

## 4.2. Air Quality

This section focuses on Whatcom County (County) air pollutant emissions and the emissions' impact on local and regional air quality. It discusses how ambient air quality is regulated, how air quality permits are issued for public- and private-sector emission sources, and how existing County and regional planning efforts will affect air quality emissions and greenhouse gases (GHGs).

### 4.2.1. Existing Conditions

This section describes current climate and air quality conditions across the County as well as current federal, state, and regional air quality regulations.

#### Existing Climate

One of the variables that influence air quality is climate. Weather by itself does not cause high pollutant levels, but sometimes, under stagnant weather conditions, air pollutants may not disperse. The County's coastal area has a mild maritime climate, which is typified by cool summers and mild rainy winters (Western Regional Climate Center 2009). Temperatures on the coast are moderate due to influences of the ocean. Mean annual temperature in Bellingham is 48.9°F with a maximum range of 4°F to 97°F. The coldest months of the year are December and January. The warmest months are June and July.

Average precipitation in Bellingham is 34 inches per year with a historical range of approximately 20 inches to 49 inches. Average snowfall during the 3 winter months is approximately 3 inches per month. Prevailing winds are from the southwest in the winter and from the west and southwest during the remainder of the year. Winds rarely exceed 20 miles per hour for extended periods. Fog is most frequent in spring and fall.

#### Air Pollutants

The paragraphs below describe the key air pollutants considered for this analysis.

#### Particulate Matter (PM10 and PM2.5)

Total suspended particulate matter (TSP) is the total amount of particulate matter in ambient air. Until 1987, there were federal and state ambient standards for TSP, but in 1987 the federal TSP standards were replaced with standards for particulate matter smaller than 10 microns in diameter (PM10). In the 1990s, the U.S. Environmental Protection Agency (EPA) adopted standards for particulate matter smaller than 2.5 microns in diameter (PM2.5). PM10 and PM2.5 are the most important ambient

particulate sizes because they contribute the most to human health effects, regional haze, and acid deposition.

Particulate matter (PM10 and PM2.5) is generated by industrial emissions, residential wood combustion, motor vehicle tailpipes, and fugitive dust from roadways and unpaved surfaces. The highest ambient concentrations generally occur near the emission sources.

## Ozone

Ozone (O<sub>3</sub>) is a highly reactive form of oxygen created by an atmospheric chemical reaction of nitrogen oxides (NO<sub>x</sub>) and hydrocarbons, both of which are emitted directly from industrial and mobile sources. Because it takes several hours for these chemical reactions to take place, the highest ambient O<sub>3</sub> concentrations can occur far downwind of the original emission sources of NO<sub>x</sub> and hydrocarbons. Ozone concentrations in the County have historically been less than allowable ambient standards. However, emissions from the County contribute to elevated O<sub>3</sub> concentrations in the densely populated lower Fraser River valley region in British Columbia, and to a lesser extent to elevated O<sub>3</sub> concentrations in the central Puget Sound region. Elevated O<sub>3</sub> concentrations can also affect sensitive alpine environments in the Cascade Mountains within the County.

## Carbon Monoxide

Carbon monoxide (CO) is a product of incomplete combustion generated by mobile sources, residential wood combustion, and industrial fuel-burning sources. CO is generally of greatest concern when it is emitted by mobile sources at congested urban intersections because the emissions in those cases occur at ground level in areas surrounded by pedestrians during stagnant weather conditions. For those reasons, ambient CO monitoring stations operated by the Northwest Clean Air Agency (NWCAA) and the Washington State Department of Ecology (Ecology) have generally been placed near congested intersections.

Exceedances of the National Ambient Air Quality Standards (NAAQS) for CO (described below) were fairly common at densely populated areas throughout Washington State until the early 1990s. However, as older, more polluting cars have been replaced with new, more efficient cars, exceedances of the NAAQS limits for CO are rare.

## Nitrogen Oxides and Sulfur Oxides (NO<sub>x</sub> and SO<sub>x</sub>)

NO<sub>x</sub> and sulfur oxides (SO<sub>x</sub>) are emitted by mobile sources and fuel-burning stationary sources. Although the ambient concentrations of these pollutants have never approached the NAAQS limits due to the rural nature of the County and the stringent air quality regulations that limit emissions from the County's major industrial facilities, NO<sub>x</sub> from regional tailpipe emissions is one of the O<sub>3</sub> precursors

that have contributed to ongoing O<sub>3</sub> concerns in the Vancouver metropolitan area and central Puget Sound region. Similarly, regional NO<sub>x</sub> and SO<sub>x</sub> emissions can react in the atmosphere to form regional haze and acid deposition in the Cascade Mountains within the County.

EPA and Ecology have established regulations that govern both the allowable concentrations of pollutants in the outdoor air (i.e., ambient air) and allowable contaminant emissions from air pollution sources. Although their regulations are similar in terms of stringency, each agency has established its own standards. Unless the state or local jurisdiction has adopted more stringent standards, the EPA standards apply.

## Greenhouse Gases (GHGs)

GHGs are a group of gases that, when present in the atmosphere, absorb or reflect heat that normally would radiate away from the earth and thereby increase global temperature. Several GHG constituents are commonly evaluated: carbon dioxide (CO<sub>2</sub>), methane, nitrous oxide, water vapor, O<sub>3</sub>, and halocarbons. CO<sub>2</sub> is the individual constituent that is normally emitted in the greatest amount and generally contributes the most to climate change. Each individual constituent has its own global warming potential. To express the average emission rate and global warming potential of the combined constituents, GHG emission rates are commonly expressed as the equivalent amount of carbon dioxide, or “CO<sub>2</sub>-equivalent” emissions.

## Air Quality Regulations

Three agencies have jurisdiction over ambient air quality in the County: EPA, Ecology, and NWCAA. Table 4.2-1 lists the NAAQS as adopted by EPA and Ecology. The list of air pollutants for which EPA has developed NAAQS are referred to as “criteria pollutants.” The NAAQS consist of primary standards designed to protect public health and secondary standards designed to protect public welfare (e.g., preventing air pollution damage to vegetation). The more stringent secondary standards are used in Washington State to regulate air quality.

**Table 4.2-1. National and State of Washington Ambient Air Quality Standards**

Pollutant	National (EPA)		Washington State
	Primary	Secondary	
<b>Carbon Monoxide</b>			
8-hour average	9 ppm	9 ppm	9 ppm
1-hour average	35 ppm	35 ppm	35 ppm
<b>Particulate Matter</b>			
<i>PM<sub>10</sub></i>			
Annual average	50 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>

Pollutant	National (EPA)		
	Primary	Secondary	Washington State
24-hour average	150 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>
<i>PM<sub>2.5</sub></i>			
Annual average	15 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>
24-hour average	35 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>
<i>Lead</i>			
Quarterly average	1.5 µg/m <sup>3</sup>	1.5 µg/m <sup>3</sup>	1.5 µg/m <sup>3</sup>
<b>Sulfur Dioxide</b>			
Annual average	0.03 ppm	No standard	0.02 ppm
24-hour average	0.14 ppm	No standard	0.10 ppm
3-hour average	No standard	0.50 ppm	No standard
1-hour average	No standard	No standard	0.40 ppm <sup>a</sup>
<b>Ozone (O<sub>3</sub>)</b>			
8-hour average <sup>b</sup>	0.075 ppm	0.075 ppm	0.075 ppm
<b>Nitrogen Dioxide</b>			
Annual average	0.05 ppm	0.05 ppm	0.05 ppm

## Notes:

Annual standards never to be exceeded. Short-term standards not to be exceeded more than once per year unless noted.

ppm = parts per million  
 PM10 = particles 10 microns or less in size  
 PM2.5 = particles 2.5 microns or less in size  
 µg/m<sup>3</sup> = micrograms per cubic meter

<sup>a</sup> 0.25 ppm not to be exceeded more than two times in 7 consecutive days.

