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NO. 67549-4-I

COURT OF APPEALS, DIVISION ONE
OF THE STATE OF WASHINGTON

CASCADE BICYCLE CLUB, a Washington non-profit corporation,
FUTUREWISE, a Washington non-profit corporation and SIERRA
CLUB, a California non-profit corporation

Appellants,

v.

PUGET SOUND REGIONAL COUNCIL, a state regional
transportation planning organization and a federally designated
metropolitan planning organization

Respondent,

APPELLANTS' OPENING BRIEF

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I. INTRODUCTION

Cascade Bicycle Club, Futurewise and Sierra Club appeal the Puget Sound Regional Council's adoption of *Transportation 2040*, the plan that directs the development of transportation infrastructure and the allocation of transportation funding within King, Kitsap, Pierce and Snohomish counties over the next 30 years. These organizations (also referred to collectively as "Cascade") challenge *Transportation 2040* ("T2040") for failure to comply with the Limiting Greenhouse Gas Emissions statute, Chapter 70.235 RCW, and failure to comply with the State Environmental Policy Act, Chapter 43.21C RCW.

The Limiting Greenhouse Gas Emissions statute at RCW 70.235.020(1)(a) requires the state to reduce its emissions of greenhouse gases (GHG) to specified limits by years 2020, 2035 and 2050. *T2040* is subject to those limits because the Puget Sound Regional Council (PSRC) acts as an agent of the state for transportation planning, funding and implementation of transportation investments in the Puget Sound region and its own policies commit it to compliance with the state GHG reductions. However, *T2040* adopts a set of transportation programs and projects that would far exceed those limits. *T2040* violates the requirements of RCW 70.235.020(1)(a) and is contrary to law.

The State Environmental Policy Act (SEPA) is an environmental full disclosure law that requires the identification and analysis of all significant impacts and the consideration of measures and alternatives to avoid and mitigate those impacts. The Environmental Impact Statement (EIS) prepared for *T2040* fails to comply with SEPA's mandates by failing to disclose *T2040*'s noncompliance with the statutory GHG emission limits and failing to consider alternatives and mitigations that would achieve those limits.

Cascade asks that violation of the state's GHG reduction requirements be remedied by a remand to PSRC for adoption of a plan fully compliant with those requirements. For violation of SEPA, Cascade seeks a remand to the PSRC for preparation of a supplemental EIS fully compliant with SEPA's requirements, including the analysis of an alternative and mitigations that would meet the state's greenhouse gas reduction requirements.

II. ASSIGNMENTS OF ERROR¹

A. Appellants assign error to Resolution No. PSRC-A-2010-02 through which the PSRC resolved that *T2040* conformed to the requirements of the State Environmental Policy Act and to other state statutes and regulations.

¹ Although this appeal seeks review of an administrative decision by the PSRC, error is assigned to both the PSRC's decision and the superior court's ruling.

B. Appellants assign error to the superior court's conclusion 3, together with any findings inferred to support that conclusion and the court's order, through which the court held that RCW 70.235.020 did not impose a requirement on PSRC to meet statutory emission reductions and that Appellants had failed to state a claim for relief under CR 12(b)(6).

C. Appellants assign error to the superior court's conclusion 4, together with any findings inferred to support that conclusion and the court's order through which it held that impacts, alternatives and mitigation measures were adequately identified, analyzed and disclosed and the EIS was legally adequate under the SEPA.

III. ISSUES PERTAINING TO ASSIGNMENTS OF ERROR

A. Did the PSRC adopt *T2040* in violation of the Limiting Greenhouse Gas Emissions statute where the selected alternative is incapable of attaining the established GHG reduction requirements? (This issue addresses assignments of error A & B.)

B. Did the PSRC adopt *T2040* in violation of the SEPA where the EIS fails to disclose the Plan's violation of GHG reduction requirements and fails to consider alternatives or mitigations that would comply with those requirements? (This issue addresses assignments of error A&C.)

IV. STATEMENT OF THE CASE

A. The Parties.

The Cascade Bicycle Club is a Washington nonprofit corporation and is the nation's largest organization that promotes bicycling for recreation, transportation and human health. Cascade has over 13,000 active members and over 50,000 people in its database. The majority of Cascade's members reside within the four county region covered by *T2040*.²

Futurewise is a Washington nonprofit corporation whose mission is to promote healthy communities and cities while protecting working farms, working forests and shorelines for present and future generations. Futurewise has over 1,200 members throughout the state, many of whom live and own property within the four county region of PSRC.³

Sierra Club is a California non-profit corporation. Founded in 1892, Sierra Club is the oldest conservation organization in the United States. Sierra Club's mission is to explore, enjoy, and protect the wild places of the earth, to practice and promote responsible use of the earth's ecosystems and resources, to educate and enlist humanity to protect and restore the quality of the natural and human environment and to use all lawful means to carry out these objectives. At the state level, Sierra Club works

² CP 4, 18, verified Complaint, ¶¶2.1.

³ CP 7, verified Complaint, ¶¶2.2.

through its state chapter and local groups. The Washington Chapter of Sierra Club has approximately 30,000 members, about 25,000 of whom reside within the Puget Sound region.⁴

The Puget Sound Regional Council is the Metropolitan Planning Organization (MPO) created and designated under federal highway and transportation statutes, 23 USC §134 and 49 USC §5301 *et seq.* for the four county Metropolitan Planning Area of King, Kitsap, Pierce and Snohomish counties.⁵ As the MPO, the PSRC is charged by federal statute with preparing and adopting a metropolitan transportation plan for the four county region to guide the funding and development of future transportation projects.

By state statute, Ch. 47.80 RCW, the PSRC is the Regional Transportation Planning Organization (RTPO) for the same four county area. As the RTPO, the PSRC is charged with preparing and updating a regional transportation plan for the four county area. A requirement of state law, the regional transportation plan is used to certify the transportation elements of the comprehensive plans of the cities and counties within the Puget Sound region and to assure

⁴ CP 9, verified Complaint, ¶12.3.

⁵ The Governor designated PSRC as the MPO for the Puget Sound region on September 24, 1991. A copy of the Governor's designation letter is set forth at Category 6, PSRC 028675 of the Administrative Agency Record, which has been forwarded to the Court of Appeals in electronic format. The Category number identifies the disk on which the document appears and the PSRC number identifies the sequential page of the document. The referenced letter is also set forth at Exhibit 1 to Cascade's hearing memorandum, which the superior court has converted into an exhibit and forwarded to the Court of Appeals. CP 278 *et seq.*

the consistency of those plans with the state-wide transportation plan.⁶ By law, the state-wide transportation plan must be consistent with the PSRC's transportation plan, *T2040*.⁷ The four counties, and the cities within those counties, have entered into an interlocal agreement establishing the PSRC as a regional planning agency under the provisions of the Interlocal Cooperation Act, RCW Ch. 39.34.⁸ Thus, *T2040* has been adopted to fulfill the requirements of both federal and state transportation planning laws.

B. Evidence of Climate Change.

The increasing concentration of greenhouses gases in the atmosphere has produced the most serious environmental problem faced by human civilization.⁹ Greenhouses gases (GHG) are those that have been shown to change the climate by increasing the insulative effect of atmospheric gases, thereby reducing the radiation of the earth's heat back into the atmosphere.¹⁰ GHG include the gases of carbon dioxide (CO₂), methane (CH₄), nitrous oxide (NO₂) and various fluorocarbons and fluorides.¹¹

⁶ RCW 47.80.023.

⁷ RCW 47.06.040.

⁸ The Interlocal Agreement is set forth at Category 6, PSRC 028700 of the Administrative Agency Record.

⁹ Department of Ecology, et al., *Growing Washington's Economy in a Carbon-Constrained World* at 5 (December 2008), Category 4, PSRC 023895.

¹⁰ FEIS, Chapter 6 (PSRC 001445 *et seq*) at 6-5, PSRC 001445 *et seq*.

¹¹ Department of Ecology, *Washington Greenhouse Gas Inventory, etc.* at ES-1 (December 2007), Category 4, PSRC 021409. For their impact upon climate, these gases are grouped together as producing a carbon dioxide equivalent (CO₂e), typically measured in million metric tons (abbreviated as MMTCO₂e).

1. Increased concentrations of GHG.

The increasing concentration of GHG in the atmosphere is well established. Since the beginning of industrialization the concentration of CO₂ in the atmosphere has risen about 35%, from 280 parts per million (ppm) to a concentration of 386 ppm in 2009.¹² As determined by an analysis of ice core samples, the present concentrations of CO₂ are higher than at any time in the last 650,000 years.¹³

2. Increased temperatures.

Increased GHG levels have caused an increase in average global temperature. Over the 20th Century, the earth's average global surface level temperature has increased about 1.3°F (.74°C).¹⁴ Over the same time frame in the US, the average temperature has risen 1.25°F with an average warming of .13°F per decade.¹⁵ The Intergovernmental Panel on Climate Change (IPCC) has concluded that the "warming of the climate system is unequivocal[.]"¹⁶

¹² NHTSA, *Draft Environmental Impact Statement, CAFE Standards* at 3-62 (September 2009), Category 4, PSRC 026151.

¹³ FEIS, Chapter 6 at 6-5, Category 1, PSRC 01449; Chapter 6 also is set forth at Appendix C to this brief.

¹⁴ NHTSA, *Draft Environmental Impact Statement, CAFÉ Standards* at 3-60, Category 4, PSRC 026149.

¹⁵ NHTSA, *DEIS* at 3-68, PSRC 026157.

¹⁶ IPCC, *Climate Change 2007 Synthesis Report* at 2, Category 4, PSRC 018215, set forth at Exhibit 14. The IPCC was created in 1998 by the World Meteorological Organization and the United Nations Environment Programme for the purposes of assessing scientific information related to climate change, evaluating the environmental and socio-economic impacts of climate change and formulating response strategies. Since its

3. Effects of increased GHG and temperatures.

Increased GHG concentrations and the resultant increase in global temperatures have produced a number of other climate and environmental changes. Over the past 30 years, higher temperatures have produced increased concentrations of atmospheric water vapor which in turn have increased the amount, frequency and intensity of precipitation.¹⁷

Climate warming has resulted in the melting of sea ice and glaciers. For example, total annual Arctic sea ice has declined at a rate of about 3% per decade in the 30 year period of 1979 – 2008. Loss of glacier mass is occurring in mountainous states, particularly in the Pacific Northwest and Alaska.¹⁸

The warming and expansion of ocean waters and the melting of sea ice and glaciers have in turn increased sea levels. For example, portions of the Atlantic and Gulf Coasts have experienced sea level rises of .8 to 1.2 inches per decade, when combined with land subsidence.¹⁹ Rising sea levels in turn

creation the IPCC has produced four assessment reports (1990, 1995, 2001 and 2007). The *Synthesis Report* is the fourth volume of the Fourth Assessment Report and summarizes the findings of the three Working Group reports also included within the Fourth Assessment Report. The Fourth Assessment Report is the product of 500 lead authors and 2000 expert reviewers. PSRC 018208. The IPCC assessment reports are the most comprehensive works on the subject of climate change. PSRC 018205.

¹⁷ NHTSA, *DEIS* at 3-68, PSRC 026157.

¹⁸ *Id.* at 3-69, PSRC 026158.

¹⁹ *Id.* at 3-68, PSRC 026157.

increase the zone of impact for storm surges and waves, resulting in increased coastal erosion.²⁰

Climate warming has delayed freeze-up, hastened the melting of river and lake ice and reduced stream flows. In the western United States snow pack has declined between 15 and 30% over the past 60 years.²¹

As ocean waters absorb CO₂, the acidity of the ocean has risen, by about .1 pH units since the industrial revolution. Increased acidity of marine waters in turn reduces the availability of calcium carbonate for the formation of shells, skeletons and other protective structures of marine organisms such as for corals, crustaceans and mollusks.²²

Changes in temperature and climate affect other biological systems besides sea life, by lengthening growing seasons for plants and causing wildlife migrations to occur earlier.²³

4. Projected future GHG concentrations and climate changes.

To forecast future climate change impacts the IPCC has prepared a number of GHG emission scenarios within its publication, *Special Report on Emissions Scenarios*, issued as part of its *Fourth Assessment Report*. These scenarios, which are based upon a number of assumptions regarding population,

²⁰ *Id.*

²¹ *Id.*

²² *Id.* at 3-72 to 3-73, PSRC 026161-62.

²³ *Id.* at 3-70, PSRC 026159.

economic growth, technological change and land use activity, show increases in GHG production over the next century. Without any additional efforts to constrain GHG emissions, these scenarios project an increase in CO₂e emissions of between 25 and 90% in the period of 2000 to 2030.²⁴ The *Special Report* forecasts that such increases in emissions would increase average global temperature of between 1.8 and 4.0°C and produce a rise in sea level of .18 to .59 meters over the 21st century, again depending upon the particular scenario.²⁵

5. Human impacts of climate change.

Temperature increases of between 1.5 and 2.5° C will likely place 20-30% of plant and animal species at increased risk of extinction.²⁶ At lower elevations, particularly in dry and tropical regions, temperature increases of 1° to 2°C are projected to cause reductions in crop yields, increasing the risk of hunger.²⁷ Climate change also will exacerbate stresses on water resources, already impacted by population expansion, economic development and land use changes. The combined effects of increased temperatures, sea level rise, disruption of ecosystems, reduced crop yields and changes in water resources will affect large

²⁴ *IPCC, Synthesis Report* at 44, PSRC 018257.

²⁵ *Id.* at 45, PSRC 018258. (However, the projected sea level rises do not include projections based upon the possible loss of the Greenland and Antarctic ice sheets.)

²⁶ *Id.* at 48, PSRC 018261.

²⁷ *Id.*

populations due to increased malnutrition, disease, increased range of parasites and low land flooding.²⁸

6. Local effects of climate change.

The Climate Impacts Group at the University of Washington has prepared projections of climate change impacts in its publication, *The Washington Climate Change Impacts Assessment: Evaluating Washington's Future in a Changing Climate* (June 2009).²⁹ As reported by the Climate Impacts Group, temperatures within the State of Washington have increased 1.5°F since 1920.³⁰ Based upon 20 different climate models, the Climate Impacts Group has projected temperature increases in Washington of 2°F by the 2020s, 3.2°F by the 2040s and 5.3°F by the 2080s, as compared to temperatures between 1970 and 1999.³¹

Over the 21st century, the models project increases in sea level of 2-13 inches, depending upon location.³² Over the period of 2010 - 2080, increased temperatures and the shift of precipitation from snow to rain are projected to reduce the snow water content (*i.e.*, snowpack) by 53 to 65%.³³ Increased precipitation and

²⁸ *Id.*

²⁹ A full copy of the *Climate Change Impacts Assessment* is contained in the Administrative Record at Category 4, PSRC 021838. This document is a comprehensive examination of climate change by over 60 scientists and researchers associated with the University of Washington. PSRC 021841.

³⁰ *Id.*, Executive Summary at 1, PSRC 021844.

³¹ *Id.*

³² *Id.* at 6, PSRC 021849.

³³ *Id.* at 8, PSRC 021851.

reduced snowpack are projected to increase winter stream flows and reduce spring and summer flows, which in turn would result in increased winter flooding events, but lower water supplies available for agriculture, hydropower and anadromous fish.³⁴

The Climate Impacts Group projects that increased temperatures will increase the number of heat-related deaths. Under a medium climate change scenario, 101 additional heat-related deaths can be expected by 2025 and an additional 150 deaths by 2045 in King, Pierce and Snohomish Counties.³⁵

7. Anthropogenic causes of climate change.

The atmospheric concentrations of CO₂ and CH₄ far exceed their natural range over the past 650,000 years. Increases in CO₂ concentrations primarily result from the burning of fossil fuels.³⁶ Conclusions drawn from the physical effects of increasing GHG concentrations, the historical estimates of past climate changes and computer-based climate models indicate that natural causes alone (e.g., solar activity, volcanoes and changes in the earth's orbit) cannot explain observed global warming and that observed temperature changes over the past century can only be explained by using model simulations that contain both natural and anthropogenic causes.³⁷ The IPCC has concluded with very high

³⁴ *Id.* at 8,10, PSRC 021851,53.

³⁵ *Id.* at 18, PSRC 021861.

³⁶ IPCC, *Synthesis Report* at 37, PSRC 018250.

