Jefferson County, Washington

2020 Greenhouse Gas Community Emissions Reduction Opportunities

Produced By the 2020 Greenhouse Gas Reduction Modeling Team for the Climate Action Committee

With Assistance from ICLEI – Local Governments for Sustainability USA

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The greenhouse gas reduction strategy modeling was performed with guidance from ICLEI – Local Governments for Sustainability (www.iclei-usa.org). Membership in this organization was provided by Jefferson County and the City of Port Townsend, which gave access to ICLEI's Clearpath Software, and allowed for the group of volunteers listed above to participate in a free Greenhouse Gas Forecasting, Target-Setting, and Planning 2020 Cohort Training. We thank the city and county for their support.

An electronic copy of this report will be available at: https://www.co.jefferson.wa.us/637/Climate-Action-Committee (under documents), once approved by the Climate Action Committee.

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I. Executive Summary

This report summarizes the greenhouse gas (GHG) reduction opportunities modeled in 2020, based on an ICLEI[1] Greenhouse Gas Forecasting, Target-Setting, and Planning 2020 Cohort Training. Having recently completed the Jefferson County 2018 Inventory of Greenhouse Gas Emissions report[2], the Jefferson County / City of Port Townsend joint Climate Action Committee[3] (CAC) recommended taking the next step of having a group of volunteers participate in the training and perform the modeling. This was undertaken to help guide our community's next steps in reducing our community-wide GHG emissions in order to meet the goals established previously by Jefferson County and the City of Port Townsend of 80% lower than 1990 levels by 2050[4]

Three local volunteers attended the training and worked together to do this modeling, with Steve King, Port Townsend Public Works Director, providing feedback throughout the process. The scope of this report is the community-wide GHG emissions reduction strategies. The City of Port Townsend is also modeling city opportunities, and those will be reported separately.

Table 1 below shows the set of community strategies modeled and the estimated potential GHG reductions (in terms of carbon dioxide equivalent, or CO_2e), ordered from highest GHG reduction to lowest. Note that the models are based on a set of assumptions, which are detailed in Section II. The table below is based on the various assumptions, and the numbers shown should be viewed as planning-level estimates.

[1] Founded as the International Council for Local Environmental Initiatives Organization, now known as ICLEI - Local Governments for Sustainability (www.iclei-usa.org)

[2] Jefferson County 2018 Inventory of Greenhouse Gas Emissions, https://www.co.jefferson.wa.us/DocumentCenter/View/10166/2018_JeffCo_GHG_Inventory_Report_approved_062420

[3] https://www.co.jefferson.wa.us/637/Climate-Action-Committee

[4] The Port Townsend / Jefferson County Climate Action Plan, https://co.jefferson.wa.us/638/Documents

Table 1: Community Strategies and Potential GHG Reductions

Strategy	CO_2e Reduction in 2030 vs Business as Usual[1]		Usage Change by 2030	CO_2e Reduction in 2050 vs Business as Usual[2]	
	Metric Tons (MT)	% of 2018 inventory		Metric Tons	% of 2018 inventory
Electric Vehicle Promotion	28,798	10.5%	-74,986,362 (Vehicle Miles Traveled (VMT) of fossil fuel vehicles)	102,116	37.1%
Data Driven Commuter Transit	2,836	1.0%	-7,522,632 (VMT)	2,836	1.0%
Employee Commute Reduction Program	2,836	1.0%	-7,522,632 (VMT)	2,836	1.0%
Residential Heat Pump Retrofits	2,349	0.9%	-37,054 MMBTU (Million Metric British Thermal Units)	2,349	0.9%
Compact Development	1,014	0.4%	-2,657,633 VMT	2,458	0.9%
High Efficiency Transit	1,005	0.4%	106,936 gallons, or 14,628 MMBTU	1,005	0.4%
Fully Implement Complete Streets	696	0.3%	1,586,832 VMT	696	0.3%
Energy Conservation Ordinance	430	0.2%	6,677 MMBTU	1,096	0.4%
Home Weatherization Promotion	433	0.2%	6,700 MMBTU	433	0.2%
Transit shuttles to ferry	53	0.02%	140,400 VMT	53	0.02%
Increased Commercial Solar	3	0.001%	500 MWhr/yr, or 341 MMBTUS	3	0.001%
Total Potential Reduction in Best Case Scenario	40,453	14.7%		115,881	42%

1) Business as Usual would result in emissions of __267,265_ MT in 2030
2) Business as Usual would result in emissions of _261,707__MT in 2050 (end of 2049 in model)

II. Introduction

Jefferson County recently completed its second GHG inventory, the Jefferson County 2018 Inventory of Greenhouse Gas Emissions[2] (referred to here as the "2018 Inventory Report"), based on 2018 data. To help guide our community's next steps, a GHG reduction strategy modeling effort was undertaken by a group of volunteers, the 2020 Greenhouse Gas Reduction Modeling Team (see Acknowledgements). It leveraged a free training offered to ICLEI members in 2020. The ICLEI Clearpath software, which included the 2018 inventory results, was used to estimate the potential community-wide GHG emission reductions of various strategies. (The City of Port Townsend and Jefferson County jointly funded the ICLEI membership.)