<sup>b</sup> Not to be exceeded on more than 1 day per calendar year as determined under the conditions indicated in Chapter 173-475 Washington Administrative Code (WAC).

Source: Chapter 173, Sections 470 to 475 WAC

## Existing County-Wide Air Pollutant Emissions

Table 4.2-2 lists reported County-wide air pollutant emission rates for the year 2001 (the most recent year for which EPA data are available), to illustrate the trend in emission sources in the County (EPA 2009). Despite its small population, there are a relatively large number of major industrial facilities in the County, which contribute a major portion of air pollutant emissions. As with other counties in western Washington, a large fraction of air pollutant emissions is generated by on-road vehicles and by non-road equipment (e.g., construction equipment, farm equipment, and water vessels). Miscellaneous sources (such as agricultural dust) are the predominant sources of PM10 emissions.

**Table 4.2-2. Whatcom County Emission Rates**

Emission Source Category	Annual Emissions for 2001 (tons per year)				
	NOx	CO	VOC	PM10	PM2.5
Industrial and Stationary Sources	4,593	26,719	7,432	1,636	1,666
Non-Road Equipment	3,415	14,608	1,967	250	233
On-Road Vehicles	4,968	49,952	4,202	111	84
Miscellaneous (e.g., agricultural dust and wood stoves)	0	0	2	2,798	263
<b>Total Emissions</b>	<b>12,976</b>	<b>91,279</b>	<b>13,603</b>	<b>5,405</b>	<b>2,246</b>

Source: EPA AirData (EPA 2009)

## Existing Air Quality and Attainment Status

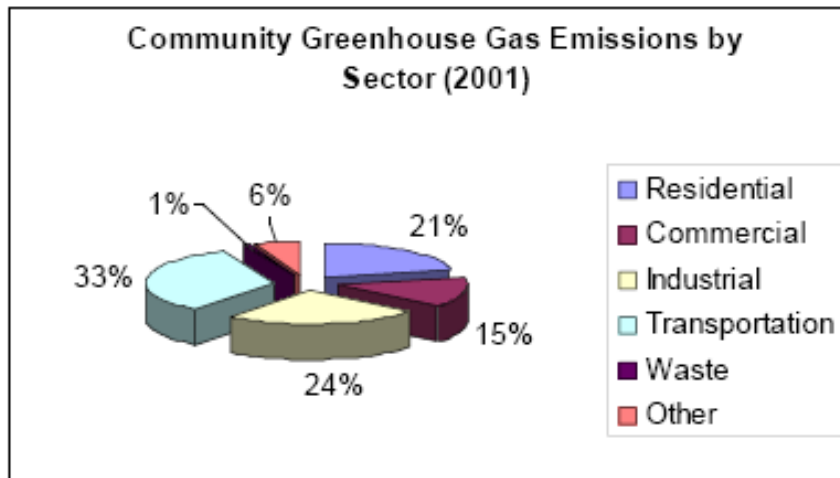
NWCAA operates five air quality monitoring stations in its three-county region, including three monitoring stations in the County. In addition, NWCAA requires large industrial facilities (like oil refineries) to operate their own monitoring stations and report the data to the agency. Existing air quality in the County is good, which is a result of the relatively low population and the stringent emission control requirements placed on the County's industrial facilities. The measured concentrations at all monitoring stations have been well below the NAAQS limits. As a result, the County, in its entirety, is classified as an "attainment area" for all regulated air pollutants.

## Greenhouse Gas Emissions

### Baseline Emissions for Whatcom County

The County has partnered with the International Council for Local Environmental Initiatives (ICLEI) under the Cities for Climate Protection Campaign, and has committed to reducing GHG emissions from county government operations and the community (Whatcom County 2007). The first step in that process was to inventory baseline GHG emissions. Community GHG from residents, businesses, and industries in the County were inventoried for the year 2001. The inventoried baseline emission rate was 2,750,729 tons CO<sub>2</sub>-equivalent per year. Figure 4.2-1 shows the distribution of the baseline emissions. As with most communities in the United States, transportation sources contributed the largest share of the baseline GHG emissions from the community.

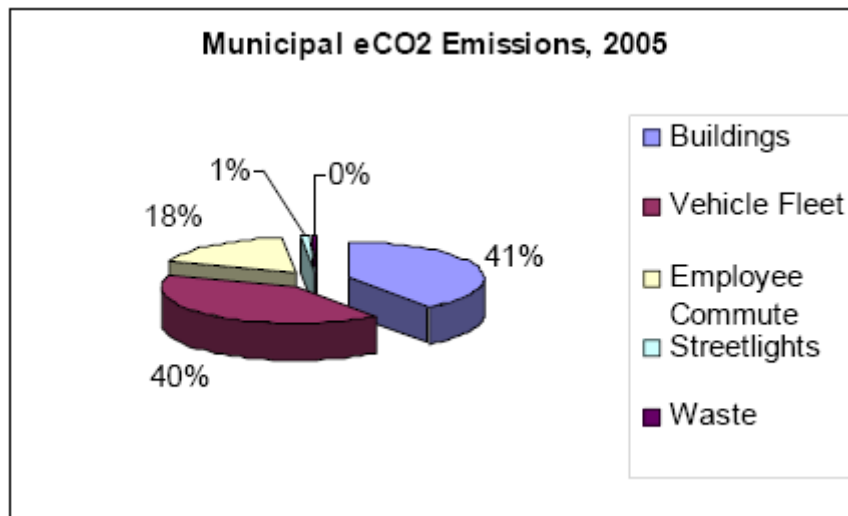
Figure 4.2-1. Whatcom County Community GHG Emissions–Year 2001



Source: Whatcom County 2007

The inventoried baseline emissions for county government operations for the year 2000 were 10,318 tons CO<sub>2</sub>-equivalent per year. Figure 4.2-2 shows the distribution of county government emissions. Transportation emissions (including the County’s municipal vehicle fleet and employee commute trips) contributed the largest share of the baseline emissions.

Figure 4.2-2. Whatcom County Government GHG Emissions–Year 2005



Source: Whatcom County 2007

### State Guidance

Ecology has already prepared aggressive goals for statewide reduction of GHG emissions and statewide reductions in vehicle miles traveled, but it has not developed guidance for how those statewide reductions should be apportioned to individual counties. Ecology’s Climate Action Team is currently formulating statewide

guidance for how local governments should evaluate and mitigate GHG emissions from internal government operations and from the community. Draft versions of Ecology's guidance are expected to be released for review in 2009, and final guidelines will not be released until well after that. At this time there is no firm understanding of how Ecology's GHG reduction requirements for local governments will be structured, and there is no indication of what level of GHG reduction would be required for an agency such as the County. However, several upcoming factors are likely to be addressed by Ecology's guidance:

- The Climate Action Team wants all municipalities in the state to enact GHG reduction measures in a consistent manner, to avoid having each agency enact its own GHG program on a piecemeal basis under the implied threat of litigation, which has occurred in California.
- A substantial fraction of future GHG reductions should be achieved by providing incentives to future developers, in addition to requiring developers to comply with new top-down regulations.
- Upcoming State Environmental Policy Act (SEPA) requirements should not pose unreasonable burdens on rural agencies.
- Ecology should provide funding and training for rural agencies to enact new GHG policies in response to new SEPA requirements.