³⁷ *Id.* at 47-51, PSRC, 018260-64.

confidence (a probability of 90-99%) that the observed increase in global average temperatures is due to anthropogenic increases in GHG emissions.³⁸

8. The contribution of transportation to increased GHG emissions.

The EPA has determined that emissions from motor vehicles are substantial sources of greenhouse gas emissions and concluded that these emissions “endanger the public health and the public welfare of current and future generations.”³⁹ Based upon this finding, the EPA and NHTSA, among other actions, have promulgated tighter emission standards for light duty vehicles⁴⁰ and have proposed the first ever fuel economy and emission standards for medium-and heavy-duty trucks.⁴¹

Statewide, the transportation sector in Washington is responsible for about 47% of GHG emissions, with on-road vehicles responsible for about three fourths of those emissions.⁴² Within the

³⁸ IPCC, *Synthesis Report* at 37, PSRC 018250.

³⁹ EPA Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act, 74 FR 66496 (December 15, 2009), generally referred to as EPA’s Endangerment Finding.

⁴⁰ See Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards, 75 FR 25324 (May 15, 2010), which require passenger cars, light duty trucks and medium duty passenger vehicles by 2016 to meet a combined average emission level of 250 grams of carbon dioxide per mile, equivalent to 35.5 miles per gallon. The regulations are available at <http://www.epa.gov/otaq/climate/regulations.htm#finalR>.

⁴¹ EPA, Office of Transportation and Air Quality, Notice EPA –420-F-10-901 (October 25, 2010), available at www.epa.gov/otaq/climate/regulations.htm.

⁴² Washington State Department of Community, Trade and Economic Development (now Commerce), *Washington State Greenhouse gas*

four county Puget Sound region, the transportation sector accounts for about 50% of all GHG production⁴³ with on-road vehicles making up about 75% of transportation generated emissions.⁴⁴ GHG emissions in the Puget Sound region account for about half of the state's total. Accordingly, the transportation sector in the Puget Sound region produces about one fourth of the state's total GHG production.⁴⁵ Thus, the control of transportation generated GHG emissions in the Puget Sound region can significantly reduce the state's total GHG production.

C. The State's Efforts to Reduce GHG Emissions.

Over the past six years, the state has taken a number of actions to reduce GHG emissions and to address the impacts of climate change.

In 2004, the Governor helped form the West Coast Governor's Global Warming Initiative (the "Western Climate Initiative") through which the western states of Washington, Oregon, California, Montana, Utah, Arizona and New Mexico and the Canadian provinces of British Columbia, Manitoba, Ontario and Quebec agreed to set GHG reduction targets for purposes of

Inventory and Reference Case Projections, 1990 – 2020 (December 2007), Table ES-1, at ES-5, Category 4, PSRC 021407.

⁴³ Puget Sound Clean Air Agency (PSCAA), *Roadmap for Climate Protection: Reducing Greenhouse Gas Emissions in Puget Sound* (December 29, 2004) at 30, Category 4, PSRC 017428.

⁴⁴ *Id.* at 30.

⁴⁵ *Id.* at 30.

tracking GHG emissions and developing a market-based program to reach those targets.⁴⁶

In 2007, the state legislature adopted the Climate Change Mitigation statute, Chapter 80.80 RCW, which was based upon findings that Washington was especially vulnerable to climate change, in part on account of its heavy dependence upon snow pack. RCW 80.80.005. The Climate Change Mitigation statute formally adopted the following GHG reduction goals: by 2020, the reduction to 1990 levels; by 2035, the reduction to 25% below 1990 levels; and by 2050, the reduction to 50% below 1990 levels.⁴⁷

In 2008, the state legislature adopted the Limiting Greenhouse Gas Emissions statute, Chapter 14, §3 (Laws of 2008), codified at Chapter 70.235 RCW.⁴⁸ Among other things, the GHG reduction statute repealed the GHG reduction “goals” of RCW 80.80.020 and re-enacted those same standards as mandatory limits.⁴⁹ The GHG statute directed the Department of Ecology to prepare a GHG reduction plan and to coordinate with Western Climate Initiative members in designing a market-based system to reduce GHG emissions.⁵⁰ Further, the statute directed all state agencies to meet additional GHG reduction

⁴⁶ <http://westernclimateinitiative.org/history>.

⁴⁷ RCW 80.80.020.

⁴⁸ A copy of RCW Chapter 70.235 is set forth at Appendix A to this brief.

⁴⁹ RCW 70.235.020(1)(a).

⁵⁰ RCW 70.235.020(1)(b) and .030.

requirements.⁵¹ The Session Law that adopted the GHG statute, Chapter 14 (Laws of 2008), also directed the state Department of Transportation to adopt benchmarks for the reduction of vehicle miles traveled, a requirement now codified at RCW 47.01.440.⁵²

Based upon a finding that “effective and immediate action to reduce greenhouse gas emissions ... is essential to the future well being of all Washingtonians”, the Governor in May 2009 adopted Executive Order 09-05, which directed the Department of Ecology to continue participation in the Western Climate Initiative and to develop emission benchmarks for various industries. It also directed the Department of Transportation to estimate current and future levels of vehicle miles traveled (VMT) and to work with PSRC and other regional transportation planning organizations to develop regional transportation plans to reduce GHG emissions and meet the VMT benchmarks.⁵³

D. PSRC’s Adoption of Transportation 2040.

As the state Regional Transportation Planning Organization for the four county Puget Sound region, the PSRC is required to adopt, and to periodically update, a regional transportation plan,

⁵¹ RCW 70.235.050.

⁵² Chapters 70.235, RCW 47.01.440, the Session Law, Chapter 14 (Laws of 2008), and an amendment to that bill are set forth at Appendix A to Cascade’s Hearing Memorandum and appear at CP196.

⁵³ A Copy of Executive Order 09-05 is set forth at Appendix B to Cascades’ Hearing Memorandum below and appears at CP251.

which must be developed in coordination with the state Department of Transportation, port authorities, local governments and transportation providers within the region.⁵⁴ To provide a framework for its transportation plan and land use planning under the Growth Management Act, Chapter 36.70A RCW, the PSRC in 2008 adopted a regional growth strategy, entitled *VISION 2040*.⁵⁵ This plan adopts a set of regional growth policies, known as Multi-County Planning Policies. These policies serve three functions: to implement *VISION 2040*'s growth strategy; to guide planning by local governments under the GMA; and to provide policies for the PSRC's functional plans, including *T2040*.⁵⁶ Among other policies, *VISION 2040* adopted Policy MPP-En-20 which commits the PSRC region, "at a minimum", to compliance with the state's GHG reduction requirements.

On May 29, 2009, the PSRC issued a Draft Environmental Impact Statement (EIS) for *T2040*, on which each of the appellant organizations commented. About a year later, on March 19, 2010, the PSRC issued its Final EIS for *T2040*.⁵⁷ However, as shown more fully below, the Final EIS failed to demonstrate that any of its

⁵⁴ RCW 47.80.023(2) and .030.

⁵⁵ *VISION 2040*, referenced in the decision record at Category 6, PSRC 028953 also is available at <http://psrc.org/growth/vision2040>.

⁵⁶ *VISION 2040* at 29, Part III - Multi-County Planning Policies, available at http://psrc.org/assets/1738/Part_III_Multicounty_Planning_Policies.pdf.

⁵⁷ The Final Environmental Impact Statement is contained in the agency record at Category 1, PSRC 001445, *et seq.* A copy of FEIS Chapter 6 is set forth at Appendix D to this brief.

alternatives or mitigations were capable of meeting the statutory GHG reduction requirements.

On May 20, 2010, the PSRC adopted Resolution No. PSRC-A-2010-02, enacting *T2040* as the federal metropolitan transportation plan and the state regional transportation plan for the four-county region.⁵⁸ *T2040* adopts two categories of programs and projects: those that are “financially constrained”, for which identified funding exists; and those that are “unprogrammed”, for which funding remains to be identified.⁵⁹ Implementation of either alternative would exceed the GHG emission limits established by RCW 70.235.010(1)(a), would fail to stabilize climate change impacts and would produce unmitigated significant adverse impacts upon the environment.

From the adoption of *T2040* Cascade appealed.⁶⁰

E. Superior Court Review.

The Honorable Carol Schapira of the King County Superior Court considered Cascade’s appeal of *T2040* on the decision record compiled by PSRC, the declarations submitted in support of and in response to PSRC’s affirmative defenses and the briefing presented by the parties. On June 28, 2011, the court heard oral argument and ruled in the favor of PSRC. The court dismissed the

⁵⁸ Resolution No. PSRC-A-2010-02 is set forth at Category 2, PSRC 003297. A copy of *T2040*, Chapter 3 is set forth at Appendix B to this brief.

⁵⁹ *T2040* at 69.

⁶⁰ CP 1 (summons and complaint).

GHG statute claims on grounds that the PSRC was simply a voluntary planning board and not bound by the statutory limits and it found the EIS to be adequate. The court also denied PSRC's affirmative defenses of lack of standing and political question.⁶¹

V. STANDARDS OF REVIEW

Appellants challenge *T2040* on two grounds: its failure to meet the GHG reduction requirements of RCW 70.235.210(1)(a); and its adoption in violation of the State Environmental Policy Act. The first issue is principally brought under Article IV, Section 6 of the Washington State Constitution.⁶² In such a challenge “the court reviews the agency's record ... to determine whether the action of a local legislative body was either illegal or arbitrary and capricious, depending on the issue presented.⁶³ The issue of *T2040*'s compliance with RCW 70.235.020(1)(a) thus presents an issue reviewable under Article IV, Section 6 for error of law. The issues, of whether *T2040* is subject to the requirements of RCW

⁶¹ CP 788 (Findings of fact, Conclusions of Law and Order of Dismissal).

⁶² *City of Des Moines v. Puget Sound Regional Council*, 97 Wn. App. 920, 925, 988 P.2d 993 (1999), *review denied*, 140 Wn.2d 1042 (affirming review of PSRC decisions under Article IV, Section 6). Plaintiffs' Complaint at 1 also asserts claims for declaratory and injunctive relief under Chapters 7.24 and 7.40 RCW.

⁶³ *Id.* See also, *Pierce County Sheriff v. Civil Service Com'n of Pierce County*, 98 Wn.2d 690, 695, 658 P.2d 648, 650 (1983)(agency's violation of rules governing its exercise of discretion is contrary to law and reviewable by constitutional certiorari).

70.235.020(1)(a) and whether Cascade’s complaint states a claim for relief also present questions of law and are reviewed *de novo*.⁶⁴

The second issue, the challenge to the legal adequacy of the EIS is brought under SEPA, which provides a right of action for the review of governmental compliance with the statute’s substantive and procedural provisions.⁶⁵ Judicially, the issue of EIS adequacy is treated as a question of law, subject to *de novo* review.⁶⁶ The *de novo* standard of review for EIS adequacy has been followed consistently since our state’s first EIS adequacy case.⁶⁷ While RCW 43.21C.090 provides that an agency’s determination under SEPA is “accorded substantial weight”, the adequacy of an EIS is ultimately a question of law for the court to determine *de novo*.

VI. ARGUMENT

A. The PSRC adopted *T2040* in violation of the GHG reduction statute.

T2040 has been adopted in violation of state law because the projects and programs authorized by the plan will cause the Puget Sound region to far exceed the GHG reduction limits in RCW

⁶⁴ *Ruvalcaba v. Kwang Ho Baek*, 159 Wn. App. 702, 708, 247 P.3d 1, 4, 247 P.3d 1 (2011)(The interpretation and applicability of a statute present questions of law reviewed *de novo*) and *Kinney v. Cook*, 159 Wn.2d 837, 842, 154 P.3d 206 (2007)(review of dismissal for failure to state a claim presents a question of law).

⁶⁵ RCW 43.21C.075(1) and .080(2)(a).

⁶⁶ *Klickitat County Citizens Against Imported Waste v. Klickitat County (Klickitat County)*, 122 Wn.2d 619, 633, 860 P.2d 390 (1993).

⁶⁷ *Leschi Improvement Council v. Washington State Highway Commission (Leschi)*, 84 Wn.2d 271, 285, 525 P.2d 774 (1974).

70.235.020(1)(a). This statute establishes the following greenhouse gas reduction requirements:

(1)(a) The state shall limit emissions of greenhouse gases to achieve the following emission reductions for Washington state:

(i) By 2020, reduce overall emissions of greenhouse gases in the state to 1990 levels;

(ii) By 2035, reduce overall emissions of greenhouse gases in the state to twenty-five percent below 1990 levels;

(iii) By 2050, the state will do its part to reach global climate stabilization levels by reducing overall emissions to fifty percent below 1990 levels, or seventy percent below the state's expected emissions that year.

A separate section, RCW 70.235.050, directs all state agencies to meet the GHG reduction requirements of 70.235.020 and to meet additional GHG reduction requirements set forth at RCW 70.235.050.

1. The statute sets GHG reduction requirements, not merely goals.

The statute's direction that "state shall limit emissions of greenhouse gases" to achieve the specified reductions by 2020, 2035 and 2050, sets a standard, not simply a goal. (Emphasis supplied.) At the time of the enactment of Chapter RCW 70.235, the state had already established as goals the specified reductions by those benchmark years through the Climate Change Mitigation statute, Chapter 80.80 RCW. However, Chapter 14, Laws of 2008 took the additional step of converting the GHG reduction goals into

mandatory limits, as clear from use of the predicate “shall” in RCW 70.235.020(1).⁶⁸

2. The GHG reductions seek to achieve climate stabilization.

The GHG reduction levels were not enacted in a vacuum. They follow broadly accepted GHG reduction standards aimed at achieving global climate stabilization, which is a stated objective of the Limiting Greenhouse Gas Emissions statute.⁶⁹ The Senate Bill Report for ESSHB 2815, enacted by Chapter 14, Laws of 2008, specifically cites to work by the IPCC.⁷⁰ The *IPCC Synthesis Report* concludes that to achieve climate stabilization with a temperature rise of between 2 and 2.4°C (3.6 - 4.3°F) above pre-industrialization levels and a sea level rise of between .4 and 1.4 meters, GHG emissions by 2050 must be reduced by 50 to 80% of 2000 levels.⁷¹ While the legislature chose limits at the low end of the scale, they do track requirements adopted by other states.⁷²

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⁶⁸ *Waste Management of Seattle, Inc. v. Utilities and Transp. Com'n*, 123 Wn. 2d 621, 629, 869 P.2d 1034 (1994) (“The use of the word ‘shall’ imposes a mandatory duty.”)

⁶⁹ RCW 70.235.020(1)(a)(iii)

⁷⁰ A copy of the Senate Bill Report for ESSHB 2815 is set forth at CP 232.

⁷¹ IPCC, *Synthesis Report* at 67, PSRC 018280 *et seq.*

⁷² The GHG reduction limit of 1990 emission levels by 2020 has been adopted by the states of California, Hawai’i and New Jersey. See Cal. Health & Safety Code § 38550, HRS § 342b-71 and NJS 26:2C-38, respectively.

3. The GHG reduction requirements apply to the PSRC.

The requirements of RCW 70.235.020(1)(a) apply to the adoption of *T2040* because the PSRC, formed under the Interlocal Cooperation Act,⁷³ has the same obligations and responsibilities as its constituent members, which include agencies and subdivisions of the state.

RCW 70.235.020(1)(a) provides that “[t]he state shall limit emissions of greenhouse gases ...” (Emphasis supplied.) Although Chapter 70.235 RCW does not contain a definition for the term, “state”, the term is uniformly defined to include all agencies, subdivisions, and instrumentalities of the state.⁷⁴

⁷³ Chapter 39.34 RCW.

⁷⁴ For example, see the following definitions of “state”:

RCW 7.60.005, relating to receiverships

(13) “State agent” and “state agency” means any office, department, division, bureau, board, commission, or other agency of the state of Washington or of any subdivision thereof, or any individual acting in an official capacity on behalf of any state agent or state agency.

RCW 8.26.020, providing relocation assistance in public acquisitions of property

(1) The term “state” means any department, commission, agency, or instrumentality of the state of Washington.

RCW 39.59.010, authorizing the investment of public funds:

(5) “State” includes a state, agencies, authorities, and instrumentalities of a state, and public corporations created by a state or agencies, authorities, or instrumentalities of a state.

RCW 49.60.400, prohibiting discrimination:

As well as being a Regional Transportation Planning Organization under Chapter 47.80 RCW, the PSRC has been formed through an Interlocal Agreement authorized under Chapter 39.34 RCW. The membership of the PSRC consists of certain statutory members, including the state transportation commission and the department of transportation,⁷⁵ and is open to all units of government within the four county region.⁷⁶ By forming an interlocal agreement, these agencies remain subject to the same legal obligations and responsibilities applicable in their individual capacities.⁷⁷ Because the PSRC is comprised of agencies and subdivisions of the state, the GHG reduction statute's directive to the "state" is binding upon their actions taken through the PSRC.