A set of strategies to reduce the GHG emissions in Jefferson County were developed through the following process. First, the set of reduction strategies that were developed by ICLEI as part of their Community Track Planning tool were reviewed by the 2020 Greenhouse Gas Reduction Modeling Team. These were evaluated to determine which might be relevant to Jefferson County based on the 2018 Inventory Report. Additionally, a list of potential GHG reduction opportunities that had been developed by a local sustainability organization, Local 20/20, were reviewed as another source of possible strategies, and a few of those strategies were added to the list. The CAC then reviewed the proposed list at their 8/26/20 meeting, and an additional strategy was suggested. The modeling team then developed models for those strategies, and in some cases combined strategies. The results are shown in Table 1 above, and the details of each strategy and its assumptions are described below.

Note that the modeling focused on the sector-based aspects of the inventory, not the consumption-based. The consumption based inventory in the 2018 Inventory Report was not based on the ICLEI model (see the report for details.) Also, the ICLEI planning strategies did not include consumption-related strategies. Separately, the planning strategies did not include the agriculture or forestry sectors. There is limited agricultural data in the 2018 Inventory, and also, the ICLEI planning strategies did not include agricultural strategies (this is an evolving area.) Similarly, the Inventory Report did not have conclusive forestry data, and the ICLEI planning strategies did not include forestry strategies or models.

III. Forecast

A "Business as Usual" forecast was created based on the 2018 Inventory Report, with the following assumptions:

1. A projected population growth rate of 0.98%/ year, based on the 2018 Jefferson County Comprehensive Plan projections.
2. The carbon footprint of Jefferson County electricity is projected to be reduced to carbon neutral by 2030, due to Washington State law SB5116. This was modeled as starting in 2025, and reaching a 99% decrease by 2030, which results in a compound annual reduction rate of -60.2% of the carbon intensity of the electricity (which is in the Factor Set of the Electricity Intensity forecast growth rate in Clearpath.) Because of this, strategies that reduce electricity use have no impact on CO_2e after 2030. Because the carbon footprint of Jefferson PUD electric power in 2018 was relatively low, the impact before 2030 is also low. However, as electricity can be sold in a broader market, and could be offsetting dirtier supplies, the electricity reductions are important, and are captured in Table 1 (see Usage Change by 2030 column) as well as the summaries below.
3. Average vehicle MPG is expected to improve based on the current EPA US SAFE standards, and the 2025 projections based on that here. This was modeled by the ICLEI trainers, assuming that by 2040 85% of cars on the road will be 2025 models or newer. This resulted in fleet-wide emissions dropping 1.3% annually, and that was input into the Transportation Intensity - Current US Standards model in Clearpath under the Forecast Growth Rate Factor Set.

4. Based on the above, the residential energy and commercial energy was expected to grow at the rate of population, with the electricity intensity decrease noted above. Note that we did not have a forecast from Port Townsend Paper Company (PTPC) regarding their future emissions, so that was modeled as flat. Transportation was forecast to grow at the population rate, with the increase in vehicle efficiency noted above. Solid waste and agriculture emissions were each forecast to grow at the population rate, with a flat growth of carbon intensity.
5. The "Business as Usual" shows a forecasted reduction in emissions by 2050 from 2018 of 13,375 metric tons of CO_2e, or a 5% reduction from the 2018 emissions.

IV. Limitations

The ICLEI Clearpath community carbon modeling and planning module offers an accessible and functional interface for citizen based user-groups to examine their local carbon emissions by sector, to develop reduction strategies, and to plan for action. However, it also has some limitations. One of the limitations experienced was that each strategy examined (below) was modeled in isolation from the others. In other words, it was not possible to model in the same scenario, an increase in the percentage of vehicle miles travelled (VMT) via electric vehicles (EVs) at the same time as we modelled a transition from single occupancy vehicles (SOVs) to public transit. One could easily imagine that by 2050, the vast majority of commuter vehicles on the road would be EVs. So, in 2050, switching from an SOV to transit would have significantly less impact on carbon reductions than making that switch in 2022, when most vehicles are likely powered by gasoline. Therefore, our 2050 projections likely overemphasized the carbon reduction values for the strategies that impact transportation (Data Driven Commuter Transit, Employee Commute Reduction Program, Compact Development, Fully Implement Complete Streets, and Transit Shuttles to Ferry).

There are other examples as well. The model did not allow for nonlinear transitions over the lifespan of a strategy, typically from 2020 to 2050. For example, a reduction in VMT that was exponentially changing year after year could only be accurately modelled by developing 30 different strategies, one for each year, with its own unique VMT reduction. Needless to say, we did not develop strategies for individual years. This limitation required making coarse assumptions about input parameters and applying those parameters identically for each year of the strategy.