In terms of Growth Management Act (GMA) requirements, direction will be coming from the State of Washington Department of Community Trade and Economic Development (CTED) based on state legislation passed in 2008, as summarized by CTED in a recent fact sheet:

**ESSB 6580.** AN ACT relating to mitigating the impacts of climate change through the growth management act; amending 36.70A.280; adding a new section to chapter 36.70A RCW.

Requires CTED to develop and provide counties and cities with advisory climate change response methodologies, a computer modeling program, and estimates of GHG reductions resulting from specific measures<sup>1</sup>. Establishes a local government global warming mitigation and adaptation program.<sup>2</sup> Prohibits Growth Management Hearings Boards from hearing petitions alleging non-compliance with the mitigation and adaptation program.

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<sup>1</sup> CTED must complete this information and make it available by December 1, 2009.

<sup>2</sup> This is a program where CTED will competitively select counties and cities to fund climate change programs: "The department of community, trade, and economic development must provide grants and technical assistance to aid the selected counties and cities in their efforts to anticipate, mitigate, and adapt to global warming and its associated problems..."

Requires CTED to provide a climate change report to the Governor and the Legislature by December 1, 2008.<sup>3</sup>

## 4.2.2. Impacts

This Draft Environmental Impact Statement (Draft EIS) analyzes the environmental impacts of four alternatives:

- **No Action Current Comprehensive Plan Alternative.** This alternative is a continuation of the current Whatcom County Comprehensive Plan and subarea plans.
- **No Action Trends Alternative.** This alternative assumes past growth continues forward.
- **Action Alternative X.** This alternative shifts growth from rural areas to Urban Growth Areas (UGAs), focusing on Bellingham.
- **Action Alternative Y.** This alternative shifts growth from rural areas to UGAs other than Bellingham.

Adoption of potential legislative policy and plan amendments associated with the 10-Year UGA Review process would not in itself directly affect air quality. However, the comprehensive plan together with any amendments would provide a framework that would guide growth and development in the County during the planning period. It would result in subsequent actions by the County to implement the plan, such as implementing new development regulations and infrastructure projects and actions by private parties within the comprehensive plan's framework.

Therefore, the comprehensive plan together with amendments that may be required as a result of any of the alternatives under study could indirectly affect air quality in the following ways. During construction of infrastructure or private projects, dust impacts from construction activities could be significant, even if localized and temporary. Pollutants would be released by space heating at new homes and retail/commercial businesses and from new industrial facilities constructed in areas zoned according to the plan. Additional dwellings that use fireplaces or wood stoves could contribute to increased wood smoke emissions. Finally, increased traffic due to population and employment growth will generate vehicle emissions (which will continue to be one of largest air pollutant source categories in the County).

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<sup>3</sup> Report to contain in summary: (i) Descriptions of actions counties and cities are taking to address climate change issues; (ii) Recommendations of changes, if any, to GMA and other relevant statutes that would enable state and local governments to address climate change issues; (iii) Descriptions of existing and potential computer modeling and other analytic and assessment tools; (iv) Considerations of positive and negative impacts to affordable housing, employment, transportation costs, and economic development that result from addressing the impacts of climate change at the local level; (v) Assessments of state and local resources, financial and otherwise, needed to fully implement recommendations. In preparing the report required by this section, the department must convene an advisory policy committee, with certain members.

## Impacts Common to All Alternatives

### Construction Impacts

Construction would occur under all of the alternatives, with the potential amount generally varying with differing growth levels. During construction, fugitive dust from excavation and grading would contribute to temporary increases in ambient concentrations of particulate matter. Construction would require the use of heavy construction equipment, large diesel-powered trucks, and smaller equipment such as portable electrical generators. Tailpipe emissions from these engines would temporarily degrade air quality near the construction sites, but their regional impacts would typically be far outweighed by emissions from cars and trucks in the neighborhoods surrounding the construction site.

Air quality regulations require construction contractors to take all reasonable steps to minimize fugitive dust emissions during construction. These required mitigation measures are designed to reduce localized impacts affecting homes and businesses adjacent to the construction sites.

Some phases of construction (e.g., installation of new pavement) would cause temporary odors that would be detectable to some people close to the construction sites.

Construction equipment and material hauling can affect traffic flow near the construction sites. If construction were to delay traffic enough to significantly reduce travel speed, then general traffic-related emissions would temporarily increase.

### Operation Impacts

#### Localized Transportation Impacts at Congested Intersections

Under any of the alternatives, localized CO impacts could occur at major intersections that experience significant traffic congestion. As described previously, measured exceedances of the NAAQS limits for CO are now extremely rare even at the most heavily congested downtown intersections in the state, so it is unlikely any intersections in the County could experience enough future congestion to cause significant CO impacts.

#### Space Heating Emissions at Residential and Retail/Commercial Buildings

Emissions would be generated by natural gas, fuel oil, and propane combustion used for space heating at new and existing dwelling and retail/commercial businesses. However, current emissions from residential and commercial space heating are currently only a minor fraction of the County's overall emission rates. Furthermore, per-building space heating emissions are expected to decrease in the future as residents purchase more fuel efficient furnaces in response to energy conservation

issues. Therefore, future space heating emissions are not expected to cause significant air quality impacts.

Space heating with electricity may also generate indirect emissions if the regional electricity source is a fossil-fueled power plant. However, any electricity used in the County would likely be generated by either hydroelectric or thermal power plants (within the County), and those large thermal power plants are required to install air pollution control devices. Therefore, this would not cause any significant impact.

### **Residential Wood Burning**

Because residential development may include installation of fireplaces or wood stoves, there is a potential for air quality impacts from wood burning. Air quality impacts from residential wood burning have been documented by numerous studies. These studies have concluded that wood-burning appliances cause elevated concentrations of particulate matter and toxic air pollutants during periods of heavy wood burning combined with stagnant weather conditions. The ambient air pollutant concentrations caused by residential wood combustion generally occur in the immediate neighborhood. Consequently, residential development containing large numbers of wood-burning appliances would represent a potentially significant air pollutant source.

However, NWCAA's existing regulations and policies are designed to reduce the potential impacts of residential wood stove and fireplace emissions. NWCAA requires all new wood stoves installed in the County to be certified by EPA for low emissions. NWCAA can impose burn bans during unusually stagnant weather conditions, to prevent ambient pollutant concentrations in heavily populated areas from approaching NAAQS health-based limits. Continued enforcement of these regulations and policies would ensure that future emissions from residential wood combustion would not cause significant impacts. However, as described in the Mitigation section, the County may consider restricting installation of new wood stoves in certain densely populated regions.

### **Commercial and Industrial Stationary Sources**

All alternatives would increase population and employment, so it is reasonable to expect an increase in emissions from commercial and industrial activity. However, these increased emissions are not likely to cause significant additional impacts. Emissions from stationary sources at industrial and commercial facilities would continue to be regulated by NWCAA and Ecology. NWCAA regulations require all new stationary sources to use best available control technology (BACT) emission controls to minimize emissions. The Notice of Construction (NOC) permitting process would require the largest new stationary sources to conduct computer modeling to demonstrate that their emissions would not cause ambient concentrations near the source to exceed the allowable NAAQS limits.