(7) For the purposes of this section, "state" includes, but is not necessarily limited to, the state itself, any city, county, public college or university, community college, school district, special district, or other political subdivision or governmental instrumentality of or within the state.

See also, *City of Seattle v. Fontanilla*, 128 Wn.2d 492, 504, 909 P.2d 1294, 1301 (1996)("That, in our judgment, [State of Washington] is a more specific reference than simply 'the state,' which can be considered synonymous with 'the government.'"), *State v. Durham*, 87 Wn.2d 206, 211, 550 P.2d 685 (1976)("The term 'state' is all-inclusive as used in the rules [of criminal procedure] and embraces not only the state but its political subdivisions.") and *City of Seattle v. State*, 103 Wn.2d 663, 670, 694 P.2d 641(1985)("Municipalities are political subdivisions of the State...").

⁷⁵ RCW 47.80.060.

⁷⁶ RCW 47.80.020 and the Interlocal Agreement, Category 6, PSRC 028700.

⁷⁷ *Harvey v. County of Snohomish*, 124 Wn. App. 806, 813-814, 103 P.3d 836 (2004), *reversed on other grounds*, 157 Wn.2d 33 (2006), citing to RCW 39.34.030(5)(subject to exceptions inapplicable here, no interlocal agreement "relieves any public agency of any obligation or responsibility imposed upon it by law.")

Stated differently, these agencies and municipalities do not insulate themselves from state directives through the formation of an interlocal agency.⁷⁸ The superior court's conclusion that RCW 70.235.020 is inapplicable to the PSRC is contrary to the provisions of the Interlocal Cooperation Act.

The superior court mischaracterizes the PSRC as "a voluntary regional planning board."⁷⁹ Even though the PSRC, like other regional transportation planning organizations (RTPO), has been created through a voluntary agreement of local governments, they are part of the state's coordinated and integrated system of transportation planning.⁸⁰ It is only "voluntary" if the region desired to forego all state and federal funding for its many transportation projects, including replacement of the Alaskan Way Viaduct, the SR 520 bridge and the extensions of light rail.

The PSRC is organized under state statute⁸¹ and in part is funded by the state⁸² and governed by the state.⁸³ Further, the PSRC plays an important role in directing state transportation planning in that the RTPO statute requires that the statewide

⁷⁸ CP 790 (Conclusion 3).

⁷⁹ CP 790.

⁸⁰ RCW 47.80.020.

⁸¹ The provisions of Chapter 47.80 RCW are included in Appendix C to the Hearing Memorandum in Superior Court, CP256.

⁸² RCW 47.80.050.

⁸³ RCW 47.80.040 (The PSRC transportation policy board includes a representative from the Washington State Department of Transportation.) and 47.80.060 (The voting membership of its executive board includes representatives of the state transportation commission and the state department of transportation.)

multimodal transportation plan prepared by the Washington State Department of Transportation must “be consistent with regional transportation planning...”⁸⁴ Because of its role in the state’s eligibility for and receipt of federal transportation funding, the PSRC in particular plays an essential part in state transportation planning.

As an RTPO, the PSRC is charged with adopting a regional transportation plan (RTP) that is consistent with both local city and county plans and with the statewide transportation plan.⁸⁵ Once adopted, this plan governs the development of regional transportation projects, including state facilities.⁸⁶ Consistency with the adopted RTP is a requirement for the development of any transportation project that will impact regional transportation facilities or services.⁸⁷ In other words, without adoption through an RTP, no regional facilities could be built. Adopted RTPs, and PSRC’s *T2040* in particular, thus determine which regional transportation projects can be built.

But the PSRC serves even a more significant role. As the federal Metropolitan Planning Organization (MPO) under both the federal highways act and the federal transportation act,⁸⁸ the PSRC is charged by federal law with adopting a transportation

⁸⁴ RCW 47.06.040.

⁸⁵ RCW 47.80.020(2).

⁸⁶ RCW 47.80.030(1)(b).

⁸⁷ RCW 47.80.030(3).

⁸⁸ RCW 47.80.020 and Letter formally designating the PSRC as the MPO for the four county Puget Sound, Category 6, PSRC 028675.

improvement plan (TIP) for the region.⁸⁹ In order to receive federal funding, a transportation project must be both listed in and consistent with the TIP.⁹⁰ Projects eligible to receive federal funding are to be selected by the MPO from the approved TIP.⁹¹ Thus, for receipt of federal funding for both state and non-state transportation projects in the Puget Sound region, the PSRC acts as the state's agent for the listing of and selection of projects.

In sum, the state has the authority to designate its agents for purposes of state and federal transportation planning. For the Puget Sound region the PSRC is that designated agent. The PSRC is made up of state agencies, municipalities and other subdivisions of the state that are subject to state directives. The directives of RCW 70.235.020(1)(a) are binding upon the PSRC, as they are upon its members. The superior court's ruling that the PSRC is not subject to RCW 70.235.020(1)(a) is in error.

4. The GHG reductions apply to T2040.

The GHG emissions limits of RCW 70.235.020(1)(a) apply to T2040 because the PSRC has committed the region to follow those requirements. The superior court at Conclusion 3 held that "those "emission limits apply to the state as a whole,"⁹² apparently based upon the statute's directive that "the state" ...reduce overall

⁸⁹ 23 USC §§134(c)(1) and 134(j)(1).

⁹⁰ 23 USC §§134(j)(3)(A) and 134(j)(5)(A).

⁹¹ 23 USC §§134(j)(5)(i)(I) and (134(k)(4)(A).

⁹² CP 790.

emissions” at specified increments by the stated years, since that is what PSRC argued below.⁹³ However, PSRC independently committed itself to compliance with GHG reductions of 70.235.020(1)(a).

VISION 2040, which *T2040* implements, commits the Puget Sound region to compliance with the state’s reduction of greenhouse gases through its adopted policy to:

Address the central Puget Sound region’s contribution to climate change by, at a minimum, committing to comply with state initiatives and directives regarding climate change and the reduction of greenhouse gases.

Policy MPP-En-20.⁹⁴ *T2040* repeatedly reaffirms that commitment.⁹⁵ While state law does not compel the PSRC to do so,

⁹³ CP 761.

⁹⁴ By statute, *T2040*, the regional transportation plan, must be consistent with the county-wide planning policies. RCW 47.80.023(2). Policy MPP-En-20 is among the multi-county policies adopted for the four county region under RCW 36.70A.210(7).

⁹⁵ *T2040* repeatedly commits the region to compliance with the state GHG reduction requirements:

The Puget Sound region is committed to meeting all state and federal targets for greenhouse gas emissions reductions. [*T2040* at 17, PSRC 003317]

The plan’s greenhouse gas reduction strategy is intended to lead and complement the development of the state strategy to meet greenhouse gas reduction goals. [*T2040* at 17]

Transportation 2040 sets the region on course to significantly reduce greenhouse gas emissions consistent with state goals through a flexible and balanced approach of land use, pricing, choices, and technology. [*T2040* at 20]

VISION 2040 calls for the region to reduce its overall production of harmful elements that contribute to climate

the PSRC is free to adopt policies committing the region to compliance with the same GHG reductions applicable to the state as a whole.⁹⁶

Once adopted within the multi-county policies, this commitment is binding upon *T2040* because the RTPO statute requires that the plan, as the region's transportation plan, be consistent with the adopted county-wide planning policies.⁹⁷ Therefore, consistency with those policies requires that *T2040* result in regional GHG reductions consistent with the state reductions. The superior court's ruling that the statutory GHG limitations apply only to the state and not to the Puget Sound region conflicts with the requirement of the RTPO statute and is contrary to law.

5. *T2040* fails to comply with the GHG reduction statute.

T2040 fails to comply with RCW 70.235.020(1)(a) because the emissions from its proposed projects and programs would be nearly double the GHG limits for 2040.

change, and commits the region to comply with state directives. [*T2040* at 49].

⁹⁶ See *Brown v. City of Yakima*, 116 Wn.2d 556, 562-63, 807 P.2d 353 (1991)(local government may adopt greater restrictions than conduct otherwise prohibited by statute).

⁹⁷ RCW 47.80.023(2) requires that the regional transportation plan be consistent with adopted county-wide planning policies. Under RCW 36.70A.210(7) the county-wide planning policies include the multiple county planning policies adopted under *VISION 2040*.

a. ***T2040's* GHG reduction strategy.**

T2040 identifies three objectives: investments to support the region's growth; a financing plan; and a strategy for reducing transportation's contribution to climate change. *T2040* at 11. The third identified objective, reducing transportation's contribution to climate change, is laid out within *T2040* at 49-52 and elaborated upon within Appendix L to *T2040*.⁹⁸ The Plan at 49 recognizes that transportation in the Puget Sound region generates about 50% of all GHG emissions. The Plan at 50 cites to RCW 70.235.020 and outlines a Four-Part Greenhouse Gas Reduction Strategy, consisting of land use, user fee, transportation choices and technology improvements.

As briefly summarized in *T2040* at 50-51 and more fully described in Appendix L, PSRC asserts that GHG reductions can be achieved through each of these strategies. Land use measures to reduce GHG principally rely upon implementation of PSRC's *VISION 2040*, which shifts development to a more compact and concentrated growth pattern.⁹⁹ User fees and transportation choices would attempt to reduce miles traveled and resultant GHG through tolls and increases in transit. The technology strategy recognizes that GHG reductions are potentially attainable through reduced carbon content of fuel and increased vehicle efficiency.

⁹⁸ The referenced pages of *T2040* and Appendix L are attached to this brief at Appendices B and C, respectively.

⁹⁹ *T2040* at 51.

Although *T2040* includes no measures to advance either, it develops two scenarios: a “likely scenario”, based upon current technologies, and an “aggressive scenario”, based upon a more concerted effort to increase fuel efficiency. The PSRC projects that the likely scenario would reduce GHG emissions by 25% and the aggressive scenario would reduce GHG emissions by 43%, each below projected emissions for 2040.¹⁰⁰

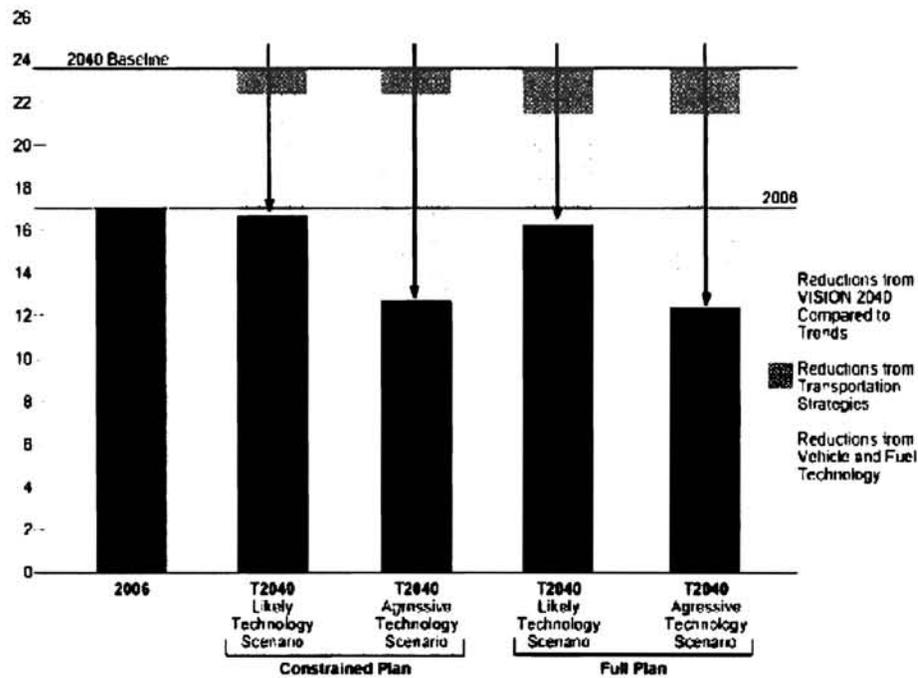
The projected results of PSRC’s GHG strategy are illustrated in *T2040* at 52, Exhibit 18 (and in Appendix L at L-1-10), which appears within the attached Appendix B:

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¹⁰⁰ *T2040* at 49 and Appendix L at L-2. The likely scenario assumes that by 2040 electric vehicles would make up 20% of the vehicle fleet, passenger vehicle economy would increase to 40 mpg and the carbon content in fuels would be reduced by 10%. The aggressive scenario assumes that by 2040 electric vehicles would make up 45% of the vehicle fleet, passenger vehicle economy would increase to 50 mpg and the carbon content of fuels would be reduced by 20%. *Id.*

Figure 18. Greenhouse Gas Emissions (CO₂ Emissions in Millions of Tons)



T2040, Appendix L-10 offers the following explanation of this graph:

As illustrated in the chart, the Four-Part Greenhouse Gas Strategy results in a range of emissions reductions between 31% and 48% below the 2040 Baseline trend, and between 5% and 28% below 2006 modeled emissions in the year 2040. As a comparison, the state's greenhouse gas emission reduction goals are to achieve 1990 levels by 2020, 25% below 1990 levels by 2035, and 50% below 1990 levels by 2050.

Of the five scenarios represented by the bars in the graph, the second bar, T2040 (FC) Likely Technology Scenario, most accurately projects the levels of GHG emission reductions for the projects and programs identified in T2040, since it is based upon transportation investments with identified funding sources and more probable advances in technology than the aggressive technology scenarios.

For the likely technology scenario, *T2040* at Figure 18 claims that its Four-Part Greenhouse Gas Reduction Strategy would reduce GHG emissions by the year 2040 to 5% below the 2006 baseline and to 31% below the 2040 baseline. However, the emission levels represented by these reductions grossly exceed the limits set by the GHG reduction statute, to which the PSRC had previously committed itself.

b. *T2040's* strategy fails to meet GHG reduction requirements.

The *T2040* GHG reduction strategy fails to meet the GHG reduction requirements of RCW 70.235.020(1) because *T2040* measures its claimed reductions from the wrong baselines and its strategies fall short of the required reductions in any regard.

As with any measurement, the beginning point makes a difference. *T2040* misrepresents its GHG reductions by measuring those reductions from 2006 when the statutory GHG reductions are to be taken from 1990 levels, which are about 20% below the GHG emissions of the 2006 time-frame that *T2040* actually uses.

Appendix L-10 at footnote 5 offers the following explanation for its use of the 2040 and 2006 baselines:

Throughout the draft plan and EIS process, the Transportation 2040 results have been compared primarily to the 2040 Baseline alternative, and to some extent also to the 2006 base year (PSRC does not have data for the 1990 year that is [*sic*] consistent with our current modeling framework; therefore, for the purposes of greenhouse gas emissions

comparisons the 2006 base year is provided as a surrogate).

(Emphasis supplied.) But PSRC's decision record does contain data of the 1990 GHG emission levels to which its projected GHG emissions should be compared. That data demonstrate that year 2006 emissions cannot serve as a "surrogate" for 1990 levels.

In April 2008, the PSRC prepared an analysis, *Transportation 2040: Climate Change and Vehicle Miles Traveled* to address two questions: how Transportation 2040 would address the GHG reduction goals in SB 6001 (now, the GHG reduction requirements in RCW 70.235.020); and how Transportation 2040 would address VMT reduction benchmarks (eventually adopted at RCW 47.01.440). That study provided data showing a 20% increase of GHG emissions from 1990 to 2005.¹⁰¹

The Administrative Record provides other data from which the increase in GHG emissions from 1990 to the 2005/2006 timeframe can be derived. The joint publication by the Departments of Ecology and Community, Trade and Economic Development (now Commerce) entitled, *Washington State Greenhouse Gas Inventory and Reference Case Projections, 1990-2020* (December 2007) reports that for the state's transportation sector as a whole GHG emissions increased from 37.5 MMTCO₂ in

¹⁰¹ *Transportation 2040: Climate Change and Vehicle Miles Traveled* is contained in the Administrative Record at PSRC 006654; the above referenced page is at PSRC 006667.

1990 to 44.5 MMTCO₂ in 2005, an increase of about 19%.¹⁰² The same study at C-9 reports that between 1990 and 2005, emissions from on-road gasoline vehicles increased by 21%. Increases in GHG emissions of about 20% in this 15 year period are consistent with national trends.¹⁰³

GHG emissions from transportation in the Puget Sound region follow state and national trends. In its publication, *Roadmap for Climate Protection: Reducing Greenhouse Gas Emissions in Puget Sound* (December 2004), the Puget Sound Clean Air Agency (PSCAA) reported that GHG emissions rose by 8% between 1990 and 2000 and were projected to increase by 21% by 2010.¹⁰⁴

None of these data support PSRC's use of 2006 GHG emissions as a "surrogate" for 1990 emission levels, as asserted by Appendix L at L-10, footnote 5. To account for differences between 1990 and 2006 GHG emission levels, PSRC's Four Part Strategy, and its Figure 18, should have included an adjustment showing 1990 levels to be 20% lower than 2006 levels. With such an adjustment, use of the 1990 baseline would show that the claimed

¹⁰² Executive Summary at ES-5, PSRC 021413.

