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SR 502 CORRIDOR WIDENING

IMPROVING SAFETY • INCREASING CAPACITY • REDUCING CONGESTION

I-5 TO BATTLE GROUND

FINAL
Climate Change Memorandum

Prepared for:

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This project is also referred to as "SR 502/I-5 to Battle Ground – Add Lanes".

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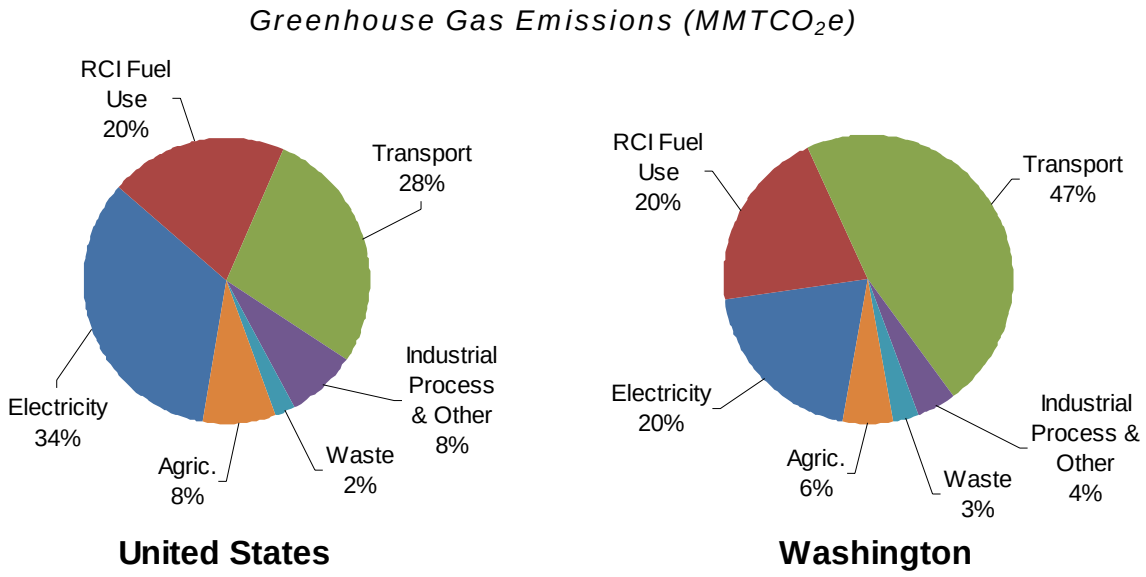
1.1 Climate Change – Greenhouse Gas Emissions

Greenhouse gases (GHGs) come in several forms. The gases associated with transportation are water vapor, carbon dioxide (CO2), methane (also known as "marsh gas"), and nitrous oxide (used in dentists' offices as "laughing gas"). CO2 makes up the bulk of the emissions from transportation. Any process that burns fossil fuel releases carbon dioxide into the air.

Vehicles are a significant source of greenhouse gas emissions and contribute to global warming primarily through the burning of gasoline and diesel fuels. National estimates show that the transportation sector (including on-road, construction, airplanes and boats) accounts for almost 30 percent or more of total domestic CO2 emissions.[1] However, in Washington State, transportation accounts for nearly half of GHG emissions because the state relies heavily on hydropower for electricity generation unlike other states that rely on fossil fuels such as coal, petroleum, and natural gas to generate electricity. The next largest contributors to total gross GHG in Washington are fossil fuel combustion in the residential, commercial, and industrial (RCI) sectors at 20 percent; and in electricity consumption, also 20 percent. The figure below shows the gross GHG emissions by sector, nationally and Washington State.

Exhibit 1. US and Washington State 2005 Greenhouse Gas Emissions by Sector



Source: Leading the Way on Climate Change: The Challenge of Our Time, February 2008, WA Dept. of Ecology Publication #08-01-008

1.1.1 What efforts are underway to reduce greenhouse gas emissions in Washington State?

In February 2007, the Governor issued Executive Order 07-02 requiring state agencies to find ways to reduce greenhouse gas emissions and adapt to the future that climate change may create.

On May 3, 2007, the Washington legislature passed Senate Bill 6001 which, among other things, adopted Governor Gregoire's Climate Change goals into state law. The law aims to achieve

[1] This percentage is based on 2004 data from the International Energy Administration and is consistent with 1996 guidelines on greenhouse gas emissions calculations issued by the Intergovernmental Panel on Climate Change (IPCC).

1990 greenhouse gas levels by 2020, a 25% reduction below 1990 levels by 2035, and 50% by 2050.

WSDOT is part of the solution. WSDOT is aggressively pursuing strategies to address climate change and recognize the responsibility to support the Governor's initiative. While the goals are clear, WSDOT also recognize that technical guidance and regulations to implement these goals are currently in development and will not be sufficiently determined before project environmental documentation is completed for this project.

At this time, the main way to reduce greenhouse gas emissions from transportation is to reduce the amount of fuel consumed by drivers. This can be achieved by:

- creating more efficient driving conditions (reducing traffic congestion),
- introducing more fuel-efficient vehicles, and
- reducing the amount of driving (through variety of methods telecommuting, transit, carpooling, more efficient movement of goods and services).