## Regional Emissions Resulting from Vehicle Travel

As described previously, on-road vehicles are one of the largest sources of emissions within the County. Countywide vehicle emissions are an important category of air pollutants because they can photochemically react in the atmosphere on warm, sunny days, and thereby contribute to regional smog, visible haze, and acid deposition at ecologically sensitive areas in the nearby Cascade Mountains and at other downwind counties in the central Puget Sound region.

All alternatives would increase countywide population and employment compared to existing levels. As a result, countywide vehicle travel (quantified as vehicle miles traveled [VMT]) is also forecast to increase, as listed in Table 4.2-3.

**Table 4.2-3. Forecast Countywide Population and Vehicle Travel**

Alternative and Forecasting Year	Countywide Average Daily VMT and Percent Increase Compared to Existing Conditions	County-Wide Population and Percent Increase Compared to Existing Conditions
Existing (2005)	5,310,000	180,800 <sup>1</sup>
No Action Alternative Current Comp. Plan (2031)	6,939,000 (31% increase)	235,000 (30% increase)
No Action Alternative Trends (2031)	7,523,000 (42% increase)	258,000 (43% increase)
Action Alternative X (2031)	7,622,000 (44% increase)	258,000 (43% increase)
Action Alternative Y (2031)	7,378,000 (39% increase)	258,000 (43% increase)

<sup>1</sup> Year 2008 population is estimated at 191,000.

The population and VMT forecasts listed in Table 4.2-3 are based on land use assumptions described in Chapter 2 of this EIS. The actual future countywide VMT will depend on where future population growth actually occurs. If a higher percentage of the additional population chooses to live in cities where amenities are closer than those in rural areas and if this percentage of the population has access to transit, the actual VMT increases could be less than indicated in Table 4.2-3. However, if more people move into the rural areas, the actual VMT increases could be higher than listed in Table 4.2-3.

However, the forecast increase in countywide VMT is not expected to cause significant additional air quality impacts related to photochemical smog. Ongoing federal EPA emission control requirements for on-road cars and trucks have provided a dramatic improvement in per-vehicle tailpipe emissions (expressed as grams per VMT). That beneficial trend is expected to continue into the future as drivers gradually replace old vehicles with new, clean-burning ones. As a result, the decrease in future per-vehicle emission rates would likely more than offset the forecast increase in countywide VMT. In that case countywide emissions from

on-road vehicles would remain roughly the same as existing levels, or even gradually decrease compared to existing levels.

For example, data compiled by EPA and the Federal Highway Administration (FHWA) illustrate the substantial reductions in per-vehicle emissions that are forecast to result from EPA's current tailpipe emission standards (FHWA 2004). By the year 2030, average per-vehicle tailpipe emissions from passenger cars are expected to decrease by 77% to 95% compared to current levels. Similarly, EPA's current tailpipe standards for heavy diesel trucks are expected to reduce their per-vehicle emissions by up to 90% compared to existing levels. Therefore, it is likely that the forecast per-vehicle emission reductions (77% to 90% reduction) would more than offset the forecast increase in countywide vehicle travel (an increase of only 39% to 44%). The historical trend of VMT per capita has shown the statewide value has remained nearly constant from 1990 through 2005 (Washington State Community Trade & Economic Development 2007). If, however, VMTs per capita were to dramatically increase in the future, as is what occurred from 1970 through 1990, then, improved per-vehicle emissions could be offset by increased VMTs per capita.

As a result of EPA's tailpipe emission standards, increased vehicle travel by countywide on-road vehicles would not be expected to cause significant impacts to regional air quality for photochemical smog. However, as described later in this section, on-road vehicle emissions are a concern with regards to county-wide GHG emissions, and the County is currently formulating plans to reduce GHG emissions.

## Climate Change Impacts and Whatcom County Climate Protection and Energy Conservation Action Plan

### Potential Impacts from Global Climate Change

The issue of how emissions from human activities may affect the global climate has been the subject of extensive international research during the past several decades. There is now a broad consensus among atmospheric scientists that emissions caused by humans have already caused measurable increases in global temperature and are expected to result in significantly greater increases in temperature in the future. However, there is still considerable uncertainty about the exact magnitude of future global impacts and the best approach to mitigate the impacts.

The United Nations' Intergovernmental Panel on Climate Change (IPCC) published its most recent sets of 5-year progress reports summarizing worldwide research on global climate change in 2001 and 2007 (Intergovernmental Panel on Climate Change 2007). These reports indicated that some level of global climate change is likely to occur and that there is a significant possibility of adverse environmental effects. Several alternative mitigation measures were evaluated by the worldwide

scientific community to reduce global emissions, including the first round of worldwide reductions in GHGs, as prescribed by the Kyoto Protocol.

Climate change is a global problem influenced by an array of interrelated factors that have concrete consequences for the Pacific Northwest. A 2009 report by the University of Washington's Climate Impacts Group found that climate change will significantly challenge the region's natural and built systems (Climate Impact Group 2009). Changes in temperature and climate are expected to have a dramatic impact on plants and animals currently adapted to conditions that will no longer prevail. Surface temperatures are on course to increase by between 2.5°F and 10.5°F by the year 2100, with regions in the northern parts of North America and Asia expected to heat by 40% above the mean increase. In addition, rising levels of GHGs will have a destabilizing effect on a number of different microclimates, conditions and systems. These temperature changes could cause the local impacts described below.

**Storm Severity.** The increase in the temperature of the oceans is projected to accelerate the water cycle, thereby increasing the severity and rate of both storms and drought, which along with decreased snow pack could disrupt ecosystems, agricultural systems, and water supplies.

**Sea level.** Globally, snow cover has decreased by 10% in the last 40 years. Average sea level has risen between 0.33 and 0.66 of a foot over the course of the twentieth century and is projected to rise by at least another 0.33 of a foot and up to almost 3 feet by the year 2100. These coastal infringements on such a large scale could lead not only to significant environmental and ecosystem disturbances, but also major population displacement and economic upheaval.

**Natural disasters.** The Climate Impacts Group has found that local climate trends will reflect continued increases in both average air and water temperatures. Additionally, sea level rise is likely to occur faster than global averages and earlier snowmelt may cause changes in river and stream flows. Sea level rise and increased seasonal flooding could incur considerable costs as these phenomena pose risks to property, infrastructure and even human life.

**Water.** Water quality and quantity are also at risk of depletion as a result of changing temperatures. With warmer average temperatures, more winter precipitation will fall in the form of rain instead of snow, shortening the winter snowfall season and accelerating the rate at which the snowpack melts in the spring. Not only does such snow melt increase the threat for spring flooding, but it will also decrease the storage of the natural water tower in the Cascade Mountains. This means less water will be available for agricultural irrigation, hydroelectric generation, and the general needs of a growing population. As we have seen in recent years, water resources for agricultural and residential use may become scarcer, especially during the summer months.

**Plants and animals.** The local native plants and animals are also at risk as temperatures rise. Scientists are reporting more species moving to higher elevations or more northerly latitudes. Increased temperatures also provide a foothold for invasive species of weeds, insects, and other nonnative threats. Nearshore habitat such as coastal wetlands and salt marshes are at risk of being inundated by rising sea levels. Likewise, increased flow and salinity of water resources could seriously affect the food web and mating conditions for fish that are of both economic and recreational interest to residents. These trends compound the challenges already posed to dwindling populations of salmon at all stages of their lifecycle. Additionally, the natural cycle of flowering and pollination would be altered, as would the temperature conditions necessary for a thriving locally adapted agriculture. Perennial crops in particular will be challenged.