¹⁰³ The US Department of State, *Fourth Climate Action Report to the UN Framework Convention on Climate Change*, Chapter 3 at 21-23 (2007) reports a 20% increase in CO₂ emissions from fossil fuel combustion in the 14 year period of 1990 – 2004. A copy of this report is set forth at Category 4, PSRC 017788. The *Fifth Climate Action Report*, Chapter 3 at 27 (2009) reports a 21.8% increase in CO₂ emissions between 1990 and 2007, Category 4, PSRC 022466.

¹⁰⁴ *Id.* at 21.

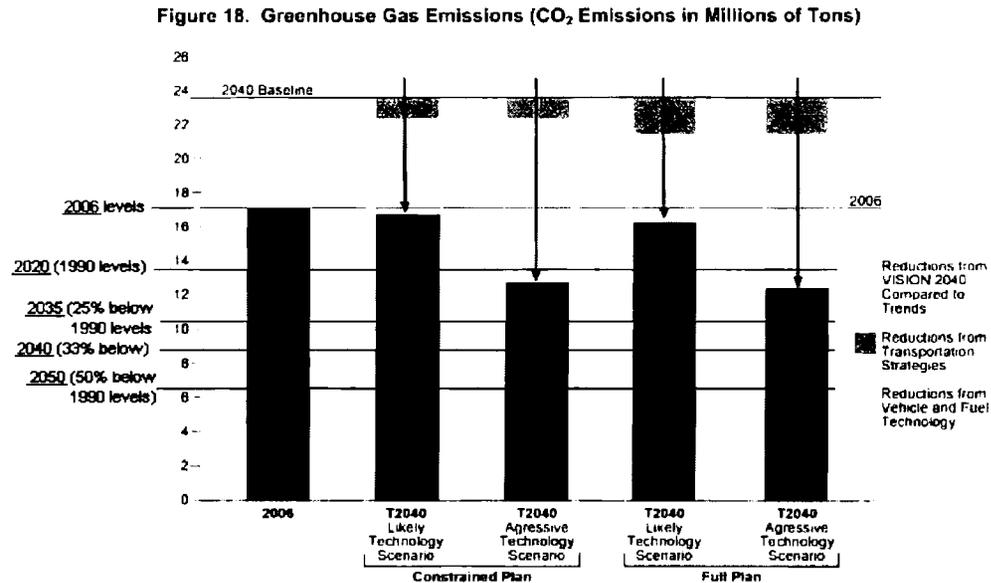
5% reduction in GHG emissions by 2040 under the T2040 Fully Constrained/Likely Technology scenario would actually produce emissions of about 15% above 1990 levels, far exceeding the GHG limits set by RCW 70.235.020(1)(a).

The GHG reduction statute requires reductions of 25% below 1990 emission levels by 2035 and 50% below 1990 levels by 2050. Assuming a constant rate of GHG reduction, an interpolation between 2035 and 2050 reduction levels would place the 2040 GHG emissions at about 33% below 1990 emission levels.¹⁰⁵ Thus by 2040, rather than a 5% reduction in GHG below the 2006 emission levels as claimed for *T2040*, a statutorily compliant plan would result in GHG reductions of 33% below 1990 levels. *T2040* is far from meeting this reduction. *T2040*'s projected year 2040 emissions do not come close to meeting the 2035 required reduction of 25% below 1990 emissions.

Because GHG emissions in 2005/2006 are about 20% greater than those in 1990, a 33% reduction below 1990 levels by the year 2040 would require a 53% reduction below 2006 levels. However, *T2040* proposes GHG reductions in 2040 of only 5% below 2006 levels, which exceeds statutory limits by 48%. Rather than being comparable to the GHG reduction requirements of RCW

¹⁰⁵ A further 25% increase in GHG reductions from 2035 to 2050 would require increased reductions of 1/3 of the necessary increased reductions every 5 years, or by about 33% by 2040 and 42% by 2045 in order to reach 50% of 1990 emission levels by 2050.

70.235.020(1)(a) as Appendix L-10 suggests, *T2040* would result in GHG emissions of nearly twice the statutory limits, placing the plan far out of compliance with the GHG reduction statute. The extent of noncompliance is illustrated by the following annotated version of Figure 18, an enlarged copy of which is set forth at Appendix E:



As shown above, *T2040* grossly exceeds the GHG reductions required by RCW 70.235.020(1)(a), since it would result in emissions of 15% above 1990 levels, rather than 33% below those levels. The superior court’s conclusion that “PSRC has done its part to reduce emissions from transportation[]”¹⁰⁶ is not supported by PSRC’s own data.

B. *T2040* has been adopted in violation of SEPA.

T2040’s adoption violates SEPA because its EIS fails to identify the extent of the plan’s violation of the state’s GHG reduction

¹⁰⁶ CP 791 (Conclusion 4).

requirements; it fails to disclose *T2040*'s inconsistency with *VISION 2040*; and it fails to develop alternatives or mitigations fully compliant with the state's GHG reduction requirements.

1. SEPA is to be liberally construed and vigorously enforced.

The State Environmental Policy Act (SEPA) is Washington's most fundamental and pervasive environmental law.¹⁰⁷ The statute contains both procedural requirements and substantive authority. Procedurally, the statute requires the integrated use of environmental values in decision making by all state and local agencies.¹⁰⁸ Substantively, SEPA grants governmental agencies the authority to use the environmental documentation to condition, and even deny, specific projects and other governmental actions based upon environmental impacts.¹⁰⁹

The principal vehicle for assuring that environmental factors are fully considered in governmental decision making is the environmental impact statement, which is required to be prepared for all major actions significantly affecting the quality of the environment.¹¹⁰ Because complete and accurate information is

¹⁰⁷ Settle, *The Washington State Environmental Policy Act: A Legal Policy and Analysis* §1.23 at 1-33 (December 2010).

¹⁰⁸ RCW 43.21C.030(2)(a).

¹⁰⁹ RCW 43.21C.060.

¹¹⁰ RCW 43.21C.030(2)(c).

essential for sound environmental decision making, the requirements of SEPA have been construed liberally.¹¹¹

SEPA's policies and mandates are exceptionally forceful and demanding. As our courts have noted:

To fulfill these purposes of restoring ecological health to our lives, SEPA mandates governmental bodies to consider the total environmental and ecological factors to the fullest in deciding major matters. The procedural duties imposed by SEPA - - full consideration to environmental protection - - are to be exercised to the fullest extent possible to insure that the "attempt by the people to shape their future environment by deliberation, not default" will be realized. *Stempel v. Department of Water Resources, supra*, 82 Wn. 2d at 118, 508 P.2d at 172. ... In view of this clear legislative mandate . . . SEPA [is to] be given a broad and vigorous construction.

(Emphasis and ellipses in original.) Cited by *West Main Associates v. City of Bellevue*, 49 Wn. App. 513, 518, 742 P.2d 1266 (1982).

2. An EIS is to be detailed.

SEPA provides that "in every recommendation or report on proposals for legislation and other major actions significantly affecting the quality of the environment" there shall be prepared "a detailed statement".¹¹²

¹¹¹ *Eastlake Community Council v. Roanoke Associates, Inc. (Eastlake)*, 82 Wn.2d 475, 490, 513 P.2d 46 (1973), in which the court accords SEPA "broad and vigorous construction".

¹¹² At RCW 43.21C.030(2). The required contents of an EIS are set forth at RCW 43.21C.030(2)(c), which provides in relevant part:

The legislature authorizes and directs that, to the fullest extent possible . . . (2) all branches of government of this state . . . shall:

...

3. The test for EIS adequacy.

The legal test for EIS adequacy is whether:

. . . the environmental effects of the proposed action and reasonable alternatives are sufficiently disclosed, discussed, and substantiated by supportive opinion and data.¹¹³

Under this test, sometimes referred to as the “rule of reason”,¹¹⁴

“conclusory statements not supported by scientific or objective data do not satisfy NEPA’s requirement for a ‘detailed’ statement.”¹¹⁵

4. The EIS fails to disclose T2040’s violation of GHG reduction requirements.

SEPA and its regulations require the T2040’s noncompliance with GHG reduction requirements to be disclosed, discussed and

(c) Include in every recommendation or report on proposals for legislation and other major actions significantly affecting the quality of the environment, a detailed statement by the responsible official on:

- (i) the environmental impact of the proposed action;
- (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented;
- (iii) alternatives to the proposed action;
- (iv) the relationship between local short-term uses of man’s environment and the maintenance and enhancement of long-term productivity; and
- (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

¹¹³ *Klickitat County*, 122 Wn.2d at 633 and *Leschi*, 84 Wn.2d at 286.

¹¹⁴ *Cheney v. City of Mountlake Terrace*, 87 Wn.2d 338, 344-45, 552 P. 2d 184 (1976), citing to *Trout Unlimited v. Morton*, 509 F.2d 1276, 1283 (9th Cir. 1974)(The “rule of reason” has been interpreted to require a “reasonably thorough discussion of the significant aspects of the probable environmental consequences . . .”)

¹¹⁵ *Citizens Against Toxic Sprays, Inc. v. Bergland*, 428 F. Supp. 908, 922 (D.C. Ore. 1977) Because SEPA is patterned after NEPA, our courts regard federal caselaw under NEPA as persuasive authority. *Juanita Bay Valley Community Ass’n v. City of Kirkland*, 9 Wn. App. 59, 510 P.2d 1140 (1973).

analyzed. As shown in the prior argument, *T2040* and the EIS misrepresent the Plan's compliance with the requirements of RCW 70.235.020(1)(a), by using incorrect baselines for the measurement of its claimed GHG reductions and by not identifying the extent of the plan's noncompliance with the GHG reduction requirements.

As noted above, an EIS must disclose and analyze:

(i) the environmental impact of the proposed action;

* * *

(v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.¹¹⁶

The scope and content of an EIS are further defined by regulations promulgated by the Department of Ecology and codified at WAC 197-11-440. Among other requirements, an EIS must:

(ii) Describe and discuss significant impacts that will narrow the range or degree of beneficial uses of the environment or pose long term risks to human health or the environment, ...¹¹⁷

The full extent of *T2040*'s violation of the statutory GHG emission limits requires disclosure in the EIS because: increased GHG emissions are impacts to the environment; the adopted emission limits do set standards for the protection of the public welfare¹¹⁸; exceeding those standards represent "irreversible and irretrievable commitments of resources" (the additional, irretrievable discharge

¹¹⁶ RCW 43.21C.030(2)(c)(i)&(v)(emphasis supplied).

¹¹⁷ WAC 197-11-440(6)(C)(ii)(emphasis supplied).

¹¹⁸ See Executive Order 09-50 at 2 ("effective and immediate action to reduce greenhouse gas emissions ... is essential to the future well being of all Washingtonians."), in part implementing Chapter 70.235 RCW.

of CO₂ into the environment); and those additional discharges “pose long terms risks to the environment”(the increased acidification of ocean waters, the raising of sea level, increased intensity of storm events, increased temperatures, the reduction of snow pack, decreased water supplies, the disruption of wildlife habitat and increased heat-related deaths).

Increases in GHG do impact the environment. Under SEPA, “impacts” are broadly defined as a proposal’s effects upon the environment.¹¹⁹ The environment in turn covers some 50 elements, including air quality, climate, and releases to the environment affecting public health.¹²⁰ Thus, the Plan’s impacts to the environment include its impacts upon air quality and climate caused by emissions to the air.¹²¹

With regard to air quality and other natural and depletable resources, RCW 70.235.020 sets the limits for GHG emission discharges. The *T2040* EIS was required to identify those requirements, which it does. *T2040* at 50 and FEIS at 6-12.

However, neither the Plan nor the EIS identify the extent of the

¹¹⁹ WAC 197-11-752.

¹²⁰ WAC 197-11-444(1)(b)(i)&(iii) and -444(2)(a)(iii).

¹²¹ The significance of an impact is judged by “context and intensity.... An impact may be significant if its chance of occurrence is not great, but the resulting environmental impact would be severe if it occurred.” WAC 197-11-794. The impacts of increased CO₂ upon the environment are significant because their probability is not only great but already occurring (e.g. the increase in global temperatures and sea levels, acidification of ocean waters and decrease in snow pack) and the resulting impacts are not only severe but potentially catastrophic (e.g., sea level rise, increased storm events, flooding of low elevation lands and melting of the ice fields of Greenland and Antarctica).

Plan's violation of the statutory GHG reduction requirements. The Plan's failure to explicitly disclose its noncompliance with those standards is shown within the prior argument. The EIS as well obscures the point.

Impacts upon air quality and climate change are addressed in the FEIS at Chapter 6.¹²² Greenhouse Gas emissions and their impacts on climate are specifically addressed at pages 6-5 to 6-6, 6-12 to 6-13; emissions of CO₂ are shown in Exhibit 6-3 on page 6-12 and Exhibits 6-8 and 6-9 on page 6-21 and mitigations are discussed at 6-25 to 6-29. But none of these discussions or exhibits disclose the extent of *T2040*'s violation of the GHG reduction requirements set by statute.

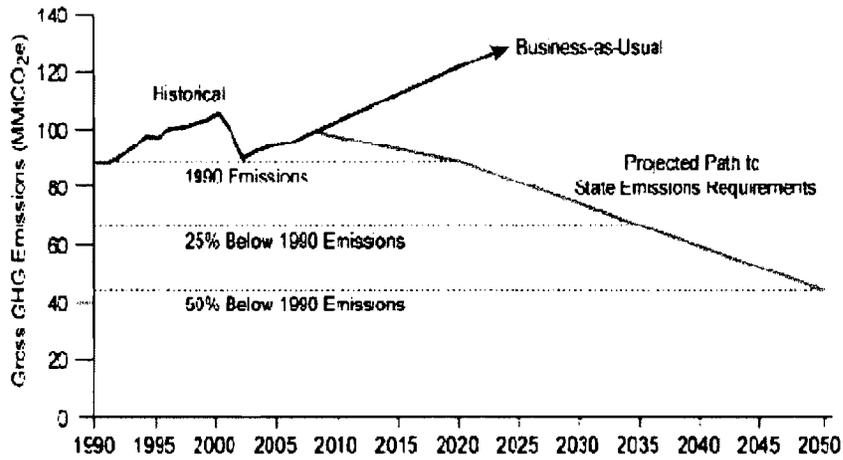
For example, Exhibit 6-3 shows the significant divide between GHG emission levels resulting from the continuation of current trends and those limits set by RCW 70.235.020, but omits the graph line that would disclose GHG emissions from the selected alternative:

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¹²² A copy of FEIS Chapter 6 is set forth at Appendix D to this brief.

Exhibit 6-3
Greenhouse Gas Reduction Goals



Source: CTEB, 2016

If added, the end point of a line representing GHG emissions for the selected alternative in the year 2040 would lie about 15% above the 1990 emissions line, when it should lie at about 33% below the 1990 emission line, a gross discrepancy.