Some of the strategies were modeled as 10 year strategies, as that was a sufficient timeframe for implementing the strategy, or that was the timeframe for which results from other communities existed. These strategies included Data Driven Commuter Transit, Employee Commute Reduction Program, High Efficiency Transit, Complete Streets, Transit Shuttles to Ferry, and Increased Commercial Solar. However, it is expected that the benefits of these programs would continue through 2050, so the 2030 benefit was also applied to 2050.

Note that the modeling only accounted for impacts to emissions that occur in Jefferson County. Emissions associated with the manufacturing of items such as EVs, heat pumps, and solar panels are not included in the modeling.

Due to the somewhat limited data on commercial fossil fuel use, the 2018 Inventory only included propane and fuel oil use for the city, county, and Jefferson Healthcare, which amounted to 0.6% of the 2018 Inventory. Hence our modeling did not include commercial fossil fuel reduction strategies. However, the Energy Conservation Ordinance strategy could also apply to commercial energy, as noted below.

For the two increased Transit runs strategies - Data Driven Commuter Transit and Transit shuttles to ferry, the Clearpath model was for total reduction in VMT for a given fuel type. For diesel fuel, it applied that reduction across all types of diesel vehicles, including large trucks, which would not be impacted by increased transit. It is estimated that the impact of this is about a 4% overestimate in the emissions reduction for each of the two transit strategies, which is relatively insignificant.

Finally, all of the strategies we modelled, if implemented, are in essence cultural shifts driven by policy, infrastructure change or other influences, which in turn drive future thinking about what is normal and what our individual relationship is with our culture. When we could, we relied on trends that have been documented in the literature regarding use of bicycles, conversion to EVs, and commuter ride share programs and so forth. But the vast majority of these documented scenarios occur in large, diverse urban areas. Those cultural shifts could occur both faster or more slowly in Jefferson County, a mostly rural environment whose largest town has a population of about 10,000 aging, well educated, and for the most part, financially stable citizens. An example of a cultural shift would include switching to EVs. In the recent past, Port Townsend had the highest per capita registration of hybrid automobiles in the State of Washington. Therefore, it is likely that we will be ahead of the projected trends for EV conversion compared to Portland, Oregon, for example. Similarly, because of our aging population, we may be less likely to increase trips by bicycle, compared to Portland.

For this planning level of calculating and modeling emissions reductions for the strategies described here, these limitations are acceptable.

V. Implement an Electric Vehicle Promotion Program

This strategy would facilitate adoption of EVs into the community-wide vehicle fleet by providing information and encouragement to the public to purchase EVs. Information to be provided would include brief descriptions of available vehicles, federal and state incentives, and EV shopping tips. Additionally, the EV charging station network in the county would be expanded through grants and other collaborative efforts.

Transportation accounts for 66% of Jefferson County GHG emissions. Over 90% of the VMT in Jefferson County are in gasoline passenger vehicles and light trucks (commuter vehicles). And transportation is the only sector with increased emissions since 2005. EV adoption to date in the state of Washington has been higher than any other state outside of California.

Sales staff at car dealerships have a disincentive to show EVs, since these dealerships typically make as much or more money from servicing gas vehicles. Providing relevant information to the public will facilitate future purchases of EVs.

An EV promotion program has been implemented in many locations including Lake Oswego, Oregon. The Lake Oswego Sustainability Network held in-person “Ride and Drives” in 2018 and 2019. As a result, they saw a tremendous increase in new EV registrations from 2018 to 2019, almost by a factor of three. This data set is too small to be meaningful, but it is interesting.

Assumptions made in this modeling strategy include using total vehicle registrations in Washington State (from Federal Highway Administration data) as the basis for growth of the Jefferson County vehicle fleet. Federal Highway Administration data does not break vehicle registrations down by county, only by state for all of the US. Washington Utilities and Transportation Commission data was used to establish the growth rate of EVs and plug-in hybrids. Then this state-wide data was applied to Jefferson County. That resulted in projections showing 23% of gas vehicles being displaced by EVs by 2030, and nearing 95 to 100% of gas vehicles being displaced by EVs by 2050. For 2050, we reviewed analyses by Climate Solutions and others, and we consequently assumed that 96% of gas vehicles would be

replaced by EVs by 2050[5]. EV registrations from Jefferson County were used to establish the percent of EVs that are plug-in hybrids (38%), since the model calculation includes gas use from plug-in hybrids. Fleet-wide fuel economy of 21.86 mpg came from averaging the mpg of gas vehicles in the 2018 inventory outputs, weighted by the VMT for each type (car, light truck, motorcycle). EV fuel economy of 130 mpg came from US Department of Energy[6]. It was assumed that 55% of plug-in hybrid miles are from electricity, based on ICLEI recommendations, from US Department of Energy[7].

Co-benefits of this strategy include:

- Lower vehicle maintenance requirements
- Reduced air pollution
- Reduced stormwater pollution from runoff of motor oil, which may contain lead, benzene, zinc or magnesium[8]

Adoption of EVs could be promoted by providing information on the Local 20/20 website, other websites, and possibly by providing hard-copy fliers in City/Utility bills. This information may include:

- Informational table showing EVs currently on the market with relevant metrics for comparison, and information on where to go to test drive each vehicle
- Information on available incentives, federal and state
- Informational tips on shopping for an EV

Additionally, volunteers could research potential grant opportunities for EV Charging Stations, and collaborate with local organizations to apply for them.