**Public health.** Warming temperatures and increased precipitation can encourage mosquito breeding, thus engendering diseases such as the West Nile virus, for which mosquitoes are vectors. Increased temperatures also pose a risk to human health because they increase ozone levels and air pollution toxicity, which are tied to increased rates of asthma and other pulmonary diseases. Furthermore, the anticipated increase in hotter days poses heatstroke risks particularly for the elderly, young, those already sick, and people who work outdoors.

Global climate change is a cumulative issue related to worldwide GHG emissions rather than emissions from any individual facility. In general, no single municipality emits enough GHG to influence global climate change by itself. GHG emitted anywhere on the planet remains active for roughly 100 years and eventually disperses throughout the world. Therefore, future climate change in Washington State would be influenced as much by, for example, new industrial activity in China as it would be by the future development of the County. Regardless, state and local governments throughout the United States have begun to demonstrate leadership by initiating action to reduce potential future GHG emissions and to adapt to future GHG impacts. In response to growing worldwide concerns, Washington State Governor Christine Gregoire issued Executive Order 07-02, committing the state to reducing its GHG emissions under a staged schedule: 1) reduce emissions to 1990 levels by 2020; and 2) reduce emissions to 50% below 1990 levels by 2050 (Ecology 2007). In 2008, the Washington State Climate Action Team published its preliminary overall climate action, entitled *Leading the Way: Implementing Practical Solutions to the Climate Change Challenge* (2008).

## Whatcom County 2007 Climate Protection Action Plan

The County has partnered with the International Council on Local Environmental Initiatives (ICLEI) under the Cities for Climate Protection Campaign and has committed to reducing the County's GHG emissions from both county government operations and from the community as a whole (Whatcom County 2007). As

described in the Affected Environment section, the County inventoried existing GHG emission rates. Based on those inventories, the County set the following goals for GHG emission reductions:

- **County government operations.** The County government shall strive to reduce its GHG emissions by 40% below 2000 levels by the year 2012. This will require the County to reduce its “business as usual” emissions by 6,179 tons CO<sub>2</sub>-equivalent by the year 2012.
- **Community emissions.** The County shall strive to reduce the community’s GHG emissions by 10% below 2001 levels by the year 2020. This will require the County and the community to reduce its “business as usual” emissions by 1,175,000 tons CO<sub>2</sub>-equivalent by the year 2020.

The County recognizes that these reduction goals will have a relatively small affect on worldwide GHG emissions because the vast majority of worldwide emissions are beyond the County’s control. However, implementing these reductions will demonstrate leadership by the citizens of the County. Furthermore, many of the measures to reduce GHG emissions will provide the immediate and long-term benefit of reducing energy consumption within the County.

The County has already begun to implement many reduction measures and is well on the way to meeting its reduction goals (Whatcom County 2007). The County’s current reduction measures for its own County-owned operations include the following:

- designing future county buildings to achieve energy conservation certification under the Green Building Council’s Leadership in Energy and Environmental Design (LEED) program;
- upgrading lighting and heating and ventilation systems on existing county buildings to provide energy conservation;
- purchasing hybrid vehicles and using renewable fuels (biodiesel and ethanol) for the county-owned vehicle and ferry fleet; and
- actively fostering employee commute trip reduction measures for county staff.

These currently planned reduction measures would achieve roughly 88% of the County’s government operations reduction goal compared to “business as usual”. Additional reduction measures will be developed in the future to achieve the balance of the reduction goal.

The County has already begun to foster energy conservation, recycling, and GHG reduction measures by citizens and industries in an effort to achieve the community reduction goal (Whatcom County 2007). These initial measures include the following general provisions:

- developing “green tag” and “green power” programs with Puget Sound Energy to allow customers to purchase electricity from renewable energy sources;

- fostering the purchase of EPA Energy Star certified appliances and heating systems;
- upgrading the Post Point Pollution Control Facility;
- fostering the FoodPlus waste recycling program;
- fostering the dairy waste biodigester and electricity cogeneration system at the VanderHaak dairy; and
- encouraging increased use of renewable fuels in community vehicles, and encouraging purchase of new hybrid vehicles.

To date, these existing programs have achieved nearly 5% of the overall reduction goal set for countywide community emissions. In addition, the County is in the process of implementing the additional reduction measures listed in Table 4.2-4 to further reduce countywide community emissions. As described previously, the County has targeted a GHG reduction of 1,175,000 tons per year by 2020 compared to “business as usual”. For each reduction measure listed in Table 4.2-4, the right-hand column lists the percentage of that target reduction provided by the given reduction measure. These reduction measures are expected to achieve 59% of the countywide community reduction target by the year 2020.

**Table 4.2-4. Proposed Whatcom County Greenhouse Gas Reduction Measures for Community**

Reduction Measure	Forecast Reduction of CO <sub>2</sub> -Equivalent Emissions (tons/year)	Percentage of Targeted Reduction by 2020 (%)
<b>Residential</b>		
Green Power	99,500	8.5
Energy Efficiency Challenge	80,000	6.8
LEED Buildings (current)	51	0.01
<b>Commercial/Industrial</b>		
Green Power	117,500	10
LEED Buildings (current)	174	0.01
Energy Efficiency Challenge	97,400	8.3
<b>Transportation</b>		
Biodiesel, ethanol sales	150,100	13
Hybrid vehicle purchases	26,000	2.2
No-idling policy	8,400	0.7
Bellingham Mode Shift goal	17,281	1.5
Whatcom Transportation Authority expansion (outside Bellingham)	484	0.04
<b>Waste</b>		

Reduction Measure	Forecast Reduction of CO <sub>2</sub> -Equivalent Emissions (tons/year)	Percentage of Targeted Reduction by 2020 (%)
Growth in Community Composting	13,200	1
Other/Agriculture		
Additional biodigesters (3 planned)	34,000	3
Total Reductions		
Total Quantified Future Reduction from Proposed Future Community Measures	644,000	54
Existing Reduction from Current Measures	56,100	5
Total Reduction from Current and Proposed Future Community Measures	694,800	59

Source = Whatcom County 2007

The County recognizes that the initial reduction measures listed here are, by themselves, not enough to achieve the overall reduction goals set for county-owned operations and the community under the Cities for Climate Protection Campaign. For example, the GHG reduction measures listed in Table 4.2-4 are forecast to provide only 59% of the target reduction in community emissions by the year 2020. It is expected that the remainder of the targeted reductions will be achieved through new technologies driven by the following external measures:

- state regulations that have been enacted but not yet implemented; these include Senate Bill 5735 (passed in April 2009), which will require coal-fired power plants in Washington to reduce their GHG emissions;
- federal regulations currently in the legislative process; these include the upcoming revisions to the federal Corporate Automobile Fuel Economy (CAFE) standards, which will substantially improve fuel economy and reduce GHG emissions from passenger cars and trucks; and
- foreseeable future statewide and national GHG cap-and-trade programs or equivalent “carbon tax” measures.

In addition to these external factors, the County may enact additional land use and transportation regulations to implement the existing vehicle trip reduction goals and policies described in the Transportation element of the current Comprehensive Plan.