By way of another example, Exhibit 6-8 page 6-21 lists projected CO₂ emissions for each of seven alternatives, plus the 2040 baseline alternative:

Exhibit 6-8¹
Emissions (annual tons)

	2006	2040 Baseline Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	PA-C	PA
CO ₂ Mobile	17,153,000	23,845,300	23,708,000	24,320,300	22,786,000	22,565,000	21,257,000	22,398,000	21,528,000
CO ₂ Buildings	8,890,000	13,178,300	13,154,000	13,088,300	13,106,000	13,198,000	12,189,000	13,245,000	13,141,000
Total CO ₂	26,051,000	38,924,300	36,862,000	37,108,300	35,894,000	35,704,000	34,428,000	35,653,000	34,667,000
CO	427,400	367,000	432,200	418,200	364,800	368,300	354,600	357,600	374,200
NOx	57,800	13,700	14,200	14,700	14,100	13,600	13,000	13,800	13,600
VOC	34,500	17,800	16,100	18,600	17,600	17,300	15,300	17,000	16,300
PM2.5	1,770	520	540	550	430	520	490	530	510

In this table, the selected plan is PA-C (Preferred Alternative-Constrained). But the table fails to identify, disclose or analyze the

extent to which any of the alternatives exceed the GHG reduction limits set by RCW 70.235.020. For a number of pollutants, including CO₂, the table forecasts emission levels for each of the alternatives, but again without reference to the 1990 baseline. The listed values allow a reader to manually calculate that the preferred alternative would cause mobile CO₂ emissions to rise from 17.1 million tons in 2006 to 22.3 million tons by 2040, or by about 30%. One might infer that a 30% increase in mobile CO₂ above 2006 levels would well exceed 1990 levels, but the data do not show the extent of noncompliance with statutory limits, which are of course expressed with reference to the 1990 baseline.¹²³

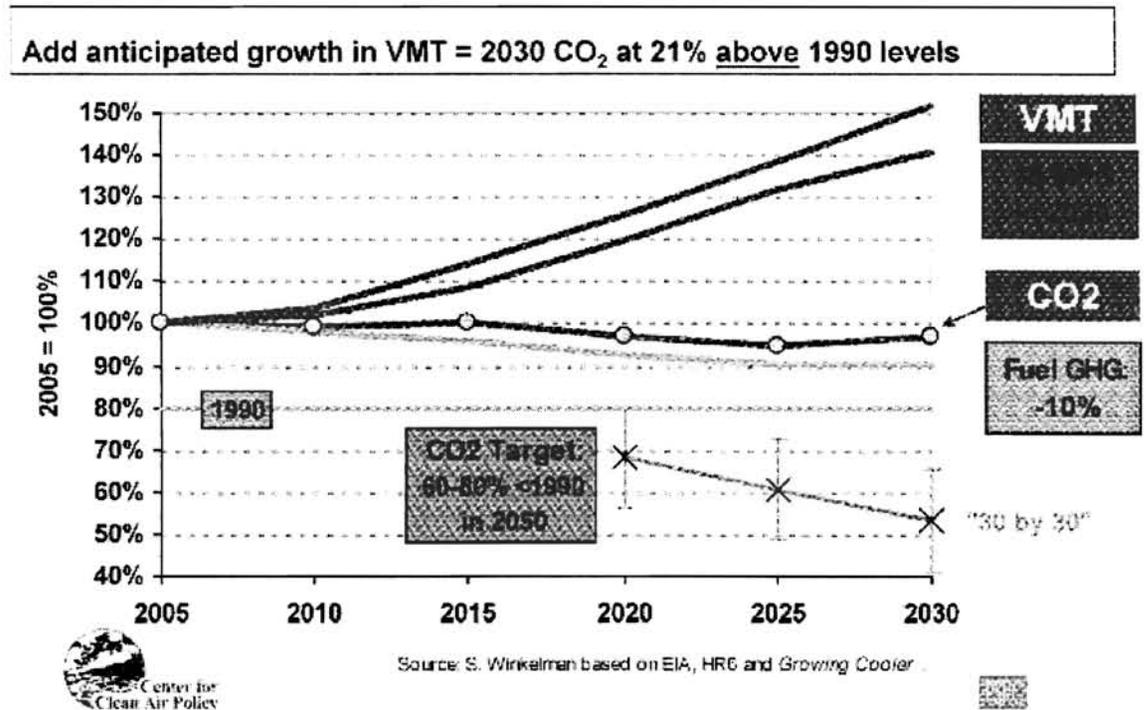
During the drafting of *T2040*, the PSRC developed data that showed how far in excess of the 1990 emission levels its plan would be, but it chose not to include that information in the EIS. The earlier cited document, *Transportation 2040: Climate Change and Vehicle Miles Traveled*¹²⁴ presented a scenario based upon projected VMT levels, mileage of 35 mpg and reduced carbon content of fuel by 10% and showed CO₂e emissions in 2030 to exceed 1990 emission levels by 21%, a year by which the GHG statute required a 30% reduction below 1990 emission levels.¹²⁵ This scenario, similar to *T2040*'s likely technology scenario,

¹²³ As demonstrated in the prior argument, the selected alternative would exceed statutory standards by about 48%.

¹²⁴ Category 3, PSRC 06654.

¹²⁵ PSRC 06671.

therefore showed a 51% exceedance of the statutory reduction requirements.



The failure to disclose the Plan's violation of GHG reduction requirements conceals the extent to which the preferred alternative places the region and the state on a direction that grossly departs from the goal of achieving climate stabilization.

5. The EIS fails to disclose T2040's inconsistency with VISION 2040.

The EIS's failure to fully identify T2040's violation of the GHG emission limits conflicts with the requirement under WAC 197-11-440(6)(d)(i) that an EIS explain how the proposed action would be "consistent and inconsistent" with adopted plans. T2040's failure to meet the GHG reduction requirements directly conflicts with Vision 2040 Policy MPP-En-20, which commits the agency to

“comply with state initiatives and directives regarding climate change and the reduction of greenhouse gases.” Implementation of T2040 would produce an *increase* of GHG emissions above 1990 levels, rather than a *decrease*, as required by RCW 70.235.020.

The EIS fails to disclose that inconsistency.

6. The EIS fails to consider alternatives capable of meeting GHG reduction requirements.

The EIS is inadequate for failing to identify and analyze alternatives that would meet the GHG reduction requirements of RCW 70.235.020. As noted above, an EIS is required to consider “alternatives to the proposed action[.]”¹²⁶ The consideration of alternatives cannot simply be cast aside: “The required discussion of alternatives to a proposed project is of major importance, because it provides a basis for a reasoned decision among alternatives having differing environmental impacts.”¹²⁷ Courts have vigorously enforced the requirement for consideration of a range of alternatives.¹²⁸

¹²⁶ RCW 43.21C.030(2)(c).

¹²⁷ *Weyerhaeuser v. Pierce County*, 124 Wn.2d 26, 42, 873 P. 2d 498 (1994).

¹²⁸ See, e.g., *Weyerhaeuser*, 124 Wn.2d at 42 (EIS held inadequate for failure to consider alternative sites to a proposed solid waste landfill); *Barrie v. Kitsap County (Barrie)*, 93 Wn.2d 843, 857, 613 P.2d 1148 (1980) (EIS held inadequate for failing to consider alternative sites for a proposed regional shopping center); and *Methow Valley Citizens Council v. Regional Forester*, 833 F.2d 810, 815 (9th Cir. 1987) (“[t]o be adequate, an environmental impact statement must consider every reasonable alternative”), *rev'd. on other grounds*, 490 U.S. 332 (1989).

The range of reasonable alternatives that must be discussed in the EIS "shall include actions that could feasibly attain or approximate a proposal's objectives, but at a lower environmental cost or decreased level of environmental degradation."¹²⁹ As cited above, the objectives of the proposal include the adoption of a strategy for reducing transportation's contribution to climate change, *T2040* at 11, and meeting state directives for the reduction of GHG emissions, *VISION 2040*, MPP-En-20. But as shown above, none of the alternatives presented in the EIS accomplish those objectives.¹³⁰

To be consistent with SEPA's overriding purposes, including the goal to "prevent or eliminate damage to the environment and biosphere,"¹³¹ consideration of a full range of alternatives would require the presentation and analysis of an alternative that would be fully compliant with the GHG reduction requirements of RCW 70.235.020.

7. The EIS fails to discuss mitigations that would address *T2040's* violation of GHG reduction requirements.

The EIS is inadequate for failing to present and analyze measures that would significantly mitigate *T2040's* excessive GHG

¹²⁹ WAC 197-11-440(5)(b).

¹³⁰ See EPA comment to the EIS that no alternatives meet the GHG reduction mandate and imploring PSRC to develop one, to which PSRC simply references its inadequate Four Part Greenhouse Gas Reduction Plan. PSRC 002523.

¹³¹ RCW 43.21C.010(2).

emissions. An EIS must identify and discuss measures that would “significantly mitigate [the] impacts” of the proposal.¹³²

Mitigations of GHG emissions resulting from *T2040*'s projects and programs are contained in its Four-Part Greenhouse Gas Reduction Strategy discussed in the prior argument, *i.e.*, the land use, user fee, transportation choices and assumed technology measures. But by 2040 under the likely technology scenario those mitigations are projected to reduce GHG emissions by only 5% below 2006 GHG levels when by 2040 the GHG reduction statute requires reductions of about 33% below 1990 levels, a limit that would be about 53% below 2006 levels. The gap between *T2040*'s projected GHG emissions for 2040 and the statute's required GHG reductions for the same year (as interpolated above) is huge, so that emissions resulting from implementation of *T2040* are about twice the statutory level, as shown by the annotations to *T2040* Figure 18 set forth at Appendix E. That increase is clearly significant.¹³³

SEPA requires the *T2040* EIS to discuss measures that would significantly mitigate the violation of statutory limits. The proposed mitigations, resulting in just 5% below 2006 projected

¹³² WAC 197-11-440(6).

¹³³ Increased CO₂ concentrations of about 110 ppm from 280 ppm at the advent of industrialization to about 390 ppm at the present have already caused significant changes to climate, oceans, wildlife habitat, agriculture and human populations. Additional GHG emissions only exacerbate impacts that are already significant. *T2040*'s proposed doubling of GHG concentrations over the statutory limits therefore would be significant.

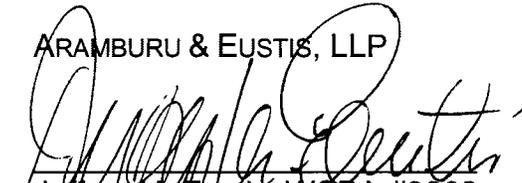
levels would not. To achieve SEPA's purposes, including to "prevent or eliminate damage to the environment and biosphere,"¹³⁴ the EIS was required to identify and discuss the mitigations capable of attaining the statutory GHG reduction requirements.

VIII. CONCLUSION

The Cascade Bicycle Club, Sierra Club and Futurewise ask the court to find *T2040* in violation of the GHG reduction statute and of SEPA and to remedy these violations through a remand to the PSRC for preparation of an EIS alternative and the adoption of a transportation plan fully compliant with RCW 70.235.020(1)(a).

RESPECTFULLY SUBMITTED this 31st day of October 2011.

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¹³⁴ RCW 43.21C.010.

Appendix A

Chapter 70.235 RCW
LIMITING GREENHOUSE GAS EMISSIONS

RCW 70.235.005 - Findings -- Intent.

(1) The legislature finds that Washington has long been a national and international leader on energy conservation and environmental stewardship, including air quality protection, renewable energy development and generation, emission standards for fossil-fuel based energy generation, energy efficiency programs, natural resource conservation, vehicle emission standards, and the use of biofuels. Washington is also unique among most states in that in addition to its commitment to reduce emissions of greenhouse gases, it has established goals to grow the clean energy sector and reduce the state's expenditures on imported fuels.

(2) The legislature further finds that Washington should continue its leadership on climate change policy by creating accountability for achieving the emission reductions established in RCW 70.235.020, participating in the design of a regional multisector market-based system to help achieve those emission reductions, assessing other market strategies to reduce emissions of greenhouse gases, and ensuring the state has a well trained workforce for our clean energy future.

(3) It is the intent of the legislature that the state will: (a) Limit and reduce emissions of greenhouse gas consistent with the emission reductions established in RCW 70.235.020; (b) minimize the potential to export pollution, jobs, and economic opportunities; and (c) reduce emissions at the lowest cost to Washington's economy, consumers, and businesses.

(4) In the event the state elects to participate in a regional multisector market-based system, it is the intent of the legislature that the system will become effective by January 1, 2012, after authority is provided to the department for its implementation. By acting now, Washington businesses and citizens will have adequate time and opportunities to be well positioned to take advantage of the low-carbon economy and to make necessary investments in low-carbon technology.

(5) It is also the intent of the legislature that the regional multisector market-based system recognize Washington's unique emissions portfolio, including the state's hydroelectric system, the opportunities presented by Washington's abundant forest resources and agriculture land, and the state's leadership in energy efficiency and the actions it has already taken that have reduced its generation of greenhouse gas emissions and that entities receive appropriate credit for early actions to reduce greenhouse gases.

(6) If any revenues that accrue to the state are created by a market system, they must be used to further the state's efforts to achieve the goals established in RCW 70.235.020, address the impacts of global warming on affected habitats, species, and communities, and increase investment in the clean energy economy particularly for communities and workers that have suffered from heavy job losses and chronic unemployment and underemployment.

RCW 70.235.010 - Definitions.

The definitions in this section apply throughout this chapter unless the context clearly requires otherwise.

- (1) "Carbon dioxide equivalents" means a metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential.
- (2) "Climate advisory team" means the stakeholder group formed in response to executive order 07-02.
- (3) "Climate impacts group" means the University of Washington's climate impacts group.
- (4) "Department" means the department of ecology.
- (5) "Director" means the director of the department.
- (6) "Greenhouse gas" and "greenhouse gases" includes carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and any other gas or gases designated by the department by rule.
- (7) "Person" means an individual, partnership, franchise holder, association, corporation, a state, a city, a county, or any subdivision or instrumentality of the state.
- (8) "Program" means the department's climate change program.
- (9) "Western climate initiative" means the collaboration of states, Canadian provinces, Mexican states, and tribes to design a multisector market-based mechanism as directed under the western regional climate action initiative signed by the governor on February 22, 2007.

[2010 c 146 § 1; 2008 c 14 § 2.]

RCW 70.235.020 - Greenhouse gas emissions reductions -- Reporting requirements.

(1)(a) The state shall limit emissions of greenhouse gases to achieve the following emission reductions for Washington state:

- (i) By 2020, reduce overall emissions of greenhouse gases in the state to 1990 levels;
- (ii) By 2035, reduce overall emissions of greenhouse gases in the state to twenty-five percent below 1990 levels;
- (iii) By 2050, the state will do its part to reach global climate stabilization levels by reducing overall emissions to fifty percent below 1990 levels, or seventy percent below the state's expected emissions that year.

(b) By December 1, 2008, the department shall submit a greenhouse gas reduction plan for review and approval to the legislature, describing those actions necessary to achieve the emission reductions in (a) of this subsection by using existing statutory authority and any additional authority granted by the legislature. Actions taken using existing statutory authority may proceed prior to approval of the greenhouse gas reduction plan.

(c) Except where explicitly stated otherwise, nothing in chapter 14, Laws of 2008 limits any state agency authorities as they existed prior to June 12, 2008.

(d) Consistent with this directive, the department shall take the following actions:

(i) Develop and implement a system for monitoring and reporting emissions of greenhouse gases as required under RCW 70.94.151; and

(ii) Track progress toward meeting the emission reductions established in this subsection, including the results from policies currently in effect that have been previously adopted by the state and policies adopted in the future, and report on that progress.

(2) By December 31st of each even-numbered year beginning in 2010, the department and the *department of community, trade, and economic development shall report to the governor and the appropriate committees of the senate and house of representatives the total emissions of greenhouse gases for the preceding two years, and totals in each major source sector. The department shall ensure the reporting rules adopted under RCW 70.94.151 allow it to develop a comprehensive inventory of emissions of greenhouse gases from all significant sectors of the Washington economy.

(3) Except for purposes of reporting, emissions of carbon dioxide from industrial combustion of biomass in the form of fuel wood, wood waste, wood by-products, and wood residuals shall not be considered a greenhouse gas as long as the region's silvicultural sequestration capacity is maintained or increased.

[2008 c 14 § 3.]

NOTES:

***Reviser's note:** The "department of community, trade, and economic development" was renamed the "department of commerce" by 2009 c 565.

RCW 70.235.030 - Development of a design for a regional multisector market-based system to limit and reduce emissions of greenhouse gas -- Information required to be submitted to the legislature.

(1)(a) The director shall develop, in coordination with the western climate initiative, a design for a regional multisector market-based system to limit and reduce emissions of greenhouse gas

consistent with the emission reductions established in RCW 70.235.020(1).

(b) By December 1, 2008, the director and the director of the *department of community, trade, and economic development shall deliver to the legislature specific recommendations for approval and request for authority to implement the preferred design of a regional multisector market-based system in (a) of this subsection. These recommendations must include:

(i) Proposed legislation, necessary funding, and the schedule necessary to implement the preferred design by January 1, 2012;

(ii) Any changes determined necessary to the reporting requirements established under RCW 70.94.151; and

(iii) Actions that the state should take to prevent manipulation of the multisector market-based system designed under this section.

(2) In developing the design for the regional multisector market-based system under subsection (1) of this section, the department shall consult with the affected state agencies, and provide opportunity for public review and comment.