As a state, WSDOT has made some progress towards each of the three efforts. The Governor and Legislature funded a 16-year plan to meet Washington State's most critical transportation needs. WSDOT and their transportation partners, including city, county, and transit agencies, are in various stages of development on a specific list of projects selected by the Legislature to help with better movement of people and goods. The revenue is invested in a three tiered strategy designed to maximize the efficiency of the system:

Tier 1 – Low cost / high return from active traffic management, ramp metering, incident response combined with transportation demand management (including commute trip reduction, park n' ride, local land use planning).

Tier 2 – Moderate to higher cost/benefits from improvements in road network like adding short lanes to connect interchanges, direct access ramps for transit and high occupancy vehicles, center turn lanes to allow better traffic flow.

Tier 3 – Higher cost/corridor wide benefit from major investments in high occupancy vehicle lanes (HOV), high occupancy tolled lanes (HOT), transit, commuter rail, general purpose roadway lanes, interchange modifications, bus access.

Many local, regional, and statewide transportation system improvements and ongoing programs will help to reduce the number of miles that vehicles need to travel each year (typically referred to VMT).[2] In addition, the Governor and Legislature are actively working toward related improvements in land use decision making and more efficient transportation technology. In 2005 and 2007 the state legislature mandated vehicles sold in Washington starting with 2009 model years meet updated California emission standards. The new vehicle standards will reduce

[2] VMT is typically defined as the number of miles that an average vehicle is estimated to drive each year. However, for transportation projects with set boundaries, VMT can also refer to the aggregate number of miles that all the vehicles travel using the specific roadway use within the specific project area. Per person (or per capita) VMT in Washington is stable at 9,000 miles per person since the 1980s, meaning the number of vehicle miles has grown at roughly the same pace as the number of new residents. Methods of reducing VMT typically target transferring trips from single occupant vehicles to multiple person vehicles like carpools, vanpools, and transit.

greenhouse gas emissions, and help reduce carbon monoxide and ozone pollutants. Researchers are also working to reduce the carbon content of motor fuel for the future.

1.1.2 What effect will the No Build Alternative have on greenhouse gas emissions?

Quantitative modeling tools to evaluate greenhouse gas emissions at the project level are limited at this time, but better tools are under development and will be available from the US Environmental Protection agency within the next several years.[3] For this memorandum, overall CO_2 emission burden levels for each alternative were calculated by multiplying a CO_2 emission factor in terms of pounds of CO_2 emitted per gallon of fuel consumed with the estimated amount of fuel consumed. An estimated 14,938 pounds of CO_2 would be generated in the AM Peak hour (6:30 a.m. to 7:30 a.m.) and an estimated 21,087 lbs of CO_2 would be generated in the PM Peak hour (4:30 p.m. to 5:30 p.m.).

The Traffic analysis indicates that the SR 502 corridor will experience substantial delays at the 2033 horizon if no improvements to SR 502 are implemented (the No Build Alternative). The SR 502 corridor is expected to operate at grid lock conditions thereby consuming slightly more fuel.

1.1.3 What effect will the transportation improvements of the Build Alternative have on greenhouse gas emissions?

Quantitative modeling tools to evaluate greenhouse gas emissions at the project level are limited at this time, but better tools are under development and will be available from the US Environmental Protection agency within the next several years.[4] For this memorandum, overall CO_2 emission burden levels for each alternative were calculated by multiplying a CO_2 emission factor in terms of pounds of CO_2 emitted per gallon of fuel consumed with the estimated amount of fuel consumed. An estimated 16,005 pounds of CO_2 would be generated in the AM Peak hour (6:30 a.m. to 7:30 a.m.) and an estimated 19,924 lbs of CO_2 would be generated in the PM Peak hour (4:30 p.m. to 5:30 p.m.).

During the morning peak hour, 34 percent more vehicle miles traveled are anticipated under the Build Alternative than under the No Build Alternative; 54 percent more vehicles miles traveled are expected during the evening peak hours. Although more vehicles would use SR 502 under the Build Alternative, these vehicles would be able to travel nearly twice as fast as they could under the No Build Alternative due to reduced congestion and other mobility improvements. Improved speeds equate to a more efficient rate of fuel consumption, and therefore the fuel consumption and the greenhouse gas emissions are approximately the same for the two alternatives despite the difference in the number of vehicles traveling on SR 502.

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[3] Some projects have applied EPA's equation: fuel consumed (FC) is the amount of fuel that would be used to operate a vehicle or bus. The emission factor (EF) is the amount of CO2 that would be emitted during combustion of a gallon of fuel. This equation does not take into account the speed of vehicles on the roadway and is not a recommended analysis method for transportation projects. Light duty vehicles are most efficient at moderate speeds in the range of 40 to 55 miles per hour. Current modeling systems available in Washington State are not able to account for speed. The result is that we are unable to show the effect of this improvement in traffic flow on emissions until future EPA tailpipe emission models are issued.

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