Studies*

Booklet design and layout:

Shew Design

OVERVIEW

Executive Summary

The movement to combat climate change has been gaining momentum around the world, with city governments like Bellingham leading the way in the public sector. In 2005, City Council committed to the Cities for Climate Protection Campaign and its five milestones (Figure 1). This process resulted in Bellingham's 2007 Climate Protection Action Plan, which included emissions reduction targets for 2012 and 2020. The City has completed all five Climate Protection milestones, and this report represents the continuation of this program, reporting on progress so far and charting a course to meet new targets in 2030 and 2050.

Tracking progress

Bellingham's efforts to curb greenhouse gas emissions have worked. Emissions inventories show that both the municipal city government and the Bellingham community within city limits exceeded 2012 emissions targets (Table 1). However, 2015 inventories show an increase in emissions since 2012 so continuing the commitment to action is necessary to reach targets in 2020 and beyond.

EMISSION SECTORS MONITORED

Municipal Sectors

- Buildings & Facilities
- Fleet
- Employee Commute
- Streetlights
- Water & Sewer Utility
- Waste

Bellingham Community Sectors

- Residential
- Commercial
- Industrial
- Transportation
- Waste

	2012 *Target*	2015 *Actual Emissions*	2020 *Target*	2030 *Target*	2050 *Target*
Municipal **reduction measures:** 3 completed, 20 long-term ongoing	-64% emissions from 2000 *exceeded (-69.5%)*	-68.3% from 2000	-70% from 2000	-85% from 2000	-100% from 2000
Community **reduction measures:** 5 completed, 43 long-term ongoing	-7% emissions from 2000 *exceeded (-17%)*	-10.4% from 2000	-28% from 2000	-40% from 2000	-85% from 2000

Table 1. *Municipal (city government operations) and community (within city limits) progress toward climate targets (which include green power purchases).*

Municipal successes

Between 2000 and 2012, municipal emissions dropped by 69.5 percent, exceeding the original target of 64 percent. This has been accomplished by implementing 23 municipal emissions reduction measures. In 2015, municipal emissions increased slightly but the City is still on track to meet the 2020 goal with continued reductions in natural gas and fleet emissions.

Community successes

Community emissions fell 17 percent between 2000 and 2012, exceeding the goal of a 7 percent reduction. This was made possible by implementing 48 emissions reduction measures. In 2015, community emissions increased compared to 2012, which could make it harder to reach emissions targets in 2020 and beyond. Committed action across the community will be necessary to meet these goals.

Taking the Next Steps

This report includes new proposed emissions reduction measures to meet emissions targets for 2020 and beyond. Looking forward, the City aims to further reduce municipal greenhouse gas emissions to 85% below 2000 levels by 2030 and 100% below 2000 levels by 2050 – making the city government carbon neutral. The new community emissions targets are 70% below 2000 levels by 2030 and 85% by 2050.

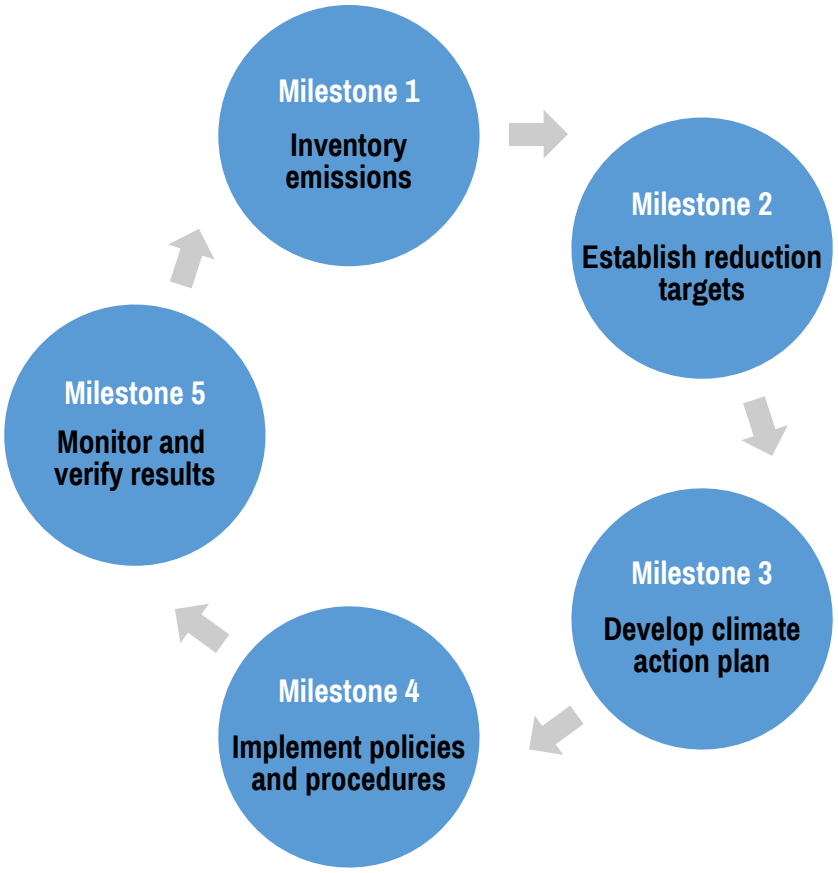


Figure 1. *Cities for Climate Protection Milestones, a program of the International Council for Local Environmental Initiatives (ICLEI).*

one vision, six strategies

To reach these ambitious goals, the City has identified 24 ongoing and proposed municipal emissions reduction measures and 56 community emissions reduction measures in six core strategies.


Transportation
Energy Efficiency and Conservation
Renewable Energy
CITY OF BELLINGHAM WASHINGTON
MUNICIPAL
Land Use
Green Building
Waste Reduction
COMMUNITY

Energy Efficiency and Conservation

MUNICIPAL

Buildings and Facilities generate 28 percent of municipal greenhouse gas emissions. Between 2000 and 2015, emissions from Buildings and Facilities decreased 2 percent, including new municipal buildings built during that time. Emissions decreased 15 percent per full-time equivalent employee. These reductions were likely due to more than $15 million in energy efficiency upgrades to city buildings since 2007.[1] Meanwhile, emissions from streetlights dropped 75 percent from 2000 to 2015 after the City upgraded 3,600 streetlights to LED (light-emitting diode) bulbs, which will save more than 2.2 million kilowatt-hours (kWh) of electricity and more than 1,000 tons of CO_2e emissions every year.

Looking ahead, the City will hire a building engineer to continue improving energy efficiency in city buildings and facilities, and to incorporate resource conservation measures identified in a recent energy audit of 41 city-owned buildings as appropriate.

Refer to page 52 to learn more.

COMMUNITY

Residential and Commercial energy makes up 43 percent of community emissions. Between 2000 and 2015, Residential energy fell 13 percent. This was possible in part due to community programs like the Community Energy Challenge, which help reduce energy use in homes and businesses. Commercial energy increased by 1 percent, suggesting that more efficiency progress is possible there.

Going forward, utilities and community groups will continue to offer money-saving rebates to help homeowners make their homes more energy efficient. The City will work with partners to expand these efforts across the community while exploring new ways to engage the commercial and industrial sectors, multi-family housing, and rental properties. A district energy project in the new waterfront development area would also provide significant energy savings.

Refer to page 70 to learn more.

Renewable Energy

MUNICIPAL

Since 2006, the City has purchased renewable energy credits (RECs) from wind power to "offset" the emissions from the city government's electricity use. Starting in 2019, the City will replace RECs with Green Direct, the new Puget Sound Energy program that will add more wind power to the grid. The City will also expand on its three solar power installations by building a new one with the help of a Northwest Clean Air Agency grant. In addition, upgrading the Post Point wastewater treatment plant biosolids process will eliminate the need for incineration and capture methane to use for energy, greatly reducing greenhouse gas emissions.

Refer to page 56 to learn more.

COMMUNITY

Solar power is booming in Bellingham: Between 2014 and 2015, annual solar installation permits increased 127 percent. In 2016, Bellingham homes and businesses generated over 3 million kWh of solar power, preventing more than 2,300 tons of CO_2e emissions. That's enough to power 225 homes for a year on nothing but the sun, even here in the rainy Northwest. In April 2016, Bellingham was recognized by Washington Governor Jay Inslee as a Northwest Solar Community for making it easier and cheaper for homeowners to install rooftop solar.

Looking ahead, solar power continues to grow with the help of community solarize campaigns. Residents continue to purchase Green Power from Puget Sound Energy and others to bring more renewable energy onto the grid.

Refer to page 84 to learn more.

Transportation

MUNICIPAL

Between 2000 and 2015, vehicle fleet emissions fell 29 percent due in part to hybrid and electric vehicles purchases. The City will purchase more hybrid and electric vehicles and will start using renewable diesel – a next generation biofuel – in the City fleet. Employee commute emissions dropped 12% between 2000 and 2015. The City will continue to promote alternative transportation for employees with free bus passes and a City bike fleet, as well as education and outreach.

Refer to page 58 to learn more.

COMMUNITY

Transportation is the largest source of greenhouse gas emissions in Bellingham, making up 32 percent of all community emissions. Between 2000 and 2015, transportation emissions dropped by 10 percent. The City will continue to promote alternative transportation in a variety of ways: bike- and pedestrian-friendly infrastructure and planning, incentives for businesses that reduce car trips, and smart land use decisions like dense, urban villages designed around walking rather than driving (see Land Use section). Going forward, the City will explore new ways to incentivize electric vehicles and charging stations in the private sector. Community programs like Whatcom Smart Trips also promote and incentivize alternative transportation.

Refer to page 89 to learn more.

Green Building

MUNICIPAL

Buildings and facilities generate 28 percent of municipal greenhouse gas emissions. Building energy use can be reduced by following green building practices during construction. The City has committed to LEED (Leadership in Energy and Environmental Design) standards for most new municipal buildings.

Refer to page 64 to learn more.

COMMUNITY

Residential and Commercial energy makes up 43 percent of community emissions. Between 2000 and 2015, Residential energy fell 13% and Commercial energy increased 1%. The City promotes green building through permitting incentives and codes, and will ensure that these tools are consistent with updated standards. New efforts like 2030 Districts seek to reach Net Zero Carbon emissions in all new buildings, developments, and major renovations by 2030. The City will review and update codes and policies in an effort to support this ambitious goal.

Refer to page 95 to learn more.

Waste Reduction

MUNICIPAL

The City reduces waste through recycling, composting, and reusing materials but lacks data on waste volumes over time. The City will begin monitoring its waste so that waste reduction can be tracked over time. With this data, a waste reduction plan can be developed. In addition, the City will continue to use recycled materials in its construction projects.

Refer to page 66 to learn more.

COMMUNITY

Between 2000 and 2015, residential solid waste emissions decreased by 10 percent while commercial, industrial, and multifamily waste increased by 20 percent. The City can help reduce community waste by working with Whatcom County to increase diversion and recycling. Community programs like Sustainable Connections' Toward Zero Waste campaign are also important efforts.

Refer to page 97 to learn more.

Land Use

MUNICIPAL

City parks sequester carbon in trees and wetlands. The Habitat Restoration program increases carbon sequestration by planting vegetation to improve fish and wildlife habitat. The City's Property Acquisition Program in the Lake Whatcom watershed purchases property to prevent development around our drinking water source and protect carbon-rich forests. The City will continue these purchases and will also research the feasibility of earning carbon credits for these purchases.

Refer to page 68 to learn more.

COMMUNITY

At the community level, Goals and Policies from the City's Comprehensive Plan aim to further decrease energy use and reduce emissions. Those land use polices promote alternative transportation and Urban villages that reduce transportation emissions by making it easier to walk, bike, and bus by concentrating a variety of services in a small area with frequent transit. High-density development accomplishes similar goals while preserving open space, reusing buildings, and saving energy and resources.

Refer to page 99 to learn more.

What's Next

The 2018 Climate Protection Action Plan update is a guiding document that provides strategies for reducing greenhouse gas emissions at the municipal and community levels. Going forward, the City will report on municipal and community emissions every two years in City performance metrics and in the mayor's State of the City address. This plan will be updated every five years.

In order to achieve these ambitious targets and lessen Bellingham's climate impact, the entire community needs to get involved. Bellingham continues to grow – our population increased by 15 percent in the last 10 years – so reducing emissions to meet our goals will be a challenge. As we continue this important work, it is essential to recognize the many benefits of acting on climate change. By saving energy, driving less, cutting waste and pollution, and planning the community with foresight and care, Bellingham will create jobs, improve health, save money, and enrich the community, all while preserving the natural beauty and resources it relies on.

Core Strategies	Ongoing & Proposed Measures	
	Municipal	Community
Energy Efficiency & Conservation	5	25
Renewable Energy	4	10
Transportation	12	11
Green Building	2	3
Waste Reduction	6	4
Land Use	2	3

I believe that this updated Climate Action Plan will help lead the transition away from fossil fuels to renewable energy, and at the same time improve the lives of our residents and visitors, grow our local economy, and create a more sustainable and equitable future for Bellingham.

—Bellingham Mayor Kelli Linville

Background

Climate Science Update

2016 was the hottest year on Earth since recordkeeping began in 1880 and the third year in a row to break that record.[2] [3] [4] Of the 17 hottest years ever recorded, 16 have occurred since the year 2000, topping off what were likely the three hottest decades in the Northern Hemisphere in the last 1,400 years.[5] [6]

The oceans have never been warmer, shrinking the polar sea ice extent like never before. Meanwhile, global sea level is rising faster than predicted by the Intergovernmental Panel on Climate Change due to the expansion of warming sea water, and melting terrestrial glaciers and ice sheets in Greenland and Antarctica.[7] [8] More rapid ice sheet collapse could raise global sea levels more than three feet by 2100 and can't be ruled out if emissions are not reduced.[9] One recent study found that carbon emissions through 2015 make four feet of sea level rise unavoidable.[10] Sea level rise could threaten up to 94,000 Washington residents and 13 million people nationwide by 2100.[11]

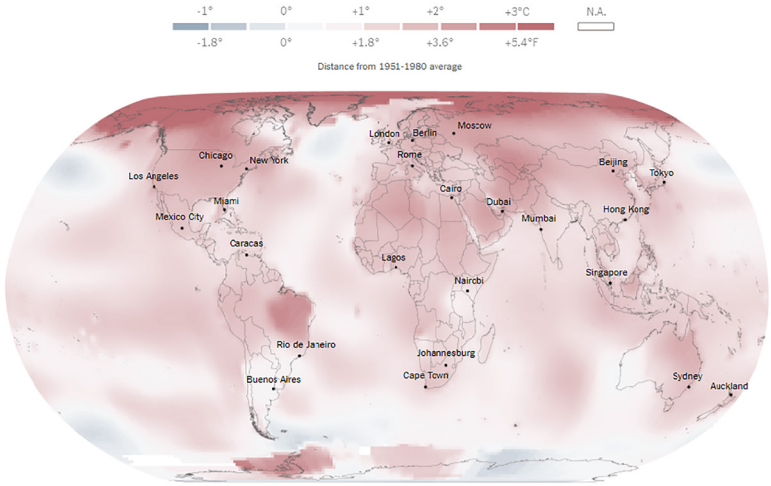


Figure 2. *Distance from average temperatures in 2016 (NASA, New York Times)*

Local Impacts

The planetary warming trend is evident here at home as well: 2015 marked the hottest year on record in Washington State, and impacts were felt in Bellingham and across the region. The record drought in 2015 closed salmon fishing on the South Fork of the Nooksack River in July to protect stressed fish. Warm ocean temperatures caused unprecedented toxic algae blooms, leading to widespread impacts to fisheries, including closures of recreational razor clamming in Washington and Oregon, and much of the state's Dungeness crab harvest.[12] Low snowpack, heat, and drought led to Washington's worst-ever wildfire season, leaving over a million acres charred across the state and a $347 million firefighting bill.[13] Less dire but still emblematic of a changing climate, 2015 marked the first time ever that Bellingham's celebrated Ski to Sea race could not live up to its name: The two ski events were canceled for lack of snow. In 2016, Bellingham again saw record-breaking summer heat and historic El Nino rains, consistent with climate change predictions. [14] [15] [16]

Isolated weather events or abnormal seasons cannot necessarily be linked to climate change, which acts on longer

time scales. But the recent trends portend what is predicted to be the new normal here in Bellingham: hotter and drier summers and more intense rain events in winter, spring, and fall[17] [18].

These changes have already caused glaciers in the North Cascades to shrink to half their size since 1900—smaller than any time in the last 4,000 years (Figure 4)[19]. This leads to warmer rivers that harm salmon and diminished run-off that reduces water supply. Lakes worldwide are warming faster than the oceans and the atmosphere, threatening water quality, and exacerbating existing problems close to home.

The Greenhouse Effect

As greenhouse gases are emitted—primarily carbon dioxide, but also methane, nitrous oxide, and others—heat is trapped in the lower atmosphere, raising surface temperatures through the greenhouse effect (Figure 3). The current rate of emissions is unprecedented in the last 66 million years due to pollution from various human activities including coal and gas-fired power plants; transportation; production of cement, metals, and other industrial products; agriculture; oil and gas production; and the degradation of forests, soils, and other ecosystems that store carbon.[20] Globally, the Earth's temperature has risen almost two degrees Fahrenheit in the last 150 years.[21] In summer of 2016, the concentration of carbon dioxide in the atmosphere surpassed 400 parts per million (ppm) for the first time in three million years and it continues to climb well above the 350 ppm that climate scientists say is the safe level to maintain a stable climate on Earth (Figure 5c).[22] [23] [24]

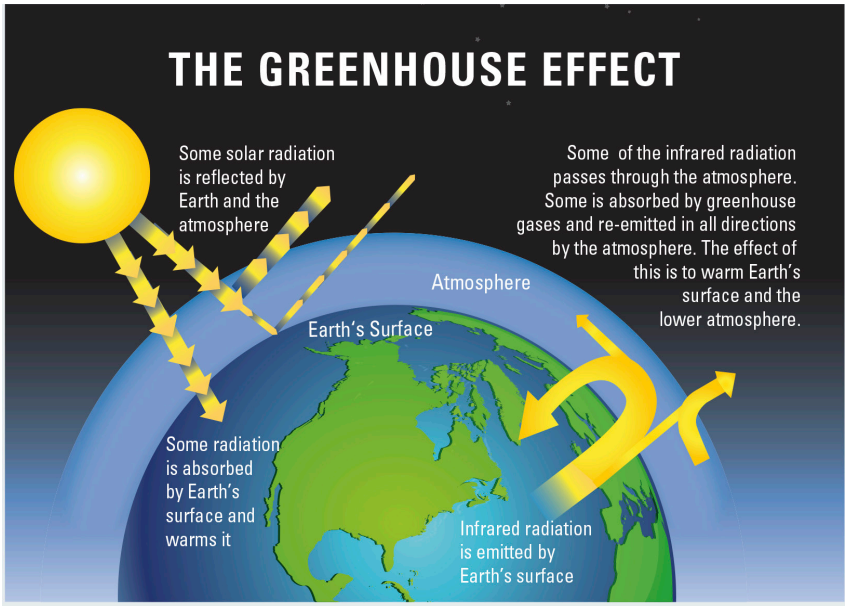


Figure 3. *The greenhouse effect (USGCRP 2014)*

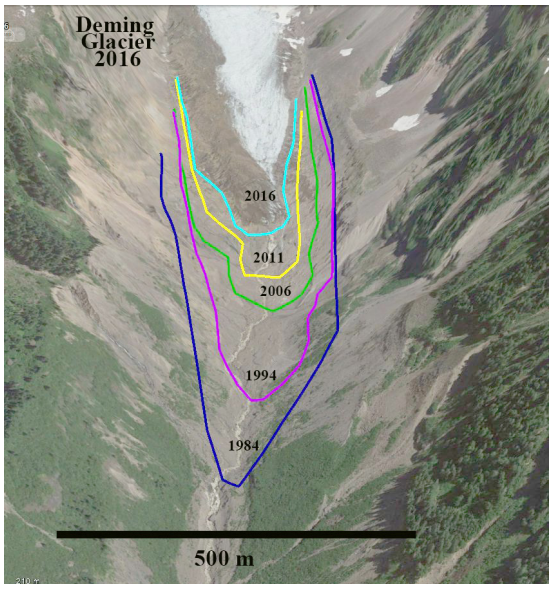


Figure 4. *Deming Glacier in 2016. The glacier has retreated 420 m from 1979 to 2015. (Figure: Mauri Pelto).*

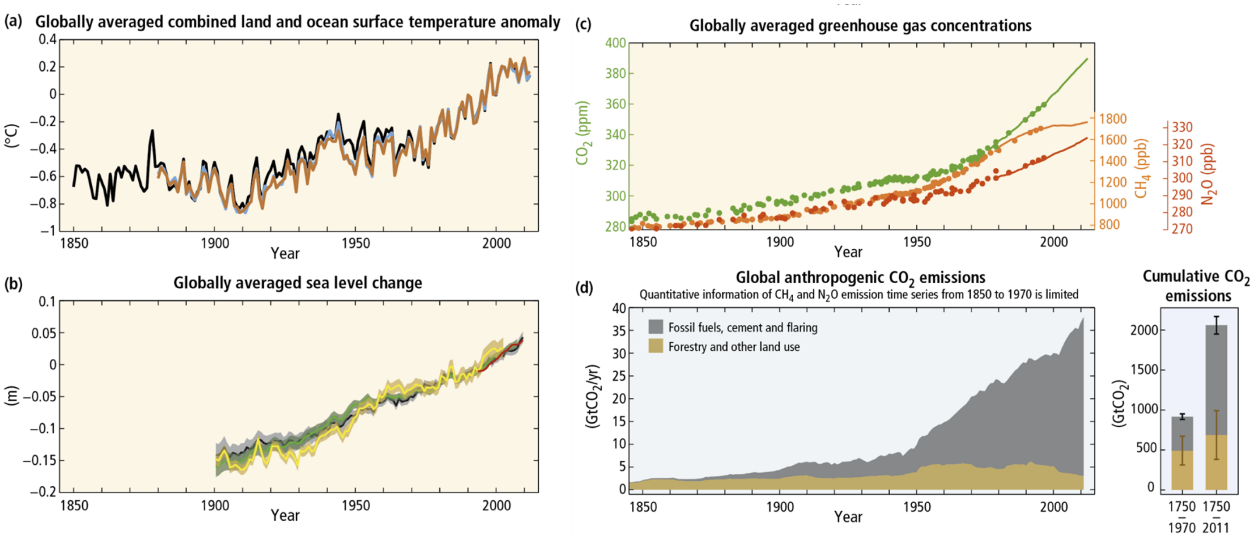


Figure 5. *Observations and other indicators of a changing global climate system. (IPCC 2014)*

Observations: (a) Annually and globally averaged combined land and ocean surface temperature anomalies relative to the average over the period 1986 to 2005. Colors indicate different data sets. (b) Annually and globally averaged sea level change relative to the average over the period 1986 to 2005 in the longest-running dataset. Colors indicate different data sets. All datasets are aligned to have the same value in 1993, the first year of satellite altimetry data (red). Where assessed, uncertainties are indicated by coloured shading. (c) Atmospheric concentrations of the greenhouse gases carbon dioxide (CO_2, green), methane (CH4, orange) and nitrous oxide (N2O, red) determined from ice core data (dots) and from direct atmospheric measurements (lines). Indicators: (d) Global anthropogenic CO_2 emissions from forestry and other land use as well as from burning of fossil fuel, cement production and flaring. Cumulative emissions of CO_2 from these sources and their uncertainties are shown as bars and whiskers, respectively, on the right hand side. The global effects of the accumulation of CH4 and N2O emissions are shown in panel c.

Puget Sound

Some of that excess carbon dioxide in the atmosphere is being absorbed by the oceans, making sea water 26% more acidic since the start of the industrial era.[25] This could have drastic ecological and economic consequences, particularly in the Pacific Northwest where the sea is naturally more acidic due to upwelling ocean currents. Already, Puget Sound shellfish growers struggle to raise oyster larvae in acidic conditions, and one of Washington's major oyster growers has moved operations to Hawaii in search of less corrosive seas. Along with reducing carbon emissions, preventing pollution in local waters is the best way to reduce these impacts.[26]

Facing the Future

Though striking, the effects of climate change seen today are dwarfed by what's to come if emissions are not reduced quickly. In fact, even if all carbon emissions were stopped tomorrow, the climate would continue changing for some time due to the amount of carbon dioxide and warming already in the system.[27]

All these signs point to one undeniable truth: Climate change is well underway and we must speed our efforts to lessen its impact. At the same time, we must work to adapt to a new world. The cost of inaction will be measured locally in lives lost to extreme weather events, homes flooded by storms, infrastructure damage on a rising sea, glaciers melted, salmon runs gone extinct, fishing jobs dried up.

Despite these dire predictions, scientists say it's not too late to protect our climate. And there are signs of progress in the fight against climate change.

Climate Policy Update

Global Climate Policy

In 2015, for the first time, global greenhouse gas emissions did not increase despite a growing world economy.[28] In May 2015, Pope Francis released a ground-breaking, 200-page document declaring climate change to be a moral issue of great concern. Such recognition marked a turning point in the global conversation on the gravity of climate change and the urgency to act now to cut carbon pollution.

In December 2015, all but two countries in the world signed on to the Paris Climate Agreement to limit global warming to less than two degrees Celsius (3.6 degrees F) above pre-industrial levels, and to stop the rise of greenhouse gas emissions as quickly as possible. This marked an important step toward global climate action, but critics say it's not nearly enough to spur rapid emissions cuts since the combined voluntary emissions reduction pledges miss the Agreement's two degree target[29]. Required five-year reviews of each country's pledge may bolster emissions reductions as renewable energy becomes more affordable and climate impacts become harder to ignore. The Paris Agreement also increased developed countries' aid to poorer countries. However, on June 1, 2017, President Trump removed the United States federal government from the Paris Climate Agreement and is seeking to nullify the obligation to contribute aid to other less developed countries. When this policy takes effect in 2020, the U.S. will be the only world government not participating in the Paris Agreement, since the original two holdouts, Syria and Nicaragua, joined in November of 2017.