VI. Implement a Data Driven Commuter Transit Scheduling and Routing Program

This strategy would apply data on commuter traffic with SOVs to create new routes and scheduling. The goal would be to create transit routes and schedules that are most likely to support commuters in making the choice to use transit to get to and from work.

As noted above, transportation is the largest contributor to our county emissions. It is estimated that 21% of our transportation vehicle miles are commuter miles[2].

Estimating the percent of commuter capture which will occur in Jefferson County is difficult. Recent studies indicate that in Washington State Commute Reduction Programs[9], up to 13% of commuters may choose from a variety of alternatives to SOVs, and in general, the capture is not constant, but increases over time. Given that traffic data will be used to develop routes and schedules, we based our calculations on a continuous capture of 10% of the current commuter traffic annually over the period from 2022 to 2040. We also assume that the number of EVs on the road will continue to increase annually. After 2040, most commuter cars are likely to be EVs. So, over time the direct carbon emission reductions from this strategy potentially would fall. Note that the model did not include the emissions due to

[5] https://www.climatesolutions.org/sites/default/files/2020-10/transpo_decarb_sept_10_web_upload_v5.pdf
[6]https://www.fueleconomy.gov/feg/PowerSearch.do?action=alts&path=3&year1=2017&year2=2018&vtype=Electric&srchtyp=newAfv
[7] http://www.afdc.energy.gov/vehicles/electric_emissions_sources.html
[8] https://www.scientificamerican.com/article/how-to-keep-waste-oil-out/
[9] https://wsdot.wa.gov/transit/ctr/home.

the transit buses themselves. Longer term, these are likely to be electric buses, and the emissions from them would be zero by 2030 as our electricity will be carbon neutral by then per SB5116 noted above.

By creating a transit option that makes commuting by transit easy and convenient, other indirect carbon emission reductions would also occur. Decreased demand for SOVs, both fossil fuel and EVs, would reduce global carbon emissions from the industrial sector, due to decreased vehicle manufacturing. Shifting the culture away from ownership and use of SOVs, both fossil fuel and electricity powered, will reduce transportation emissions. Finally, a robust commuter oriented transit system could result in a cultural shift leaving open the possibility of more people choosing to move here without bringing a car with them. These indirect benefits were beyond the scope of the model.

A focused and intentional commitment to develop a transit system that reduces GHGs will create a culture that results in fewer miles traveled in SOVs. Ultimately, the creation of a data driven transit system will open up more affordable housing opportunities for those working in Port Townsend.

VII. Implement an Employee Commute Reduction Program

This strategy would implement an employee commute reduction program, potentially with financial incentives, across the major employers in Jefferson County. It would be modeled after the Washington State Commute Reduction Program[9]. Ideally, it would be run by one organization for all major employers, and could potentially be grant funded.

See the Data Driven Commuter Transit Scheduling strategy above for an overview of the significant emissions from employee commutes in Jefferson County. The Washington State Commute Reduction program, which was required for the 9 largest counties in the state, and for companies with over 100 employees, achieved a 13% reduction in employee VMT between 2007 and 2018. We assume starting this program in 2022 (since it will take some time to implement it). Modeling results indicate this strategy could result in achieving a 10% reduction by 2030.

Co-benefits of this strategy include:

- a reduction in wear and tear on the roads
- improved air and noise quality
- improved health for those who increase walking or biking to work
- increased use of transit.

VIII. Increase Compact Development

This strategy would refine land use policies to encourage even more new development in the Port Townsend and Port Hadlock Urban Growth Areas.

Compact development (areas of increased population density) have been shown to be associated with overall shorter trips because destinations are closer together. (From Moving Cooler - An Analysis for Transportation Strategies for Reducing GHG emissions by Cambridge Systematics, Inc.[10]). ICLEI has built into the Clearpath software a model based on the Moving Cooler study that estimates the reduction in VMT based on an increase in density. In Port Townsend, the density in 2018 was 1,351 people per square mile of land area[11], and the population was 9,428, which is considered low-density suburban/small towns/villages per the ICLEI Smart Growth reference table. Port Hadlock - Irondale is 535 people/square mile[11], also low-density suburban, with a 2018 population of 3,574. Using the ICLEI model, we assumed that Port Townsend and Port Hadlock, which together had 41% of the Jefferson County population (using the 31,729

[10] http://www.reconnectingamerica.org/assets/Uploads/2009movingcoolerexecsumandappend.pdf
[11] https://www.towncharts.com/Washington/Demographics/Port-Townsend-city-WA-Demographics-data.html

total county population in 2018 from the 2018 inventory report), was medium-low density initially, which has an estimated VMT per capita of 10,083 per the ICLEI model. The remaining population was low density (the lowest category available in the calculator). The per capita VMT of the low density is 11,422, per the model. (Actual VMT in all of Jefferson County in 2018 per capita was 11,918, per the 2018 Inventory Report, which is a bit higher than the low density, to be expected given most of the county is actually rural, not low density. Rural VMT per capita for all of Washington in 2016 was 15,828, from USDOT information.) We assumed that with the expected ~1% population growth, land use planning could drive two-thirds of the population increase into the Port Townsend and Port Hadlock areas, resulting in medium low density increasing from 41% to 47%. While the rural density was not included in the model, we assume that the reduction in per capita VMT from low density to medium low of 12% has good correlation with the change from rural to low density.