(3) In addition to the information required under subsection (1)(b) of this section, the director and the director of the *department of community, trade, and economic development shall submit the following to the legislature by December 1, 2008:

(a) Information on progress to date in achieving the requirements of chapter 14, Laws of 2008;

(b) The final recommendations of the climate advisory team, including recommended most promising actions to reduce emissions of greenhouse gases or otherwise respond to climate change. These recommendations must include strategies to reduce the quantity of emissions of greenhouse gases per distance traveled in the transportation sector;

(c) A request for additional resources and statutory authority needed to limit and reduce emissions of greenhouse gas consistent with chapter 14, Laws of 2008 including implementation of the most promising recommendations of the climate advisory team;

(d) Recommendations on how projects funded by the green energy incentive account in RCW 43.325.040 may be used to expand the electrical transmission infrastructure into urban and rural areas of the state for purposes of allowing the recharging of plug-in hybrid electric vehicles;

(e) Recommendations on how local governments could participate in the multisector market-based system designed under subsection (1) of this section;

(f) Recommendations regarding the circumstances under which generation of electricity or alternative fuel from landfill gas and gas from anaerobic digesters may receive an offset or credit

in the regional multisector market-based system or other strategies developed by the department;
and

(g) Recommendations developed in consultation with the department of natural resources and the department of agriculture with the climate advisory team, the college of forest resources at the University of Washington, and the Washington State University, and a nonprofit consortium involved in research on renewable industrial materials, regarding how forestry and agricultural lands and practices may participate voluntarily as an offset or other credit program in the regional multisector market-based system. The recommendations must ensure that the baseline for this offset or credit program does not disadvantage this state in relation to another state or states. These recommendations shall address:

(i) Commercial and other working forests, including accounting for site-class specific forest management practices;

(ii) Agricultural and forest products, including accounting for substitution of wood for fossil intensive substitutes;

(iii) Agricultural land and practices;

(iv) Forest and agricultural lands set aside or managed for conservation as of, or after, June 12, 2008; and

(v) Reforestation and afforestation projects.

[2008 c 14 § 4.]

NOTES:

***Reviser's note:** The "department of community, trade, and economic development" was renamed the "department of commerce" by 2009 c 565.

RCW 70.235.040 - Consultation with climate impacts group at the University of Washington -- Report to the legislature.

Within eighteen months of the next and each successive global or national assessment of climate change science, the department shall consult with the climate impacts group at the University of Washington regarding the science on human-caused climate change and provide a report to the legislature summarizing that science and make recommendations regarding whether the greenhouse gas emissions reductions required under RCW 70.235.020 need to be updated.

[2008 c 14 § 7.]

**RCW 70.235.050 - Greenhouse gas emission limits for state agencies -- Timeline -- Reports -
- Strategy -- Point of accountability employee for energy and climate change initiatives.**

(1) All state agencies shall meet the statewide greenhouse gas emission limits established in RCW 70.235.020 to achieve the following, using the estimates and strategy established in subsections (2) and (3) of this section:

(a) By July 1, 2020, reduce emissions by fifteen percent from 2005 emission levels;

(b) By 2035, reduce emissions to thirty-six percent below 2005 levels; and

(c) By 2050, reduce emissions to the greater reduction of fifty-seven and one-half percent below 2005 levels, or seventy percent below the expected state government emissions that year.

(2)(a) By June 30, 2010, all state agencies shall report estimates of emissions for 2005 to the department, including 2009 levels of emissions, and projected emissions through 2035.

(b) State agencies required to report under RCW 70.94.151 must estimate emissions from methodologies recommended by the department and must be based on actual operation of those agencies. Agencies not required to report under RCW 70.94.151 shall derive emissions estimates using an emissions calculator provided by the department.

(3) By June 30, 2011, each state agency shall submit to the department a strategy to meet the requirements in subsection (1) of this section. The strategy must address employee travel activities, teleconferencing alternatives, and include existing and proposed actions, a timeline for reductions, and recommendations for budgetary and other incentives to reduce emissions, especially from employee business travel.

(4) By October 1st of each even-numbered year beginning in 2012, each state agency shall report to the department the actions taken to meet the emission reduction targets under the strategy for the preceding fiscal biennium. The department may authorize the department of general administration to report on behalf of any state agency having fewer than five hundred full-time equivalent employees at any time during the reporting period. The department shall cooperate with the department of general administration and the *department of community, trade, and economic development to develop consolidated reporting methodologies that incorporate emission reduction actions taken across all or substantially all state agencies.

(5) All state agencies shall cooperate in providing information to the department, the department of general administration, and the *department of community, trade, and economic development for the purposes of this section.

(6) The governor shall designate a person as the single point of accountability for all energy and climate change initiatives within state agencies. This position must be funded from current full-time equivalent allocations without increasing budgets or staffing levels. If duties must be shifted within an agency, they must be shifted among current full-time equivalent allocations. All

agencies, councils, or work groups with energy or climate change initiatives shall coordinate with this designee.

[2009 c 519 § 2.]

NOTES:

***Reviser's note:** The "department of community, trade, and economic development" was renamed the "department of commerce" by 2009 c 565.

Findings -- 2009 c 519: See RCW 43.21M.900.

RCW 70.235.060 - Emissions calculator for estimating aggregate emissions -- Reports.

(1) The department shall develop an emissions calculator to assist state agencies in estimating aggregate emissions as well as in estimating the relative emissions from different ways in carrying out activities.

(2) The department may use data such as totals of building space occupied, energy purchases and generation, motor vehicle fuel purchases and total mileage driven, and other reasonable sources of data to make these estimates. The estimates may be derived from a single methodology using these or other factors, except that for the top ten state agencies in occupied building space and vehicle miles driven, the estimates must be based upon the actual and projected operations of those agencies. The estimates may be adjusted, and reasonable estimates derived, when agencies have been created since 1990 or functions reorganized among state agencies since 1990. The estimates may incorporate projected emissions reductions that also affect state agencies under the program authorized in RCW 70.235.020 and other existing policies that will result in emissions reductions.

(3) By December 31st of each even-numbered year beginning in 2010, the department shall report to the governor and to the appropriate committees of the senate and house of representatives the total state agencies' emissions of greenhouse gases for 2005 and the preceding two years and actions taken to meet the emissions reduction targets.

[2009 c 519 § 5.]

NOTES:

Findings -- 2009 c 519: See RCW 43.21M.900.

RCW 70.235.070 - Distribution of funds for infrastructure and capital development projects -- Prerequisites.

Beginning in 2010, when distributing capital funds through competitive programs for infrastructure and economic development projects, all state agencies must consider whether the entity receiving the funds has adopted policies to reduce greenhouse gas emissions. Agencies

also must consider whether the project is consistent with:

(1) The state's limits on the emissions of greenhouse gases established in RCW 70.235.020;

(2) Statewide goals to reduce annual per capita vehicle miles traveled by 2050, in accordance with RCW 47.01.440, except that the agency shall consider whether project locations in rural counties, as defined in RCW 43.160.020, will maximize the reduction of vehicle miles traveled; and

(3) Applicable federal emissions reduction requirements.

[2009 c 519 § 9.]

NOTES:

Findings -- 2009 c 519: See RCW 43.21M.900.

RCW 70.235.900 - Scope of chapter 14, Laws of 2008.

Except where explicitly stated otherwise, nothing in chapter 14, Laws of 2008 alters or limits any authorities of the department as they existed prior to June 12, 2008.

[2008 c 14 § 11.]

RCW 70.235.901 - Severability -- 2008 c 14.

If any provision of this act or its application to any person or circumstance is held invalid, the remainder of the act or the application of the provision to other persons or circumstances is not affected.

[2008 c 14 § 12.]

Chapter 47.01 RCW
DEPARTMENT OF TRANSPORTATION

RCW 47.01.440 -- Adoption of statewide goals to reduce annual per capita vehicle miles traveled by 2050 -- Department's duties -- Reports to the legislature.

To support the implementation of RCW 47.04.280 and 47.01.078(4), the department shall adopt broad statewide goals to reduce annual per capita vehicle miles traveled by 2050 consistent with the stated goals of executive order 07-02. Consistent with these goals, the department shall:

(1) Establish the following benchmarks using a statewide baseline of seventy-five billion vehicle miles traveled less the vehicle miles traveled attributable to vehicles licensed under *RCW 46.16.070 and weighing ten thousand pounds or more, which are exempt from this section:

- (a) Decrease the annual per capita vehicle miles traveled by eighteen percent by 2020;
- (b) Decrease the annual per capita vehicle miles traveled by thirty percent by 2035; and
- (c) Decrease the annual per capita vehicle miles traveled by fifty percent by 2050;

(2) By July 1, 2008, establish and convene a collaborative process to develop a set of tools and best practices to assist state, regional, and local entities in making progress towards the benchmarks established in subsection (1) of this section. The collaborative process must provide an opportunity for public review and comment and must:

- (a) Be jointly facilitated by the department, the department of ecology, and the **department of community, trade, and economic development;
- (b) Provide for participation from regional transportation planning organizations, the Washington state transit association, the Puget Sound clean air agency, a statewide business organization representing the sale of motor vehicles, at least one major private employer that participates in the commute trip reduction program, and other interested parties, including but not limited to parties representing diverse perspectives on issues relating to growth, development, and transportation;
- (c) Identify current strategies to reduce vehicle miles traveled in the state as well as successful strategies in other jurisdictions that may be applicable in the state;
- (d) Identify potential new revenue options for local and regional governments to authorize to finance vehicle miles traveled reduction efforts;
- (e) Provide for the development of measurement tools that can, with a high level of confidence, measure annual progress toward the benchmarks at the local, regional, and state levels, measure the effects of strategies implemented to reduce vehicle miles traveled and

adequately distinguish between common travel purposes, such as moving freight or commuting to work, and measure trends of vehicle miles traveled per capita on a five-year basis;

(f) Establish a process for the department to periodically evaluate progress toward the vehicle miles traveled benchmarks, measure achieved and projected emissions reductions, and recommend whether the benchmarks should be adjusted to meet the state's overall goals for the reduction of greenhouse gas emissions;

(g) Estimate the projected reductions in greenhouse gas emissions if the benchmarks are achieved, taking into account the expected implementation of existing state and federal mandates for vehicle technology and fuels, as well as expected growth in population and vehicle travel;

(h) Examine access to public transportation for people living in areas with affordable housing to and from employment centers, and make recommendations for steps necessary to ensure that areas with affordable housing are served by adequate levels of public transportation; and

(i) By December 1, 2008, provide a report to the transportation committees of the legislature on the collaborative process and resulting recommended tools and best practices to achieve the reduction in annual per capita vehicle miles traveled goals.

(3) Included in the December 1, 2008, report to the transportation committees of the legislature, the department shall identify strategies to reduce vehicle miles traveled in the state as well as successful strategies in other jurisdictions that may be applicable in the state that recognize the differing urban and rural transportation requirements.

(4) Prior to implementation of the goals in this section, the department, in consultation with the **department of community, trade, and economic development, cities, counties, local economic development organizations, and local and regional chambers of commerce, shall provide a report to the appropriate committees of the legislature on the anticipated impacts of the goals established in this section on the following:

(a) The economic hardship on small businesses as it relates to the ability to hire and retain workers who do not reside in the county in which they are employed;

(b) Impacts on low-income residents;

(c) Impacts on agricultural employers and their employees, especially on the migrant farmworker community;

(d) Impacts on distressed rural counties; and

(e) Impacts in counties with more than fifty percent of the land base of the county in public or tribal lands.

[2008 c 14 § 8.]

NOTES:

Reviser's note: *(1) RCW 46.16.070 was recodified as RCW 46.16A.455 pursuant to 2010 c 161 § 1217, effective July 1, 2011.

** (2) The "department of community, trade, and economic development" was renamed the "department of commerce" by 2009 c 565.

Findings -- Intent -- Scope of chapter 14, Laws of 2008 -- Severability -- 2008 c 14: See RCW 70.235.005, 70.235.900, and 70.235.901.

Appendix B

Chapter 3: A Sustainable Environment

The geographic features that uniquely define central Puget Sound, located between the Cascade and Olympic mountain ranges and bisected by its namesake saltwater estuary, create an outstanding natural setting and support a richly diverse ecology. The region's forests, wetlands, maritime waterways and fisheries are not only natural economic resources but also attractions for people whose daily lives are closely linked to vistas and access to mountains, beaches, rivers and lakes. The region's environment serves as a key foundation for growing clusters of the regional economy, making nurturing and sustaining the environment an economic priority vital to sustaining a high quality of life.

The region's topography also limits lands suitable for development and imposes complex and often expensive infrastructure requirements. Cities and towns are reshaping aging infrastructure to transform urban environments into more livable places, and are building new centers for additional job and employment growth.

This complex and rich environment shapes Transportation 2040. The plan is designed to keep the region's air and water healthy, sustain the region's overall ecology, assist in coordinated efforts of the Puget Sound Partnership to protect and restore the health of the region's watersheds, and lead in the development of emerging federal and state initiatives to reduce overall greenhouse gas emissions to address global climate change.

Transportation 2040 commits to supporting a heightened awareness of the relationship between transportation and the environment, consistent with the regional environmental sustainability framework established by VISION 2040. The plan has been designed with a central focus of reducing the potential environmental impacts associated with both transportation infrastructure and operation. See *Appendix C, MPP-En-2 and 3, MPP-En-8 through 15, MPP-En-17 through MPP-En-19, MPP-En-23, MPP-DP-27, and MPP-T-28.*

Alternative approaches to developing a regional transportation system were evaluated in the *Environmental Impact Statement for Transportation 2040 (EIS)*. Preparation of the EIS included extensive agency coordination and public comment over many months, and has been guided by PSRC's Transportation Policy Board and Growth Management Policy Board. The Transportation 2040 Environmental Impact Statement contained information that allowed regional decision makers to craft a transportation plan that addresses critical regional policy objectives, including improved air quality, reduced greenhouse gases, improved water quality, public health and mobility, and support for the VISION 2040 Regional Growth Strategy. The EIS identifies specific potential measures to mitigate impacts associated with the implementation of Transportation 2040. For full documentation of the environmental analysis supporting Transportation 2040, see www.psrc.org

Maintain and Improve Air Quality

The region has made great strides in improving air quality over the past several decades, even with growth in both population and vehicle miles traveled. However, emissions of certain pollutants have been on the rise in recent years, and there are new and continuing challenges ahead.

To protect human health and the environment, the Environmental Protection Agency has set National Ambient Air Quality Standards (NAAQS) for six "criteria" pollutants under the Clean Air Act. These pollutants are ground-level ozone, carbon monoxide, particle pollution (or particulate matter), sulfur oxides, nitrogen oxides, and lead. Levels of many of these pollutants have been

declining in our region, but emissions of fine particulates and elements that form ground-level ozone are still a concern. While emissions of these pollutants come from a variety of sources, motor vehicles account for a significant share in the central Puget Sound region.

Transportation Conformity

Air quality is monitored and areas are designated according to whether or not they meet the air quality standards for each pollutant. Geographic regions that meet the standards are referred to as attainment areas; areas that do not meet the standards are designated nonattainment to that standard. Once designated nonattainment, the Clean Air Act requires the preparation of an attainment plan to demonstrate how an area will thereafter meet and maintain established standards. Once a nonattainment area has subsequently met the standards for a period of time, the area may be redesignated as a maintenance area. To demonstrate that the standards will continue to be met in the future, a maintenance plan is required for these areas.

Parts of the region are designated as maintenance areas for particulate matter less than 10 microns in diameter (PM10) and carbon monoxide (CO). Under federal and state air quality statutes and regulations, there are special requirements in maintenance areas to ensure that proposed transportation activities — plans, programs and projects — do not cause new, or contribute to existing, air quality problems. Compliance with these statutes and regulations (referred to as conformity) requires analyses that demonstrate compliance with existing air quality control plans and programs. A positive finding of conformity is required by the federal Clean Air Act and its amendments, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) and the Clean Air Washington Act. Positive conformity findings allow the region to proceed with implementation of transportation projects in a timely manner. In the absence of a positive conformity finding, only those projects which are exempt (such as safety or transit projects) will be allowed to proceed using federal transportation funds.

As shown in Figure 17, the projects and programs in Transportation 2040 are well within the established limits for the two pollutants for which conformity currently applies in the region, CO and PM₁₀. The formal conformity analysis and finding for Transportation 2040 is included as Appendix E.

Figure 17. Transportation Conformity Analysis Summary

	Motor Vehicle Emissions Budget*	Transportation 2040
CO (daily tons)	2,512.0	1,188.5
PM10 (daily pounds)		
Kent	231.5	84.4
Duwamish	844.4	287.8
Tacoma	460.8	240.1

* from the Central Puget Sound Region Maintenance Plans for each pollutant

While the region is currently designated as being in attainment with the federal standards for the other criteria pollutants, the South Tacoma (Wapato Hills/Puyallup River Valley) area has violated the fine particulate matter standard (PM 2.5) and was designated nonattainment in December 2009. The Washington State Department of Ecology, in cooperation with the Puget Sound Clean Air Agency, is developing an attainment plan to demonstrate how the area will come back into compliance with the standard. The primary source of fine particulate matter emissions in this area is wintertime wood burning activities, but mobile sources also represent a portion of the emissions. The region is also facing a potential re-designation to the newly proposed ground-

level ozone standard. In recent years the region had exceeded the existing standard, but had not yet officially violated the standard. On December 21, 2009, EPA released a proposed new ground-level ozone standard, which is more stringent than the existing standard. The new standard is expected to be finalized by August 2010, with area designations made by August 2011. Given the monitoring data in recent years, the region may be at risk of being designated nonattainment to the new standard.