Responding to the President's announcement withdrawing the federal government from the Paris Agreement, dozens of cities, states, and U.S. corporations have joined the We Are Still In campaign declaring their continued commitment to meeting the reduction goals of the Paris Agreement. On June 5, 2017, Bellingham Mayor Kelli Linville signed on to the Mayor's National Climate Action Agenda in support of the Paris Climate Agreement. Leading up to the Paris climate talks, the City of Bellingham also signed on to the United Nations Compact of Mayors, a global campaign to strengthen cities' commitments to climate action. The 680 participating cities are committed to developing climate action and

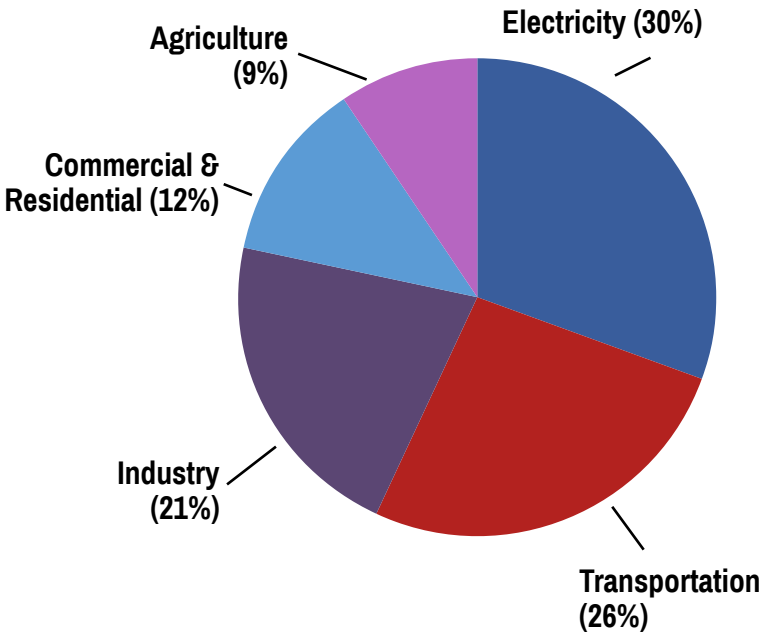


Figure 6. *Total U.S. Greenhouse Gas Emissions by Economic Sector in 2014. Total Emissions in 2014 = 6,870 Million Metric Tons of CO_2 equivalent*

adaptation plans, and to monitor and report emissions.

The World Climate Conference COP23 was held in Bonn Germany in November of 2017. With every nation in the world — save the U.S. — formally committed to the Paris agreement, COP23 drew an estimated 25,000 participants representing nations, subnational governments, businesses, schools, universities, NGOs and faith communities. Washington Governor Inslee and the governors of Oregon and California were invited by COP23 President Bainimarama to speak as representatives of the United States Climate Alliance. During the conference, work progressed on the implementation guidelines for the Paris Agreement that will be finalized in 2020. Another significant outcome was the establishment of the Talanoa Dialogue, a mechanism to raise the level of ambition needed to reach the two degrees Celsius target by bringing together contributions from science, industry, and the civil sector. Despite the changes to the U.S. position on climate change, the U.S. federal government delegation continued to support past U.S. climate policy positions.

Federal Climate Policy in Transition

Like the global economy, growth of the U.S. economy is no longer directly linked to carbon emissions. Since 2007, U.S. Gross Domestic Product has grown by 12 percent, while energy consumption has fallen by 3.6 percent.[30] Wind and solar power are booming as they become more affordable, and coal production and consumption are in decline. Renewable energy is now a major part (22%) of the U.S. power mix, with 244 gigawatts of installed capacity across the country, an 83% increase from 2007 levels.[31] [32]

Meanwhile, U.S. greenhouse gas emissions are falling. Total U.S. greenhouse gas emissions hit a 25-year low in 2016, down 12% from their peak in 2007. The U.S. is now almost halfway toward its Paris Agreement pledge to reduce national emissions by 26 to 28 percent below 2005 levels by 2025.[33]

In 2013, President Obama put in place a federal Climate Action Plan to cut carbon emissions, prepare for climate change impacts, and lead international climate protection efforts. If fully implemented, it would cut nearly 6 billion tons of carbon pollution through 2030.[34] The plan furthers the 2012 fuel efficiency standards for cars and trucks, which could avoid 1 billion tons of carbon pollution by doubling efficiency by 2025.[35] The plan also calls for investments in energy efficient buildings and technology, accelerating renewable energy development on public lands, improving low-income access to solar power, cutting

methane emissions from fossil fuel production, and protecting carbon-rich ecosystems.[36] The fate of the federal Climate Action Plan is so far unclear under President Trump.

In 2015, the U.S. Environmental Protection Agency (EPA) announced the Clean Power Plan to cut carbon emissions from electricity generation by 32 percent from 2005 levels by 2030 (about 900 million tons per year). This reduction in air pollution would prevent more than 3,500 premature deaths, 1,700 heart attacks, and 90,000 asthma attacks in children per year, according to EPA.[37] [38] In March of 2015, the City of Bellingham joined a coalition of local governments around the country submitting an amicus brief to the U.S. Supreme Court in support of the Clean Power Plan. Then, in early 2016, the Supreme Court halted implementation of the Clean Power Plan pending judicial review at the request of 29 states and state agencies. In March 2017, President Donald Trump signed an Executive Order to revoke the Clean Power Plan and other climate policies.[39] This move appears to put the U.S. emissions reduction goal under the Paris Agreement out of reach.[40]

The controversial Keystone XL oil pipeline that would bring carbon-intensive tar sands oil from Canada to the Gulf Coast was approved by President Trump in March 2017.[41] He has also reversed President Obama's decision to halt the Dakota Access Pipeline after months of sustained protests over water quality threats to local tribes.

Given these and other significant setbacks to federal climate policy, city and state governments along with major U.S. corporations are now leading U.S. efforts to reduce emissions and prevent catastrophic climate change.

State Climate Policy

Governor Jay Inslee, with support from many leaders in the state legislature, has championed significant greenhouse gas reduction policy in Washington State and beyond. In January 2017, the Governor's Clean Air Rule went into effect, capping state carbon emissions and regulating the state's largest greenhouse gas emitters. The rule also created incentives for investments to reduce fossil fuel use and adopt clean energy. Washington is the first state to use its Clean Air Act authority to fight climate change after ambitious cap-and-trade legislation failed in 2015[42] [43] [44]. The rule is now facing legal challenges from Puget

OTHER CLIMATE-RELATED CITY PLANS & POLICIES

- City of Bellingham Comprehensive Plan 2016 Update
- Mayoral Proclamation of Energy Year 2016
- Energy and Resource Conservation (ERC) Policy
- Resolution Endorsing the Earth Charter (Resolution 2002-44)
- Cities for Climate Protection Program (Resolution 2005-08)
- Construction and Renovation of Public Buildings Using LEED Standards (Resolution 2005-21)
- Renewable Energy Purchase for Municipal Facilities (Resolution 2006-28)
- Environmentally Preferable Purchasing Program (Resolution 2007-05)
- Greenhouse Gas Reduction (Resolution 2007-10)
- Electric Car Charging Station (Ordinance 2011-03-009)
- Single-use carryout Bag Ordinance (6.47.050)

Sound Energy, three other natural gas utilities, and eight industry groups.

At the 2016 United Nations Marrakesh Climate Conference, Washington State joined the Under 2 MOU, a coalition of 167 subnational jurisdictions in 33 countries that committed to cutting carbon emissions below 80 percent of 1990 levels by 2050 – a reduction deemed necessary to limit global warming to less than two degrees Celsius by 2100. In 2015, Governor Inslee attended the U.N. Paris Climate Conference and committed to doubling the percent of electric vehicles in the state government fleet to 20%. Nationwide, Washington ranks among the top three states for electric vehicle adoption. Washington also participates in other regional climate agreements like the Pacific Coast Collaborative and Pacific North America Climate Leadership Agreement.

These efforts build on Washington's 2008 Climate Action Plan, which calls for reducing statewide greenhouse gas emissions to 1990 levels by 2020, 25 percent below 1990 levels by 2035, and 50 percent below 1990 levels by 2050. A State House of Representatives Bill introduced in January 2017 calls for accelerating those goals to reach 80 percent below 1990 levels by 2050[45]. The state's Renewable Portfolio Standards have reduced carbon pollution from electricity generation and require utilities to use 15 percent renewable resources by 2020. In July 2016, Puget Sound Energy settled a Clean Air Act lawsuit from the Sierra Club by agreeing to shut down the dirtiest units of its coal-fired power plant in Colstrip, Montana by 2022.[46] In November 2016, Washington voters rejected the nation's first state carbon tax initiative.[47]

After President Trump removed the United States from the Paris Climate Agreement in June 2017, Governor Inslee joined the governors of New York and California to form the United

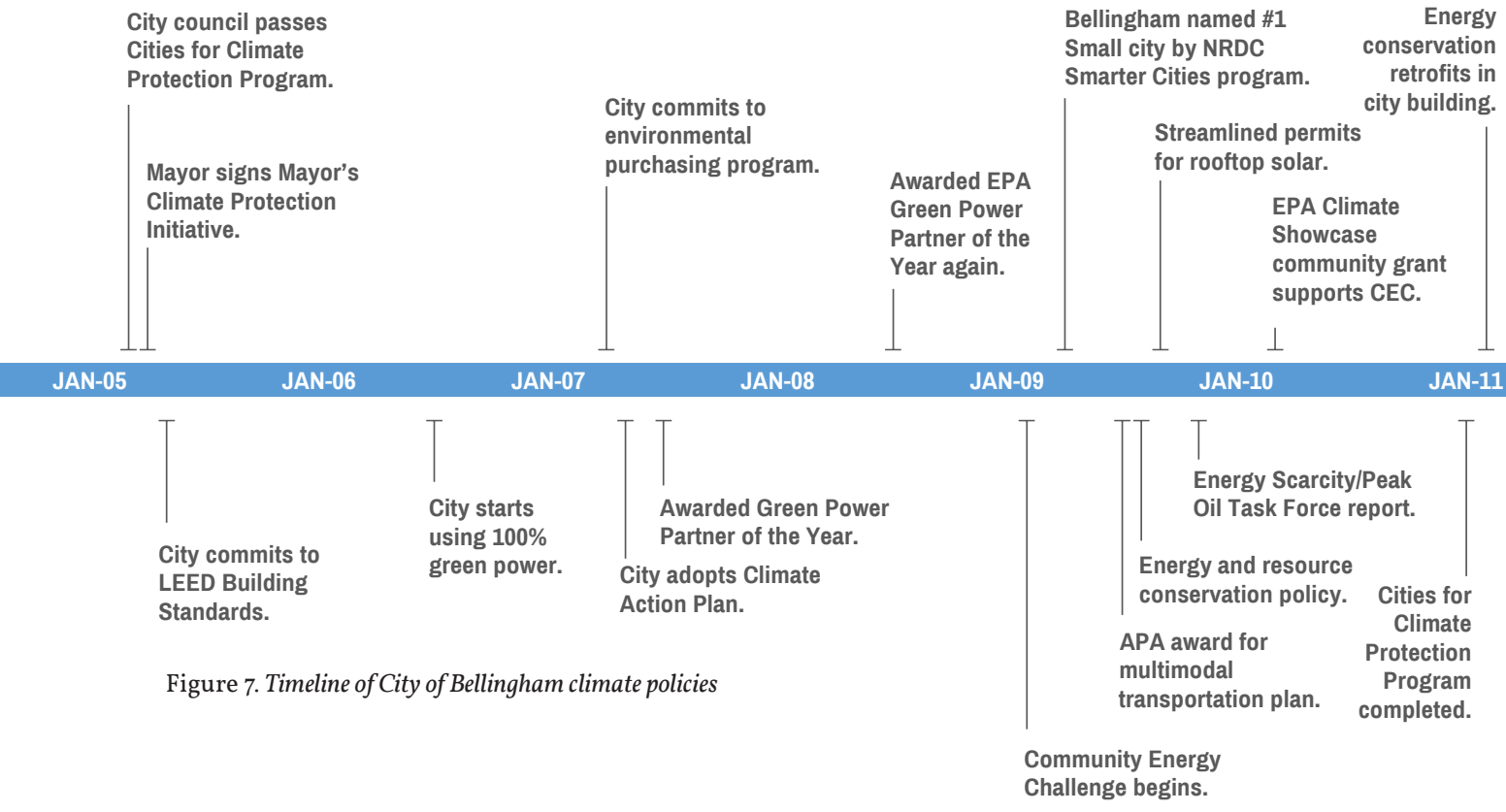


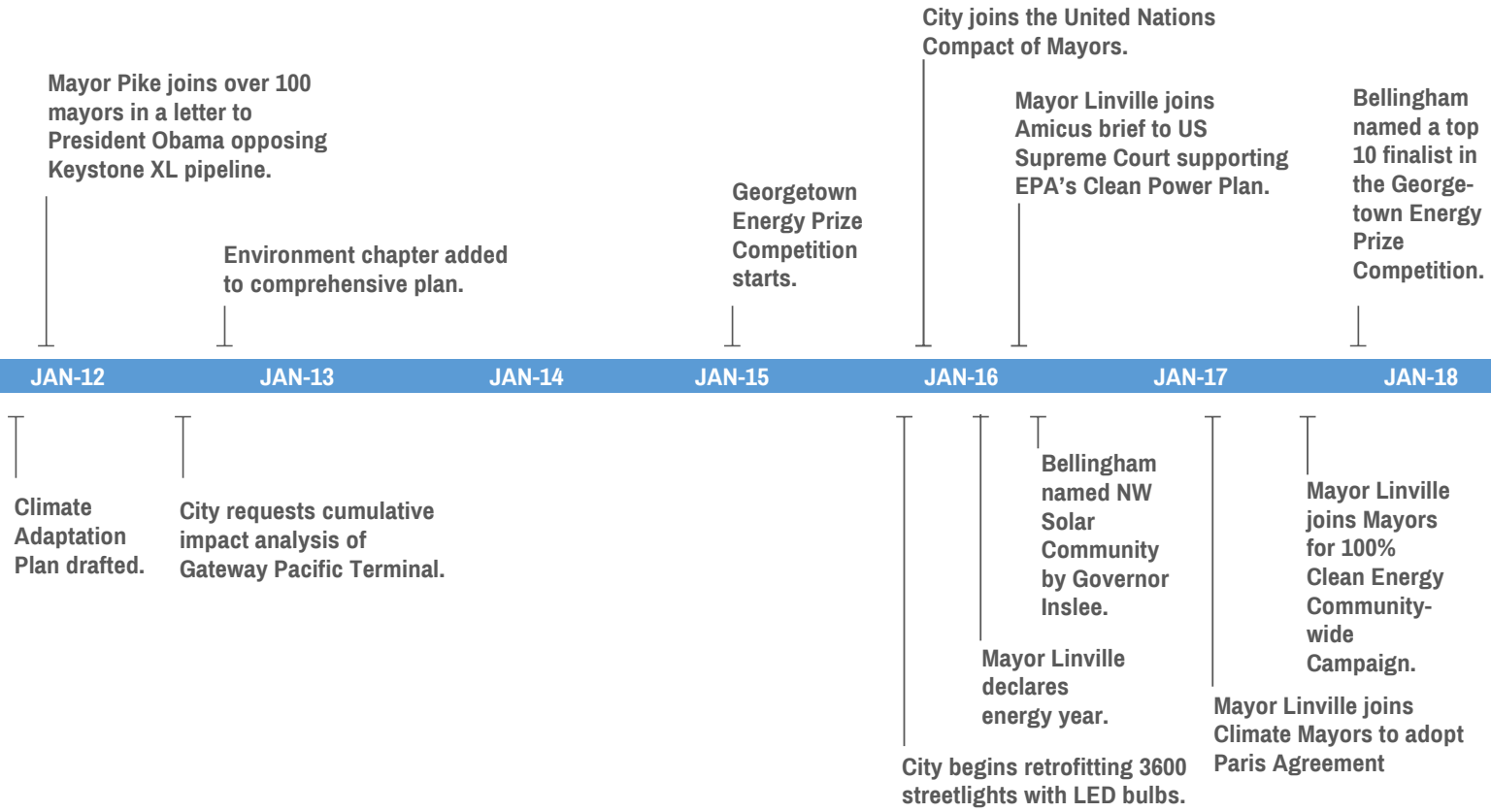
Figure 7. *Timeline of City of Bellingham climate policies*

State Climate Alliance, a coalition of U.S. states committed to upholding the Paris Agreement and taking aggressive action on climate change.

Local Climate Policy

Bellingham's climate leadership began in 2005 when the City committed to the five milestones of the Cities for Climate Protection Program.[48] In 2006, the City began purchasing renewable energy credits to offset all municipal electricity use, earning recognition from U.S. Environmental Protection Agency in 2007 and 2009. In 2007, City Council approved the Greenhouse Gas Inventory and Climate Protection Action Plan, which committed the City to reduce greenhouse gas emissions by 64% in 2012 and 70% in 2020, compared with the 2000 baseline levels.[49] The City also planned to reduce greenhouse gas pollution in the entire Bellingham community by 7% below 2000 levels by 2012 and by 28% below 2000 levels by 2020. To reach these goals, the City has put in place numerous policies to increase renewable energy, energy efficiency and conservation, alternative transportation, and waste reduction. Major policies are noted in the Bellingham climate policy timeline (Figure 7) and specific measures are highlighted in the Climate Action Plan Update section of this report. Climate action involves numerous sectors of City government including a number of existing policies and plans. Bellingham continues to implement and revise the climate plans begun in 2007.

In addition to acting locally to reduce greenhouse gas emissions the City has also joined important state, national and international campaigns to support reduction measures.



Greenhouse Gas Emissions Update

Emissions Inventories

An emissions inventory is a comprehensive estimate of the amount of greenhouse gases emitted from a particular area or jurisdiction. Inventories are the best way to track progress towards emissions targets. The City of Bellingham has completed emissions inventories for the years 2000, 2005, 2012, and 2015 to track progress toward targets set for 2012, 2020, 2030 and 2050. Inventories are completed at two scales: municipal city government operations and the Bellingham community within city limits.

Going forward, emissions inventories will be completed every two years by City of Bellingham Natural Resources staff. See Appendix for Inventory Methods.

Municipal Emissions Trends

Between 2000 and 2012, municipal emissions dropped by 69.5%, including reductions from renewable energy credits purchased by the City to offset electricity emissions (Figure 8). This exceeds the goal set in 2007 to cut emissions by 64% from 2000 levels by 2012, and puts within reach the 2020 goal to cut emissions by 70% below 2000 levels, despite emissions growth in 2015. The increase in non-electricity

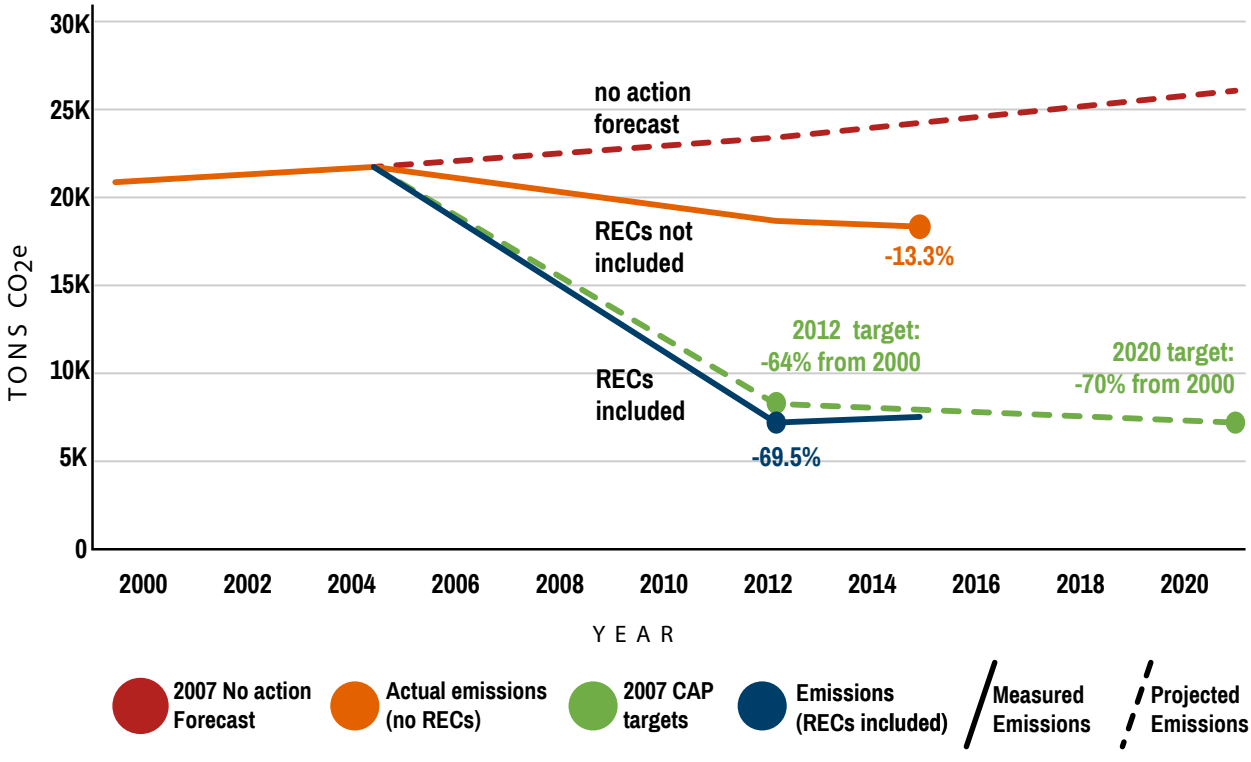


Figure 8. *Estimated Bellingham municipal emissions (tons CO_2e) from 2000 to 2015, with and without emissions reductions from purchased renewable energy credits (RECs)*

emissions in 2015 (blue line in Figure 8) and the corresponding decrease in overall emissions (orange line) reflects the City's focus on reducing electricity use; however, natural gas and fleet emissions must be cut in order to meet the City's 2020 goal. 2012 emissions were 4% below 1990 levels, missing the Kyoto Protocol of 7% below 1990 levels when emissions from new buildings are included. Note that these emissions do not include solid waste, which were not factored into baseline emissions or targets. Also note that these are comparisons of discrete snapshots in time; multi-year trends will better reflect emissions reductions.

Municipal Emissions Analysis by Sector

Note: Renewable energy credit emissions offsets not included in this analysis.

Sewer utility emissions dropped an estimated 8% between 2000 and 2012 due to improved incinerator use, improved secondary treatment energy efficiency, and a new centrifuge (Figure 10; see measures for details). However, in 2015, the City sewer utility emitted 40% of municipal emissions -- by far the most of any sector (Figure 9). Buildings and Facilities accounted for 28% of 2015 municipal emissions with a 3% reduction from the 2000 baseline despite more city-owned buildings. This decrease is likely due to energy efficient retrofits and green building practices. The increase in Building and Facility emissions from 2012 may be due to air conditioning during the hot summer in 2015; there were 152 more cooling degree-days in 2015 compared to 2012. Streetlights and traffic signals emitted just 3% of city emissions in 2015 – down from 12% in 2012 – thanks to LED lightbulb upgrades that save 2,204,210 kWh of electricity and 1,000 tons of CO_2e every year. The City's vehicle fleet, which made up 10% of 2015 emissions, saw a 29% emissions reduction due to a decrease in diesel fuel use and improved average fleet fuel efficiency, aided by the City's no idling policy and purchases of hybrid and electric vehicles. Emissions from

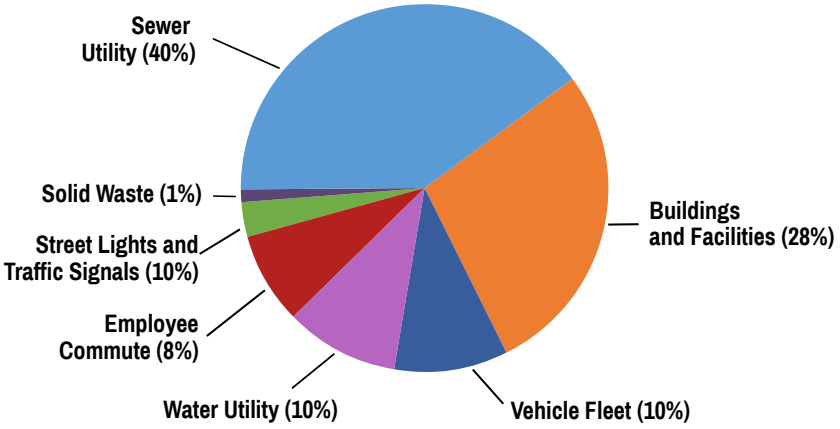


Figure 9. *Estimated Bellingham municipal emissions (tons CO_2e) by sector in 2015, including emissions from electricity use (renewable energy credit emissions offsets are omitted)*

Municipal sectors	Community sectors
Buildings & Facilities	Residential
Vehicle Fleet	Commercial
Employee Commute	Industrial
Streetlights	Transportation
Water & Sewer	Solid Waste
Solid Waste	

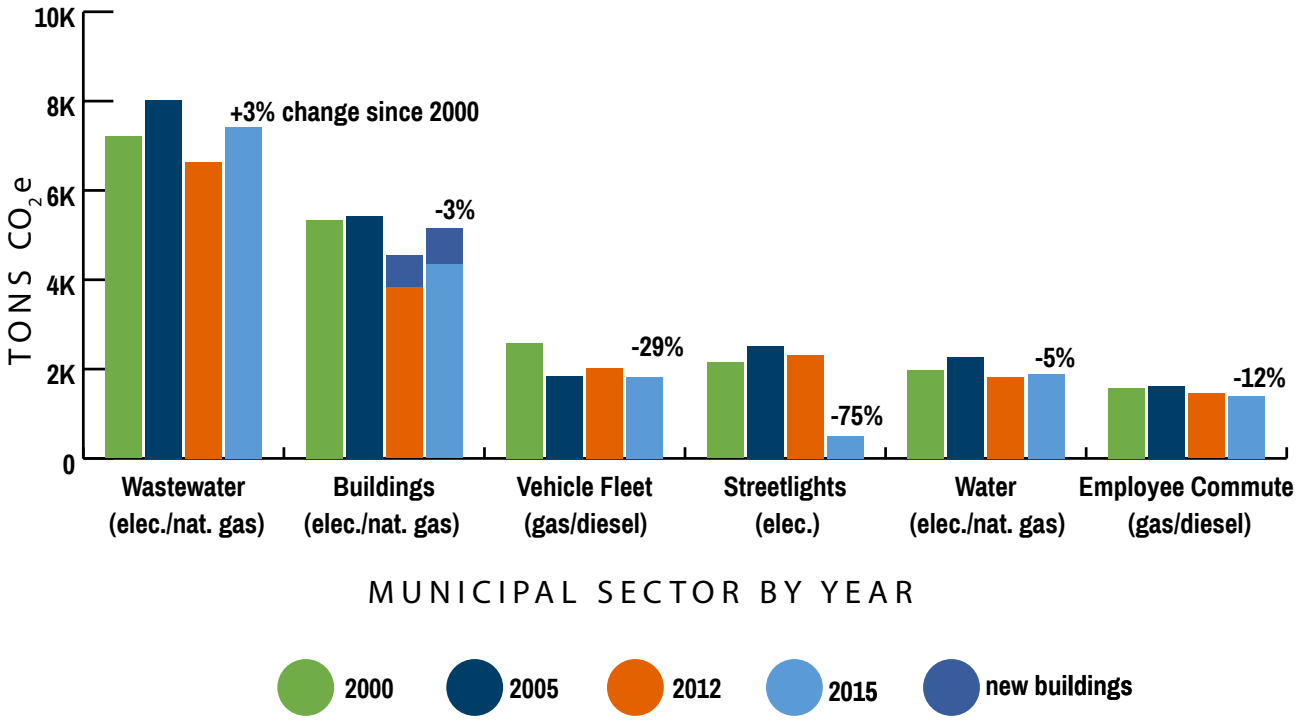


Figure 10. *2000-2015 municipal CO_2e emissions by sector excluding solid waste*

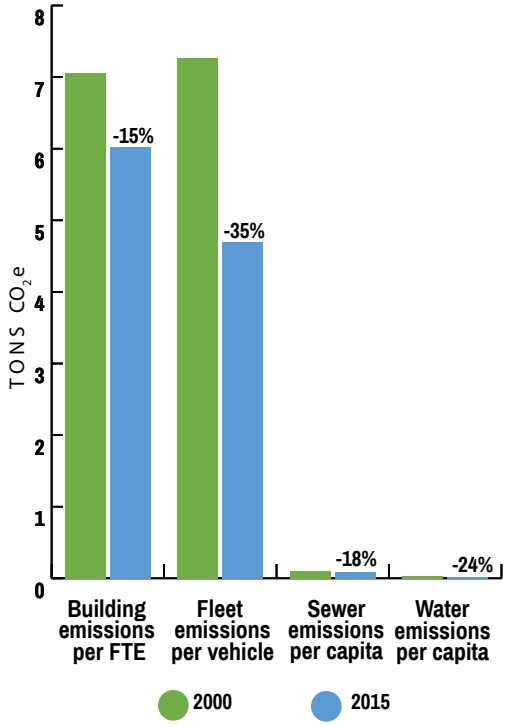


Figure 11. *Normalized CO_2e emissions from municipal sectors in 2000 and 2015*

water treatment and delivery were 10% of all City emissions in 2015 after decreasing 5 percent from 2000 with improved water conservation. City employee commute emissions – 8% of 2015 emissions – fell 12 percent as City jobs were cut and commuting behavior changed under the City's commute trip reduction program. Solid waste emissions were an estimated 1% of 2012 emissions; however, as noted above, this is a very rough estimate with no baseline data for comparison.