Co-benefits of this strategy include:

- a reduction in wear and tear on the roads
- improved health for those who increase walking or biking by living in more dense areas
- increased use of transit, with the increased population in the denser areas
- reduction of sprawl

IX. Implement a Heat Pump Retrofit Program

This strategy would facilitate replacing home heating systems that utilize fossil fuels with heat pumps. The goal would be to transition from fossil fuels to electricity (which is primarily renewable energy) for home heating.

According to the 2018 Inventory Report, approximately 18% of homes in the County use propane or heating oil for home heating. At the same time, Covid-19 has created financial difficulties for many of our residents. Incentives currently exist for converting inefficient electric heat to more efficient heat pumps. Incentives are needed to convert propane or heating oil systems to more efficient heat pumps. Note that this strategy could be expanded to apply to wood heating, but that was not included in the model as it was viewed as likely to be politically unpopular in our rural county. The CO_2e from residential wood energy was 21% of the total from residential stationary energy in the 2018 Inventory Report, which is about one third of the CO_2e from propane and fuel oil.

On-bill financing of energy efficiency improvements may be a financing option that makes a heat pump retrofit feasible for many. On-bill financing would mean that the PUD partners with a third party financing organization, such as Craft 3, to provide loans to homeowners for energy efficiency improvements, and the loan payments are added to the owners' power bill. This has been done successfully at Seattle City Light, and is recommended in the 2012 WA State Energy Strategy[12]. Since heat pumps are energy efficient, homeowners may pay near or slightly more than they are paying now for their monthly heating bill, until the heat pump retrofit is paid off. Then their heating cost would be lower than previously. We believe that Jefferson PUD has had some conversations with Craft 3 about such a program.

Assumptions made in this modeling strategy include estimating that 30% of homes would be retrofitted over a 10-year period. Only homes currently utilizing fossil fuels were included in the modeling. However homes with inefficient electric heating systems could be retrofit with heat pumps, providing energy savings and lower heating bills for those homeowners as well.

Co-benefits of this strategy include:

- Lower heating bills once the heat pump is paid for

[12] http://www.commerce.wa.gov/wp-content/uploads/2016/06/energy-state-strategy-2012.pdf

- Increased electricity demand for the PUD

X. High Efficiency Transit

This was a simplistic model that estimated the impact if the Jefferson Transit fleet were able to go all electric. This was estimated by assuming the 2018 Jefferson Transit fuel use for both Transit Buses and light trucks/vans goes to zero by 2030. Since the carbon intensity of our electricity by 2030 is set to 0, there is no offsetting increase from electricity usage. This did not take into account potential increases in transit by 2030, which would be expected.

XI. Implement an Energy Conservation Ordinance Prohibiting New Propane or Fuel Oil

This strategy was modeled for residential energy, but could also apply to commercial energy, as noted below. It would prohibit new residential construction from using propane or fuel oil for heating or cooking. A variety of cities and one county[13] have done this across the country to fight climate change. It particularly makes sense in Jefferson County where the carbon footprint of our electricity is very low. Ductless heat pump heaters, heat pump water heaters, and induction stoves are now available that provide much more efficient heating, cooling, and cooking, and result in significantly lower GHG emissions. They also have lower annual heating costs currently, and there is the potential for the costs of fossil fuels to increase over time if carbon pricing or other disincentives occur at a state or national level.

The assumptions in this strategy are that it would take effect starting in 2025 and run through 2050. With the population growth rate of 0.98%, and an average household size of 2.1 (from the 2018 Inventory Report, using 2018 population and household numbers), it is assumed that new houses in Jefferson County increase at a 0.46% annual rate. This results in 14% of the total households in Jefferson County by 2050 being governed by this ordinance. Note that in 2018, 18% of homes used propane or fuel oil.

Note that this strategy could be expanded to apply to wood heating, but that was not included in the model as it was viewed as likely to be politically unpopular in our rural county. The CO_2e from residential wood energy was 21% of the total from residential stationary energy in the 2018 Inventory Report, which is about one third of the CO_2e from propane and fuel oil.

This strategy is complementary to the Heat Pump Retrofit strategy above, which encourages the replacement of existing propane or fuel oil heaters with heat pumps. Both strategies could be implemented in order to address both existing houses and new houses.