The region is committed to maintaining the air quality standards in our region by continuing to reduce emissions of air pollutants through the use of cleaner fuels and vehicles, increasing alternatives to driving alone, and land use strategies. The region continues to monitor these air quality issues, and Transportation 2040 has been crafted to maintain compliance with all air quality and transportation conformity regulations.

Reduce Greenhouse Gas Emissions

Climate change has become a significant issue at the national, state, regional and local level. Washington state has taken numerous steps to begin addressing climate change, including the passage of legislation, which established goals for the reduction of greenhouse gases, and which sets benchmarks for the reduction of vehicle miles traveled (VMT) per capita (RCW 70.235.020, RCW 47.01.440).

Because the consequences of climate change are serious, the central Puget Sound region has committed to take aggressive action to reduce its transportation-related emissions. Throughout the process of creating Transportation 2040, climate change has been identified as one of the key issues needing to be addressed in the plan.

VISION 2040 calls for the region to reduce its overall production of harmful elements that contribute to climate change, and commits the region to comply with state directives. An evaluation of greenhouse gas emissions and vehicle miles traveled per capita was conducted in the process to develop Transportation 2040. The results of this analysis and additional research have produced a four-part greenhouse gas strategy that is a central part of Transportation 2040.

Climate change is defined as a significant change in the earth's long-term weather patterns. Increased levels of greenhouse gases in the atmosphere trap heat, causing the earth's surface to warm to a greater extent than usual; as temperatures rise, the climate changes. The burning of fossil fuels is a significant contributor to greenhouse gases.

In the United States, the transportation sector contributes 28 percent of all greenhouse gas emissions. In Washington state, transportation is responsible for 45 percent of greenhouse gas emissions, and in the Puget Sound region, the figure increases to approximately 50 percent. This difference among sectors can be explained in part due to our heavy use of hydropower for electricity, as opposed to coal and other fossil fuels in the rest of the country.

Within the transportation sector, passenger vehicles are responsible for roughly half of all emissions. While motor gasoline is the largest contributor to emissions among fuel types, the shares from diesel and jet fuel have grown over the last several decades. Reducing emissions from the transportation sector involves three components: (1) the type of fuel used, (2) travel behavior (especially as it relates to vehicle miles traveled), and (3) energy efficiency. However, analyses show that the growth in vehicle miles traveled due to population growth over the next four decades will outpace the improvements from the recently adopted fuel economy standards (a 35.5 mile per gallon fleet average by 2016). Even with more aggressive fuel economy improvements, the established greenhouse emission reduction goals will not be reached without some reduction in overall travel.

Washington State Legislation. RCW 70.235.020 established the following greenhouse gas emission reduction goals:

- To 1990 levels by 2020
- To 25 percent below 1990 levels by 2035
- To 50 percent below 1990 levels by 2050

In Addition, two key pieces of legislation were subsequently passed:

- RCW 47.01.440 establishes statewide annual per capita reduction benchmarks for vehicle miles traveled. The legislation established the forecast baseline of statewide vehicle miles traveled of 75 billion by the year 2020, exempting trucks over 10,000 pounds.
 - By 2020, decrease by 18 percent
 - By 2035, decrease by 30 percent
 - By 2050, decrease by 50 percent
- RCW 36.70A.580 and 5801 aim to address the impacts of climate change through the Growth Management Act, and direct the Department of Commerce to work with the Department of Transportation to reduce vehicle miles traveled.

In 2009, the Governor signed Executive Order 09-05, which directs the state to continue work on a variety of important climate change activities, including working with the federal government on a climate program, reducing greenhouse gas emissions from stationary sources, reducing greenhouse gas emissions from transportation (including recommendations on vehicle miles traveled benchmarks and working with organizations such as PSRC), and adapting and preparing for unavoidable impacts.

Regional Policies. VISION 2040 established a wide variety of specific regional greenhouse gas reduction goals, policies, and actions committing the Puget Sound region to meet all state and federal targets for greenhouse gas emissions reductions. See *Appendix C, MPP-En-3, MPP-En-16 through MPP-En-25, MPP-DP-45, MPP-Ec-15, MPP-T-5, MPP-T-6, MPP-T-22, MPP-T-23, MPP-T-25, MPP-PS-1, MPP-PS-12 and MPP-PS-13.* See also *En-Action-6, DP-Action-9 and T-Action-14.*

Four-Part Greenhouse Gas Reduction Strategy

The analysis for Transportation 2040 included research into the potential impacts to emissions from various levels of pricing, system management and demand management strategies, as well as strategic expansion of all modes including roadways, transit, and bicycle and pedestrian facilities.

The realization that it will require a variety of strategies and tools to effectively reduce emissions from the transportation sector led to the development of a four-part greenhouse gas strategy:

- **Land Use:** Build upon the VISION 2040 Regional Growth Strategy to further the goal of providing an improved jobs-housing balance, and pursue additional refinements through strategies such as transit oriented development.
- **User Fees:** Recognize the critical role of price in reducing vehicle miles traveled and emissions, transition the region over time to a user fee/roadway pricing system.
- **Choices:** Provide travelers options to single occupant vehicles, and continue to research the costs and benefits of various strategies.
- **Technology:** Recognize that improvements to vehicles and fuels will play a crucial role in reducing emissions. PSRC has undertaken research with the Department of Ecology on the potential technological advances that may be likely in our region by the year 2040.

Transportation 2040 includes programs and investments that encompass all four of these strategies, including land use actions, roadway pricing, providing more transportation choices, and vehicle and fuel technology. Transportation 2040 supports the following specific actions:

Land Use: In order to achieve the greenhouse gas reduction benefit from land use, the region must achieve a growth pattern similar to the one adopted in the VISION 2040 Regional Growth Strategy. Analysis conducted for the development of VISION 2040 indicated that the increased shift to a more compact and concentrated growth pattern, and a better jobs/housing balance within the region's four counties, will reduce greenhouse gas emissions by about 6 percent from the trend.³ A compact development pattern is a foundation of the region's greenhouse gas reduction strategy.

Pricing and Choices: Transportation 2040 embraces pricing strategies that would be phased in over the life of the plan, with the effect of reducing vehicle travel and associated greenhouse gas emissions. These pricing approaches, supported by the full plan's peak period 132 percent increase in local transit service (108 percent increase off-peak), the extension of regional light rail, and investments in walking and biking facilities, together result in a 9 percent reduction in regional greenhouse gas emissions from the trend.

Technology: Transportation 2040 makes assumptions about the market penetration of electric and other alternative fuel vehicles, less carbon-intensive fuels, and improved fuel efficiency of the overall passenger and freight fleets. In collaboration with the Washington State Department of Ecology, PSRC developed two technology scenarios: a "likely" scenario, which is probable given current trends and conservative assumptions about fuel prices and other incentives to change technology, and an "aggressive" scenario, which assumes a higher degree of concerted effort to transition the vehicle fleet to a more energy efficient approach. These scenarios, based on extensive national research and consultation with the Environmental Protection Agency, the Washington State Department of Transportation and the Puget Sound Clean Air Agency, are identified in Figure 17 below. The "likely" scenario results in an additional 25 percent reduction of greenhouse gas emissions, and the "aggressive" scenario results in an additional 43 percent reduction in emissions. Appendix L provides additional details on the technology assumptions contained in the Four-Part Greenhouse Gas Strategy.

Outcomes

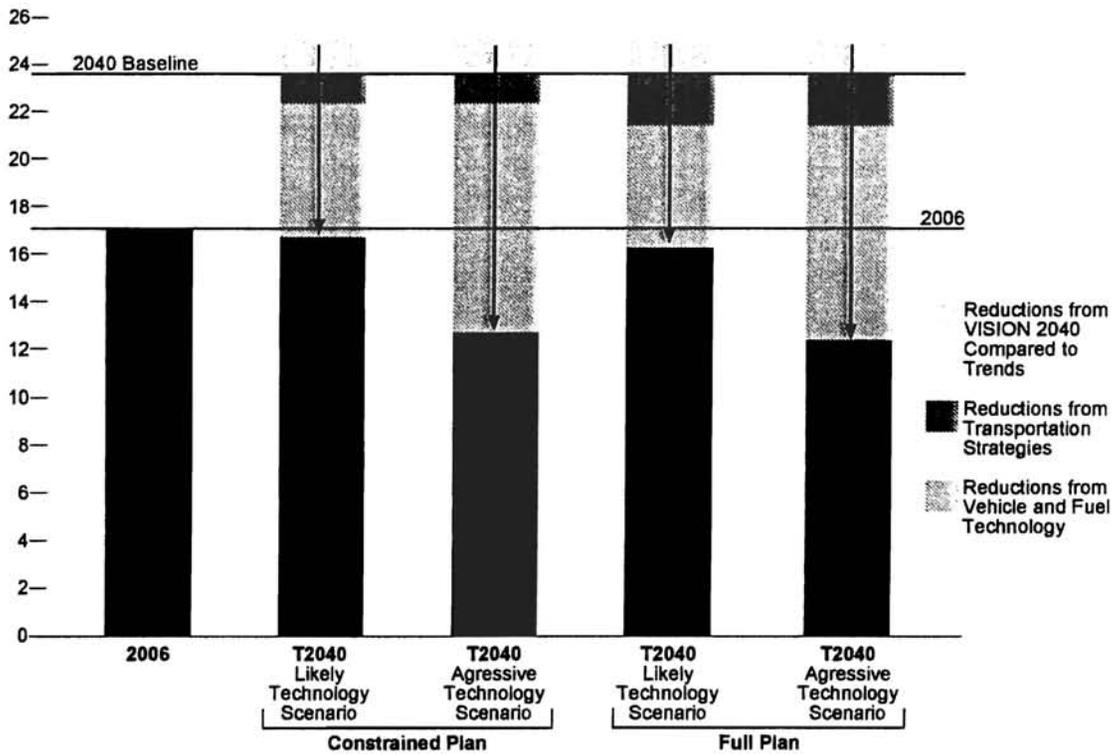
The results of the investments and strategies contained in Transportation 2040 are illustrated in Figure 18. The combination of the four-part strategy results in a range of emissions reductions (between 5 percent likely technology scenario and 28 percent aggressive technology scenario) below 2006 modeled emissions.⁴ As compared to the 2040 Baseline trend, the preferred alternative results in emissions reductions between 31 percent and 48 percent.

PSRC's 2010 Action Strategy will include a strategy to work with WSDOT and local and regional jurisdictions by December 2011 to improve analysis methodologies and identify additional strategies to reduce greenhouse gas emissions, when WSDOT is required to report to the Governor on the status of regional transportation plans. When state targets are set for the transportation sector and regions, PSRC should revisit its greenhouse gas reduction strategy.

³ Value obtained from the analyses conducted for the VISION 2040 Environmental Impact Statement. The alternatives analysis for VISION 2040 evaluated various growth patterns compared to the historic trend, using the investments contained in the existing long-range transportation plan, Destination 2030.

⁴ The Washington State greenhouse gas emissions reduction goals are set to a baseline 1990 level; PSRC does not at this time have a 1990 model year, so 2006 is used as a surrogate for comparison. The approximate increase in emissions from 1990 to 2006 are incorporated into findings.

Figure 18. Greenhouse Gas Emissions (CO₂ Emissions in Millions of Tons)



Adaptation

In addition to reducing the impacts from the transportation sector on climate change, it is also important for the region to address the impacts from climate change. This concept is referred to as “adaptation to climate change.” Beyond transportation, a wide variety of impacts from long term climate change may be expected in Washington state and the Puget Sound region. These include rising sea levels, increased flooding, and an increase in the frequency and severity of storms and other weather events, droughts, wildfires, impacts to water availability and quality, and impacts to crops. Specific to transportation, impacts could include the accelerated deterioration of roadways, issues related to flooding and increased stormwater, bridge damage, rail buckling, and reduced water levels in some water bodies that could affect the passage of ships and barges.

This is an emerging area of study, but the state and region are being proactive in planning for potential impacts on transportation. These activities include the state’s work called for in Executive Order 09-05 and RCW 43.21M, which direct the departments of Ecology, Health, Agriculture, Commerce, Fish and Wildlife, Natural Resources and Transportation to work with scientific experts and stakeholders to develop an integrated climate change strategy by December 2011. King County, in collaboration with the University of Washington and the International Council for Local Environmental Initiatives (ICLEI)-Local Governments for Sustainability released “Preparing for Climate Change: A Guidebook for Local, Regional and State Governments.” The King County Wastewater Division has also conducted an analysis of vulnerability of wastewater facilities to sea level rise.

PSRC has evaluated these potential impacts to transportation infrastructure in the Puget Sound region, including the port areas which would be most affected by rising sea levels. Appendix L contains a white paper on adaptation to climate change for transportation planning in the Puget Sound region.

Improve Water Quality

Maintaining and improving water quality is a regional priority. See *Appendix C, MPP-En-13 and 14*. The transportation system is a significant source of pollutants that affect water quality. The Puget Sound Partnership Action Agenda identified several sources of water pollution from the transportation system, including land-based vehicles, planes, and recreational and commercial ships. Roads and rail systems contribute pollutants from impervious road surfaces, brake pads, oil leaks, vehicle emissions, and maintenance of rights of way. Aviation contributes emissions, de-icing compounds, and oil/fuel leaks, and ships contribute anti-fouling compounds, oil/fuel leaks, personal care products, pathogens, sewage, and ballast water. Vehicles – including buses, trains, and ferries – are a source of greenhouse gas emissions and particulates. Although these initially enter the air, they can also settle in and contaminate surface waters.

In developing Transportation 2040, the potential impacts of different transportation systems to water quality were evaluated. A key finding was that as the region implements the system envisioned in Transportation 2040, it must do so in a way that avoids and mitigates harm to the region's precious water resources.

Transportation 2040 recommends that mitigation of transportation-related impacts to water quality can be accomplished in a number of ways:

- Reducing vehicle miles traveled decreases the amount of pollutants generated by vehicles. The use of innovative technologies can also help control potential water pollution at the source, as could programs that promote cleaner fuels and vehicles. A combination of incentives and disincentives could be used to promote clean vehicles, such as higher taxes on dirty fuels or tax credits for clean fuels and vehicles. Transportation programs that are designed to address issues such as congestion, emissions, fuel use, or waste management can indirectly benefit water quality through reduction of pollutants entering the environment.
- The treatment and detention of stormwater runoff from operating the transportation system will be particularly important, due to increased new impervious surfaces associated with preservation of existing facilities and new capacity. Potential stormwater impacts should be mitigated by designs that minimize the amount of impervious surface and use low-impact materials such as pervious pavers to manage runoff volumes. Collection, treatment and reuse of stormwater and other runoff is recommended to maximize the use of scarce water resources. Other approaches include use of natural systems such as wetlands to manage water flow, and measures to restore buffers and natural channels for streams alongside transportation facilities.
- Many existing facilities lack modern systems for water quantity or quality management. As projects replace, improve, or extend existing facilities, an opportunity exists to improve their environmental performance compared to today. For example, culverts and other drainage facilities associated with transportation infrastructure can be designed and operated to facilitate fish passage. Transportation 2040 supports the opportunity for the region to create innovative, low-impact, environmentally friendly transportation infrastructure, and to address and correct the harm we have already done.

Improve and Promote Health

Health and well-being factor prominently in VISION 2040. Multicounty planning policies call for improving opportunities for walking and biking, as well as for addressing health in regional and local planning and decision-making processes (MPP-DP-43 and MPP-DP-44). The region's transportation system is to be developed in a manner that minimizes impacts to human health (MPP-T-7). Transportation 2040 addresses public health from several perspectives, the most common of which are impacts to air and water quality and promotion of physical activity. As described above, Transportation 2040 has been designed to minimize impacts to air and water quality, which will yield positive health benefits.