Community Emissions Trends

Between 2000 and 2012, community emissions dropped by 17%, exceeding the goal of a 7% reduction and preventing 419,284 tons of CO_2e emissions when compared to the No Action forecast (Figure 12). In 2015, however, emissions increased to just 4% below 2000 levels. Some year-to-year variation is expected due to weather. 2012 emissions were 10% higher than 1990 levels, missing the Kyoto Protocol goal of 7% below 1990 levels. Note that these emissions do not include solid waste, which were not factored into baseline emissions or emissions reductions targets, but will be going forward.

Community Emissions Analysis by Sector

Transportation accounted for an estimated 32% of Bellingham community greenhouse gas emissions in 2015 (Figure 13). A significant portion of transportation emissions come from Interstate 5 traffic passing through Bellingham, which is outside the influence of City climate policies. Bellingham community transportation emissions are difficult to estimate over this time period because transportation models changed from a state-level model to a more accurate local model. For consistency, the local model was backcast to 2005 and 2000, though this represents

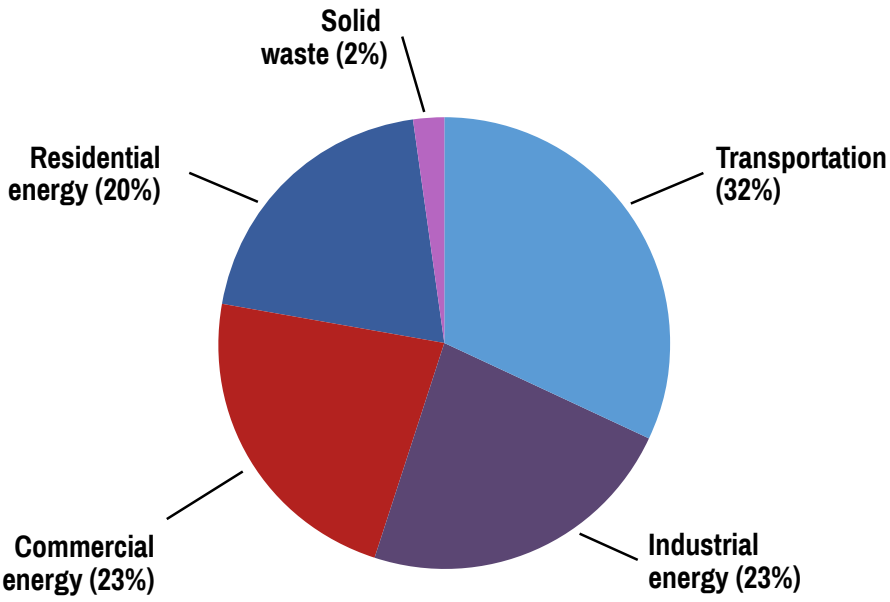


Figure 13. *2015 Bellingham community CO_2e missions by sector*

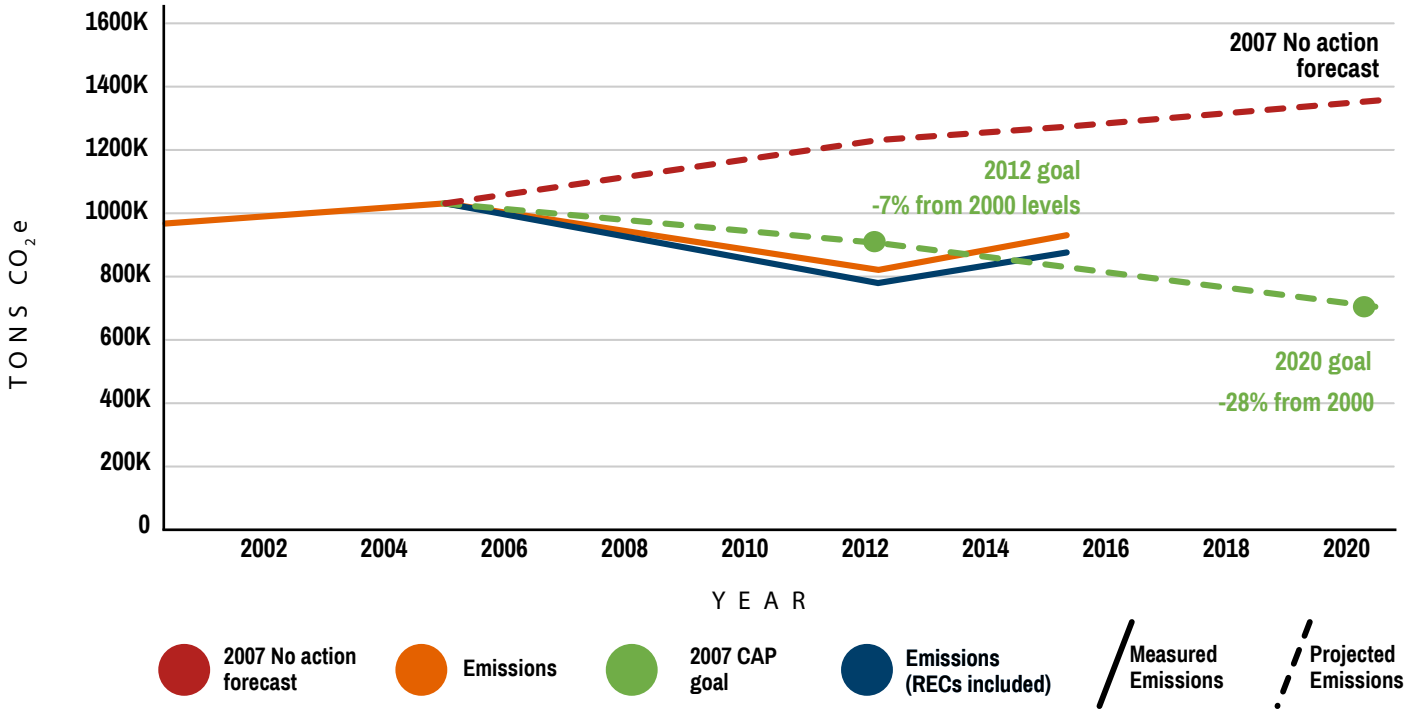
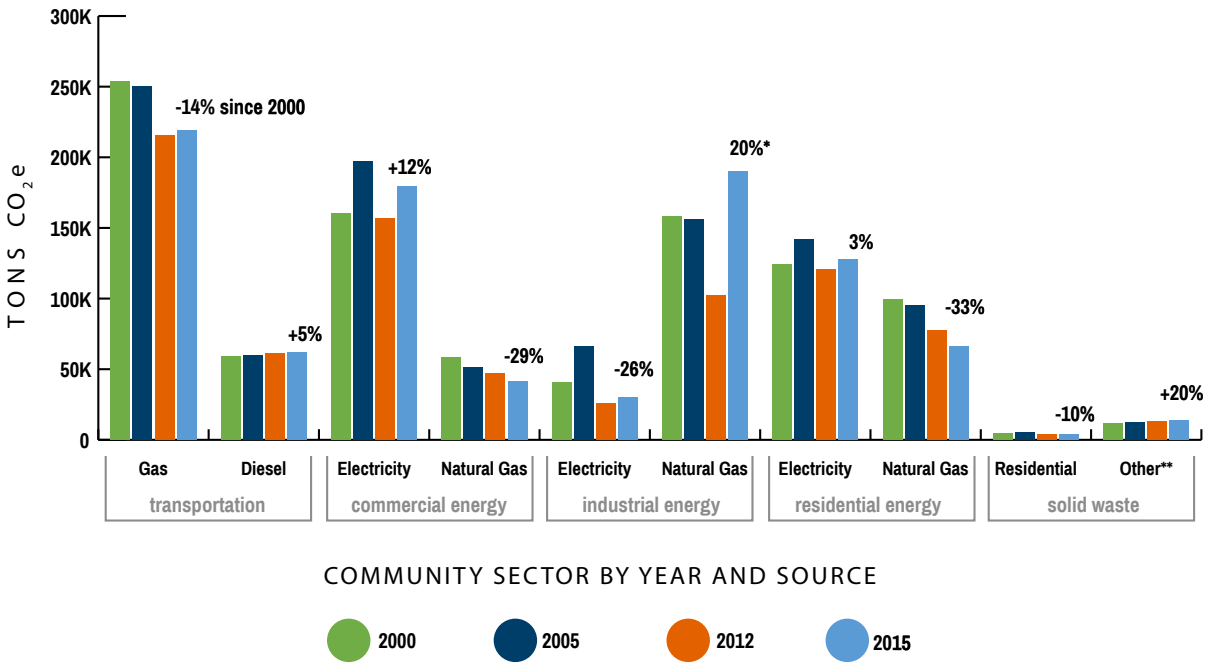


Figure 12. *Estimated Bellingham community emissions (tons CO_2e) from 2000 to 2015*

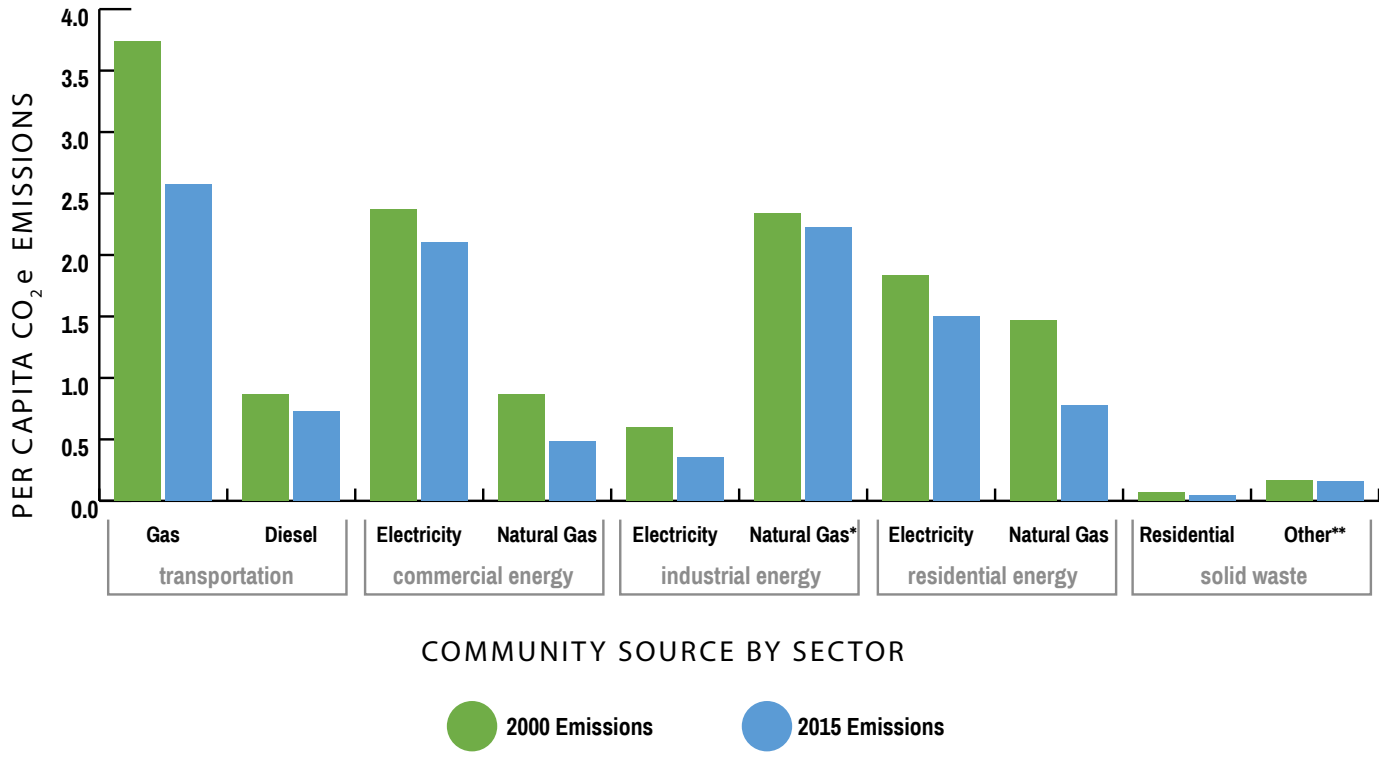
a gross estimate of past emissions. It is similarly difficult to attribute the emissions reductions to specific measures, but City and community efforts to promote alternative transportation and improve access to electric vehicles likely helped (see Climate Action Plan measures for details). Residential and Commercial energy made up 43% of community emissions in 2015. Residential natural gas use saw the largest reduction (33%) between 2000 and 2015 thanks to a variety of community campaigns and programs like the Community Energy Challenge that provide rebates and incentives for energy efficient investments in homes and businesses. Western Washington University and the Bellingham School District have also implemented ambitious energy efficiency campaigns reflected in these emissions reductions. The increase in Residential and Commercial electricity emissions from 2012 to 2015 may be due to air conditioning during the hot summer in 2015; there were 152 more cooling degree-days in 2015 compared to 2012. Industrial energy comprised 15% of community emissions in 2015; industrial electricity fell 26% over 15 years. Note that utility accounting of industrial energy use changed over this period and so accurate comparison is difficult.



*Changing utility accounting methods of industrial natural gas use confound consistent emissions tracking over time. For this reason, 2007 data was backcast to 2000 to better estimate non-CNG industrial users, raising baseline estimates.

**Other=commercial, industrial, multifamily. These emissions were backcast from 2012 due to lack of data

Figure 14. *Estimated Bellingham community emissions (tons CO_2e) by sector in 2000, 2005, 2012, and 2015.*



*Changing utility accounting methods of industrial natural gas use confound consistent emissions tracking over time. For this reason, 2007 data was backcast to 2000 to better estimate non-CNG industrial users, raising baseline estimates.

**Other=commercial, industrial, multifamily. These emissions were backcast from 2012 due to lack of data

Figure 15. *Per capita CO_2e emissions from community sectors in 2000 and 2015*

Greenhouse Gas Emissions Reduction Goals

The City of Bellingham achieved the 2007 Climate Action Plan goal of 64% municipal emissions reduction from 2000 levels by 2012. However, this target did not include emissions from City government electricity use because the City's purchase of renewable energy credits (RECs) accounted for 100% of these emissions by helping to fund renewable energy projects, and so they were not counted.

Going forward, the City will set targets to cut actual emissions as well. This will push the City to further reduce electricity use and to find cleaner energy sources, ideally close to home (see the Renewable Energy and Energy Efficiency and Conservation sections below).

	2000 backcast	2005	2012	% Change ('00-'12)	Change ('00-'12)	2015	Change ('00-'15)	% Change ('00-'15)	2020	% Change ('00-'20)	2030	% Change ('00-'30)	2050	% Change ('00-'50)
2007 CPAP goals (with RECs)[1]	-	-	7,505	-64%	-	-	-	-	6,254	-70%	1,175	-85%	-	-100%
2018 update goals (no RECs)[2]	-	-	-	-	-	-	-	-	15,848	-25%	12,678	-40%	-	-65%
COB emissions (with RECs)[1]	-	-	6,349	-69.5%	6,709	6,709	-14,421	-68.3%	TBD	TBD	TBD	TBD	TBD	TBD
COB emissions (no RECs)[2]	21,130	21,695	18,728	-11.4%	18,267	18,267	-2,863	-13.5%	TBD	TBD	TBD	TBD	TBD	TBD

Table 2. *City of Bellingham municipal emissions goals, forecasts, and inventories (2000 - 2030) (tons CO_2e)*

[1] RECs are assumed to offset all electricity emissions, which are excluded from these totals. Solid waste emissions are omitted due to lack of data.

[2] Electricity emissions are included in these totals. Solid waste emissions omitted due to lack of data.

	2000 backcast	2005	2012	% Change ('00-'12)	2015	Change ('00-'15)	% Change ('00-'15)	2020	% Change ('00-'20)	2030	% Change ('00-'30)	2050	% Change ('00-'50)
2007 CPAP goals[1]	-	1,019,680	892,397	-7%	-	-	-	688,554	-28%	-	-	-	-
2018 CPAP update goals[1]	-	-	-	-	-	-	-	-	-	573,795	-40%	191,265	-85%
Emissions (RECs included)[1]	956,325	-	764,506	-20.1%	866,572	89,753	-9.4%	TBD	TBD	TBD	TBD	TBD	TBD

Table 3. *Bellingham community emissions goals, forecasts, and inventories (2000 - 2030) (tons CO_2e)*

[1] RECs are assumed to offset all electricity emissions, which are excluded from these totals. Solid waste emissions are omitted due to lack of data.

2018 CLIMATE ACTION PLAN UPDATE

Core Climate Action Strategies

Emissions Forecast & Reduction Measures

Forecasting emissions allows for more effective climate action planning to meet future goals. In the 2007 plan, an emissions forecast to 2020 was used to develop the 2020 emissions targets. For this plan update, updated forecasts for municipal and community emissions were calculated to 2030 based on the most recent emissions inventory from 2015 (Figure 16). This forecast includes estimated emissions reductions from ongoing and proposed measures (Table 4). Emissions reductions calculations and forecasting were done using ICLEI ClearPath software. More information on forecast methodology and assumptions is in Appendix A.

Municipal Emissions Forecast

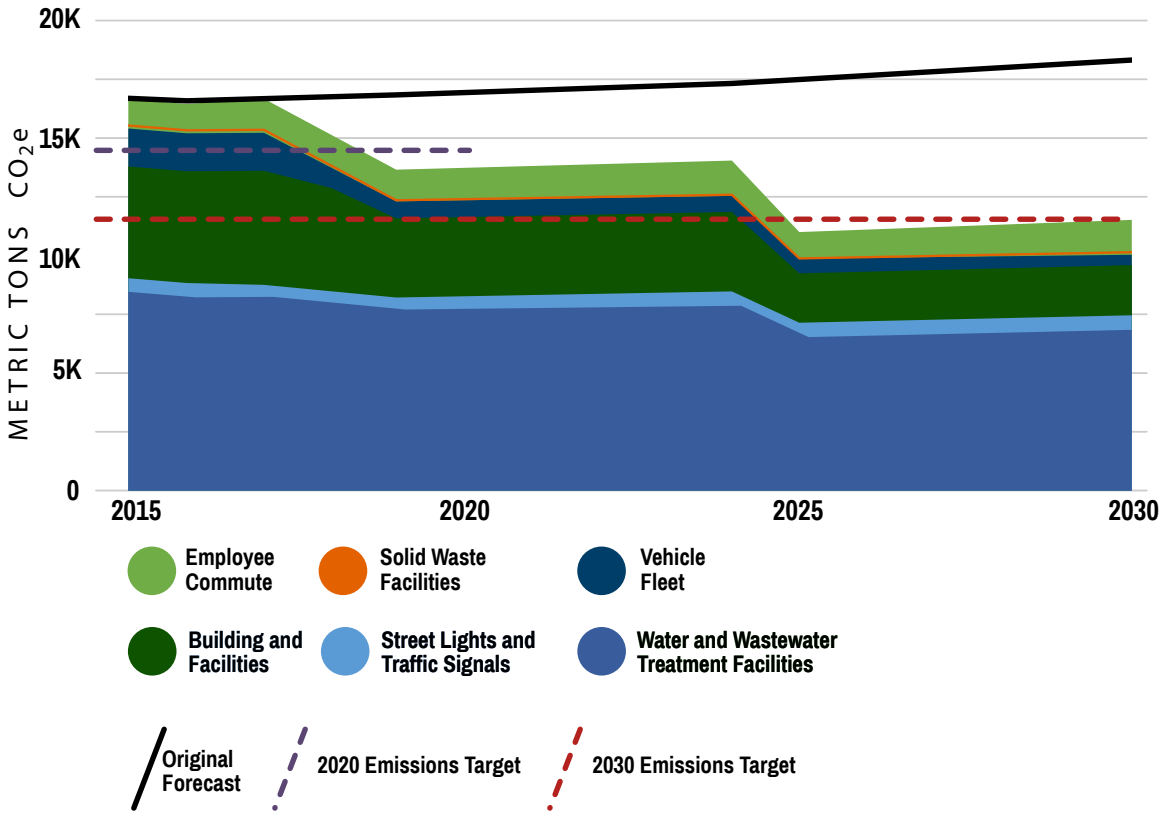


Figure 16. *City of Bellingham municipal emissions forecast by sector including proposed emissions reductions measures (see Table 4) (2015-2030). The black line represents a no action forecast.*

Ongoing and Proposed Municipal Measures Included in Forecast*

	New and Ongoing Emissions Reduction Measures	Rating	Phases	Status	Start Year	CO_2e change '15-'30 (tons)	% of 2020 target	Lead
Energy Efficiency and Conservation	Resource Conservation Management		2	ongoing	2007	-1238	52%	COB Public Works, Facilities
	Post Point Best Management Practices		2	ongoing	2007	-157	7%	COB Public Works, Post Point
	Operations and Employee Actions		2	ongoing	2007	-19	1%	COB Public Works, Facilities
	Parks LED upgrades		4	proposed	2019	-595	25%	COB Parks
	Residential Water Metering		3	complete	2015	-54	2%	COB Public Works
Renewable Energy	City Solar		3	ongoing	2005	-332	14%	COB Public Works
	Post Point Resource Recovery		4	proposed	2025	-1558	NA	COB Public Works, Post Point
Transportation	Limit Idling		2	ongoing	2007	-117	5%	COB Public Works, Fleet
	Increase Biofuel Use		2	ongoing	2007	-117	5%	COB Public Works, Fleet
	Free Employee Bus Passes		2	ongoing	2007	-18	1%	COB Public Works, Fleet
	Invest in Hybrid & Electric Vehicles		3	ongoing	2007	-40	2%	COB Public Works, Fleet
	Fleet Vehicle Telematics		4	proposed	2018	-88	4%	COB Public Works, Fleet
	Commute Trip Reduction		2	ongoing	2008	-142	6%	COB Public Works
	Invest in Hybrid & Electric Vehicles		2	ongoing	2022, 2028	-328	NA	COB Public Works, Fleet
	TOTAL:					**-4802**	**123%**	

NA = not applicable to 2020 goal

Table 4. *Ongoing and proposed municipal emissions reduction measures included in emissions forecast.*

**There are additional measures not included in the emissions forecast due to lack of emissions reduction data. All measures are reported in the next section.*

Community Emissions Forecast

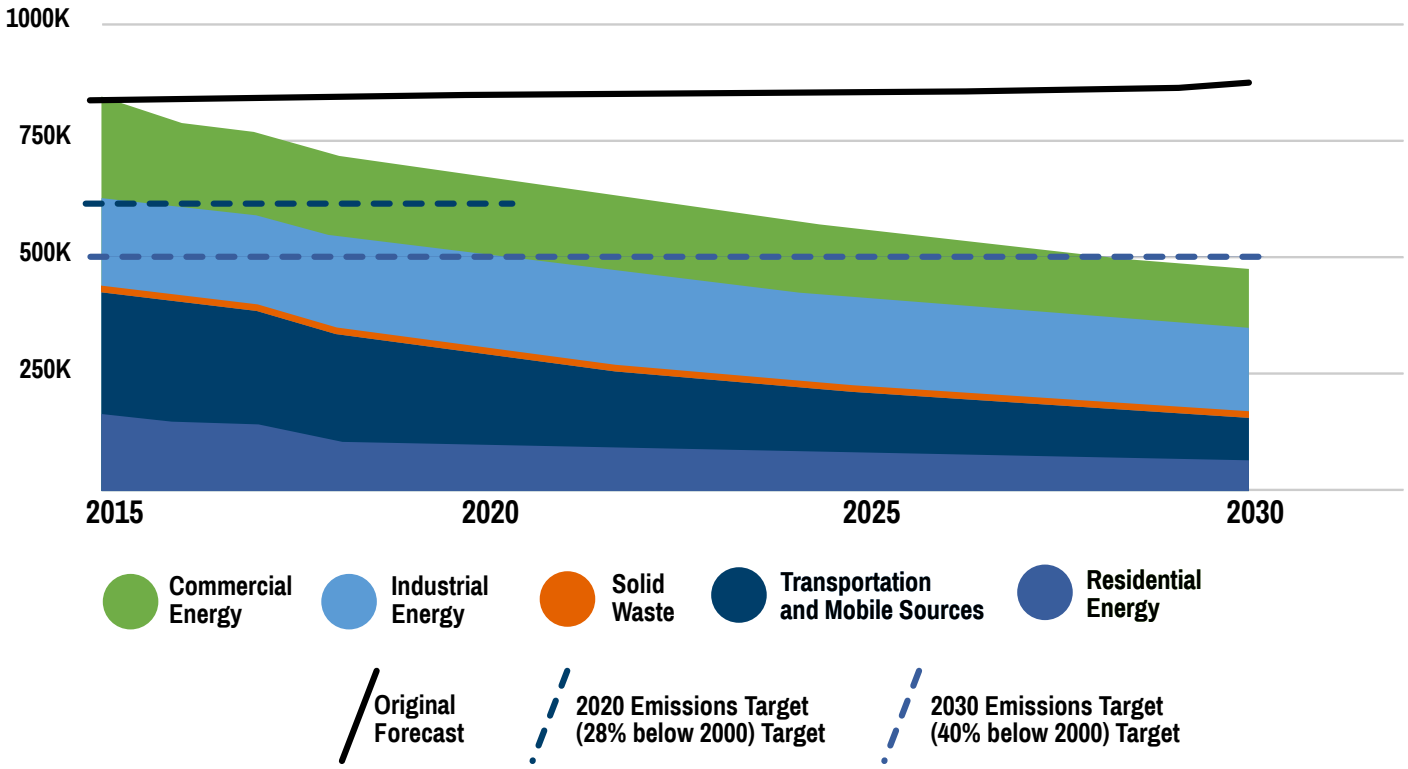


Figure 17. *Bellingham community emissions forecast by sector including proposed emissions reductions actions (see Table 5) (2015-2030)*

Ongoing and Proposed Community Measures Included in Forecast*

	Community Reduction Measure	Rating	Phase	Status	Start year	CO_2e change '15-'30 (tons)	% of 2020 target	Lead
Energy Efficiency and Conservation	COB municipal measures		Various	Various	Various	-4,821	2.12%	Various (see Table 4; all strategies)
	Puget Sound Energy Programs		2	Ongoing	Various	-233	0.10%	Puget Sound Energy
	Cascade Natural Gas Programs		2	Ongoing	Various	-149	0.07%	Cascade Natural Gas
	WWU Sustainability Program		1	Ongoing	2008	-1,342	0.59%	WWU Office of Sustainability
	Community Energy Challenge		2	Ongoing	2009	-4,116	1.81%	Community Energy Challenge
	COB Water Conservation Program		3	Ongoing	2016	-15	0.01%	City Public Works Dept.
	Single- & Multi-family Residential Outreach		3	Ongoing	2016	-7,263	3.19%	PSE, Sustainable Connections, WWU
	Residential Water Metering		3	Ongoing	2016	-471	0.21%	City Public Works Dept.
	Project RENT		3	Ongoing	2016	-9	0.00%	WWU Office of Sustainability
	Bellingham Energy Prize Energy Center		3	Discontin-ued	2016	-81	0.04%	Sustainable Connections
	COB Climate Education		1	Ongoing	2017	-2,879	1.26%	City Public Works Dept.
	PSE Sweeps Campaign		3	Ongoing	2017	-3,609	1.58%	Puget Sound Energy
	Bellingham Cold Storage Energy Efficiency		2	Ongoing	2017	-80	0.04%	Bellingham Cold Storage
	Building Performance Center grant		3	Ongoing	2017	-1,477	0.65%	Building Perfor-mance Center
	Toward Net Zero (elec + nat. gas)		3	Ongoing	2018	-17	0.01%	Sustainable Connections
	Industrial Energy Efficiency		4	Proposed	2018	-12,711	5.58%	Community and City
	Green Leases for City Tenants		4	Proposed	2018	-312	0.14%	City Public Works Dept.
	Weatherization Requirement		4	Proposed	2018	-8,389	3.68%	City Planning and Development Dept.
	PSE LED Streetlights		3	Proposed	2019	-413	0.18%	Puget Sound Energy
	Waterfront District Energy		4	Proposed	2020	-3,045	1.34%	Port of Bellingham
	Residential Energy Ratings		4	Proposed	2025	-28,207	NA	City Planning and Development Dept.
	Commercial & Multifamily Benchmarking		4	Proposed	2025	-1,102	NA	City Public Works Dept.