Also, in 2008, the County and City of Bellingham established the Energy Resource Scarcity Task Force, to study how the County could reduce its dependence on fossil fuels, in anticipation of foreseen long-term scarcity of those fuels. If the Task Force develops recommendations for steps to reduce the County’s fossil fuel consumption, then reduced emissions of ozone precursors and GHG would be a side benefit to those actions.

## No Action Current Comprehensive Plan Alternative

The air quality impacts under the No Action Current Comprehensive Plan Alternative would be the same as described in Impacts Common to All Alternatives above. Air quality impacts would not be significant because of the following regulatory requirements:

- Impacts resulting from construction would be addressed by NWCAA regulations for fugitive dust control.
- Impacts resulting from stationary source emissions would be addressed by compliance with NWCAA requirements for emission control and permitting.
- Localized impacts caused by traffic emissions at congested intersections would likely be insignificant because of steady improvement in vehicle emissions for new cars.
- As listed in Table 4.2-3, countywide daily VMT would increase by 31%, and countywide population would increase by 30% between the years 2005 and 2031. These estimates assume that VMT per capita, which has remained steady in Washington State since 1990 (Washington State Department of Community Trade & Economic Development 2007), would continue to remain steady in the future. As described in the Transportation section of this EIS, the Transportation element of the current Comprehensive Plan includes goals and policies to encourage trip reduction through innovative land use planning and other transportation measures. Successful implementation of those goals could decrease VMT per capita in the County, which could help reduce the VMT values listed in Table 4.2-3. This would also reduce countywide vehicle emissions.

Any increase in emissions of conventional smog-forming pollutants (NO<sub>x</sub>, VOC, and particulate matter) caused by forecast increases in countywide vehicle travel would likely be either fully or partially offset by future improvements in per-vehicle emissions provided by EPA regulations. Therefore, it is concluded that future countywide emissions from motor vehicles would not cause significant regional air quality impacts for conventional smog-forming pollutants.

As described later in this section, the "business as usual" increase in GHG emissions from forecast population growth under the No Action Current Comprehensive Plan Alternative is accounted for in the County's current 2007 Climate Protection and Energy Conservation Action Plan (Whatcom County 2007). Future GHG reduction measures to meet most of the County's targeted reductions are listed in Table 4.2-4. As described previously, the remaining GHG reductions are expected to result from future technology improvements driven by external state and federal regulations. Finally, additional GHG reductions can be achieved by implementing new County land use and transportation regulations to address the land use and transportation goals and policies included in the current Comprehensive Plan.

## No Action Trends Alternative

Impacts resulting from construction and stationary sources would be similar to those described for the No Action Current Comprehensive Plan Alternative and to those described in Impacts Common to All Alternatives. As shown in Table 4.2-3, the forecast countywide population and VMT under the No Action Trends Alternative are higher than existing conditions and the Current Comprehensive Plan; the VMT increase is expected to be 42% and the population increase is expected to be 43%. However, future countywide emissions of conventional smog-forming air pollutants from residential areas, commercial activity, and motor vehicles would not cause additional significant regional air quality impacts because future population growth would likely be more than offset by future improvements in per-vehicle emissions. However, the increased population and VMT resulting from the No Action Trends Alternative is not completely accounted for in the County's 2007 climate action plan. Therefore, the County should consider updating the 2007 GHG plan to address the additional growth and mitigation measures. Mitigation measure opportunities are further discussed in Section 4.2.4 and would include measures to reduce VMT through infill, mixed use, and other strategies.

Similar to the No Action Current Comprehensive Plan Alternative, substantial emission reductions for both criteria pollutants and GHGs are expected to occur as a result of new technologies driven by external state and federal regulations (beyond new regulations that could be enacted by the County). In addition, the County could achieve further emission reductions by enacting new land use and transportation regulations to address trip reduction goals and policies listed in the current Comprehensive Plan.

## Action Alternative X

Impacts resulting from construction and stationary sources would be similar to those described for the No Action Trends Alternative and to those described in Impacts Common to All Alternatives. As shown in Table 4.2-3, the forecast countywide population and VMT are higher than existing conditions, but roughly the same as the No Action Trends Alternative; the VMT increase is expected to be 44% and the population increase is expected to be 43%. Future countywide emissions of conventional smog-forming pollutants from residential areas, commercial activity, and motor vehicles would not cause significant regional air quality impacts, because the increase in population and vehicle travel would likely be more than offset by future improvements in per-vehicle emissions. However, the increased growth and VMT generated by this alternative are not fully accounted for in the County's 2007 GHG action plan. Therefore, the County should consider updating its climate plan to address the additional growth and additional mitigation measures. Mitigation measure opportunities are further discussed in Section 4.2.4 and would include measures to reduce VMT through infill, mixed use, and other strategies.

Similar to the No Action Current Comprehensive Plan Alternative, substantial emission reductions for both criteria pollutants and GHGs are expected to occur as a result of new technologies driven by external state and federal regulations (beyond new regulations that could be enacted by the County). In addition, the County could achieve further emission reductions by enacting new land use and transportation regulations to address trip reduction goals and policies listed in the current Comprehensive Plan.

## Action Alternative Y

Impacts resulting from construction and stationary sources would be similar to those described for the no action alternatives and to those described in Impacts Common to All Alternatives. As shown in Table 4.2-3, the forecast countywide population and VMT are higher than existing conditions, but less than the other action alternatives that have a similar population growth; the VMT increase is expected to be 39% and the population increase is expected to be 43%. This is likely because of the more balanced proportion of jobs and housing in the communities surrounding Bellingham. Future countywide emissions of conventional smog-forming air pollutants from residential areas, commercial activity, and motor vehicles would not cause additional significant regional air quality impacts because the increased vehicle travel would likely be more than offset by the forecast future decrease in future per-vehicle emission rates. However, similar to the No Action Trends Alternative and Action Alternative X, the increased growth and VMT for this alternative are not fully accounted for in the County's 2007 GHG action plan. Therefore, the County should consider updating the GHG action plan, to address the additional growth and additional mitigation measures. The relatively lower VMT than the No Action Trends Alternative and Action Alternative X may mean a little less mitigation is required to meet county goals.

Similar to the No Action Current Comprehensive Plan Alternative, substantial emission reductions for both criteria pollutants and GHGs are expected to occur as a result of new technologies driven by external state and federal regulations (beyond new regulations that could be enacted by the County). In addition, the County could achieve further emission reductions by enacting new land use and transportation regulations to address trip reduction goals and policies listed in the current Comprehensive Plan.

### 4.2.3. Mitigation Measures

#### Incorporated Plan Features

The following county plans support the achievement of air quality standards.

## Comprehensive Plan Goals and Policies

**Policy 11A-6.** Adopt in accordance with national, state, and regional regulations the required air quality standards. Develop and implement programs to monitor and assure compliance with those standards.

Land use patterns that reduce vehicle trips could be encouraged such as mixed uses (e.g., residential, commercial, and employment uses in close proximity to one another). This type of land use pattern reduces the VMT and encourages multimodal transportation, both of which help to reduce impacts on air quality.

Current policies that address mixed uses or density in urban areas where more transit and other services are available include, but are not limited to:

**Policy 2F-4.** Review and adopt, where appropriate, incentive programs such as cluster density bonuses in UGAs, the purchase and transfer of development rights, and tax deferrals.