Also note that a conservation ordinance prohibiting propane or fuel oil could apply to new commercial buildings as well. This would help owners avoid locked-in carbon-emitting infrastructure, and reduced flexibility if the price for fossil fuels increases over time. This can be roughly modeled, using the somewhat limited commercial data in the 2018 Inventory (which included propane and fuel oil data for the city, county, and Jefferson Healthcare), and amounts to 0.6% of the 2018 Inventory. This ordinance could provide an exception allowing propane cooking equipment for restaurants.

Co-benefits of the Energy Conservation Ordinance strategy include:

- Reduced annual costs
- Increased electricity demand for the PUD

[13] https://www.usatoday.com/story/news/2019/11/10/climate-change-solutions-more-cities-banning-natural-gas-homes/4008346002/

- Reduced transportation of propane and fuel oil

XII. Implement a Complete Streets Program

This strategy calls for implementing a Complete Streets program. A Complete Streets approach integrates people and place in the planning, design, construction, operation, and maintenance of our transportation networks. This helps to ensure streets are safe for people of all ages and abilities, to balance the needs of different modes, and to support local land uses, economies, cultures, and natural environments.

The National Complete Streets Coalition, which launched this movement in 2004, promotes the development and implementation of Complete Streets policies and professional practices. Approximately 1500 municipalities across the country, including Port Townsend, have adopted Complete Streets ordinances or policies. More information on Complete Streets can be found here at the Smart Growth America website[14].

When complete streets are implemented with fidelity and best practice infrastructure design, a significant number of people could choose to gain access to goods, services and jobs using bicycles or on foot. In Copenhagen, it is estimated that 62% of commuters are using a bicycle to get to work[15].

Closer to home, it is estimated that 6% of all commuters are using bicycles to get to work in Portland, OR[16].

The primary assumption in this scenario included limiting the strategy to the Port Townsend city limits and the approximately 10,000 people that live here. We also based our assumption on the bicycle commute rate on the designation of "medium low" population density (between 500 and 1,500 people per square mile). At this density, with full implementation of Complete Streets (including bike stations at all commercial and transit centers, and an average of 8 miles of protected bicycle right of way per square mile), the expected bicycle mode share could be 5%. For those on bicycles, we estimated an average bike trip length of 2.5 miles. For rural areas, the total number of weekday person trips per person was estimated to be 3.7, per the reference from ICLEI (Adamu, Ayalew, Azita Fatemi, and Gregory Miyata. 2000-2001 California Statewide Travel Survey Weekday Travel Report. June 2003[17].

Additional benefits for complete streets cut across all aspects of modern society. Improved public health and fitness along with reduced health care costs are primary. Additional benefits are reduced carbon emissions and environmental impact as more individuals make a choice to not purchase a car. When integrated with public transit, the load on the electrical grid (from EVs) would be reduced, as the culture shifts towards mobility and access to goods and services without the use of SOVs.

XIII. Implement Direct Transit from Port Townsend/Port Hadlock to Bainbridge and Kingston Ferry Terminals

This strategy would directly affect carbon emissions from VMT attributable to visitors, tourists and commuters who are coming to Jefferson County from the other side of Puget Sound. A key component is using traffic data on SOVs travelling

[14] https://smartgrowthamerica.org/program/national-complete-streets-coalition/
[15] https://www.c40knowledgehub.org/s/article/How-we-built-an-inter-municipal-cycle-superhighway-network-across-the-Capital-Region-of-Denmark?language=en_US&gclid=CjwKCAjwzvX7BRAeEiwAsXExo6cN45Pb_p-xbJdNVj1luW4zNtXYGgLi8ZblUQrz95mZQx92-aDxVxoCY5cQAvD_BwE
[16] https://www.portlandoregon.gov/transportation/article/629951
[17] http://www.dot.ca.gov/hq/tsip/tab/documents/travelsurveys/Final2001_StwTravelSurveyWkdayRpt.pdf

between the Bainbridge Island and Kingston ferries to Port Hadlock and Port Townsend to determine routes and schedules.

While the Inventory report has information on total VMT in Jefferson County as noted above, there is no data on the percent of VMT that is attributed to visitors and tourists. However, the total per capita VMT for Jefferson County is 1.44 times the state average (derived from the numbers in the 2018 Inventory). Between 2005 and 2018, the per capita VMT in Jefferson County has increased 6.3% (from the 2018 Inventory). This increase strongly suggests that tourism may be playing a significant role in our carbon inventory. The number of large annual festivals in Jefferson County is approximately 24, up significantly from ten years ago. Using data to establish optimum transit routing and scheduling to and from ferries could provide a choice for visitors and tourists to make Jefferson County a destination without having to bring their vehicle.

The primary assumptions we made for this strategy is that an efficient direct route transit could reduce the average number of vehicle round trips between Port Townsend/Port Hadlock and the ferries by 50 for 52 weeks per year. The number of visitors to Jefferson County is not constant throughout the year. However, some events, such as the Wooden Boat Festival and Thing can draw up to 20,000 visitors over a weekend. Achieving an average of 50 trips per week, or 2600 round trips per year is conservative. Because our inventory and strategies are only concerned with Jefferson County VMT, we based our calculations on the distance between the Hood Canal Bridge and Port Townsend. It is noteworthy that for each SOV round trip that was eliminated, there would also be a significant number of Kitsap County VMT also eliminated. Note that the model did not include the emissions due to the transit buses themselves, for the same reasons noted in the Data Driven Transit section above.