Table 5. *Ongoing and proposed community emissions reduction measures included in community emissions forecast (continued on next two pages)*
**There are additional measures not included in the emissions forecast due to lack of emissions reduction data. All measures are reported in the next section.*

	Community Reduction Measure	Rating	Phase	Status	Start year	CO_2e change '15-'30 (tons)	% of 2020 target	Lead
Renewable Energy	Green Power (COB, WWU, Whatcom Cty, PSE)		1	Ongoing	Various	-57,465	25.23%	PSE and organizations
	Solar Permitting Improvements		3	Ongoing	2009	-2,578	1.13%	City Planning and Development Dept.
	Solarize Whatcom		3	Ongoing	2016	-171	0.08%	Sustainable Connections
	Washington Goes Solar		3	Ongoing	2017	-141	0.06%	RESources
	Solar Incentives - Accelerated		4	Proposed	2018	-360	0.16%	City Planning and Development Dept.
	Promote Hybrid & Electric Cars		2	Ongoing	2007	-20,844	9.15%	City Planning and Development Dept.
Transportation	Promote Biofuels		2	Ongoing	2007	-599	0.26%	City Planning and Development Dept.
	Vehicle Mode Shift Goal (gas + diesel)		2	Ongoing	2015	-13,073	5.74%	City Planning and Development Dept.
	WTA Bus and Facility Upgrades		3	Ongoing	2017	-130	0.06%	Whatcom Transit Authority
	SSC CNG Truck Conversion		3	Ongoing	2018	-2,237	0.98%	Sanitary Service Company
	Promote Hybrids - Accelerated		4	Proposed	2019	-11,941	5.24%	Community and City
	Exceed Vehicle Mode Shift Goal by 10%		4	Proposed	2025	-8,849	3.88%	City Planning and Development Dept.
Green Building	Promote Green Building		1	Ongoing	2007	-2,906	1.28%	City Planning and Development Dept.
Waste Reduction	Construction and Demolition Recycling		1	Ongoing	2018	-4,122	1.81%	City Planning and Development Dept.
	TOTAL:					**-206,156**	**78%**	

All Municipal Emissions Reduction Measures (Past, Present, & Future)

Energy Efficiency and Conservation

Municipal measures	Phase	Status
Resource Conservation Management	2	Ongoing
Post Point Best Management Practices	2	Ongoing
Federal Building Retrofits	2	Ongoing
LED Streetlight Upgrades	3	Complete
Operations and Employee Actions	4	Proposed
Parks LED Upgrades	4	Proposed

Renewable Energy

Municipal measures	Phase	Status
100% Green Power	I	Ongoing
City Solar	3	Proposed
Post Point Resource Recovery	3	Proposed
Wastewater Heat Recovery	4	Proposed

Transportation		
Municipal measures	**Phase**	**Status**
Biodiesel Pilot Project	1	Discontinued
Commute Trip Reduction Program	1	Incomplete
Increase Biodiesel / Renewable Diesel Use	2	Incomplete
Invest in Hybrid and Electric Vehicles	2	Ongoing
10% Ethanol in City Fleet	2	Complete
Limit Idling	2	Proposed
35% Reduction in Employee Commute VMT	3	Incomplete
Free Employee Bus Passes	3	Ongoing
City Bike Fleet	3	Ongoing
Green Fleet Work Plan	4	Proposed
Western Washington Clean Cities	4	Proposed
Become Evergreen Fleets Certified	4	Proposed
Efficient Driver Training	4	Proposed
Advanced Vehicle Locator Systems	4	Proposed
Diesel Exhaust Retrofits	4	Proposed

Green Building

Municipal measures	Phase	Status
LEED Buildings	I	Ongoing
Recycled Construction Materials	3	Ongoing

Waste Reduction

Municipal measures	Phase	Status
City Hall Recycling	I	Complete
Green Purchasing	I	Ongoing
All City Facility Recycling	2	Ongoing
Green Event Kits	3	Ongoing
Municipal Waste Monitoring	4	Proposed
Waste Reduction Plan	4	Proposed
Good-on-One-Side Notepads	3	Ongoing
Specialty Recycling	3	Ongoing

All Community Emissions Reduction Measures (Past, Present, & Future)

Energy Efficiency and Conservation		
Community measure	Phase	Status
Climate Outreach and Education	1	Incomplete
WWU Sustainability Program	1	Ongoing
County Courthouse Efficiency	1	Complete
Community Energy Challenge	2	Ongoing
Puget Sound Energy Programs	2	Ongoing
Cascade Natural Gas Programs	2	Ongoing
BCS Energy Efficiency	2	Ongoing
Toward Net Zero Energy	3	Ongoing
COB Water Use Efficiency	3	Ongoing
Residential Water Metering	3	Complete
Housing Rehab and Construction	3	Ongoing
Housing Authority Retrofits	3	Complete
Bellingham Energy Prize	3	Ongoing
Energy Prize Online Energy Center	3	Ongoing
Energy Efficiency and Real Estate	3	Ongoing
Project RENT	3	Complete
Multi-family Residential Efficiency	3	Ongoing
Bellingham Schools Energy Efficiency	3	Ongoing
Green Classroom Certification	3	Ongoing
Waterfront District Energy	4	Proposed
Energy Innovation Hub	4	Proposed
Single-family Residential Outreach	4	Proposed
PSE Streetlights LED Upgrade	4	Proposed
Commercial & Multi-family Building Benchmarking	4	Proposed
Industrial Energy Efficiency	4	Proposed
Green Leases for City Tenants	4	Proposed
Residential Energy Ratings	4	Proposed
Weatherization Requirement	4	Proposed

Renewable Energy		
Community measure	**Phase**	**Status**
Green Power Purchases	I	Ongoing
Green Power Community Challenge	I	Complete
WWU Sustainability Program	I	Ongoing
County Green Power	I	Ongoing
Solar Permitting Improvements	3	Complete
Solarize Whatcom	3	Ongoing
Washington Goes Solar Campaign	3	Ongoing
Waterfront District Energy	4	Proposed
Community Solar	4	Proposed
More Efficient Energy Distribution	4	Proposed
Support Wind Power	4	Proposed

Transportation		
Community measure	**Phase**	**Status**
SSC Biodiesel	1	Ongoing
Car Sharing	1	Ongoing
Vehicle Mode Shift	2	Ongoing
Safe Routes to School	2	Ongoing
Limit Idling	2	Incomplete
Promote Biofuels	2	Incomplete
Promote Hybrid and Electric Vehicles	2	Ongoing
Whatcom Smart Trips	3	Ongoing
SSC Natural Gas Trucks	3	In Progress
Commute Trip Reduction	3	Ongoing
WTA Bus and Facility Upgrades	3	In Progress

Green Building

Community measure	Phase	Status
Promote Green Building	I	Ongoing
Advanced Materials and Methods Policies	3	Ongoing
2030 Districts	4	Proposed

Waste Reduction

Community measure	Phase	Status
Construction/Demolition Recycling	I	Ongoing
Food Plus!	I	Ongoing
Increase Curbside Recycling	I	Incomplete
Plastic Bag Ban	3	Complete

Land Use

Community measure	Phase	Status
COB Habitat Protection and Restoration	1	Ongoing
Urban Villages	3	Ongoing
High Density Development	3	Ongoing
COB Carbon Fund	4	Proposed

Municipal Measures

Energy Efficiency and Conservation

Buildings & Facilities—Phase 2

RESOURCE CONSERVATION MANAGEMENT

In 2009, the City of Bellingham adopted a policy to establish baseline energy use and cost information. The next step was to kick off the Municipal Facilities Energy Conservation Project with a municipal facilities upgrade.[50] After an energy audit and initial energy use reduction projects, the City began a larger effort to retrofit systems in most city buildings and facilities using a federally backed financing program. In March 2011, the City acquired $6.5 million in Qualified Energy Conservation Bonds to fund 47 energy improvement projects in 22 buildings and facilities.[51] After installation, the contractor verified over $200,000 in annual energy savings, exceeding expectations by 28%. Nearly half of these savings came from heating, ventilation, and air conditioning (HVAC) and direct digital controls (DDC) upgrades at the Arne Hanna Aquatic Center.[52] In addition, the City received an incentive payment of $109,312 from Cascade Natural Gas for the Aquatic Center retrofits.[53] The package of upgrades is expected to reduce CO2 emissions by nearly 1000 metric tons annually, representing a 15% reduction from the baseline.

In April 2016, the City hired Sustainable Connections to host a new Resource Conservation Manager (RCM) to inspect buildings and provide additional recommendations for retrofits and conservation actions in 41 City-owned buildings. A number of low and no-cost projects were completed, including replacement of more than 500 incandescent light

Puget Sound Energy presents an energy efficiency grant of over $500,000 to Bellingham City Council (Photo: courtesy of PSE)

bulbs with LEDs at the Lightcatcher museum, saving substantial energy and improving lighting quality.

Status: Ongoing

Goal: Implement recommended RCM measures and ensure existing RCM measures are being properly implemented and monitored.

Emissions Reduction: 1,238 tons CO_2e per year.

Next Steps: Fund and implement additional RCM recommendations. In 2017 mid-biennium budget adjustments, funding was included for a building engineer position to implement energy conservation measures.

POST POINT BEST MANAGEMENT PRACTICES

City staff at Post Point Wastewater Treatment Plant have adopted a number of best management practices to reduce energy use. These include adjusting incinerator temperatures based on quantity of sludge, and adjusting the space-heating thermostat dependent upon need. City staff have estimated that between 2000 and 2010, these actions allowed the plant's natural gas usage to remain relatively constant despite approximately 1% growth per year in amount of sludge burned. This resulted in a savings of about 13,940 therms or 82 tons of CO2.

Worthy of note, but not included in the emissions inventory, is the significant savings yielded in the early years of the plant's operation. Between 1994 and 1996, the incinerator's gas use declined by 255,000 therms per year. In 2006-2007, Puget Sound Energy funded a $300,000 power reduction project that reduced energy cost of secondary treatment by 25-30%. In 2011, a new centrifuge was installed, resulting in savings of approximately 300,000 kWh annually. The City also

Before (above) and after (below) LED streetlight installation

LED Streetlight Upgrades

In early 2016, the City finished replacing 3,615 conventional street-lights with LED lighting and adaptive controls allowing lights to be dimmed for certain periods of time for additional energy savings. The total cost of this project was approximately $4 million and it will save approximately $240,000 dollars annually. This investment will save 2,204,210 kWh of electricity and more than 1.8 million pounds of CO_2 every year. City has qualified for at least $434,000 in Puget Sound Energy rebates for the estimated energy savings. The City pays for an additional 1,700 streetlights owned and operated by Puget Sound Energy, which have not been upgraded. In 2005, red and green stoplights were upgraded to LEDs.

Status: Complete

replaced energy-related equipment for an expected reduction in the plant's energy consumption by approximately 1.83 million kWh per year and a savings of more than $115,000 in energy costs annually. In recognition of these efforts, the City received $548,937 from Puget Sound Energy. In 2017, Post Point staff completed an energy saving upgrade for the oxygen control of the treatment system with energy savings around $30,000 and 323,000 kWh per year, and a cost around $250,000.

Status: Ongoing

Emissions Reduction: 157 tons CO_2e per year

Next Steps: A multi-year planning process for biosolids treatment and resource recovery is underway. Switching from incinerators to a less energy-intensive process such as anaerobic digestion and biogas capture would reduce emissions significantly (see Post Point Resource Recovery measure in the Renewable Energy section).

FEDERAL BUILDING RETROFITS

The City of Bellingham Federal Building, a structure built in 1913 that is on the National Register of Historic Places, received mechanical, electrical, and plumbing infrastructure upgrades in 2015 to conform to the State's new energy code. Renovations were completed on the first floor (about 1/4 of the total square footage), including replacement of inefficient air distribution systems, conversion of the heating system from steam to hot water, new insulated plumbing and water-saving fixtures, and upgrading

of lighting control systems and replacement of lightbulbs with LEDs.

Several energy-efficiency measures were implemented in the Federal Building prior to city ownership. These upgrades contributed to the award of the Energy Star label for buildings. Measures include a lighting retrofit and installation of an Energy Management System (EMS). In addition, load-reduction strategies were implemented to reduce the amount of heating, cooling and electricity used. These energy-efficiency initiatives cost approximately $230,000, providing an annual energy cost savings of $45,000, resulting in a payback time of approximately five years.

Status: Ongoing

Goal: Implement recommended RCM measures and ensure they are properly monitored.

Emissions Reduction: Included in Resource Conservation and Management measure above

Next Steps: The Federal Building is included in the City's most recent Resource Conservation and Management analysis. Recommended upgrades include additional HVAC upgrades, LED lights, reduced flow faucets, energy management system programming, lighting occupancy sensors, and storm windows.

OPERATIONS AND EMPLOYEE ACTIONS

In order to maximize the energy savings from facilities improvements, the City will conduct a focus group to help develop best practices for energy efficient behavior in the workplace and at home. These materials can then be adapted and distributed to other large employers.

Status: Ongoing

Emissions Reduction: 19 tons CO_2e per year

Next Steps: Establish employee contacts in each department to communicate energy saving information and materials.

Buildings & Facilities - Phase 4 Measures

PARKS LED UPGRADES

The City Parks Department will continue replacing indoor and outdoor lights at Parks facilities. Maritime Heritage Park lights and others have already been replaced.

Status: Proposed

Goal: Replace all appropriate lights with LEDs by 2019.

Emissions Reduction: 595 tons CO_2e per year

RESIDENTIAL WATER METERING

The City completed a residential water-metering program to install about 15,000 water meters in 2017 . Metering has been shown to reduce consumer use by tying water use to cost, with corresponding reductions in the energy needed to treat and distribute water.

Status: Complete

Emissions Reduction: 54 tons CO_2

Renewable Energy

Buildings - Phase 1 Measures

100% GREEN POWER

In July 2006, the Bellingham City Council voted unanimously to begin buying renewable energy credits (RECs) through Puget Sound Energy's Green Power Program to offset 100 percent of the electricity used by the city government -- almost 20,700,000 kilowatt hours in 2007. As a result, the city won the U.S. Environmental Protection Agency's Green Power Leadership Award for 2007 and 2008, and was named the #1 Green Power Community in the country. Bellingham was also named an EPA Climate Showcase Community.

In recognition of these accomplishments, Puget Sound Energy (PSE) donated a 2-kilowatt solar project on the roof of the Environmental Learning Center (ELC) at Maritime Heritage Park, which was installed in July 2007. A second PSE-funded 2.4-kilowatt solar project was dedicated in 2009 on the south-facing parking shed at Depot Market Square in downtown Bellingham.

In 2015, the City purchased renewable energy credits (RECs) for 22,000,000 kilowatt-hours (kWh) through Puget Sound Energy to support the Wild Horse wind power project in Washington's Kittitas County. From 2016 to 2018, the City will purchase RECs from 3 Degrees.

Status: Ongoing

Emissions Reductions: 11,054 tons CO_2e per year (not in forecast)

Next Steps: In 2019, the City will begin participating in Puget Sound Energy's Green Direct Program, a long-term agreement that allows the City to add more renewable power to the electrical grid by more directly funding (via PSE) construction of new wind turbines in Eastern Washington.

Buildings - Phase 3 Measures

CITY SOLAR

Currently, there are three solar panel arrays on City property totaling more than 4.4 kilowatts of capacity, two of which were awarded to the City from Puget Sound Energy. Installing more solar would allow the City to save money by producing energy and feeding surplus solar power onto the electric grid, while also avoiding the cost of renewable energy credits per the City's commitment to purchase 100% green power.

Status: Ongoing

Emissions Reductions: 332 tons CO_2e per year

Next Steps: City staff are evaluating the potential for a solar installation on a City-owned building with the help of a Northwest Clean Air Agency grant.

POST POINT WASTEWATER RESOURCE RECOVERY

In the past, the City assessed the feasibility of implementing sludge pyrolysis, a method of wastewater treatment that collects methane from sewage sludge and uses it as a fuel source. However, this method was not selected as the preferred treatment technique due to numerous factors. Currently, the City is conducting a multi-year planning project to evaluate ways to manage biosolids in an environmentally, fiscally, technically, and socially sustainable manner. This project uses Triple Bottom Line Plus accounting to develop biosolids into a sustainable resource, limiting environmental impacts while maximizing resource recovery opportunities. The next steps in this multi-phased project will provide a high-level evaluation of emerging technologies including anaerobic digestion with natural gas recovery. A 2012 analysis identified that anaerobic digestion coupled with sludge drying provided the most viable option to meet the City's strategic commitments and legacy goals. The next study will further evaluate potential biosolids processing technologies that may be suitable for the City's application.

Status: Ongoing

Emissions Reductions: 1,558 tons CO_2e per year (This is a conservative estimate based on natural gas use reductions but does not include additional emissions reductions from not incinerating biosolids, or from the carbon sequestration of biosolids land application).

Next Steps: City staff are working with consultants to determine the best resource recovery method.

Buildings - Phase 4 Measures

WASTEWATER HEAT RECOVERY

Municipal wastewater contains heat energy that can be absorbed using a hygienic and odorless process, and then reused to heat residential and commercial buildings instead of using electricity or natural gas. Vancouver, British Columbia has implemented this type of system. The City will continue to monitor the feasibility to recover heat from sewer lines.

Emissions Reductions: Unknown

Transportation

Vehicle Fleet - Phase 1 Measures

BIODIESEL PILOT PROJECT

Switching from fossil fuels to agriculturally based fuels can reduce carbon pollution because biofuel emissions are part of the natural carbon cycle. Recent concerns about indirect environmental impacts of biofuels on the degradation of wild ecosystems and associated carbon emissions, biodiversity, food prices, water consumption, and poor communities have dimmed enthusiasm for the carbon reduction benefits of biofuels. Fortunately, Whole Energy Fuels produces biodiesel locally from used cooking oil, avoiding these impacts. According to the City of Bellevue, which recently switched to B20 (a blend of 20% biodiesel and 80% diesel), used cooking oil reduces lifecycle greenhouse gas emissions by 16.5% as compared to petroleum diesel.[54]

In 2005, four Public Works vehicles ran on B20 biodiesel as a pilot program. Unfortunately, the fuel injector in one vehicle clogged and the problem was not covered under the manufacturer's warranty because of the use of B20. Because of this, the program was canceled. Today, many vehicle manufacturer warranties now cover biodiesel up to B20. However, a next generation fuel known as renewable diesel is now being considered for City fleet use (see below).

Status: Discontinued

Vehicle Fleet - Phase 2 Measures

INCREASE USE OF BIODIESEL / RENEWABLE DIESEL

Biodiesel (B5) use in the City fleet has fallen over the last six years (Figure 18). Meanwhile, a next-generation biofuel called renewable diesel is drop-in ready in all diesel engines. The City's

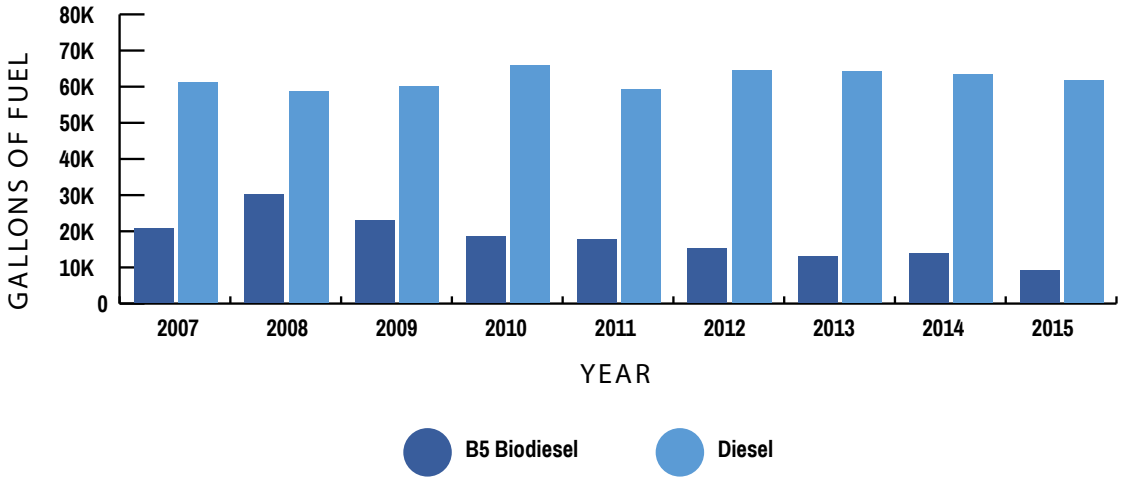


Figure 18. *Total diesel and biodiesel use by city government from 2007 to 2015*

source of renewable diesel is made from recycled oils but unlike biodiesel it is chemically identical to petroleum diesel and meets industry standard specifications (American Society for Testing and Materials (ASTM) D975). Biodiesel still has lower lifecycle emissions, so Fleet could start with an R95/B5 mix and increase the biodiesel portion over time.

Status: Incomplete

Goal: 100% renewable diesel in City pumps by 2018.

Emissions Reduction: 117 tons CO_2e per year

INVEST IN HYBRID AND ELECTRIC VEHICLES

Due to the region's relatively low-carbon electricity, electric vehicles are a particularly effective way to cut emissions. As of December 2016, there are 16 hybrid vehicles in the municipal fleet, up from six in 2005. This makes up 15% of existing fleet vehicles in classes that could be replaced with hybrids or EVs. As of 2015, these vehicles had been driven 546,040 miles, preventing about 77 metric tons of CO2 emissions, equivalent to the annual emissions of about 16 passenger cars. The City has two fully electric vehicles (EVs) – 10% of existing fleet vehicles that could be replaced with EVs (not including police cruisers).

Status: Ongoing

Goal: Phase in electric and hybrid vehicles to replace all City vehicles in suitable classes by 2030 (approximately 8 vehicles, not including police cruisers). (EVs 15% and hybrids 25% passenger vehicle miles traveled (VMT) by 2018; EVs 30% passenger VMT and hybrids 50% SUV VMT by 2022; EVs 45% and hybrids 50% passenger VMT by 2028). At least 10 percent of new vehicle purchases should be electric vehicles, consistent with state policy.

Emissions Reduction: 40 tons CO_2e by 2018, 288 tons by 2022, 41 tons by 2028

Next Steps: Restructure City fleet purchasing processes to prioritize electric and hybrid vehicles. Develop a Green Vehicle Purchasing Standard for each vehicle class. Determine fleet average fuel efficiency and set a goal to increase average miles per gallon.

10% ETHANOL IN CITY FLEET

In 2014, the City's gasoline vehicles used 118,741 gallons of 10% ethanol gasoline and 327 gallons of regular unleaded -- a 99.7% adoption of 10% ethanol gasoline, reflecting a nationwide shift in fuel types. This prevented about 116 tons CO2 tailpipe emissions compared to regular gasoline; importantly, however, this reduction does not include indirect emissions from corn ethanol production and refining, which have been found to actually exceed emissions from burning regular gasoline.[55] [56]

Status: Complete

Next Steps: Reinforce E85 use in Flex Fuel vehicles through employee education and reminders.

LIMIT IDLING

Limiting car and truck idling promotes clean air, healthier work environments, efficient use of City resources, conservation of natural resources, and good stewardship practices. The City's anti-idling policy states that no operator shall unnecessarily idle the engine of an unleaded or diesel fueled car or truck that is stopped for a foreseeable period in excess of 5 minutes except under rare conditions.

Status: Ongoing

Emissions Reduction: 117 tons CO_2e

Next Steps: Remind drivers not to idle through outreach campaign. Start employee efficient driver training. Purchase cars with idle management systems or install them in cars that need electricity when not driving (like police cars).