The Transportation element of the Comprehensive Plan includes goals and policies to reduce reliance on single-occupancy vehicles. Successful implementation of these goals would reduce countywide VMT, which would also reduce regional tailpipe emissions. The key goals to reduce reliance on single-occupancy vehicles are as follows:

**Goal 6D.** Support land use planning efforts in Whatcom County which include land use types and densities that reduce reliance on single-occupancy vehicles.

**Goal 6E.** Provide a transportation system that minimizes environmental and social impacts and reduces reliance on fossil fuels.

**Goal 6F.** Promote energy conservation by implementing demand management policies and encouraging the reduction of single-occupancy vehicles on county roads and highways.

**Goal 6K.** Support the development and use of technologies (e.g., fiber optics, other communication improvements) and approaches to planning in Whatcom County, so as to minimize the reliance on vehicular travel.

**Goal 6L.** Support commuter use and employer promotion of alternative modes of transportation where feasible and discourage reliance on the single-occupancy vehicle.

**Goal 6M.** Promote bicycle and pedestrian travel by systematically providing safe and convenient routes and facilities where feasible.

**Policy 6N.** Support the Whatcom County Transportation Authority in providing high-quality, safe, convenient, accessible public transportation, where cost-effective, for the public as an attractive alternative to single-occupancy vehicles.

## Applicable Regulations and Commitments

The EPA, Ecology, and NWCAA regulate the allowable concentrations of pollutants in ambient air and allowable contaminant emissions from air pollution sources.

### Construction

Construction activities could generate fugitive dust, which will be mitigated using the following best management practices (BMPs) required by NWCAA regulations and implemented through permit reviews, and/or SEPA. Typical BMPs for fugitive dust control include the following:

- Use water sprays or other nontoxic dust control methods on unpaved roadways.
- Minimize vehicle speed while traveling on unpaved surfaces.
- Prevent track-out of mud onto public streets.
- Cover soil piles when practical.
- To the extent practical, minimize work during periods of high winds.
- Burning of slash or demolition debris is not permitted without express approval from NWCAA and is prohibited within the UGAs.

Mobile construction equipment and stationary non-road engines would emit air pollutants, including NO<sub>x</sub>, CO, and PM<sub>10</sub>. These emissions would be temporary and localized. It is unlikely that the temporary construction emissions would cause ambient concentrations to approach the NAAQS limits. The following are some typical mitigation measures to minimize air quality and odor issues caused by construction tailpipe emissions (implemented through local and regional regulations, permit reviews, and/or SEPA).

- Construction contractors must purchase equipment with engines complying with EPA certification requirements, and must maintain the engines of construction equipment according to manufacturers' specifications.
- Construction equipment that is not in use should be shut off, to reduce emissions from idling equipment.

Any temporary stationary sources such as asphalt plants or gravel plants will be required to use BACT in accordance with NWCAA regulations. All stationary equipment must have appropriate NWCAA permits. This will greatly reduce potential air quality and odor issues.

### Wood Stoves and Fireplaces

Wood smoke pollution in rural or residential areas could worsen if a substantial number of new residences elected to burn wood. However, all wood stoves and factory-built fireplaces sold in Washington State must satisfy EPA certification for low emissions, and NWCAA curtails residential wood combustion during stagnant weather conditions, when wood smoke might otherwise increase PM<sub>10</sub>

concentrations to above the NAAQS standards. Residences that use wood stoves as their primary heat source are allowed to burn wood during curtailment periods.

## Commercial and Industrial Facilities

Any new or modified industrial facilities that generate substantial air pollutant emissions will be required to use BACT in accordance with NWCAA regulations. All stationary equipment must have appropriate NWCAA permits. This will greatly reduce potential air quality and odor issues.

## On-Road Vehicles

Vehicles driving within the County are required to comply with federal emission standards. This will reduce on-road emissions, as drivers gradually replace older vehicles with new clean-burning ones.

## Greenhouse Gas Emissions

Washington State regulations have set a goal to reduce statewide GHG emissions. Ecology is currently in the process of enacting a variety of future statewide GHG emission-reduction regulations. Some of these future statewide regulations could require the County to implement additional measures, beyond those listed in the 2007 Climate Protection and Energy Conservation Action Plan.

## Energy Resource Scarcity Task Force

In 2008, the County and City of Bellingham established the Energy Resource Scarcity Task Force to study how the County could reduce its dependence on fossil fuels in anticipation of foreseen long-term scarcity of those fuels. Many of the Comprehensive Plan goals and policies listed above relate directly to fossil fuel consumption, so it is expected the task force will consider those policies as it explores practical ways to reduce fuel consumption. If the task force develops recommendations for steps to reduce the County's fossil fuel consumption, then reduced emissions of ozone precursors and GHGs would be a side benefit to those actions.

## Other Potential Mitigation Measures

### Wood-Burning Appliances

The County could consider adopting policies and regulations to prohibit the installation of even EPA-certified wood burning appliances in certain areas where population density would be high enough to cause air quality impacts from wood smoke emissions.

## Greenhouse Gas Emissions

The annual tons/year of GHG reduction outlined in the County’s 2007 Climate Protection and Energy Conservation Action Plan were quantified based on future population increases forecast according to the No Action alternative scenarios. As listed in Table 4.2-3, other alternatives would induce larger increases in population and vehicle travel, so required ton/year GHG reductions specified by the County’s 2007 GHG plan could have been underestimated. Therefore, the County should consider updating its 2007 GHG plan, if either Action Alternative X or Action Alternative Y is selected.

The GHG reduction measures listed in the County’s 2007 GHG action plan are not the only ways the County could reduce GHG emissions. Additional GHG emission reductions could be provided by using prudent building design and construction methods to use recycled construction materials, reduce space heating and electricity usage, and reduce water consumption and waste generation. Table 4.2-5 lists a variety of additional mitigation measures that could further reduce GHG emissions caused by building construction, space heating, and electricity usage (Ecology 2008). The table lists potential GHG-reduction measures, and indicates where the emission reductions might occur. The bolded items listed in Table 4.2-5 indicate the items that have already been considered in the County’s 2007 GHG action plan. This list, together with the list in the County’s climate plan, could be reviewed as the County prepares amendments that may be needed if some of the action alternatives are considered.

**Table 4.2-5. Potential Greenhouse Gas Reduction Measures**

	Comments	Emissions Category		
		Direct <sup>1</sup>	Indirect <sup>2</sup>	Transportation <sup>3</sup>
<b>Land Use Planning</b>				
Site mixed land uses (residential, commercial) in close proximity to each other.	Encourages non-motorized transportation for non-commute trips			■
Encourage construction of bicycle and walking paths.	Encourages non-motorized transportation			■
Encourage high-density development accessible to public transit.	Reduces reliance on single-occupancy vehicles for commute travel			■