As in the previous scenario, shifting the culture away from ownership and use of SOVs, both fossil fuel and electricity powered is essential to reduce transportation emissions. Addressing climate change in both long and short term will require a focused and intentional commitment to develop a transit system that more people could choose.

XIV. Increase Commercial Solar Installations

This strategy would increase commercial solar by implementing multiple community solar projects, and incentivizing large scale commercial solar projects. This could also apply to residential solar, but has been modeled as commercial including community solar, which is available to a wider number of residents at a lower cost. Washington State has various incentives[18] for residential, commercial and community solar, and currently has a grant program for low income community solar projects[19]. Also, Jefferson PUD[20] is currently in the planning stages of a Community Solar project. The incentives reference above notes that there have been more than 9 community solar projects installed in WA from 2017 - 2019, for a total of 1.3 Megawatts capacity.

The assumptions made in modeling this strategy include that 5 commercial or community solar projects of the size that Jefferson PUD is currently planning (100 KW system with a 100,000 KWHr annual production in the first year) would be installed in Jefferson County from 2025 - 2030. These would be promoted locally through education, partnership development, and potentially local incentives. Grant opportunities would be sought and applied for, particularly for low income projects.

The electricity production from these could be significant - 500,000 KWHr by 2030, which is 0.1% of total community electricity usage in 2018. However, as noted in the introduction, the CO_2e impact is small due to the low, and declining,

[18] http://www.energy.wsu.edu/documents/Renewable%20Energy%20System%20Incentive%20Program%20Report-Oct2019.pdf
[19] https://www.commerce.wa.gov/growing-the-economy/energy/clean-energy-fund/clean-energy-fund-solar-program/
[20]https://www.jeffpud.org/community-solar-project/

carbon footprint of our electricity. New solar installations could be encouraged on roofs of new commercial buildings and residences, to minimize intrusion into natural areas.

A possible future benefit for this scenario would be that a smart grid, utilizing battery storage in conjunction with solar power and smart meters, could be operated to provide distributed power and cover peak demand cost-effectively.

Other co-benefits of this strategy include:

- Potential community resiliency improvements if some systems include battery backup.
- Equity improvements with the offering of community solar to those who might not have the ability to install residential solar, especially if low income grants are successfully applied for.
- Enhance reliability of the electric grid by diversifying with non-hydropower renewable energy.

XV. Implement a Home Weatherization Promotion Program

This strategy would promote home weatherization in general. The program would also promote low-income home weatherization through the OlyCAP Weatherization Assistance Program, which already exists. The OlyCAP website[21] states, "The goal of the Weatherization Assistance Program is to help relieve the burden of high energy bills on our clients while improving the comfort and safety of their homes. OlyCAP provides free home energy-efficiency improvements to households that meet low-income guidelines." According to the Washington State Low-Income Weatherization Program 2020 Income Eligibility Guidelines, the state low-income upper limit is $39,497 per year for a 2-person household to qualify for a low-income home weatherization program.

Model input for number of homes weatherized was developed using the 2015 Biennial Energy Report and State Energy Strategy Update[22] which includes Graph 3-1 showing Estimate of Energy Upgrade Potential for Single Family Homes in Washington State. This graph indicates the percentage of Washington homes that demonstrate need for the various home weatherization strategies, which generally range between 25 to 40% upgrade potential. For the modeled Home Weatherization High Estimate, it was assumed that 30% of homes (3,272 homes) would be weatherized over a 10-year period. This best case scenario estimate assumes that nearly all of the homes with upgrade potential would be upgraded. It was assumed that qualifying homes would use the OlyCAP Weatherization Assistance Program, and that non-qualifying homeowners would pay for their own upgrades.

Weatherization of low-income households through the existing OlyCAP Weatherization Assistance Program is included in the modeling. This program appears to be underutilized and funding enhancement may be needed to support the projected estimate of home weatherization.

Information needed to apply for the OlyCAP program includes identification (personal information), income and existing utility bill information. Following a home energy assessment, a scope of work is developed. Typical free weatherization improvements may include:

- Insulating attics, floors, walls, and exposed water heaters & water supply lines
- Sealing and insulating exposed heat ducts
- Sealing drafts throughout the home
- Installing whole-building ventilation to help improve indoor air quality
- Repairing or upgrading home heating systems
- Providing resources and tools to help households maintain a healthy, energy-efficient home

[21] https://olycap.org/

[22] http://www.commerce.wa.gov/wp-content/uploads/2016/05/Energy-2015-Biennial-Energy-Report.pdf

- Protecting weatherization improvements through minor repairs

Major home repairs are typically not included, and current restrictions from OlyCAP's existing funding sources may be limiting the use of that program for such homes. Alternative funding sources may be one option to address this issue.

Assumptions made in this modeling strategy include the number of homes weatherized.