Vehicle Fleet – Phase 3 Measures

CITY BIKE FLEET

Eight fully accessorized bikes are available to staff for official business and personal errands.

Status: Ongoing

Next Steps: Remind employees to use City bikes via email.

Emissions Reduction: Unknown

Vehicle Fleet - Phase 4 Measures

Consider development of a Green Fleet Work Plan outlining the following measures:

WESTERN WASHINGTON CLEAN CITIES COALITION

This is a not-for-profit membership organization dedicated to expanding the

As part of our commitment to reduce vehicle emissions, in 2017 Public Works purchased a mail delivery bike for official use between the multiple City buildings, eliminating daily short trips.

use of alternative fuels and advanced vehicle technologies. A program of the U.S. Department of Energy, they provide education, technical expertise, networking opportunities and funding assistance to help members invest in local, sustainable transportation solutions (wwcleancities.org). The City will research the feasibility of joining this coalition.

Emissions Reduction: Emissions reductions in related measures

EVERGREEN FLEETS

Evergreen Fleets is a voluntary, tiered certification program that recognizes fleets for making smart, environmentally responsible choices that save fuel, improve operational efficiencies, and reduce air emissions. The City will research the feasibility of this certification.

Emissions Reduction: Unknown

EFFICIENT DRIVER TRAINING

Include anti-idling, best practices, fueling, and acceleration practices to reduce fuel use. This could also be an online training format.

Emissions Reduction: Included in Limit Idling measure above

FLEET VEHICLE TELEMATICS

Vehicle telematics, also known as Advanced Vehicle Locator (AVL) systems, are GPS-enabled locator devices that monitor and correct excessive idling, speeding, and other inefficiencies. This improves maintenance and overall driver performance. City fleet has a few vehicles with this technology; staff will review effectiveness and feasibility of wider use.

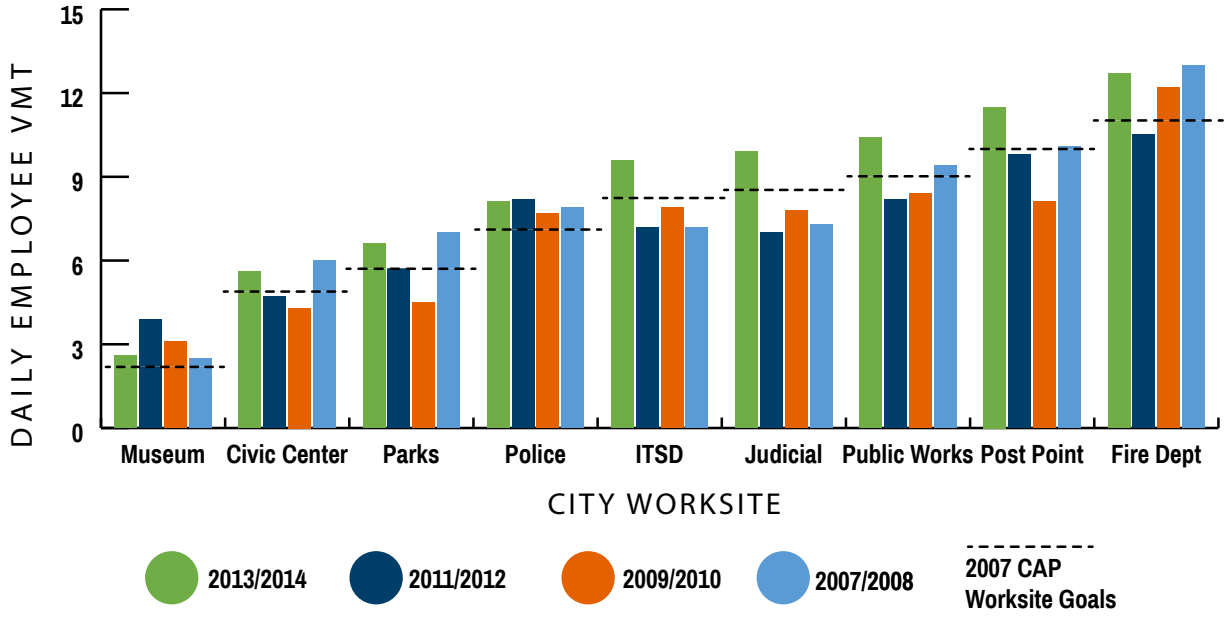


Figure 19. *Average daily roundtrip employee commuting vehicle miles traveled (VMT) by city worksite. Worksite goals were established during the Commute Trip Reduction worksite survey process.*

Emissions Reduction: 88 tons CO_2e

DIESEL EXHAUST RETROFITS

Install a filter technology with either a passive or active cleaning system. This technology does not reduce greenhouse gas emissions but can reduce particulate matter by more than 85 percent. Requires regular maintenance and has temperature and opacity requirements.

Emissions Reduction: Particulate emissions reduction only

Employee Commute - Phase 1 Measures

COMMUTE TRIP REDUCTION PROGRAM

As part of the statewide Commute Trip Reduction Program (CTR), the City conducted a commuter survey of vehicle miles traveled per employee (VMT) by Civic Center and Public Works Operations employees in 1997 and every other year thereafter. In 2008, the City expanded the commuter survey to all other worksites, so the new CTR goal could be applied Citywide. The program established reduction goals of 25% in 2003 and 35% in 2009. The state revised these goals in 2006 to 13% VMT reduction and 10% drive alone rate reduction from 2008 levels by 2012.

Whatcom Smart Trips is a program through the Whatcom Council of Governments in which City employees can earn rewards when they make trips by walking, biking, riding the bus, or carpooling. Since the Smart Trips program started in 2006, about 350 employees have participated, recording a total of 86,065 work trips for a total of 989,244 miles. Counting all trips (work, errands, school, etc.), employees have recorded a total of 107,260 trips for a total of 1,290,992 miles. In 2016, 118 employees participated, an increase from 72 employees in 2015.

Status: Incomplete. Civic Center employees eventually met the 2009 goal in 2012 with 4.3 VMT per employee only to jump back up to 6 VMT in 2014 (Figure 19). Public Works Operations employees have increased VMT over the last 15 years from 8.57 VMT in 1997 to 9.4 employee VMT in 2014, but met the 13% reduction goal from 2009 to 2012. Only two of nine worksites have stayed below their respective VMT goals since 2008. Judicial and Support Services cut employee VMT from 2007 to 2014 by 26% while IT reduced per employee VMT by 25%. In 2014, no other worksites were meeting their 2008 goals. Civic Center, Parks, and Fire increased VMT in that period. Across worksites, the City achieved the 13% VMT reduction goal in 2009-2010 and 2011-2012 but not in 2013-2014. For drive alone rate, Post Point employees have easily met the 10% reduction goal every year since 2008. The only other worksites to meet this goal were Parks and IT in 2011-2012.

Emissions Reduction: 142 tons CO2e per year

Next Steps: The City is discontinuing worksite commuting surveys except for the state-required sites (Civic Center and Public Works Operations). Employee education will continue in order to encourage commute trip reduction (see below).

Employee Commute - Phase 2 Measures

35% REDUCTION IN EMPLOYEE COMMUTE MILES

In the 2007 Climate Action Plan, the City proposed an internal goal to reduce vehicle miles traveled per employee (VMT) for all worksites by 35% from 2001 levels (4.86 VMT using an average of Civic Center and Public Works Operations 2001 VMT as baseline data).

Status: Incomplete. City employees still have a long way to go to reach 4.86 VMT. The lowest recorded municipality-wide VMT was 7.12 VMT in 2011/2012 and in 2014 it increased to 8.30 VMT, requiring a 42% reduction to reach the 2007 goal. Similarly, the 2014 drive alone rate (82.0%) was higher than in 2007 (78.8%).

Next Steps: The City is discontinuing worksite commuting surveys except for the state-required sites (Civic Center and Public Works Operations).

Employee Commute – Phase 3 Measures

FREE BUS PASSES

Free quarterly bus passes are available to employees who commit to ride the bus to work on a regular basis. When the program started in 2008, 155 employees signed up for bus passes. Whatcom Transit Authority (WTA) ridership data showed a 51% increase in transit ridership for City employees over the five-month trial period. After one year, both City and County employee transit use increased by nearly two-thirds. In 2010, WTA increased the price from $15 to $52.50 per quarterly pass, so the City started requiring employees to make a certain number of trips per quarter to be eligible for a pass. Currently, about 30 employees sign up for passes each quarter.

Status: Ongoing

Goal: Double employee participation by 2020.

Emissions Reduction: 18 tons CO_2e

Next Steps: Continue to encourage City employees to ride the bus to work and offer effective incentives.

Green Building

Buildings - Phase 1 Measures

LEED BUILDINGS

In 2005, City Council resolved to use LEED (Leadership in Environmental and Energy Design) standards in the construction of all future municipal buildings over 5,000 square feet. Depot Market Square, home of the Bellingham Farmer's Market, was completed in 2006 with a LEED Silver certification. Large steel beams were salvaged from the demolition of the Highway 99 bridge over the Skagit River and reused, saving about $255,000. A rain garden and pervious pavers allow infiltration of runoff. Puget Sound Energy installed a 14-panel, 2.4 kilowatt solar electric power system on the roof of one of the parking sheds in 2009. The City also uses Low-Impact Development standards focused on reducing stormwater run-off and conserving water.

Status: Ongoing

Emissions Reduction: Unknown

Next Steps: Research feasibility and benefits of committing to a higher green building standard in municipal buildings such as Net Zero Energy.

The Lightcatcher has a living roof that helps absorb rainwater, lower air temperatures, and improve insulation.

Buildings - Phase 3 Measures

RECYCLED CONSTRUCTION MATERIALS

In August 2011, the City used 400 crushed recycled toilets to make 250 square yards of aggregate 'poticrete' to pave a sidewalk on Ellis Street. In collaboration with the Bellingham Housing Authority, the City diverted toilets from the landfill, crushed them, and tested them as an alternative to virgin aggregate. Test results demonstrated the 'poticrete' met City requirements for flatwork concrete. The final mix contained about 20% crushed toilets by volume and represents about 5 tons of material diverted from the landfill. Crushing the toilets costs about the same as using virgin aggregate from regional gravel pits and likely prevents carbon emissions. Upon successful completion of this project, the City revised the concrete specification to allow the use of similar materials, including crushed concrete for flatwork concrete aggregate in City projects. Crushed concrete would provide greater emissions reductions given the industry's massive carbon emissions. In 2012, Bellingham received the first-ever Greenroads silver certification for the project. Greenroads requires a variety of sustainable roadway design concepts and construction specifications. Other unique features of the road included the first light-emitting diode (LED) streetlights in the City, first porous pavers pocket parking, rain gardens, infiltration ditches, bike lanes, and porous concrete. The project garnered national news. The City has now completed nine Greenroads-certified projects.

Status: Ongoing

Emissions reductions: Outside of current scope

Next Steps: Increase use of recycled materials in City projects.

Waste Reduction

NOTE: Accurate municipal waste data is not available at this time so emissions reductions from these measures are not included. See Municipal Waste Monitoring measure below.

Buildings - Phase 1 Measures

CITY HALL RECYCLING

In 2006, City staff expanded the City Hall recycling program to include mixed-container recycling. A Green Team was created, enlisting one or two representatives from each department, to help facilitate the implementation of the recycling program and disseminate information to City Hall employees.

Status: Complete

Next Steps: See below

Buildings - Phase 2 Measures

ALL CITY FACILITY RECYCLING

In July 2008, the City Council committed to reducing garbage from City facilities as part of Sustainable Connections' Toward Zero Waste campaign. In order to achieve this goal, the City implemented a variety of waste-reduction programs aimed at reducing waste by 50% in municipal facilities. Efforts focus on pre-cycling as well as increased recycling. In 2009, City Hall reduced its waste by half, modeling how to cut waste throughout municipal facilities. All City facilities also have Food Recycling bins available. The City also has specialty recycling of other items.

Status: Ongoing

Emissions reduction: Unknown

Next Steps: Continue providing can and bottle recycling facilities and work to improve diversion rate. See Municipal Waste Monitoring measure below. Assess feasibility of providing Food Plus recycling in parks. Monitor use of Food Plus bins (See Municipal Waste Monitoring measure below).

GREEN PURCHASING

In April 2007, Bellingham City Council passed a resolution to encourage the purchase of environmentally preferable materials by all departments, as long as the price of the environmentally preferable product is 120% or less than the price of the conventional product. Environmentally friendly products include those that are energy efficient, recyclable, Persistent Bioaccumulative Toxin (PBT)-free, and/or made from post-consumer recycled material. The City purchases 30% to 100% post-consumer recycled paper, recycled paper toilet paper, recycled office supplies, green office equipment, and green cleaning supplies. Computers purchased by the City meet the "gold" or "silver" EPEAT (Electronic Product Environmental Assessment Tool) standard and are manufactured with minimal environmental impact including materials, energy consumption, and packaging.

Status: Ongoing

Emissions reduction: Unknown

Next Steps: Research latest trends and update purchasing policy.

OPERATIONS AND EMPLOYEE ACTIONS

In order to maximize the energy savings from facilities improvements, the City will conduct a focus group to help develop best practices for waste reduction behavior in the workplace and at home . These materials can then be adapted and distributed to other large employers .

Status: Ongoing

Emissions Reduction: 19 tons CO_2e per year

Next Steps: Establish employee contacts in each department to communicate waste reduction information and materials

Buildings - Phase 4 Proposed Measures

MUNICIPAL WASTE MONITORING

The City has implemented numerous internal municipal waste reduction actions but lacks accurate data to monitor progress. For this reason, the City will research methods to monitor waste volume and composition at our worksites. This could consist of quarterly monitoring of dumpster volumes at all worksites as well as a more in-depth survey of waste composition. This will allow the City to report more accurately on waste diversion rates to recycling and composting, and greenhouse gas emissions.

Recycling stations throughout City buildings make it easy for staff and visitors to reduce the waste they produce.

Emissions reduction: Unknown

WASTE REDUCTION PLAN

Using data from the municipal waste monitoring, the City will develop a waste reduction plan to further decrease waste production.

Emissions reduction: Unknown

City Waste Reduction

Green Event Kits
In 2014, over 3,000 staff and members of the public attended City events with City-provided Green Event Kits that include compostable cups, plates, napkins, and utensils.

Good-On-One-Side Notepads
Green Government Team members collect used office paper that has only been printed on one side and turn it into notepads for staff use.

Specialty Recycling
In addition to the above-mentioned recycled items, the City also collects CFL bulbs, batteries, plastic film, metals. City surplus computers are recycled by an authorized green recycler. The recycler breaks down the computers in order to re-use as many elements as possible.

Status: Ongoing

Next Steps: Continue these practices

Land Use

CITY OF BELLINGHAM NATURAL SYSTEM PROTECTION AND RESTORATION

The City preserves areas of ecological value that also store carbon in soils, wetlands, and trees. Protecting these areas prevents this stored carbon from entering the atmosphere and allows these ecosystems to continue absorbing carbon dioxide from the atmosphere. These areas also improve air and water quality, provide fish and wildlife habitat, and moderate air temperature in the city, which prevents the urban heat island effect. These ecological services are increasingly important as we continue emitting greenhouse gases and as the climate changes, worsening the effects of pollution and other ecosystem stressors. In this way, intact ecosystems make us more resilient to climate change. A number of policies and programs drive this work. The state Growth Management Act required environmental protection via a Critical Areas Ordinance. The

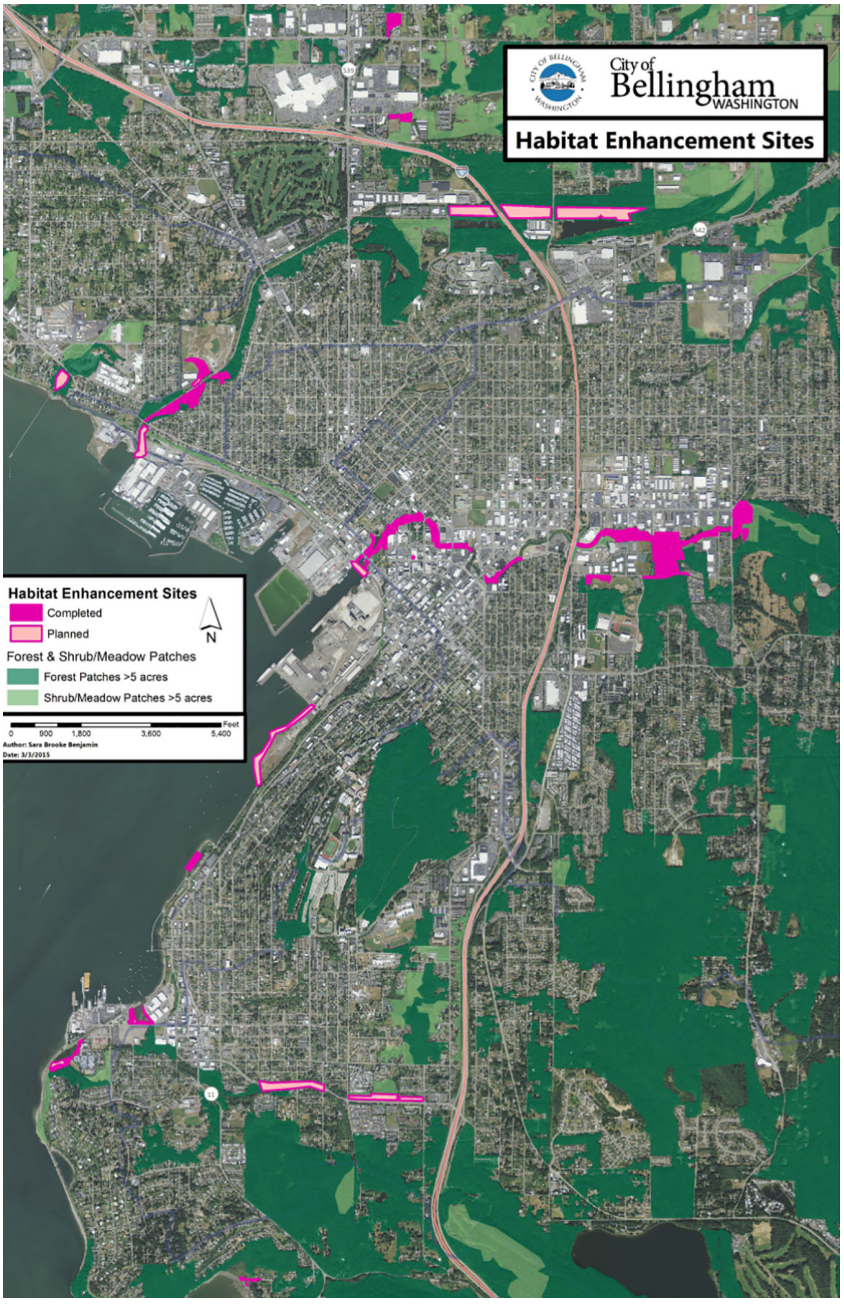


Figure 20. *City of Bellingham Habitat Enhancement Sites*

City of Bellingham Comprehensive Plan includes land use goals and policies that promote carbon sequestration through protection and conservation of forests, street trees, and landscape practices. The Lake Whatcom Property Acquisition Program protects over 2,000 acres of mostly forested property in the City's municipal watershed. City Parks protect an additional several hundred acres of forested parkland.

The City also restores degraded lands by planting native plants that absorb and store carbon. Currently, the City maintains 71 restoration sites (155 acres). In the 2015-2016 planting season City restoration crews and volunteers planted more than 25,000 native plants.

Status: Ongoing

Next Steps: Continue to protect and restore lands of ecological value. Quantify carbon storage of protected and restored lands.

CITY OF BELLINGHAM CARBON FUND

The City continues to preserve forestland in the City and in the Lake Whatcom watershed through the Lake Whatcom Watershed Property Acquisition Program to prevent impacts to our drinking water source from development. There may be an opportunity to account for the amount of carbon sequestered and sell carbon offset credits on the carbon cap-and-trade market.

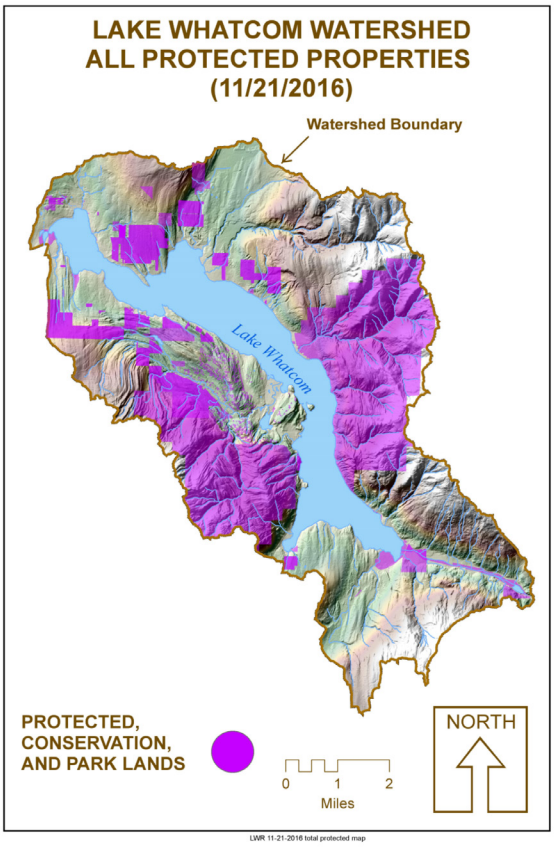


Figure 21. *Protected Land in the Lake Whatcom Watershed*

Alternatively, these credits could be used internally to offset City emissions. The first step is to inventory the amount of carbon sequestered in City properties that have prevented development, and the amount that will continue to be sequestered with forest growth and potential management regimes. This opportunity will be further researched and scoped for future consideration.

Community Measures

Energy Efficiency and Conservation

Residential - Phase 1

CLIMATE EDUCATION AND OUTREACH

The City's climate leadership positions it as a strong messenger. The Public Works Natural Resources Division currently engages in a number of education and outreach programs. Climate protection can be incorporated into these existing efforts and/or developed as a stand-alone educational program. Public education and outreach would have a synergistic effect, enhancing the effectiveness on nearly all other community action plan components. Ideally, the process should begin with research into existing attitudes, understandings and receptiveness, which will maximize the effectiveness of future efforts.

Status: Incomplete. The City has not moved forward with a climate-specific education program. However, City staff worked closely with utilities and community members and organizations to support and promote the Georgetown Energy Prize competition (a.k.a. Bellingham Energy Prize), which encouraged homeowners to improve household energy efficiency.[57] The City also posts climate protection resources on the City website such as the Climate Protection Action Plan, educational resources, and links to energy saving incentives for homeowners and businesses.[58] In 2017, the City hired a new Education and Outreach Specialist to work part time.

Goal: Reach 1000 residents annually who reduce energy use by 5%.

Emissions Reduction: 727 tons CO_2e per year.

Next Steps: The climate outreach strategy will prioritize opportunities to engage municipal and community audiences in a variety of emissions reduction activities discussed elsewhere in this report, including energy efficient behaviors, limiting vehicle idling, using biofuels, and using alternative transportation.

Residential - Phase 2 Measures

COMMUNITY ENERGY CHALLENGE

In 2009, multiple community partners including the City of Bellingham and Sustainable Connections, the Opportunity Council, Puget Sound Energy, Cascade Natural Gas, and others came together to begin an energy efficiency campaign called the Community Energy Challenge (CEC). Operating in Whatcom, Skagit, Island, and San Juan counties, this program provides whole-building energy assessments for homes and businesses, resulting in a list of prioritized upgrades from no- to low-cost actions, as well as financing options for larger retrofits.[59] Participants can access utility rebate programs for lighting and insulation improvements, sealing, and more efficient appliances. Puget Sound Energy and Cascade Natural Gas assist the program in a number of ways including co-marketing, and financial support.[60] The Building Performance Center, an affiliate of the Opportunity Council, provides weatherization training for contractors and other community action programs in one of the state's three state-of-the art building performance training facilities.[61] [62] The Opportunity Council also weatherizes low-income homes.

Recently, the CEC introduced a sliding scale pilot for families just above low-income levels, which reduces the upfront audit cost and increases incentives based on income.[63] The pilot will continue through the middle of 2017 and may be expanded. Through the end of 2016, the low-income program served five Bellingham households, which are expected to save more than 30% on annual utility bills.

According to an analysis of the program, the CEC catalyzed $14 million in direct economic activity and resulted in more than $793,000 in energy savings per year from 2010 to 2014. In addition, more than 80 jobs have been supported by the program.

Status: Ongoing

Emissions Reduction: 755 tons CO_2e per year

Next Steps: Community partners should continue with the CEC. Future projects include deep energy retrofits, in which homeowners or owners of rental units pair more extensive energy upgrades with planned remodels of a residential unit. CEC will encourage the inclusion of deep energy retrofits in already-planned remodel projects. Activities will include development of educational materials for homeowners and builders that emphasize long-term savings, presentations to the

City's Permit Center staff, and other educational activities.

PUGET SOUND ENERGY INCENTIVES

PSE offers free Home Energy Assessments that include up to 20 free LED lightbulbs, as well as a suite of rebates and incentives for household upgrades to more energy efficient technologies. PSE recently expanded its multi-family program and also provides incentives for replacement of old refrigerators in multifamily dwellings. In 2016, PSE completed a Sweeps Campaign to distribute free LED lightbulbs and energy efficiency information via targeted mailing and door-to-door canvassing. PSE also partnered with Lowes to further engage Bellingham residents with energy-efficient products, hosting two events at Lowes in Bellingham in September 2016. The Sweeps Campaign delivered 5,861 LEDs to 2,000 individuals for an estimated annual energy savings of 7,546,038 kWh in Bellingham.

Status: Ongoing

Emissions Reduction: 47 tons CO_2e per year

Next Steps: Puget Sound Energy is bringing a program to Bellingham that will enroll three Bellingham/Whatcom Housing properties and monitor operational and behavioral changes for both facilities and tenants, with a goal of achieving 5% savings.

CASCADE NATURAL GAS INCENTIVES

Cascade Natural Gas offers rebates for energy-efficient furnaces, high efficiency or tankless hot water heaters, whole house sealing, fireplaces and hearth sealing, improving insulation to higher R thresholds, and Energy Star whole-house rebates for new construction. Additional services offered by CNG include free home weatherization and energy efficiency improvements for low-income households offered through local community action agencies and Washington's Weatherization Assistance Program.