	Comments	Emissions Category		
		Direct <sup>1</sup>	Indirect <sup>2</sup>	Transportation <sup>3</sup>
<b>Site Design</b>				
Plant trees and vegetation near structures to shade buildings.	Reduces onsite fuel combustion emissions and purchased electricity plus enhances carbon sinks.	■	■	
Minimize building footprint.	Reduces onsite fuel combustion emissions and purchased electricity consumption, materials used, maintenance, land disturbance, and direct construction emissions.	■	■	
Design water efficient landscaping.	Minimizes water consumption, purchased energy, and upstream emissions from water management.		■	
Minimize energy use through building orientation.	Reduces onsite fuel combustion emissions and purchased electricity consumption	■	■	
<b>Building Design and Operations</b>				
<b>Apply Leadership in Energy and Environmental Design (LEED) standards (or equivalent) for design and operations.</b>	Reduces onsite fuel combustion emissions and off-site/indirect purchased electricity, water use, waste disposal	■	■	
<b>Purchase Energy Star equipment and appliances for public agency use.</b>	Reduces onsite fuel combustion emissions and purchased electricity consumption	■	■	
Incorporate on-site renewable energy production, including installation of photovoltaic cells or other solar options.	Reduces onsite fuel combustion emissions and purchased electricity consumption.	■	■	
<b>Design street lights to use energy efficient bulbs and fixtures.</b>	Reduces purchased electricity.		■	
Construct "green roofs" and use high-albedo roofing materials.	Reduces onsite fuel combustion emissions and purchased electricity consumption	■	■	
<b>Install high-efficiency HVAC systems.</b>	Minimizes fuel combustion and purchased electricity consumption.	■	■	

	Comments	Emissions Category		
		Direct <sup>1</sup>	Indirect <sup>2</sup>	Transportation <sup>3</sup>
Eliminate or reduce use of refrigerants in HVAC systems.	Reduces fugitive emissions. Compare refrigerant usage before/after to determine GHG reduction.	■		
Maximize interior day lighting through floor plates, increased building perimeter and use of skylights, celestories and light wells.	Increases natural/day lighting initiatives and reduces purchased electrical energy consumption.		■	
Incorporate energy efficiency technology such as: <ul style="list-style-type: none"> <li>▪ super insulation,</li> <li>▪ motion sensors for lighting and climate control, and</li> <li>▪ efficient, directed exterior lighting.</li> </ul>	Reduces fuel combustion and purchased electricity consumption.	■	■	
Use water conserving fixtures that surpass building code requirements.	Reduces water consumption.		■	
Re-use gray water and/or collect and re-use rainwater.	Reduces water consumption with its indirect upstream electricity requirements.		■	
<b>Use recycled building materials and products.</b>	Reduces extraction of purchased materials, possibly reduces transportation of materials, encourages recycling and reduction of solid waste disposal.		■	■
Use building materials that are extracted and/or manufactured within the region.	Reduces transportation of purchased materials			■
<b>Use rapidly renewable building materials.</b> <sup>4</sup>	Reduces emissions from extraction of purchased materials		■	
Conduct third-party building commissioning to ensure energy performance.	Reduces fuel combustion and purchased electricity consumption.	■	■	
Track energy performance of building and develop strategy to maintain efficiency.	Reduces fuel combustion and purchased electricity consumption.	■	■	

<sup>4</sup> For example, wood or bamboo.

	Comments	Emissions Category		
		Direct <sup>1</sup>	Indirect <sup>2</sup>	Transportation <sup>3</sup>
<b>Transportation</b>				
Size parking capacity to not exceed local parking requirements and, where possible, seek reductions in parking supply through special permits or waivers.	Reduced parking discourages auto dependent travel, encouraging alternative modes such as transit, walking, biking etc. Reduces direct and indirect VMT			■
Develop and implement a marketing/information program that includes posting and distribution of ridesharing/transit information.	Reduces direct and indirect VMT			■
Subsidize transit passes. Reduce employee trips during peak periods through alternative work schedules, telecommuting, and/or flex-time. Provide a guaranteed ride home program.	Reduces employee VMT			■
Provide bicycle storage and showers/changing rooms.	Reduces employee VMT			■
Utilize traffic signalization and coordination to improve traffic flow and support pedestrian and bicycle safety.	Reduces transportation emissions and VMT	■		■
Apply advanced technology systems and management strategies to improve operational efficiency of local streets.	Reduces emissions from transportation by minimizing idling and maximizing transportation routes/systems for fuel efficiency.			■
Develop shuttle systems around business district parking garages to reduce congestion and create shorter commutes.	Reduces idling fuel emissions and direct and indirect VMT			■
<b>Encourage the purchase and use of fuel-efficient vehicles including hybrid or electric-hybrid cars and trucks.</b>	Reduces fossil fuel combustion.			■

	Comments	Emissions Category		
		Direct <sup>1</sup>	Indirect <sup>2</sup>	Transportation <sup>3</sup>
<b>Encourage the distribution, sale, and use of renewable fuels such as ethanol and biodiesel.</b>	Reduces fossil fuel combustion.			■
<b>Waste Recycling and Re-Use</b>				
<b>Optimize collection of recyclable materials.</b>	Reduces shipment of waste to regional landfills, reduces methane generation at landfills, and fosters recycling.	■	■	■
Provide incentives for use of recycled building materials.	Reduces transportation and embodied emissions from manufacture of virgin construction materials	■	■	■
<b>Provide incentives for installation of anaerobic digestion of livestock manure, with cogeneration of electricity.</b>	Reduces on-site methane emissions, and reduces the need for regional power generation.	■	■	■
Provide incentives for installation of new commercial composting facilities to recycle putrescible organic waste diverted from landfill.	Reduces shipment of waste to regional landfills, reduces methane generation at landfills, and provides marketable compost.	■	■	■
Provide incentives for installation of local construction waste recycling facility.	Reduces shipment of waste to regional landfills, reduces methane generation at landfills, and provides marketable recycled building material	■	■	■
Mandate increased governmental agency purchase of compost made from recycled organic waste.	Fosters economic development of local composting facilities.	■	■	■
Champion the community use of compost made from recycled organic waste.	Fosters economic development of local composting facilities.	■	■	■
Provide incentives for agricultural industry use of soil amendments and fertilizers made by anaerobic digestion of livestock manure and putrescible waste.	Reduces embodied emissions from manufacture and transport of virgin material.	■	■	■

	Comments	Emissions Category		
		Direct <sup>1</sup>	Indirect <sup>2</sup>	Transportation <sup>3</sup>
<b>Upgrade municipal wastewater treatment plants to cogenerate electricity from excess methane produced by sludge digesters.</b>	Reduces fossil fuel combustion by regional power plants.		■	

Note: Bolded items indicate the listed GHG reduction measure has already been considered in the Whatcom County GHG Action Plan

- <sup>1</sup> Direct emissions include emissions generated onsite that the proponent of the action has direct control over.
- <sup>2</sup> Indirect emissions include those generated offsite and for which the proponent does not have direct control over. Examples include emissions associated with purchased or acquired electricity.
- <sup>3</sup> Transportation emissions can be either direct (i.e., within the control of the proponent) or indirect (i.e., outside of the proponent's direct control).

Source: Ecology 2008

#### 4.2.4. Significant Unavoidable Adverse Impacts

Population and vehicle travel would increase under all four alternatives based on their growth levels. However, air quality emission increases for conventional smog-producing pollutants (NO<sub>x</sub>, VOC and PM) are likely to be either partially or fully offset, due to a combination of beneficial factors: EPA emissions control requirements on vehicles; anticipated future purchase of more fuel-efficient household appliances and industrial equipment; and continued application of air quality regulations on stationary industrial sources.

In terms of GHG emissions, each alternative would increase VMT with the No Action Current Comprehensive Plan increasing the least and Action Alternative X increasing the most. Action Alternative Y would have the least negative air quality effect of the two action alternatives. Future “business as usual” GHG emissions under the No Action Trend Alternative, Action Alternative X and Action Alternative Y would be higher than the No Action estimates incorporated into the County’s 2007 GHG action plan. Therefore, the 2007 GHG action plan should be updated to reflect the higher estimates of future “business as usual” GHG emissions.