Co-benefits of this strategy include:

- Lower heating bills and more comfortable homes once the weatherization is complete
- Creates jobs for people weatherizing homes

XVI. Conclusion

The 2020 Greenhouse Gas Reduction Modeling Team modeled a range of GHG reduction strategies spread over multiple sectors, with an emphasis on transportation and residential energy, using the ICLEI Clearpath Planning tools.

The goal of this work was to provide input to the CAC on their future work of defining next steps to reduce our community wide emissions to meet the GHG emissions goals set by the City of Port Townsend and Jefferson County. The current GHG reduction goal is to reduce emissions to 80% below 1990 levels by 2050[4]. Achieving that goal requires reducing emissions by 186,771 metric tons of CO_2e, to 88,312 tons of CO_2e, which is a 68% reduction from 2018 levels. The "Business as Usual" forecast generated as part of this modeling shows a forecasted reduction in emissions by 2050 from 2018 of 13,375, or a 5% reduction from the 2018 emissions. This is due to the current state law requiring our electricity to be carbon neutral by 2030, and due to the existing federal CAFE standards. The strategies modeled, if all applied to 2050, are estimated to result in a total emissions reduction of 42% from the 2018 inventory (Table 1). Those strategies combined with the 5% reduction in the forecast results in a total emissions level of 146,464 metric tons of CO_2e, which is a 47% reduction from 2018, short of the current goal of 68% from 2018 levels. The strategies modeled also resulted in a 15% reduction from 2018 by 2030, and the forecast shows a reduction by 2030 of 3%, for a total reduction of 18% below 2018 levels by 2030. Given the 2018 IPCC report[23] on the need to globally reduce emissions by 45% from 2010 levels by 2030 to reduce the likelihood of a 1.5°C temperature increase and the resultant impacts, one could argue that locally we should reduce our emissions more aggressively in the next 10 years.

Our modeling results suggest the following considerations and next steps could be taken in order to meet our 2050 carbon reduction target:

1. Transitioning to EVs stands out as the strategy with the largest impact, a 37% reduction by 2050. Further consideration is recommended for the CAC on how to best encourage and incentivize EV adoption.

However, the impact from EVs by 2030 is not as strong, at 11% GHG reduction by 2030, and other shorter term transportation strategies will be needed to more aggressively reduce emissions. A recent study[5] from Climate Solutions and others noted that the most cost effective and fastest approach to reduce transportation emissions in the Northwest is to increase EVs while also reducing VMT through other strategies.

2. Meeting our 2050 target will require a wide variety of strategies, and policy, infrastructure, and behavior change across all sectors, including additional strategies beyond those modeled here. This is especially true since, as noted in the Limitations section, the modeling strategies are not all cumulative.

[23] https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf

3. Meeting our 2050 carbon reduction target will most likely affect all community members. Behavior changes can drive policy. At the same time, policy can drive behavior changes. To meet carbon reduction targets, we need to align policy and behavior change with carbon reductions targets.

4. Meeting carbon reduction targets cannot be met by voluntary behavior changes by community members alone. Significant policy and infrastructure changes are necessary. These changes range from building code changes, transit system changes, bike and pedestrian infrastructure, EV charging stations, incentives for commute alternatives, land use changes and growth management. Tourism, a significant economic driver, is primarily based on personal vehicle movement. So any real attempt to meet carbon reduction targets must also address the movement of visitors. Mandating changes from the top down can be fraught with obstacles. However, policy makers and civic leaders could integrate carbon reduction into the decision making process at all levels. Policy makers and civic leaders could encourage low-carbon visitor behaviors through encouraging businesses, the Chamber of Commerce, Main Street and Fort Worden Public Development Authority to promote Port Townsend as a community striving to reduce GHG emissions, asking that visitors do their part too. Policy makers could make carbon reduction a high priority and include, educate, and facilitate the role of individual community members in the process.

5. This modeling assumed the emissions from Port Townsend Paper Company were flat, as significant reductions have been made recently. However, further reductions from PTPC could significantly move us toward our goal, while increases would cause the need for further reductions elsewhere to meet our goal.

6. The modeling in this report did not include consumption-based, agricultural, or forestry reduction opportunities. Those areas are evolving for community inventories, and there may be opportunities in the future to model reduction strategies in those areas.

7. Our results suggest that, given our carbon inventory and demographics, there are key groups of policy makers that will be responsible for significant policy changes. These include, but are not limited to, all Climate Action Committee organizations (Port Townsend City Council, Jefferson County Board of County Commissioners, Jefferson Transit, Jefferson PUD, Port of Port Townsend, Jefferson Healthcare, and Port Townsend Paper Company), as well as Jefferson County Chamber of Commerce, Main Street, and the Fort Worden Public Development Authority.

In conclusion, it is clear that meeting the community's GHG emission reduction goals are within reach (and perhaps can be exceeded.) Meeting our goals will require all of us working together across multiple fronts to confront the climate challenge in front of us.

Note that the supporting documentation for this report will be archived in the Climate Action Committee archives.