Status: Ongoing

Emissions Reduction: 30 tons CO_2e per year

Next Steps: Cascade Natural Gas anticipates increasing conservation program goals for Bellingham, and is striving to increase rebate payments where feasible in the next year, increasing outreach efforts to customers, and expanding its low-income program offerings.[64]

Residential - Phase 3 Measures

TOWARD NET ZERO ENERGY

This is a pilot project designed to identify and understand the most cost-effective ways to achieve maximum energy savings in residential retrofit construction. The Community Energy Challenge, a partnership of the Opportunity Council and Sustainable Connections, is seeking qualified contractors to participate in a new pilot project offering funding, technical

assistance, and marketing support to companies seeking to hone their expertise in high performance energy-efficient building practices. Typical single-family residential retrofits through the CEC achieve an average of 20-25% energy savings. The new pilot builds upon this success by utilizing local contractors to complete retrofits achieving 50% or greater energy reductions while maintaining or improving indoor air quality. There are currently four homes receiving net-zero upgrades through this project, with expected completion by spring 2017. Energy models project energy savings in the four homes will meet or exceed 50%.[65]

Status: Ongoing

Goal: Reduce 15 tons CO_2e

Next Steps: The Building Performance Center will be developing materials for contractors interested in learning more about the materials and techniques used to get to Net Zero. Sustainable Connections has written a grant proposal to fund a series of Net Zero trainings for building professionals in 2017. Partners will continue work to identify the necessary incentives and marketing to expand net zero to multi-family owners.

CITY OF BELLINGHAM WATER USE EFFICIENCY PROGRAM

The City of Bellingham recognizes that water and energy are inextricably linked: It takes energy to treat and transport drinking water from the City's water treatment plant to households and businesses. The City's Water Use Efficiency Program partners with the Opportunity Council and Sustainable Connections to deliver water use efficiency services via the Community Energy Challenge (see above). Each participating household and business is provided with water quality information, a full energy assessment, a water assessment for City of Bellingham water customers, a customized energy action plan detailing cost-effective actions, assistance with utility and tax rebates (water and energy), identification of reliable contractors, and quality assurance. Residential water customers participating in the CEC have access to rebates for purchase and installation of WaterSense-labeled toilets or a qualified energy and water efficient clothes washer. Under this option, approximately 144 rebates have been issued, saving about 1.1 million gallons of water over a five-year period. Commercial water customers participating in the CEC are also eligible for rebates on water-efficient equipment, ranging from toilets, commercial clothes washers, and commercial kitchen equipment. The City also offers free water conservation kits to its water customers. These include one low-flow showerhead, a kitchen and a bathroom faucet aerator, and toilet leak detection tablets. This program saves electricity in City facilities and also results in water and energy savings for end users.

Status: Ongoing

Emissions Reduction: 4 tons CO_2e per year

RESIDENTIAL WATER METERING

The City completed a residential water-metering program to install about 15,000 water meters in 2017. Metering has been shown to reduce consumer use by tying water use to cost, with

corresponding reductions in the energy needed to treat and distribute water.

Status: Complete

Emissions Reduction: 54 tons CO_2e

CITY-SPONSORED HOUSING REHABILITATION & CONSTRUCTION PROGRAMS

The City of Bellingham Home Rehabilitation Program uses federal grants to pay for home rehabilitation for owner-occupied low-income homes. Although these renovations are focused on health and safety, improved energy efficiency is usually a side-effect of the rehabilitation. For example, the City requires Energy Star-rated appliances when it pays for appliance upgrades. The program coordinates with the Opportunity Council for additional energy upgrades when possible. A citywide Housing Levy was passed by voters in 2012 to increase and maintain affordable housing stock. New construction and renovation projects funded by the Levy are required to be built to the state's Evergreen Sustainable Development Standard that sets a high threshold for energy efficiency and other sustainability features.

Status: Ongoing

Emissions Reduction: Unknown

Next Steps: Review green building standards to ensure that the latest energy efficiency methods and technologies are included in this program.

WHATCOM HOUSING AUTHORITY RETROFITS

The Bellingham Whatcom Housing Authority is a local government agency with about 3,000 units that house over 7,000 residents in Whatcom County. The Housing Authority works to provide needed housing in the community for low-income families, seniors, and people with disabilities. The Housing Authority has completed energy efficiency retrofit projects on all of its properties within city limits.

Status: Complete

Emissions Reduction: Unknown

BELLINGHAM ENERGY PRIZE

Bellingham finished 3rd in the nationwide Georgetown University Energy Prize (locally known as the Bellingham Energy Prize), a two-year contest between 50 mid-size cities to reduce residential and municipal energy use. The City of Bellingham partnered with Bellingham Public Schools, Cascade Natural Gas, Community Energy

Challenge, Opportunity Council, Puget Sound Energy, RE Sources for Sustainable Communities, Sustainable Connections, Northwest Clean Air Agency, and Western Washington University. To increase participation in the competition, the City and its partners reached out to the community by disseminating information on energy conservation programs in new ways, and by reaching new audiences that may not have been part of other efforts. These activities included a large employer campaign; enhanced canvassing; neighborhood involvement; local bus, garbage truck, and television ads; low-income outreach; a middle school energy efficiency and conservation contest; and utility bill inserts.

Status: Complete

Emissions Reduction: See related measures

BELLINGHAM ENERGY PRIZE ONLINE ENERGY CENTER

In partnership with the City, Puget Sound Energy, and Cascade Natural Gas, Sustainable Connections set up an online Energy Center website for residents to track their electricity and natural gas use, find ways to save energy, compare their energy use to neighbors, and win prizes like free utilities for a month and a free bike. The Energy Center supported the Bellingham Energy Prize (see above), and in 2016 was viewed 8,300 times with 1,124 signed up residents, 305 of whom also linked their utilities.

Status: Discontinued due to lack of funding

Emissions Reduction: 81 tons CO_2e in 2016

ENERGY EFFICIENCY AND THE REAL ESTATE MARKET

Efforts are underway to better connect efficiency programs and real estate professionals. The Community Energy Challenge completed educational classes with realtors in 2015 and 2016 to educate them on the benefits to owners of efficient homes. Bellingham Energy Prize team members also conducted both resident and real estate education at the annual Building Industry Association of Whatcom County Home Shows in both years. As a foundation for future activity, the WWU economics department has received a $309,304 grant from the Sloan Foundation to conduct a two-year study on the impact of energy efficiency on housing prices with the Opportunity Council and its Building Performance Center. The study will document a home's expected annual energy usage to see whether more efficient homes sell for a premium. The study will also examine how upgrading efficiency of a less efficient home impacts its market price. As part of the study, the Building Performance Center will provide the energy audits and modeling on 600 homes on the market.[66]

Status: Ongoing

Goal: 600 audited households achieve average energy reductions.

Emissions Reduction: 340 tons CO_2e per year

Next Steps: See Residential Energy Performance Ratings and Multifamily

and Commercial Benchmarking measures below.

PROJECT RENT

In 2015, The Wstern Washington University (WWU) Institute for Energy Studies and the WWU Office of Sustainability collaborated to start Project RENT (Reducing ENergy with Tenants) to provide energy efficiency outreach and education to the 11,000 students living off-campus. Puget Sound Energy, Cascade Natural Gas, and the Opportunity Council trained 12 student Energy Educators to go into student neighborhoods to promote local energy resources such as PSE's Home Energy Assessments, free Energy-Saving Kits from Cascade Natural Gas, and smart powerstrips. They also provided energy conservation education and helped with basic installations.

During the 2015-2016 school year, Project RENT consulted nearly 70 off-campus students and distributed 100 water-saving kits (which included a low-flow showerhead, kitchen and bathroom sink aerators, and toilet leak detector tablets) and 200 LED lightbulbs to off-campus students. Analysis of post-program surveys revealed that students who engaged in Project RENT became significantly more aware of local energy efficiency programs and practiced more energy efficient behaviors than before participating in the program. Participating students receive periodic reports that track their energy use and can be involved in competitions to reduce energy use. More information here: www.energytrans.org/project-rent.html

Status: This pilot program ended in June 2016 but WWU's Office of Sustainability is examining results of the project and may implement a permanent version when a new funding source can be secured.

Emissions Reduction: 20 tons CO_2e in 2016

Next Steps: WWU students created a prototype Sustainability Index website allowing students to share current energy information of rental properties, as well as other information useful for locating a quality, efficient, and safe rental. This concept is loosely based on a Rent Rocket web site that is running in several university towns in the Midwest. The website will help off-campus students choose their rental homes based on several sustainability factors, including the energy use of that home. The site would produce both an energy-related "Utility Score" and a more general "Community Score" combining other features of sustainability such as a high walk score, or being on a bus line. The effort has created a prototype for collecting renter data and is starting to populate it in the testing phase. This program is fully funded and is expected to be launched in Spring 2017. There are

plans for the future version of Project RENT to work in close collaboration with the Sustainability Index, with outreach providing both renter energy information, and encouraging students to sign up on the site.

MULTI-FAMILY RESIDENTIAL ENERGY EFFICIENCY

City staff and partners are working to expand energy conservation in multi-family dwelling through financing or incentive programs that work around the "split incentive" problem with rental housing. In 2016, City staff worked with PSE's Multi-family Retrofit Program to provide Bellingham-specific marketing to potential customers in larger apartment buildings. As a result, 103 units were assessed, and one ten-unit building was set up for direct install LEDs, new ventilation fans, refrigerators, and windows. This, however, represents a relatively small number of larger multifamily buildings in Bellingham.

The Community Energy Challenge also expanded commercial audits to include some large multi-family buildings. In 2016, the program audited the large Leopold senior housing complex and changed out all 91 residents' showerheads, kitchen and restroom aerators, and they will soon be converting all of the common area lighting to LED. Expected savings are $3,017 in gas costs per year for the low-flow fixtures and $5,375 in electric costs for the lighting upgrade.

WWU's Institute for Energy Studies students are researching the feasibility of a "green lease" program to assist in resolving incentive issues and provide behavioral and technical components of energy efficiency for both landlords and tenants. One part of the program could target master-metered rental properties for conservation efforts. Larger properties could access ESCO's (energy service companies) that do retrofits with guaranteed savings. The City's Water Use Efficiency Program will also provide incentives for water use efficiency retrofits that result in energy savings.

Status: Ongoing. Increasing multifamily projects proved difficult.

Goal: Achieve above reductions every year at minimum, as well as 15 million kWh saved from PSE's upcoming program below.

Emissions Reduction: 1,392 tons CO_2e per year

Next Steps: Partners will continue work to identify the necessary incentives and marketing to expand energy efficiency and conservation programs to multifamily owners. Puget Sound Energy is bringing a program to Bellingham that will enroll three Bellingham/Whatcom Housing properties and monitor operational and behavioral changes for both facilities and tenants, with a goal of achieving 5% savings. This could amount to about 15 million kWh savings for the 424 units involved.

BELLINGHAM PUBLIC SCHOOLS ENERGY EFFICIENCY

Bellingham Public Schools have a record of substantial investments in energy efficiency as facilities are renovated or rebuilt. Resource Conservation Management work is incorporated into the work plans of key facilities management staff,

who have developed the expertise to continually develop and implement projects resulting in steady reductions in energy use. All schools are now benchmarked on the ENERGY STAR® Portfolio Manager, with some rated at 100 percent. Energy efficiency projects have been incorporated into recent school levies, and additional resources have resulted from successful grant applications. Retrofit projects for the first half of 2015 included replacement of 245 lights with LEDs in Bellingham High School, and installations of 625 LED fixtures at Geneva Elementary School. Additional lighting upgrades were completed at five other schools or facilities, for a total savings of 433,661 kWh for lighting annually. In the second half of the year, outdated control systems were replaced with electronic control systems at four elementary schools. A rebuild of Sehome High School and the new Options High School both exceed the Washington Sustainable Schools Protocol, which is equivalent to LEED Silver building standards. Bellingham Public Schools also helped promote the Bellingham Energy Prize.

Status: Ongoing

Emissions Reduction: Unknown

Next Steps: Classroom lighting continues to be upgraded to LEDs. A bond measure will be on the ballot in February 2018 and will include a wholesale change to LED lamps across the district and low-energy rebuilds of three elementary schools

GREEN CLASSROOM CERTIFICATION PROGRAM

In partnership with the City, ReSources for Sustainable Communities continued to implement its Green Classroom Certification program that provides education on energy, water, and resource management at area elementary schools. This program is partially funded by the City and it provides in-class education and behavioral tips to save energy at school. This program was adapted in 2015 and 2016 for the Bellingham Energy Prize (see above) to provide additional educational materials focused on residential conservation and encouraging parents to sign up for energy services. During 2016, 83 elementary classrooms either attained their Green Classroom Certificate or began working towards attaining this Certificate in 2017. Some examples of the conservation activities that these classrooms pledged to practice during 2016 include using natural lighting in classrooms when possible, turning off electronics not in use, and avoiding water waste when washing hands. ReSources also worked with three high school and 12 middle school classrooms in 2016. ReSources has added a focus on the water-energy nexus to its water conservation programs in middle and high schools, with the goal of raising awareness about the indirect energy use associated with using water.

Status: Ongoing

THE OFFICE OF sustainability WWU

Emissions Reductions: Unknown

Commercial - Phase 1 Measures

WESTERN WASHINGTON UNIVERSITY SUSTAINABILITY

In 2007, WWU created an Office of Sustainability to oversee a wide range of initiatives and continue its efforts toward becoming a national model for campus sustainability.

- WWU Climate Action Plan - In 2007, the University approved a Climate Action Plan and began tracking its greenhouse gas emissions with the goal of achieving climate neutrality by 2050.
- Go for the Green - This energy-reduction residence hall campaign resulted in over 20 percent energy use reduction.
- 10x12 Program - This program reduced overall campus energy use by 10 percent by the end of 2012. The university contracted for $3.2 million in building energy retrofits, resulting in annual savings of $244,000 in year one, 7.8 percent carbon emissions reduction, 8 percent natural gas reduction, 8 percent water use reduction, and 7.5 percent electricity use reduction.

In spring 2016, Puget Sound Energy recognized WWU for more than 20 projects the two entities have partnered on together, and for the energy savings accrued through the campus' behavior change campaigns. These campaigns resulted in more than 5 million kilowatt hours saved and $750,000 from PSE in incentive funding.

Status: Ongoing

Emissions Reduction: 250 tons CO_2e per year

COUNTY COURTHOUSE EFFICIENCY

This measure includes a number of actions taken at county facilities. Most of this reduction has been achieved through lighting and HVAC upgrades and intense energy management at the County Courthouse and jail facilities.

Status: Complete

Industrial - Phase 1 Measures

BELLINGHAM COLD STORAGE ENERGY EFFICIENCY

Prior to the 2007 Climate Action Plan, Bellingham Cold Storage (BCS) implemented a number of energy-efficiency actions, including an integrated energy management system, increased insulation, automatic doors, lighting upgrades and installation of variable speed drives. These actions allowed the business to grow without a significant increase in energy consumption, saving an estimated 10-20 million kWh annually.

According to their website, "BCS has continued to adopt the latest technology to reduce power consumption. New refrigeration control systems at both plants have reduced power consumption by 4.8 million kWh per year. In addition, we have replaced more than 70 percent of the facility's older halogen fixtures with more energy efficient florescent lighting, reducing consumption by approximately 800,000 kWh per year."

BCS also promotes alternative transportation for employee commuting, has been recognized by

Bellingham waterfront. Image: Bellingham Herald

EPA as one of the "Best Workplaces for Commuters," and twice won the Governor's Award for innovation in workplace commuting.

Status: Ongoing

Emissions Reduction: 73 tons CO_2e

Next Steps: Convert to LED lighting. This will save 168,434 kWh and prevent 73 tons of CO_2e per year. A new energy audit of refrigeration is also underway.

Residential/Commercial—Phase 4 Measures

WATERFRONT DISTRICT ENERGY

The City and Port of Bellingham drafted a Waterfront District Sub-Area Plan to rebuild a 180-acre site once used by the Georgia-Pacific pulp and paper mill. The plan includes exploring development of advanced energy systems on the site, and "additional piping and infrastructure to support the long-term development of district heating and cooling, on-site energy generation, and wastewater reuse."

The City took the next step to examine this as part of its utility planning by reviewing and updating the feasibility numbers.[67] The report also estimates that a district energy project would substantially reduce overall energy use in the area, as well as greenhouse gas emissions. Micro-hydro was also considered but was found to be unfeasible. This district could expand beyond the waterfront area, and separate energy districts should be considered in other parts of the city. This project is still being assessed for feasibility.

Emissions Reductions: 609 tons CO_2e per year

SINGLE-FAMILY RENTAL HOUSING OUTREACH

Bellingham has a significant single-family rental house population due in part to the 14,000+ enrolled students at Western Washington University (WWU) and surrounding neighborhoods that house a significant number of these students in off-campus housing. While tenants most often do not have the expendable income to make upgrades in their rental homes, behavior change education can be implemented, with an emphasis on utility bill savings that result through energy-saving habits. WWU's Project RENT (see above) has implemented this on a pilot basis. Additional engagement with property management companies and landlords to increase awareness of energy efficiency programs available to them will further address this under-tapped sector. To supplement this effort, utilities could set up energy displays at colleges, with an emphasis on LED upgrades and other low-cost actions. In addition, students could be provided with tools to assess their own off-campus housing to identify other potential energy saving activities. Such a program could begin at Western Washington University given its large local enrollment, but an expanded campaign could be appropriate for Bellingham Technical College and Whatcom Community College. This program could be facilitated though the rental inspection program.

Emissions Reductions: 20 tons CO_2e per year per Project RENT results

PUGET SOUND ENERGY STREETLIGHTS LED UPGRADE

The City pays for an additional 1,700 streetlights owned and operated by Puget Sound Energy, which have not

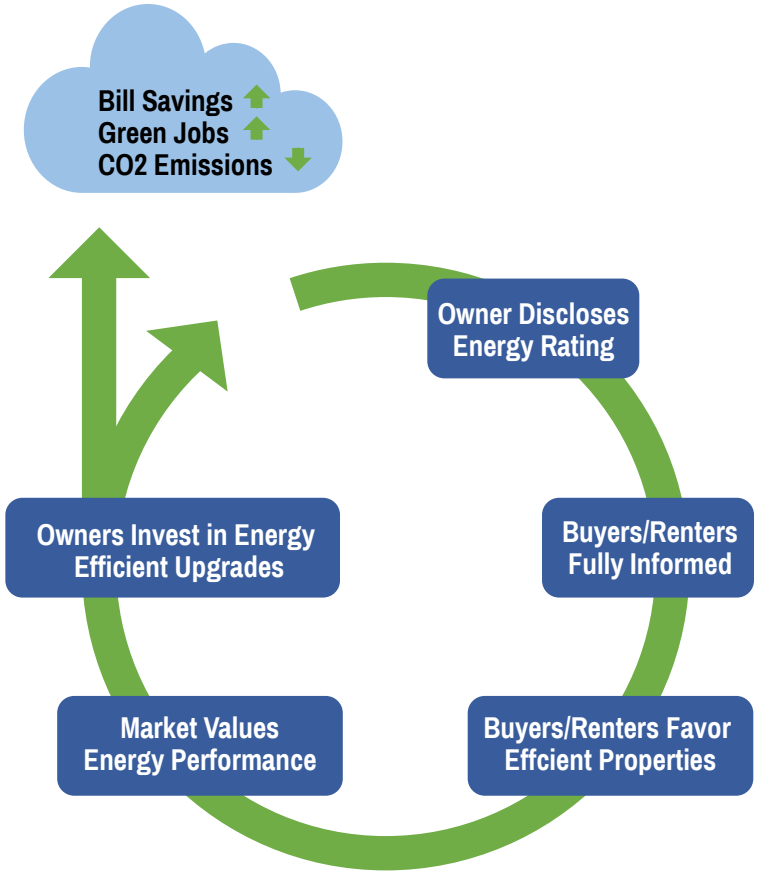


Figure 22. *Energy benchmarking and reporting allows tenants to make choices based on energy efficiency. This figure was sourced from the City of Seattle.*

been upgraded to high-efficiency LED (light-emitting diode) bulbs. City staff will work with PSE to assess the feasibility of upgrading these streetlights.

Emissions Reductions: 413 tons CO_2e

MULTI-FAMILY & COMMERCIAL BUILDING BENCHMARKING

A building energy benchmarking and reporting policy would require multi-family and commercial buildings to track and report their energy use. This would allow tenants to choose energy-efficient homes and workplaces, and would introduce energy efficiency into the marketplace (Figure 22). This could be modeled after successful policies in Seattle and 24 other U.S. cities. The City of Portland, Oregon organized an energy conservation contest between businesses that used the U.S. Environmental Protection Agency (EPA)'s free energy-tracking tool called Energy Star Portfolio Manager, the use of which has resulted in 7% energy savings over three years, according to EPA. This could provide a model to pilot a benchmarking program. Research at WWU will help inform this process (see Energy Efficiency and the Real Estate Market measure above).

Goal: Benchmark all multifamily and commercial buildings by 2030

Emissions Reductions: 1102 tons CO_2e

RESIDENTIAL ENERGY PERFORMANCE RATINGS

Residential energy performance ratings would allow renters and buyers to consider energy efficiency in their decisions, effectively introducing energy efficiency into the marketplace, as with benchmarking (Figure 22). Ratings would also help agencies and utilities track progress in energy efficiency across the community. This could be incorporated with the City's recent rental registration program.

Goal: Rate 90% of residential properties by 2025.

Emissions Reductions: 28,207 tons CO_2e

Residential/Commercial/Industrial Phase 4 Stretch Measures

GREEN LEASES FOR CITY TENANTS

The City owns numerous commercial rental properties that are leased to various tenants. Updating these leases to include required energy efficiency and conservation measures — also known as green leases — would save energy and reduce emissions. According to the Institute for Market Transformation, green leases can reduce energy consumption in office buildings by 11-22%.

Goal: Implement green leases as existing leases are renewed.

Emissions Reductions: 312 tons CO_2e

WEATHERIZATION REQUIREMENTS

The City will research the feasibility of requiring weatherization upgrades for buildings at the time of sale, which could include insulation, double-paned windows, and other energy-saving upgrades.

Goal: Reduce residential energy use of sold homes by 15%.

Emissions Reductions: 1,678 tons CO_2e

INDUSTRIAL ENERGY EFFICIENCY

The industrial sector accounts for 23% of Bellingham energy use. Engaging businesses in the industrial sector to adopt energy efficiency measures could reduce emissions from this sector. This could include existing incentive programs as well as industry-specific programs such as Puget Sound Energy's Industrial System Optimization Program and the U.S. Department of Energy Better Buildings Accelerator Program's Superior Energy Performance Certification, which uses the ISO 50001 global energy management system standard, "emphasizing measurable savings through a transparent, independent, and highly regarded verification process." Companies that join USDOE's Better Plants Challenge commit to reducing energy intensity by 25% over 10 years. The International Energy Agency reported in 2012 that energy efficiency improvements could reduce global industrial energy demand by 26%.

Goal: Reduce overall Industrial sector energy use 15% below 2015 levels by 2030 in addition to getting one quarter of industrial businesses to commit to the USDOE's Better Plants Challenge goal of 25% energy reduction by 2030.

Emissions Reductions: 2,542 tons CO_2e

2030 DISTRICTS

2030 Districts commit to reducing building energy use, water consumption, and transportation emissions by 50% by 2030. Communities across the country are forming 2030 Districts led by the private sector to focus efficiencies and efforts such as district energy, benchmarking, energy ratings, collective buying power, and green building standards. This model could work well in densely populated areas like Bellingham's downtown and urban villages.

Emissions Reductions: Unknown

Renewable Energy

Residential - Phase 1 Measures

GREEN POWER PURCHASES

Even before the Bellingham Green Power Community Challenge (see sidebar), Bellingham residents and businesses were participating in Puget Sound Energy's Green Power Program. In this program, customers pay an additional $4 to $12 per month to help fund the development of renewable energy sources. In 2005, 1,368 customers participated in the program and purchased approximately 8,083,100 kWh. In 2014, 6,083 residential and business customers participated and purchased 35,744,548 kWh—a 342 percent increase since 2005.

Status: Ongoing

Emissions Reductions: 18,922 tons CO_2e per year

Residential - Phase 3 Measures

SOLAR PERMITTING IMPROVEMENTS

In 2009, Bellingham became the first city in Washington State to offer a solar panel permit exemption program. In an effort to reduce costs for solar projects, the City of Bellingham adopted a policy to exempt small rooftop solar installations from standard structural review and building permits on single family, two family and town home buildings (electrical permits are still required).[68] A similar exemption was approved for solar hot water heating projects.[69] The cost of solar panels is also excluded when determining permit fees for non-residential buildings. Program participants can

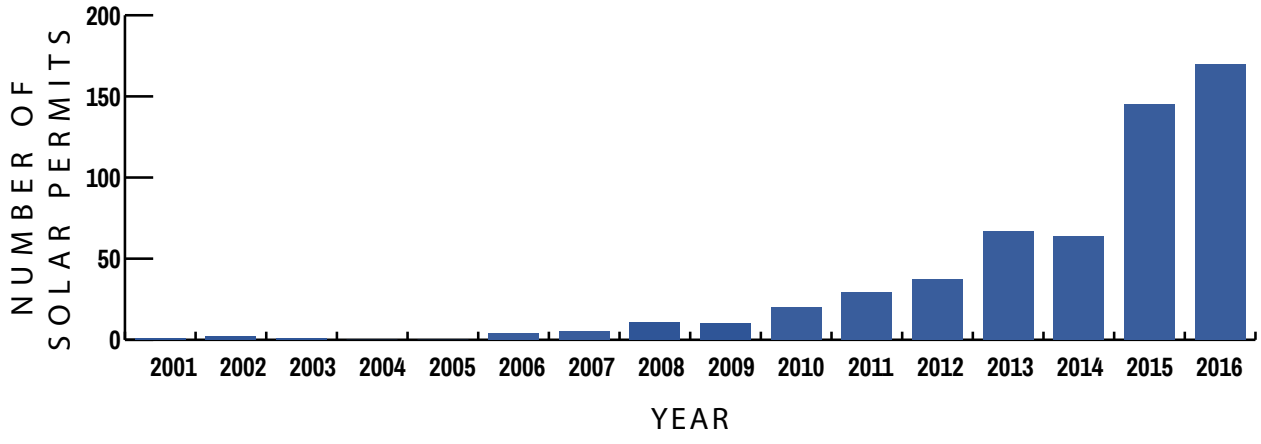


Figure 23. *Number of solar permits issued per year by City of Bellingham*

save more than $2,000 in fees and get an expedited, two-week permit review.

Streamlined permitting and experienced local installers have put Bellingham into the lead in the region in residential installed systems per capita. From 2009 to 2010, City-issued permits for solar installations and upgrades doubled and continued to climb each year, reaching 145 in 2015 (Figure 23). In May 2016, Bellingham had 3,349 kW of residential solar capacity and 609 kW of commercial solar capacity. In 2016, Bellingham businesses and residents produced 3,037,439 kWh of solar power, preventing over 2,300 tons of CO_2e emissions, about the same as the annual emissions from 450 cars. That's enough to power 225 homes for a year. Evidence suggests that many residents will increase their energy efficiency when they install solar.

Status: Ongoing

Goal: Increase solar capacity in residential, commercial, and industrial sectors by 10% every year. An accelerated goal would increase residential solar by an additional 5% every year.

Emissions Reductions: 608 tons per year

Next Steps: Develop a per capita solar capacity goal. Include solar site orientation information on subdivision maps to provide for passive solar heating and cooling opportunities. Find new ways to promote solar power in Bellingham.

Bellingham Green Power Challenge

As part of the City's 2016 Energy Year, Puget Sound Energy launched the Bellingham Green Power Challenge with the goal of enrolling 400 more homes in Green Power. Participants pay extra on their electric bills to support wind, solar, and/or biomass energy projects. In seven months, Bellingham residents almost doubled the goal with 779 enrolled, earning the City a $50,000 grant to install a solar array on a visible building that will contribute to education on solar power's potential. This effort mirrored the 2006 Bellingham Green Power Community Challenge when the City, PSE, and Sustainable Connections partnered to promote participation in the Puget Sound Energy Green Power Program among Bellingham businesses and residents. In six months, the Bellingham community nearly doubled its green power purchases. As a result of these campaigns, Bellingham is the #3 jurisdiction in the PSE service territory for Green Power.

Status: Completed in 2006 and again in 2016

SOLARIZE WHATCOM

Solarize Whatcom was a community solar purchasing campaign organized by Sustainable Connections with help from installers Ecotech Solar and Western Solar and local solar panel manufacturer Itek Energy. This campaign offered the best value for homeowners and businesses for easy solar installations on their homes, businesses, or multi-family units. Benefits to participants included a free solar workshop, free site assessment, competitive flat rate pricing from vetted local installers, and low interest loans. Puget Sound Cooperative Credit Union offered a special rate for participants as low as 4.25% and up to $50,000. The campaign was a resounding success, with 47 contracts signed, $1.2 million in solar investment, and 311.15 kW of new solar capacity. A large solar array will be donated to the Food Bank by Itek, with installation provided by Western Solar and Ecotech.

This model of tying a residential install campaign with donated solar for a non-profit is a replicable model for solar installations, as it not only encourages more residential capacity, but provides additional motivation by helping improve the long-term finances of popular local non-profits. These win-win campaigns also raise the profile of solar in the community more generally.[70]

Status: Complete.

Emissions Reductions: 168 tons per year

WASHINGTON GOES SOLAR CAMPAIGN

ReSources for Sustainable Communities started this program in 2017 to help homeowners and businesses get hassle-free solar installation while helping RE Sources earn a free solar array from Ecotech Solar and Itek Energy. Benefits to participants include a free solar workshop, free site assessment, competitive pricing from vetted local installers, and low interest loans.

Status: Ongoing

Goal: 155 tons CO_2e per year

Commercial - Phase 1 Measures

WWU SUSTAINABILITY PROGRAM

In 2007, WWU created an Office of Sustainability to oversee a wide range of initiatives and continue its efforts toward becoming a national model for campus sustainability. WWU approved a Climate Action Plan and began tracking its greenhouse gas emissions

with the goal of achieving climate neutrality by 2050.

- WWU Green Power - Beginning in 2005, WWU became the first institution in the nation to offset 100 percent of its electricity use with renewable energy credits. This decision followed a vote by the student body that overwhelmingly supported an increase quarterly fees to pay the premium cost. Students each pay approximately $10 more each quarter to help offset 40 million kilowatt hours of electricity with wind energy through the Puget Sound Energy Green Power Program. WWU remains one of the nation's top-20 buyers of renewable energy among academic institutions as recognized by the US EPA. Like the City, WWU will enroll in PSE's Green Direct Program to more directly fund new windmill construction in eastern Washington.
- WWU Sustainable Action Fund - Formerly called the Green Energy Fee, the Sustainable Action Fund Fee was adopted by students in 2009 to raise over $300,000 annually for on campus pilot projects. One project included a $167,000 solar array on the Environmental Studies Building. The fee also helps pay for Green Power purchases (see above).

Emissions Reduction: 19,799 tons CO_2e per year

COUNTY GREEN POWER

In September 2006, the Whatcom County Council voted to begin buying renewable energy credits through the Puget Sound Energy Green Power Program to offset 100 percent of the electricity used by county government, and became a U.S. Environmental Protection Agency Green Power Partner. In 2014, the County bought credits equal to 5,800,000 kWh of electricity.

Status: Ongoing

Emissions Reduction: 2,871 tons CO_2e per year

Commercial - Phase 4 Measures

WATERFRONT DISTRICT ENERGY

This measure is also included in the Energy Efficiency and Conservation section due to overlapping emissions reductions. The City and Port of Bellingham drafted a Waterfront District Sub-Area Plan to rebuild a 180-acre site once used by the Georgia-Pacific pulp and paper mill. The plan includes exploring development of advanced energy systems on the site, including "additional piping and infrastructure to support the long-term development of district heating and cooling, on-site energy generation, and wastewater reuse."[71] The City took the next step to examine this as part of its utility planning by reviewing and updating the feasibility numbers. The report also estimates that a district energy project would substantially reduce overall energy use in the area, as well as greenhouse gas emissions. Micro-hydro was also considered but found to be unfeasible. This district could expand beyond the waterfront area, and separate energy districts should be considered in other parts of the city. This project is still being assessed for feasibility.

Goal: Reduce future waterfront emissions by 90%.

Emissions Reduction: 3,045 tons CO_2e per year

Residential / Commercial Phase 4 Stretch Measures

COMMUNITY SOLAR

Community solar allows residents who can't install solar panels on their homes to lease panels from a centralized, off-site solar array. Power generated from leased panels is metered and subtracted from the lessee's home electricity bill. In 2017, the Bellingham community is seeking to expand this model of linking solar purchases to assisting low income communities by working with the Opportunity Council to explore community solar projects that could result in permanently lower bills for residents of low income housing. The City of Bellingham energy intern assists this project.

MORE EFFICIENT ENERGY DISTRIBUTION

Microgrids and smart grids are possible solutions for more efficient electricity distribution that will require extensive planning between municipalities and utilities. Integrating land use and infrastructure planning could optimize opportunities for heat exchange between sources that generate excess heat (e.g. data centers or sewer lines) and buildings that require additional heat (e.g. office buildings or apartments).

SUPPORT RESIDENTIAL WIND POWER

Research and develop policies and incentives for residential wind power to increase local renewable energy production. Ensure that City permits and codes allow for residential wind turbines.

Empowering Lydia Place

In a unique partnership between Western Solar, iTek Energy, and Aslan Brewing Company, funds from the sale of Aslan's Summer Solar Ale were donated to help install solar panels on Lydia Place, a non-profit agency serving homeless families. The solar panels will offset power use in Lydia Place's Baker Place location, saving money on electric bills. This partnership highlights the many opportunities for multiple benefits – economic, environmental, social -- when addressing climate change.

Transportation

Transportation - Phase 1 Measures

SSC BIODIESEL

In 2005, Sanitary Service Corporation (SSC) began running 60 garbage trucks on B20 biodiesel. This was later changed to B5 (5% biodiesel, 95% petrodiesel). SSC's use of B5 prevents about 156 tons of CO_2 emissions per year, equal to taking 30 passenger cars off the road for a year.[72] SSC is now in the process of switching trucks to compressed natural gas (see below).

Status: Complete

CAR SHARING

Car sharing programs allow occasional needs for a vehicle to be met without the burden of ownership, while also reducing the number of cars on the road. Such programs can help two- or three-car households revert to one car, or even provide for all of the private vehicle needs for some residents. In 2006, a non-profit organization called Community Car Share began offering Bellingham residents access to the use of a shared vehicle paid for on a per-use basis. Community Car Share went under in 2010, but in 2014 Western Washington University began a car-sharing program with two cars through Zipcar, a nationwide membership-based car-sharing company. Faculty, staff, students and community members can join this program.

Status: Ongoing

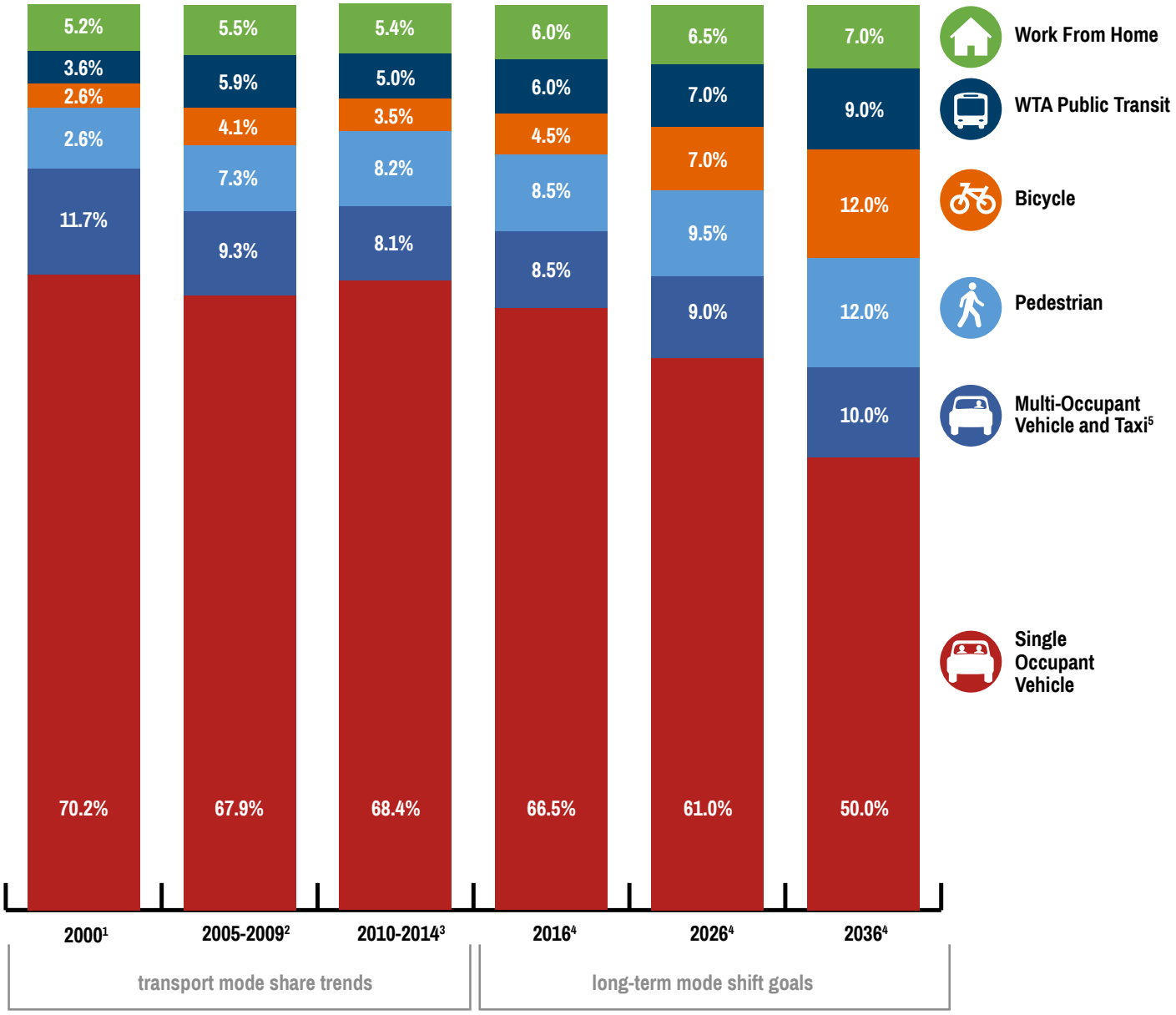
Emissions Reduction: Unknown

Transportation - Phase 2 Measures

VEHICLE MODE SHIFT

The Bellingham Comprehensive Plan 2016 Update outlines a mode shift goal to reduce total trips by automobile from the current rate of 87% of all trips to 70% of all trips by 2022 and 60% of all trips

Steady increases to the availability and convenience of public transportation will make Bellingham much more friendly to pedestrians and cyclists.



1) Table P030: 2000 U.S. Census Summary; Means of Transportation to Work
2) Table B08301: 2009-2013 Average from American Community Survey (U.S. Census)
3) Table S0801: 2010-2014 Average from American Community Survey (U.S. Census)
4) 2015 baseline and long-term mode shift goals [Monitor annual in TRAM; update goals in 2026 Comp Plan]
5) Taxi includes ridesharing organizations, such as "Uber" and "Lyft"

Figure 22. *Historic (2000-2014) and long-term (2016-2036) transportation mode shift goals*

by 2036 (Figure 22). The goal outlines a steady increase in other modes and a concurrent decrease in the use of automobiles.

Achieving this goal is expected to depend on the success of a number of factors including the Whatcom Smart Trips program, the Social Data Individualized Marketing program, land use decisions, a steady increase in availability and convenience of mass transit (Whatcom Transportation Authority's Go Lines in particular) as well as a widespread effort to make the city more pedestrian- and bicycle-friendly. Achieving this goal will require a wide range of actions local government can take to encourage the development of a city that is not so dependent on cars.

The City developed an incentive to support transportation mode shifts that reduces transportation impact fees for performance measures that are proven to reduce on-site trip generation, such as location on Whatcom Transportation Authority Go-Lines. Bellingham is currently certified as a silver-level "Bicycle Friendly Community" by the League of American Bicyclists.

Status: Ongoing

Goal: Reduce vehicle trips by 17% by 2022 and by 27% by 2036. Reaching the 2036 goal earlier may be necessary to meet the 2030 emissions target.

Emissions Reduction: 2330 tons CO_2e per year

SAFE ROUTES TO SCHOOL

City of Bellingham Public Works and Police Departments partners with Bellingham School District, Whatcom County Health Department, and everybodyBIKE to implement programs in local elementary and middle schools that use education, enforcement, and engineering improvements to increase the number of students walking and bicycling to school, with the goals of reducing vehicle trips and congestion and improving air quality.

Status: Ongoing

Emissions Reduction: Unknown

Next Steps: In 2018, City staff will perform educationand enforcement at Shuksan Middle School and start

Bellingham Bikes

From dedicated bike commuters on the City's freshly painted bike routes to thrill-seeking mountain bikers up on Galbraith Mountain, Bellingham's bike culture thrives. The Hub Community Bike Shop is a non-profit organization that encourages transportation alternatives and builds community around bikes. They take old, donated bikes and refurbish them to be sold back to the community, reducing waste and increasing the number of bikes on the streets. They also provide reusable parts and community shop space.

Every spring, more than 30 organizations in Bellingham and Whatcom County work together to support Bike to Work and School Day with almost 30 "celebration stations" where bikers can stop for refreshment and sustenance. The Hub's Pancake Feed is a popular stop.

work on the Aldrich Road (Cordata Elementary School) Safe Routes to School grant project. The City of Bellingham Comprehensive Plan includes actions to: "Continue and expand Safe Routes to School programming, such as assemblies, bicycle rodeos and in-classroom safety education, to all schools in the Bellingham School District," and "Encourage the Bellingham School District to partner with the City in funding Safe Route to School sidewalk and bicycle facility improvements."

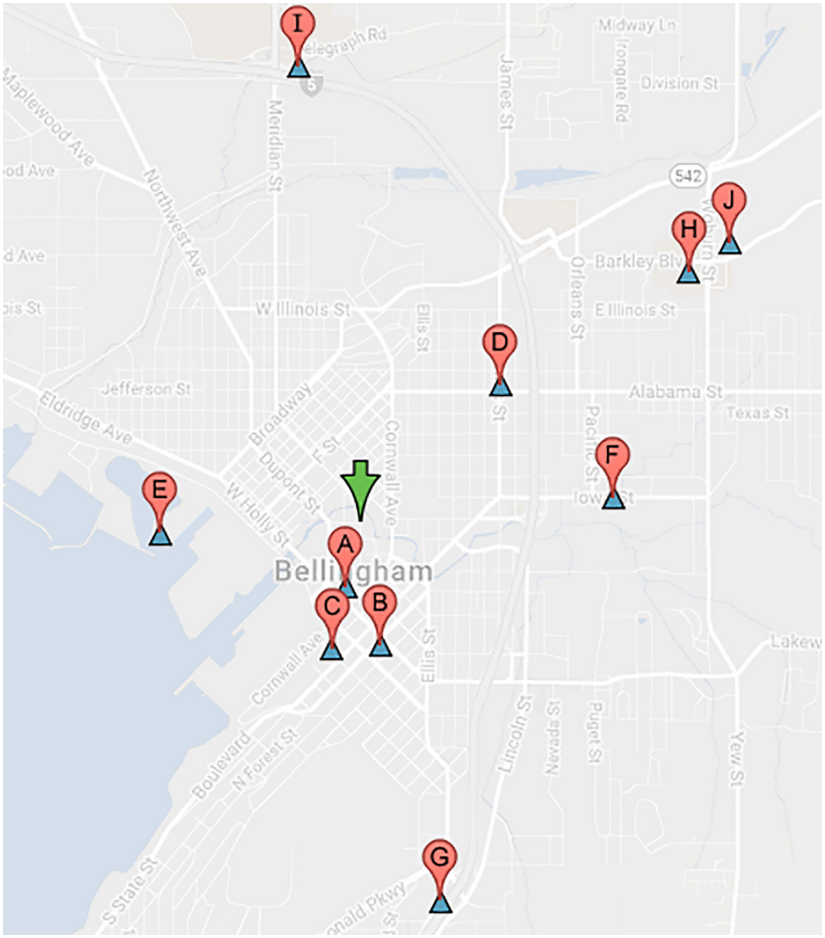


Figure 23. *Electric vehicle charging station locations in Bellingham.*

(USDOE Alternative Fuels Data Center)

LIMIT IDLING

The 2007 Climate Protection Action Plan proposed working with regional partners to limit vehicle idling. With funding from the Northwest Clean Air Agency, RE Sources worked with 22 schools in Whatcom, Skagit, and Island counties to limit idling and reported preventing 1,380 tons of carbon dioxide emissions. RE Sources also created a tool kit for municipalities that focused on businesses in 2011.

Status: Ongoing

Emissions Reduction: Unknown

Next Steps: The City will work with partners to assess additional anti-idling educational opportunities at the community level.

PROMOTE BIOFUELS

Switching from fossil fuels to agriculturally based fuels can reduce carbon pollution because biofuel emissions are part of the natural carbon cycle. However, recent concerns about indirect environmental impacts of biofuels on wild ecosystems, biodiversity, food prices, water consumption, and poor communities have dimmed enthusiasm for the carbon reduction benefits of biofuels.[73] Reflecting these trends and a variety of other factors, biodiesel use in Bellingham has fallen. Renewable diesel is an emerging fuel chemically identical to petroleum diesel but made from renewable oils. This fuel is not available to retail customers at this time. Biodiesel and renewable diesel made from recycled oils such as tallow and fryer oil provide the greatest

environmental benefit. Today, biodiesel is available at the Bakerview Yorky's Market, Sammy's Place on State Street, and the Shell Station on Meridian and Kellogg Road.

Status: Incomplete

Goal: 5% biodiesel or renewable diesel use in Bellingham by 2025.

Emissions Reduction: 154 tons CO_2e per year

Next Steps: The City can lead by example by switching the City fleet to this new fuel, following the example of other cities. The City and community will explore options for other incentives to gas stations to offer fuels blended with biodiesel and ethanol (E85), and outreach to auto dealerships to encourage them to offer more vehicles compatible with greater use of biofuels.

PROMOTE HYBRID AND ELECTRIC VEHICLES

In 2005, there were 168 hybrid vehicles registered in Bellingham. As of March 2017, there were 2,628—a more than 1450% increase to comprise 2% of all vehicles in Bellingham. Combined with 481 electric cars, this shift saved more than 516,000 gallons of gas or 5,057 tons of CO_2e in 2017, which is equivalent to taking 969 passenger cars off the road for a year. In 2011, Bellingham mayor Dan Pike helped break ground in the Sehome Shopping Village for construction of the first electric vehicle (EV) DC fast-charging station on the West Coast Electric Highway, a network of such stations in Washington, Oregon, and California. Today, Bellingham has 11 public charging stations, including one fast charger and 23 total outlets. In March 2016, there were 481 electric vehicles registered in Bellingham, a 0.3% adoption rate. (This measure was combined with the Phase 1 Hybrid Vehicles measure from the 2007 plan).

Status: Ongoing

Goal: 40% EV adoption and 30% hybrid adoption by 2030. This far exceeds Bellingham's estimated contributions to the Washington Electric Vehicle Action Plan goal of 50,000 EVs in the state by 2020 and sets up Bellingham to meet 2030 emissions targets.

Emissions Reduction: 5,160 tons CO_2e per year

Next Steps: Include promotion of hybrid vehicles in climate change education efforts. Create an educational electric vehicle page on the City website. Continue to partner with utilities and community stakeholders to promote electric vehicle adoption and infrastructure, including large employers and car dealers. Recognize businesses offering EV benefits. Assess feasibility of free electric vehicle charging for the public at City charging stations. Investigate if and how City employees can use city chargers. Standardize EV signage and consider pavement markings to help EV drivers find charging stations. Assess permitting needs and opportunities for incentives for installing EV infrastructure. Assess opportunities to include EV infrastructure in new developments. Consider reducing parking requirements for developers

when charging stations are installed. Designate reserved preferential parking for EVs. Provide free parking to EVs at City buildings and metered spaces. Assess ways to incentivize charging stations at workplaces. Research feasibility of waiving City sales tax on electric vehicles. Join Washington Clean Cities Coalition.

Transportation – Phase 3 Measures

WHATCOM SMART TRIPS

Whatcom Smart Trips is a unique community-wide vehicle trip reduction program that focuses on all trip purposes (not just commute trips.) Since the program started in June 2006, participants have walked, bicycled, shared rides and ridden the bus for more than 52 million miles and prevented over 21,000 tons of carbon dioxide from being emitted (Figure 24).

Emissions Reduction: Included in Vehicle Mode Shift

SSC NATURAL GAS TRUCKS

In 2015, the City required SSC to convert their fleet of garbage trucks from diesel to CNG with the last contract revision and authorized the necessary rate increase to pay for the cost.

Emissions Reduction: 2237 tons CO_2e

COMMUNITY COMMUTE TRIP REDUCTION

Continue to work with Waatcom Council of Governments to administer the state-required Commute Trip Reduction program for large employers and encourage smaller employers to help both employees and customers make local trips by walking, biking, and riding transit or sharing rides (Bellingham Comprehensive Plan Policy T-18).

Status: Ongoing

Emissions Reduction: Included in Vehicle Mode Shift

Next Steps: Increase carpooling incentives— provide carpool-only spaces downtown, work with large shopping centers.

Green Building

Residential/Commercial - Phase 2

PROMOTE GREEN BUILDING

In 2010, the City of Bellingham's Permit Center launched a "Bin Bump-Up" program to encourage and support green building projects by reducing building permit review time for certified green projects. A project that would typically be eligible for a 28-day review will be "bumped-up" to a seven-day review if it meets all applicable requirements. These projects are also eligible for one "integrated design" meeting with the City's Green Project Review Team to identify potential code conflicts between the project's concepts and City building codes. These incentives will be offered for new buildings and residences that achieve either a Building Industry Association of Whatcom County (BIA) Built Green 4- or 5-star standard or a U.S. Green Building Council (USGBC) LEED Silver, Gold, or Platinum standard. Project registration with the BIA or the USGBC is required to be eligible and third party verification is required. Other equivalent green programs may be eligible as determined by the City's Planning Director or Building Official.

Status: Ongoing

Goal from 2007 Plan: 50% of new residential, commercial, and industrial building is LEED certified or equivalent.

Emissions Reduction: 596 tons CO_2e per year

Next Steps: Review and consider including more recent green building standards in this program and consider scaling incentives based on energy savings. Review the feasibility of making downtown multi-family tax credit dependent upon meeting green building standards.

Residential/Commercial/Industrial - Phase 3

ADVANCED MATERIALS AND METHODS POLICIES

The City and Sustainable Connections developed policies for a variety of green building techniques to help businesses and homeowners achieve LEED and BuiltGreen standards while saving money:

- Roof-mounted Photovoltaic Solar Panels to produce local, clean energy.
- Solar Water Heating Systems to lower energy use and costs.
- Advanced Framing to reduce the amount of building materials used on a project while increasing the thermal efficiency of a home.
- Vegetated Roofing to reduce stormwater runoff and cut energy use by insulating roofs while cleaning the air and reducing the urban "heat island" effect caused by heat absorption of pavement and black rooftops.

- Rainwater Harvesting to save water, reduce stormwater runoff, and save money on stormwater development charges through a 50% discount for qualifying projects. Rainwater Harvesting can also help avoid stormwater detention or mitigation requirements.
- Composting Toilets and waterless urinals to cut energy and water use.

Status: Ongoing

Emissions reduction: Included above

Next Steps: Research feasibility of updating policies and incentives to include more recent green building standards. Research policies to support advanced materials and methods in the industrial sector.

Residential/Commercial/Industrial - Phase 4

2030 DISTRICT

Cities across the country are forming 2030 Districts led by the private sector to focus efficiencies and efforts such as district energy, benchmarking, energy ratings, collective buying power, and green building standards. 2030 Districts commit to reducing building energy use, water consumption, and transportation emissions by 50% by 2030. This model could work well in Bellingham's downtown and urban villages.

Waste Reduction

Residential, Commercial - Phase 1 Measures

CONSTRUCTION AND DEMOLITION RECYCLING

According to the Washington State Department of Ecology, about 30 percent of all solid waste consists of construction and demolition waste.[74] This presents a major opportunity to reduce waste by increasing recycling rates during construction and demolition.

The RE Store sells used building and home improvement materials at prices up to 50% off of new items. In 2005 they diverted more than an estimated 875 tons of material from the landfill. In 2014, that number reached 1825 tons.

Status: Incomplete

Next Steps: Work with Whatcom County to assess feasibility of requiring recycling at all construction sites. Ensure that all City construction and demolition projects recycle waste and use recycled building materials.

Emissions reduction: 4,122 tons CO_2e

FOOD PLUS!

Sanitary Service Corporation (SSC) began offering FoodPlus! organic food waste recycling opportunities in 2004. The program has been made available to a wider and wider range of customers since its inception. In 2005, the program diverted about 1600 tons of food waste from the landfill. At this time, SSC does not provide data on the volume of composted waste.

Goal: Unknown emissions reduction

Next Steps: Consider measuring use. Increase usage of program

Residential - Phase 2 Measures

INCREASE RESIDENTIAL CURBSIDE RECYCLING RATE

The 2007 Climate Protection Action Plan set a goal of a 35% curbside recycling rate. From 2009 to 2012 and in 2015, the residential recycling rate was 32%, up from 31% in 2005. Countywide, the percent of all waste diverted or recycled is around 46%.

THE RE STORE
SPEND A LITTLE. SAVE A TON.

The RE Store sells used building materials and offers other support such as salvage services. This sustainable and low cost alternative to demolition provides strip-out, and tear-down of building materials for reuse. By choosing to salvage rather than demolish, Bellingham residents conserve valuable natural resources, build a healthier local economy and reduce fuel costs and emissions.

In 2008, Bellingham-based non-profit Sustainable Connections launched a "Toward Zero Waste" campaign as a local business challenge. The City, along with the Farmer's Market, Western Washington University, Whatcom Community College, RE Sources, and SSC, partnered in this effort. 161 businesses are participating in Toward Zero Waste.

Status: Incomplete

Goal: Unknown emissions reduction

Next Steps: Support County efforts outlined in Comprehensive Waste Plan for recycling and diversion.

Commercial - Phase 3 Measures

PLASTIC BAG BAN

In 2011, City Council banned single-use plastic bags from retail stores in Bellingham in order to prevent litter, reduce solid waste and greenhouse gas emissions, preserve natural resources, and prevent harm to wildlife.

Emissions reduction: Unknown

Land Use

URBAN VILLAGES

The City of Bellingham is fulfilling the Comprehensive Plan goal of master-planning urban villages as part of a larger "centers and corridors" planning approach that links mixed-use centers of activity through vibrant, high-frequency transit corridors. The Urban Village designation encourages the creation of intensely developed mixed-use areas where infrastructure, transit, and other public facilities and services are available or can be provided (Bellingham Comprehensive Plan LU-12). As implementation of these urban villages progresses, planning work can begin on the transit corridors that connect them to each other and the surrounding community. The six planned urban villages are Downtown, Waterfront, Fairhaven, Fountain, Samish Way, and Old Town Districts. Barkley Village lacks a formal plan but it functions as an urban village in many ways. Other potential urban villages that have not yet been formalized with master plans include James Street, Cordata, Lakeway/Lincoln, and Birchwood/Northwest/Maplewood. New and updated urban village plans should consider sustainable development practices and the use of the Leadership in Energy and Environmental Design for Neighborhood Development (LEED-ND) rating system, or similar system, to action the potential sustainability outcomes of the proposed plans (Bellingham Comprehensive Plan Policy LU-18 and LU-43).

Status: Ongoing

Next Steps: Continue effective incentives and develop new incentives where needed for the planned urban villages. These incentives should be targeted to areas where they have proven to be successful and/or where the greatest need has been identified. Incentives should be flexible to respond to opportunities and changing markets. (Comprehensive Plan Policy LU-15).

HIGH DENSITY DEVELOPMENT

The Bellingham Comprehensive Plan supports higher-density development with parks, monuments, schools, and other public amenities (Policy LU-6). The City will continue to implement and seek new, innovative tools to achieve a healthy mix of housing that is affordable to a wide range of incomes, including

- Density bonuses;
- Inclusionary zoning;
- Cluster subdivisions that preserve open space, retain natural features and provide other public benefits;
- The Infill Housing Toolkit, which includes small lot homes; townhomes and other housing forms;
- Accessory dwelling units;

- Adaptive re-use of existing structures; and
- Purchase and transfer of development rights (TDR) programs; and
- Public-private partnerships for shared parking facilities, wetland mitigation, and regional stormwater management.

Status: Ongoing

Emissions Reduction: Included in Mode Shift measure

Next Steps: Review infill opportunities across different neighborhoods and consider policies to further encourage infill and higher density housing.

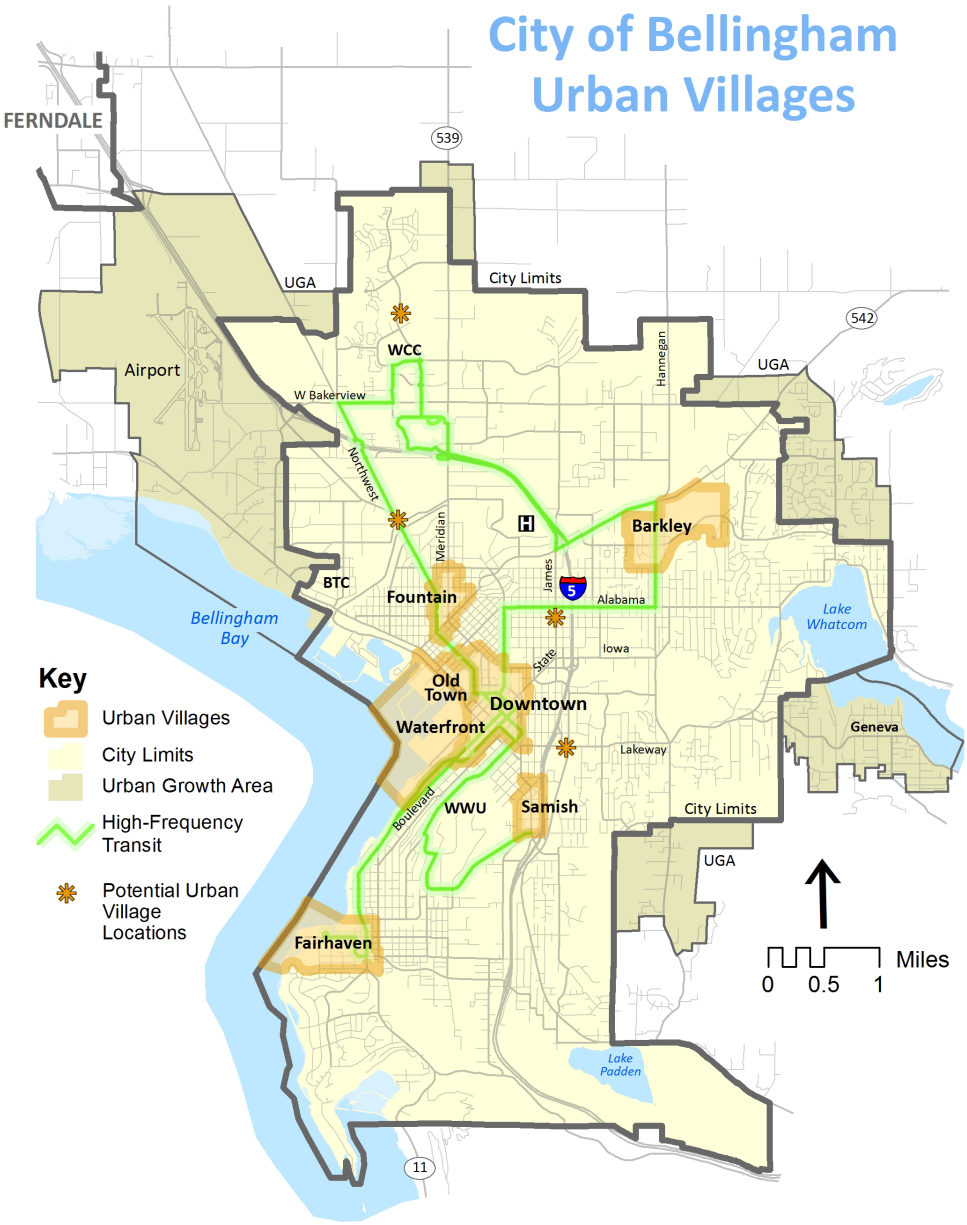


Figure 24. *City of Bellingham Urban Villages*

Appendix: Emissions Inventory Methods

Emissions inventories are calculated using a web-based application called ClearPath (www.icleiusa.org/clearpath), which was developed by the International Council for Local Environmental Initiatives (ICLEI) and replaces the discontinued Clean Air and Climate Protection (CACP) software used in the 2007 Climate Action Plan. The City follows the Local Government Operations Protocol[75] and the U.S. Community Protocol[76] for accounting and reporting greenhouse gas emissions.

Municipal Emissions Inventories

Methods for greenhouse gas emissions inventories continue to be updated with new science and protocols. For this Climate Action Plan update, the City recalculated previous emissions inventories from the 2007 Climate Action Plan (which followed the 1996 Revised Interagency Panel on Climate Change (IPCC) Guidelines) using the new standard IPCC 4th Assessment Report guidelines. This means that emissions calculations from 2000 and 2005 have changed slightly to reflect updated science, and to improve consistency between multi-year emissions comparisons. In this update the City also included nitrous oxide emissions and off-road vehicle emissions (like landscaping and construction equipment) in all inventory years, which were omitted in the 2007 Climate Action Plan. Previous emissions reductions target percentages have not changed but have been applied to the updated baseline emissions values. It is important to note the difficulty of calculating accurate greenhouse gas emissions given data collection challenges across multiple agencies and service providers, as well as other challenges. The emissions reported in this report should be taken as estimates meant to show trends over time rather than exact calculations.

For solid waste emissions, inventory protocol has changed since the first Climate Action Plan such that carbon sequestration in landfills is no longer included. This results in a new source of emissions that were not included in past inventories. Solid waste emissions were not included in the baseline inventory or the initial emissions reductions goals, so they will be omitted from 2012 emissions reductions goal assessment. However, they are included in total 2012 and 2015 emissions and will be included in future emissions reductions targets. Unlike other inventoried emissions that are emitted during the inventory year, solid waste emissions of carbon dioxide and methane will be emitted as waste decomposes over time. The methane that these landfills recover for energy use is subtracted from the emissions estimates. The City lacks data on City government waste generation and so needs to survey waste generation and composition to improve these estimates.

For the fleet inventory, City departments have changed, as have

data tracking procedures, making it difficult to accurately compare emissions between departments across years. Similarly, past vehicle-specific data is difficult to verify so methane and nitrous oxide emissions, which are calculated from miles traveled in different vehicle types, represent an estimate. This is not a concern since these trace gases are such a small percentage of total fleet emissions (~1.3% for 2012). However, gross emissions for each year should be more complete and accurate than previous inventories.

For emissions from electricity use, the City uses electricity use data and emissions factors provided by Puget Sound Energy. Natural gas use data is provided by Cascade Natural Gas.

For wastewater emissions, this report focuses on natural gas and electricity emissions over which the City has the most control. There are additional nitrous oxide emissions associated with the decomposition of organic waste in Bellingham Bay that are not reported here.

Municipal Emissions Forecast

Growth rates were applied to the 2015 emissions inventory to forecast "business-as-usual" emissions to 2030. Buildings and Facilities, Employee Commute, and Solid Waste emissions were forecasted to grow based on projected FTE (full time equivalent) positions at the City of Bellingham. Streetlight electricity use was forecasted based on planned projects. Vehicle Fleets emissions were forecasted based on projected FTE positions and an average projected increase in fuel efficiency. Water and Wastewater Treatment emissions were forecasted based on the high population growth scenario adopted by the City (Berk 2013). Carbon intensity of grid electricity was projected to decrease with state Renewable Portfolio Standards to 2020; after that, U.S. Energy Information Administration projections for this region were used to estimate further reductions.

Community Emissions Inventories

Community transportation emissions were estimated using the Whatcom Council of Governments (WCOG) Regional Travel Demand Model, which began in 2008. This model estimates higher vehicles miles traveled (VMT) compared to the previously used Washington Department of Transportation Highway Performance Monitoring System, so the WCOG model results were backcast to 2000 and 2005, which raised baseline transportation emissions from the 2007 Climate Action Plan. These estimates are likely more accurate than past estimates and also allow more accurate comparisons between inventory years going forward.

Community natural gas use data for Residential, Commercial, and Industrial sectors is provided by

Cascade Natural Gas. CNG's accounting of industrial natural gas use changed between inventory years 2005 and 2012 such that natural gas transported by CNG's pipes but not purchased directly from CNG is now included. This is likely a more accurate representation of natural gas used within Bellingham city limits. For this reason, 2012 industrial natural gas use data was backcast to 2005 and 2000, raising baseline emissions from the 2007 Climate Action Plan, but allowing for more accurate comparison between years going forward. Propane use appears to be minimal within city limits so is excluded from emissions inventories.

Community electricity data for Residential, Commercial, and Industrial sectors is provided by Puget Sound Energy.

Community solid waste data for Residential and Commercial (which includes multifamily Residential, Commercial, and Industrial) sectors is provided by Sanitary Service Company for 2012, 2015, and going forward. However, recycling and composting data is not provided. Waste characterization data is from Whatcom County. Electricity emissions are included in the municipal forecast despite being "offset" by the City's purchase of renewable energy credits (which will be replaced by PSE's Green Direct Program in 2019). This is because the City wants to continue to track its electricity emissions, both to understand the actual amount of emissions generated by City operations, and to track energy efficiency progress.

Community Emissions Forecast

Growth rates were applied to the 2015 emissions inventory to forecast "business-as-usual" emissions to 2030. Residential, commercial, and industrial energy use was forecasted using U.S. Energy Information Administration projections of electricity and natural gas demand for each sector in this region. Transportation emissions were forecasted based on a VMT growth rate derived from the Whatcom Council of Governments Regional Travel Demand Model and an average projected increase in fuel efficiency. Solid Waste was assumed to increase at the high population growth rate adopted by the City (Berk 2013). Carbon intensity of grid electricity was projected to decrease with state Renewable Portfolio Standards to 2020; after that, U.S. Energy Information Administration projections for this regions were used to estimate further reductions.

References

1. Blackburn, V. January 26, 2016. Mayor declares 2016 "Energy Year" in the City of Bellingham. City of Bellingham. Retrieved from: *https://www.cob.org/news/Pages/features/Mayor-declares-2016-Energy-Year.aspx*

2. Lindsey, Rebecca. (2016, January 19) No surprise, 2015 sets new global temperature record. Climate.gov. Retrieved from: *http://1.usa.gov/1nyftHP*

3. Blunden, J. and D. S. Arndt, Eds. (2015) State of the Climate in 2014. Bull. Amer. Meteor. Soc. , 96 (7), S1–S267. Retrieved from: *http://bit.ly/1LmngQC*

4. National Aeronautics and Space Administration. (2017, January 18) NASA, NOAA Data Show 2016 Warmest Year on Record Globally. Retrieved from *https://www.giss.nasa.gov/research/news/20170118*

5. Patel, J.K. (2017, January 18) How 2016 Became Earth's Hottest Year on Record. *https://www.nytimeAs.com/interactive/2017/01/18/science/earth/2016-hottest-year-on-record.html*

6. Pachauri, R. K. , Allen, M. R. , Barros, V. R. , Broome, J. , Cramer, W. , Christ, R. , et al. (2014). Climate change 2014: synthesis report. Contribution of Working Groups I, II and III to the fifth assessment report of the Intergovernmental Panel on Climate Change. Retrieved from: *https://www.ipcc.ch/report/ar5/syr/*

7. Holthaus, Eric. (2015, July 20) Earth's Most Famous Climate Scientist Issues Bombshell Sea Level Warning. Slate Magazine. Retrieved from: *http://slate.me/1Mgxi6H*

8. Horton, B.P. , Rahmstorf, S. , Engelhart, S.E. and Kemp, A.C. (2014) Expert assessment of sea-level rise by AD 2100 and AD 2300. Quaternary Science Reviews, 84, pp.1-6. Retrieved from: http://bit.ly/1fyP7L7

9. Tollefson, Jeff. (2016, March 30) Antarctic model raises prospect of unstoppable ice collapse. Nature. March 30, 2016. Retrieved from: *http://bit.ly/1opbXiD*

10. Christensen, E. (2016, February 9) Sea Level Rise Update 2016. City of Olympia, Washington.

11. Hauer, M.E. , Evans, J.M. and Mishra, D.R. , 2016. Millions projected to be at risk from sea-level rise in the continental United States. Nature Climate Change. Retrieved from*: http://bit.ly/1MlfyJO*

12. Di Liberto, T. (2017, January 23) Scientists link toxic algal blooms along U.S. West Coast to warm waters in the Pacific. Retrieved from: *https://www.climate.gov/news-features/event-tracker/scientists-ink-toxic-algal-blooms-along-us-west-coast-warm-waters*

13. Washington Department of Natural Resources Wildland Fire Summary 2015. Retrieved from: *http://file.dnr.wa.gov/publications/em_wildfire_summary_2015.pdf*

14. Mittendorf, R. (2016, August 19) Record-breaking Whatcom County heat to continue through Saturday. Retrieved from: *http://www.bellingham-herald.com/news/local/article96651997.html*

15. Bellingham breaks heat record for fourth day in a row. (2016, April 20) Retrieved from: *http://www.bellingham-herald.com/news/local/article72901442.html*

16. Mote, P. W. et al. (2013) Climate: Variability and Change in the Past and the Future. Chapter 2, 25-40, in M.M. Dalton, P.W. Mote, and A.K. Snover (eds.) Climate Change in the Northwest: Implications for Our Landscapes, Waters, and Communities, Washington D.C.: Island Press. Retrieved from*: https://cig.uw.edu/learn/climate-change/*

17. University of Washington Climate Impacts Group. (2017) Retrieved from: *https://cig.uw.edu/learn/climate-change*

18. Mote, P. W. et al. (2013) Climate: Variability and Change in the Past and the Future. Chapter 2, 25-40, in M.M. Dalton, P.W.

19. Boos, R. and A. Ahearn. (2015, July 19). How will the Pacific Northwest change when its glaciers are gone? Living on Earth. Public Radio International. Retrieved from: *http://bit.ly/1HM07Wl*

20. Waldman, S. (2017, April 5) Earth's CO_2 Could Spike to a Level Not Seen Since the Dinosaurs. E&E News. Retrieved from: *https://www.scientificamerican.com/article/earths-CO2-could-spike-to-a-level- not-seen-since-the-dinosaurs*

21. Ibid

22. Dutton, A. , et al. (2015) Sea-level rise due to polar ice-sheet mass loss during past warm periods. Science 349.6244 (2015): aaa4019. Retrieved from *http://bit.ly/1JZu59k*

23. Waldman, S. (2017, April 5) Earth's CO_2 Could Spike to a Level Not Seen Since the Dinosaurs. E&E News. Retrieved from*: https://www.scientificamerican.com/article/earths-CO2-could-spike-to-a-level- not-seen-since-the-dinosaurs*

24. Hansen, J. , Sato, M. , Kharecha, P. , Beerling, D. , Berner, R. , Masson-Delmotte, V. , . . . & Zachos, J. C. (2008). Target atmospheric CO_2: Where should humanity aim?. Open Atmos. Sci. J. (2008), vol. 2, pp. 217-231.

25. Pachauri, R. K. , Allen, M. R. , Barros, V. R. , Broome, J. , Cramer, W. , Christ, R. , et al. (2014). Climate change 2014: synthesis report. Contribution of Working Groups I, II and III to the fifth assessment report of the Intergovernmental Panel on Climate Change. Retrieved from: *https://www.ipcc.ch/report/ar5/syr/*

26. Chan, F. , Boehm, A.B. , Barth, J.A. , Chornesky, E.A. , Dickson, A.G. , Feely, R.A. , Hales, B. , Hill, T.M. , Hofmann, G. , Ianson, D. , Klinger, T. , Largier, J. , Newton, J. , Pedersen, T.F. , Somero, G.N. , Sutula, M. , Wakefield, W.W. , Waldbusser, G.G. , Weisberg, S.B. , and Whiteman, E.A. (2016) The West Coast Ocean Acidification and Hypoxia Science Panel: Major Findings, Recommendations, and Actions. California Ocean Science Trust, Oakland, California, USA. April 2016. Retrieved from: *http://bit.ly/1SwUZHm*

27. Mote, P. W. et al. (2013) Climate: Variability and Change in the Past and the Future. Chapter 2, 25-40, in M.M. Dalton, P.W. Mote, and A.K. Snover (eds.) Climate Change in the Northwest: Implications for Our Landscapes, Waters, and Communities, Washington D.C.: Island Press. Retrieved from: *https://cig.uw.edu/learn/climate-change/*

28. Hertsgaard, M. (2015, July 19) Climate Seer James Hansen Issues His Direst Forecast Yet. The Daily Beast. Retrieved from: *http://thebea.st/1UDSaKj*

29. Adler, B. (2015, December 12) Here's what you need to know about the new Paris climate agreement. Grist. Retrieved from: *http://bit.ly/1Y9HmGp*

30. Sustainable Energy in America Factbook. (2016) Business Council for Sustainable Energy. Retrieved from: *http://www.bcse.org/sustainableenergyfactbook/*

31. Ibid.

32. Pyper, J. (2017, February 8) The 'New Normal' in America: Renewables Boom, Emissions Plunge and Consumers Save More Than Ever. Greentech Media. Retrieved from: *https://www.greentechmedia.com/articles/read/us-consumers-are-spending-less-on-energy-as-clean-energy-booms-and-the-ec*

33. Sustainable Energy in America Factbook. (2016) Business Council for Sustainable Energy. Retrieved from: *http://www.bcse.org/sustainableenergyfactbook/*

34. The White House. (2015) President Obama's Climate Action Plan: 2nd Anniversary Progress Report. June 2015. *(https://obamawhitehouse.archives.gov/the-record/climate)*

35. The White House. (2015, August 30) Fact Sheet: President Obama to Announce Historic Carbon Pollution Standards for Power Plants. Retrieved from: *https://obamawhitehouse.archives.gov/the-press-office/2015/08/03/fact-sheet-president-obama-announce-historic-carbon-pollution-standards*

36. Ibid.

37. Kolbert, E. (2017, April 12) Earth Day in the Age of Trump. The New Yorker. Retrieved from: *http://www.newyorker.com/news/daily-comment/earth-day-in-the-age-of-trump*

38. Clean Power Plan Factsheet. (2016) Environmental Protection Agency. Retrieved from: *https://www.epa.gov/clean-powerplan/fact-sheet-clean-power-plan-numbers (*This website has been replaced by the Trump Administration).

39. The White House. (2017) Presidential Executive Order on Promoting Energy Independence and Economic Growth. Retrieved from: *http://bit.ly/2nf052u*

40. Davenport, C. and A. Rubin. (2017, March 28) Trump Signs Executive Order Unwinding Obama Climate Policies. The New York Times. Retrieved from: *http://nyti.ms/2036oKN*

41. Davenport, C. (2015, November 6) Citing Climate Change, Obama Rejects Construction of Keystone XL Oil Pipeline. The New York Times. Nov. 6, 2015. Retrieved from: *http://nyti.ms/1LVDbVP)*

42. Washington State Governor's Office. (2017) Energy and Environment website. Retrieved from: http://www.governor.wa.gov/issues/issues/energy-environment

43. Brunner, J. and H. Bernton. (2015, July 29) Inslee: I'll use my authority to impose cap on emissions. The Seattle Times. Retrieved from: h*ttp://www.seattletimes.com/seattle-news/politics/inslee-acts-to-cap-carbon-emissions/*

44. Le, P. (2015, September 21) State moves to limit greenhouse gases. The Seattle Times. Retrieved from: *http://www.seattletimes.com/seattle-news/politics/state-moves-to-limit-greenhouse-gases/*

45. Washington State House of Representatives. (2017) House Bill 1144. Retrieved from: *http://lawfilesext.leg.wa.gov/biennium/2017-18/Pdf/Bill%20Reports/House/1144%20HBR%20ENVI%2017.pdf*

46. Bernard, S. (2016, July 12) Puget Sound Energy to Retire Some Coal-Fired Power. Seattle Weekly. Retrieved from: *http://www.seattleweekly.com/news/puget-sound-energy-to-retire-some-coal-fired-power/*

47. Lavelle, Marianne. (2016, November 9) Washington State Voters Reject Nation's First Carbon Tax. Inside Climate News. Retrieved from: *https://insideclimatenews.org/news/09112016/washington-state-carbon-tax-i-732-ballot-measure*

48. Bellingham City Council. (2005) Resolution 2005-08

49. Bellingham City Council. (2007) Resolution 2007-10

50. City of Bellingham. (2016) Municipal Facilities Energy Conservation Project website Retrieved from: *http://bit.ly/1IwtDjh*

51. City of Bellingham Ordinance 2011-04-019. (2011) Retrieved from: *http://www.codepublishing.com/WA/Bellingham/?BellinghamOT/bellinghamOT876.html&?f*

52. Johnson Controls. (2013) Post Installation Measurement and Verification Report. Prepared for City of Bellingham.

53. Bellingham City Council (2011, November 7) Agenda Bill number 19371.

54. Wash. City Moves to Higher Biodiesel Blend. (2015, October 19) Green Fleet. Retrieved from: *http://www.greenfleetmagazine.com/news/story/2015/10/wash-city-moves-to-higher-biodiesel-blend.aspx*

55. National Research Council. (2011) Renewable Fuel Standard: Potential Economic and Environmental Effects of U.S. Biofuel Policy. National Academy of Sciences. Retrieved from: *http://bit.ly/1Rb5Zvx*

56. Lavender, M. (2015) The Corn Ethanol Bridge is Crumbling. Environmental Working Group. Retrieved from: *http://bit.ly/1GTlwc9*

57. City of Bellingham. (2016) Bellingham Energy Prize website. Retrieved from: *www.cob.org/services/environment/climate/energy-prize.aspx*

58. City of Bellingham. (2016) Climate Protection Program website. Retrieved from: *www.cob.org/services/environment/climate/index.aspx*

59. Sustainable Connections. (2013, March 1) Community Energy Challenge hits targets, creates jobs. Retrieved from: *http://bit.ly/1WGPtFP*

60. U.S. Environmental Protection Agency. (The Whatcom Energy Challenge. Retrieved from: *http://1.usa.gov/1zdHSGQ*

61. Dolan, T. (2012) Nonprofit Energy Savers Thrive in Washington State. Home Energy. Retrieved from: *http://bit.ly/1U6E9VB*

62. Building Performance Center web site *(http://bit.ly/249fZvO)*

63. Gardner, M. (2016) City of Bellingham Georgetown University Energy Prize Year End Review 2016.

64. Gardner, M. (2016) City of Bellingham Georgetown University Energy Prize Year End Review 2016.

65. Gardner, M. (2016) City of Bellingham Georgetown University Energy Prize Year End Review 2016.

66. Gardner, M. (2016) City of Bellingham Georgetown University Energy Prize Year End Review 2016.

67. FVB Energy. (2014, April) Bellingham Waterfront Utility Master Plan District Infrastructure Assessment, Preliminary Finding Report.

68. Tinner, J. (2009, September 4) Roof Mounted Photo-Voltaic Solar Panels for One and Two Family Dwellings. City of Bellingham Policy.

69. City of Bellingham. (undated) Advanced Methods and Materials, Solar Water Heating Systems.

70.Gardner, M. (2016) City of Bellingham Georgetown University Energy Prize Year End Review 2016.

71. FVB Energy. (2014, April) Bellingham Waterfront Utility Master Plan District Infrastructure Assessment, Preliminary Finding Report.

72. USEPA Greenhouse Gas Equivalencies Calculator *(http://1.usa.gov/1e2viuH)*

73. Kiger, P. J. (2014) Milestone IPCC Climate Report Shifts on Biofuels. National Geographic Energy Blog. Retrieved from: *http://bit.ly/1i08i0C*

74. Whatcom County. (2016) 2016 Whatcom County Comprehensive Solid and Hazardous Waste Management Plan. Retrieved from: *http://whatcomcounty.us/674/Solid-Waste-Management*

75. International Council for Local Environmental Initiatives (ICLEI), et al. (2010) Local Government Operations Protocol for the quantification and reporting of greenhouse gas emissions inventories.

Version 1.1. May 2010. ICLEI—Local Governments for Sustainability USA.

76. International Council for Local Environmental Initiatives (ICLEI). (2013). U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. Version 1.1. July 2013. ICLEI—Local Governments for Sustainability USA.

For additional information please visit
www.cob.org/climate or contact City of
Bellingham Public Works Natural Resources
at 360-778-7800