Public health concerns have traditionally focused on preventing the spread of disease, protecting people from unsafe water, polluted air, hazardous waste, and to help people live healthy lives. In recent years, however, public health agencies, local land use planners, and transportation staff have begun to focus increased attention on the health implications of the built environment and the way people travel. Research findings from the Centers for Disease Control (CDC) link the country's obesity epidemic in part to both community design and travel choices. Physical inactivity is a growing health problem in the United States, contributing not only to obesity, but also to chronic disease, osteoporosis, depression, and premature death. Several CDC studies indicate that communities that feature a mix of land uses, are connected by pedestrian and bicycle infrastructure and transit, and rely less on driving are more conducive to physical activity.

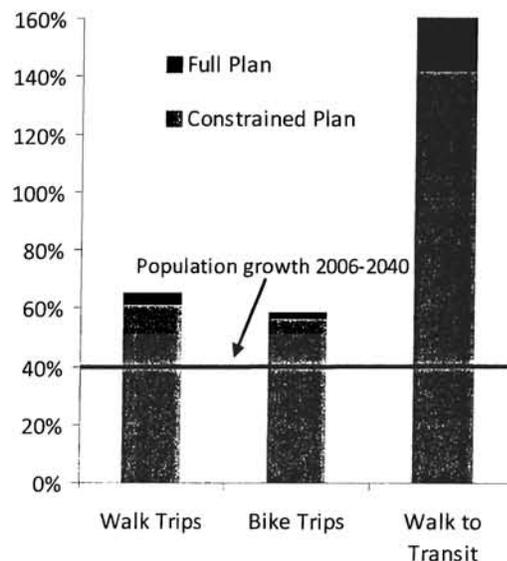
Transportation 2040 promotes programs and investments that provide alternatives to driving, especially to improve the walkability and bikability of the region's communities. These alternatives can result in mobility choices that are healthier and safer. The region's built environment, including the design of communities, the completeness of sidewalk networks, and the provision of open space, affects not only physical well-being, but also mental well-being. Transportation 2040 holds that the region should take a "complete streets" approach to operating transportation rights-of-way. This involves making attractive, safe space for all system users, especially in dense urban areas. See *Appendix C, MPP-T-14 and MPP-T-15*.

Outcomes

Transportation 2040 supports the reintegration of public health into planning and implementation of transportation projects as a way to ensure the region's communities are more sustainable and truly provide opportunities for improved quality of life.

Projects and programs were selected to reduce emissions, minimize impacts to water bodies, emphasize investment in trails and walkways, complete local street networks, and minimize trip distances and congestion. As illustrated in Figure 19, modeling of Transportation 2040 showed increases in walk and bike trips at rates significantly higher than population growth, providing conditions that encourage physical activity.

Figure 19. Increase in Bike and Walk Activity



Appendix C

Appendix L Greenhouse Gas 4-part Strategy

Supplementary information regarding options for further reducing greenhouse gas emissions in the Puget Sound region

State and Federal Greenhouse Gas Emissions Reduction Directions

Greenhouse Gas Reduction Goals: The State of Washington has adopted greenhouse gas (GHG) emission reduction goals for the state to reduce emissions to 1990 levels by 2020, 25% below 1990 levels by 2035, and 50% below 1990 levels by 2050. These goals are overall statewide reduction goals, across all sectors and sources of emissions. While these goals are enacted in state law, the state has not yet assigned targets for the regions of the state, nor for individual sectors (transportation, energy, housing, etc.). The federal government has also not yet set national GHG reduction goals, and current federal legislation being considered by Congress would require specific state goals and targets at least 2 years beyond the enactment of federal legislation.

In the absence of specific requirements and guidance, the Puget Sound Regional Council (PSRC) Transportation Policy Board has taken a proactive stance to address the state's climate change goals in the Transportation 2040 Update process. Each alternative analyzed according to State Environmental Policy Act (SEPA) rules was evaluated for GHG emissions as well as total and per capita vehicle miles traveled (VMT). The data produced from this evaluation process helped to inform the region and state on the potential benefits of a combination of transportation strategies in reducing emissions and VMT.

Based on PSRC's analyses and research, as well as data and research conducted at the national level, Transportation 2040 includes a Four-Part Greenhouse Gas Strategy. Recognizing that it will require a variety of strategies and tools to effectively reduce emissions from the transportation sector, the four-part strategy contains the following elements:

- **Land Use:** build upon the VISION 2040 Regional Growth Strategy to further the goal of balancing jobs and housing, and pursue additional refinements through strategies such as transit-oriented development.
- **User Fees:** recognizing its critical role in reducing VMT and emissions, transition the region over time to a user fee/roadway pricing system.
- **Choices:** continue to provide travelers options to the single-occupant vehicle, and continue research into the costs and benefits of various strategies.
- **Technology:** recognizing that improvements to vehicles and fuels will play a crucial role in reducing emissions, PSRC has undertaken research with the Washington State Department of Ecology (Ecology) on the potential technological advances that may be likely in our region by the year 2040.

Transportation 2040 includes programs and investments that encompass all four of these strategies; these investments are described in more detail later in this document.

State Vehicle Miles Traveled Reduction Benchmarks: The state of Washington has also enacted VMT reduction benchmarks. These benchmarks are not requirements, but were enacted to encourage measurement of VMT as part of an overall greenhouse gas reduction strategy. In early 2009, Governor Gregoire issued an Executive Order, which requires a collaborative process to review the VMT reduction benchmarks and report on whether they should be changed, especially related to alternative fuel vehicles, and the economic and other impacts of VMT reduction benchmarks. The report is due by the end of 2010. The analysis conducted for Transportation 2040 has demonstrated that VMT per capita in the region is already meeting the State's 2020 benchmark, and additional reductions for all alternatives are estimated by 2040 (Refer to Chapter 6 for more information). Given this state directive, PSRC is reporting progress on VMT reduction and has incorporated specific actions within the four-part greenhouse gas strategy to support VMT reduction.

PSRC continues to work with the Washington State Department of Transportation (WSDOT), other metropolitan planning and regional transportation planning organizations around the state, and additional stakeholders on the requirements of Governor Gregoire's executive order.

Transportation 2040

The Transportation 2040 alternatives contain elements of the Four-Part Greenhouse Gas Strategy, including land use actions, roadway pricing, providing more transportation choices, and vehicle and fuel technology. Each of these strategies are discussed below:

Land Use: The region will achieve the adopted growth strategy, VISION 2040. Analysis conducted for the development of VISION 2040 indicates that the increased shift to a more centered growth pattern, and a better jobs/housing balance within the four counties embodied within VISION 2040, will reduce GHG emissions by about 6% from the trend¹.

Pricing and Choices: The Transportation 2040 alternatives use four pricing strategies that would have the effect of reducing vehicle travel, and therefore, GHG emissions.

1. Tolling individual freeway segments: The first strategy is tolling of individual roadway segments, first converting most high-occupancy vehicle (HOV) lanes to high-occupancy toll (HOT) lanes, and then tolling individual freeways where capacity will be added. The tolling is assumed to be variable by time of day to reduce peak period travel and congestion, and the overall effect of tolling is to reduce unnecessary travel and overall vehicle travel. Assumed toll rates were set at levels that would optimize use of the system (while minimizing negative arterial diversion) and maximize benefits to system users.

2. Substituting a VMT fee for the gas tax: A gas tax substitute, such as a VMT fee, could be implemented. The VMT fee has a more direct link to amount of travel compared with the gas tax, providing drivers with more direct information on how much they travel. This approach has been demonstrated to reduce the amount of travel.

3. Freeway System Tolls: All regional freeways could be tolled to raise money for transportation investments and to manage the limited capacity of the system. It is assumed that the freeway system toll will be variable, with higher toll rates during the peak commute times, and a minimal or no toll at night and other non-congested times. Toll rates were set to optimize use of the system and to maximize benefits to the system users. This translates to an average toll of about 18 cents per mile.

4. Parking Surcharges: Additional parking surcharges could be implemented in major regional employment centers.

The above pricing approaches, supported by a 120% increase in local transit service and the extension of regional light rail to Everett, Tacoma, and Redmond, plus investments in walking and biking facilities within and accessing centers and transit stations, together result in a 9% reduction in regional GHG emissions from the trend.

Technology: Assumptions about the market penetration of electric and other alternative fuel vehicles, less carbon-intensive fuels, and improved fuel efficiency of the overall passenger and freight fleets could further reduce GHG emissions. In collaboration with Ecology, PSRC developed two technology scenarios: a "likely" scenario, which is probable given current trends and conservative assumptions about fuel prices and other incentives to change technology, and an "aggressive" scenario, which assumes a higher degree of concerted effort to transition the vehicle fleet to a more energy-efficient approach. These scenarios, based on extensive national research and prepared in consultation with the U.S. Environmental Protection Agency (U.S. EPA), WSDOT, and the Puget Sound Clean Air Agency, are

¹ The value referenced here is obtained from the analyses conducted for the VISION 2040 Environmental Impact Statement. The alternatives analysis for VISION 2040 evaluated various growth patterns compared to the historic trend, using the investments contained in the existing long-range transportation plan, *Destination 2030*.

identified in the chart below. The “likely” scenario could result in an additional 25% reduction of GHG emissions, and the “aggressive” scenario could result in an additional 43% reduction in emissions.

Potential Vehicle and Fuel Technological Improvements in the Central Puget Sound Region by 2040

	LIKELY SCENARIO	AGGRESSIVE SCENARIO
Percent of Electric Vehicles in Fleet	20%	45%
Improvements to Fuel Economy	40 mpg	50 mpg
Reduction of Carbon Intensity of Fuel	10%	25%
Improvements to Heavy Duty Vehicles	5%	10%

Four-Part Greenhouse Gas Strategy: Next Steps

PSRC has taken a proactive stance at addressing the reduction of GHG emissions, beginning with the multicounty planning policies and the Regional Growth Strategy contained in VISION 2040 and continuing with the analysis work and investment strategies contained in Transportation 2040. This is an emerging area, with research and legislation continuing to evolve at both the state and national levels. PSRC’s Boards have directed that Transportation 2040 should be flexible and adaptable in order to respond to new guidance and directions on a variety of issues, including climate change.

The Transportation 2040 alternatives contain elements of each of the four components of the Four-Part Greenhouse Gas Strategy. Additional research and analysis could be conducted in each of these areas, such as the following:

Land Use: VISION 2040 resulted in a 6% reduction in GHG emissions from the trend. From the VISION 2040 Environmental Impact Statement (EIS), further focusing growth in metropolitan and larger cities could result in up to a 9% reduction in GHG emissions.

User Fees and Choices: The transportation investments in the Preferred Alternative result in a 9% reduction in GHG emissions from the 2040 Baseline. Higher assumptions of vehicle operating costs would result in additional reductions, for example:

- The toll rates in Alternative 5 were higher (25¢ per mile) and resulted in a 10% reduction in GHG emissions from the Baseline.
- Other sensitivity tests of higher vehicle operating costs (an additional 19¢ per mile, equal to approximately an additional \$4.00 a gallon) indicated the potential for further reductions of GHG emissions in the range of 7% to 10%.
- A sensitivity test that involved increasing urban bus services in coordination with the road tolls analyzed in the Draft EIS alternatives indicated the potential for further modest reductions in GHG emissions, in the range of 0.2%.
- The report Moving Cooler² analyzed fees equivalent to an *additional* \$5.00 a gallon, which resulted in a 28% reduction in GHG emissions from their study baseline by 2050.

The alternatives analysis conducted for Transportation 2040 included significant investments in alternatives to single-occupant vehicle travel, consistent with the 2008 Washington State Climate Action Team’s recommendations³. Additional research could be conducted regarding the impact of the region’s “short trips,” as well as the benefits of localized bicycle and pedestrian investments, active traffic management, transportation demand management (TDM) programs, etc.

² Moving Cooler, an Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions, Cambridge Systematics, Inc. 2009.

³ As published in Leading the Way: Implementing Practical Solutions to Climate Change, November 2008.

Technology: The application of likely and aggressive technology improvements to the Preferred Alternative results in a total GHG emissions reduction between 5% and 28% below 2006 levels. To ensure that these potential emissions reduction benefits are achieved, the region and the state should consider opportunities to influence the direction of vehicle and fuel improvements over the next 30 years, for example, through legislation or incentives.

SUMMARY

The results from the strategies and investments contained in the Transportation 2040 Preferred Alternative are consistent with state and national research related to the reduction of GHG emissions from the transportation sector. The 2008 Washington State Climate Action Team report, Leading the Way: Implementing Practical Solutions to the Climate Change Challenge, makes the following statements:

- “Two objectives are key to achieving the state’s goals for GHG emission reductions: 1) a binding GHG emissions limit, and 2) alignment of market incentives to support achieving that limit.”
- “In order to meet the 2020 targets and achieve the longer-term GHG emission reduction targets, a “centerpiece” market-based policy must be aligned with these limits to deliver cost-effective solutions and drive the broad structural changes needed to achieve a flourishing low-carbon economy. The sector-specific “most promising” policies recommended here can complement, but cannot supplant, this centerpiece policy; but they alone cannot (and are not intended to) achieve the longer-term goals in the absence of this market signal.”

Further, of the 14 “most promising strategies” recommended in the 2008 Climate Action Team report for all sectors, 10 were quantitatively analyzed for their emissions reduction potential. These 10 strategies were estimated to be able to reduce GHG emissions by 10% below forecasted 2020 levels.⁴

In addition, it is nationally recognized that all possible strategies are required to effectively reduce emissions from the transportation sector:

- “Meeting long-term climate protection goals will require significant progress on all three legs of the stool.” Center for Clean Air Policy
- “Independently, each approach appears to have the potential to significantly reduce GHG emissions from the transportation sector, but not enough to flatten emissions. When the approaches are combined however, there are even greater opportunities and added flexibility to reduce emissions.” U.S. EPA
- “For the U.S. transportation sector, system approaches that combined advanced vehicle technology, lower GHG fuels, and TDM yield the largest potential and flexibility for lowering both GHG emissions and petroleum use.” U.S. EPA

As mentioned previously, this is an emerging issue with numerous state and federal activities in process, including potential future federal legislation. PSRC will continue to move forward on its Four-Part Greenhouse Gas Strategy and will continue to collaborate with other agencies and monitor this important issue.

⁴ Page 49, Leading the Way: Implementing Practical Solutions to Climate Change, November 2008.

Appendix D

Chapter 6 Air Quality and Climate Change

1 What affects air quality in the central Puget Sound region?

Air pollution comes from many different sources, including industry, transportation, and agriculture. It affects both human health and the environment, including plants, animals, and visibility, as well as the built environment.

Air quality in the central Puget Sound region is affected by several factors, including geography, climate, and the urban environment. The region is located between the Cascade and Olympic mountain ranges and is bisected by Puget Sound. Largely surrounded by mountains and water, the region's land is further restricted by steep hills and environmentally sensitive areas. Most of the urban development in the region has occurred near sea level, adjacent to Puget Sound. Most of the air pollution in the region comes from the urban areas and transportation corridors that follow the north/south trending geography of the Puget Sound.

The central Puget Sound region has a modified marine climate. Temperatures are generally moderate with few extremely cold or hot days throughout the year. On most days, clean ocean air combined with wind disperses air pollutants in the region. When the onshore airflow is interrupted, the combined effects of urban development, geography, and weather can result in stagnating air and an increase in air pollution. In particular, the mountains on both the east and the west side of the region create a bowl, trapping pollution in the urban basin.

Which elements of Washington Administrative Code (WAC) 197-11-444 are addressed in this chapter?

This chapter addresses:

- Section (1)(b)(i) Air quality
- Section (1)(b)(iii) Climate
- Section (1)(b)(ii) Odor is not discussed separately because odor impacts from vehicle emissions would be similar to those discussed in the response to question 6 in this section.

Air Quality Information Sources

Air quality monitoring and other relevant information in this chapter was obtained from the Puget Sound Clean Air Agency (PSCAA), the U.S. Environmental Protection Agency (EPA), the Washington State Department of Ecology (Ecology), and the University of Washington.

2 What are the pollutants of concern in the central Puget Sound region?

The pollutants of concern in the central Puget Sound region include the following:

- Particulate matter
- Carbon monoxide
- Ozone
- Hazardous air pollutants/air toxics
- Greenhouse gases

Particulate Matter

Particulate matter is the term for small particles of dust, soot, and organic matter suspended in the atmosphere. In this document, coarse particulate matter is referred to as PM_{10} and fine particulate matter is referred to as $PM_{2.5}$. Sources of particulate matter include motor vehicles, industrial boilers, wood stoves, open burning, and dust from roads, quarries, and construction activities. Relating to transportation sources, road and construction dust is often in the larger PM_{10} range, while vehicle exhaust emissions are generally in the smaller $PM_{2.5}$ range. In particular, diesel exhaust is a significant source of fine particles.

Health effects of particulate matter include respiratory illnesses, such as aggravated asthma, chronic bronchitis, and decreased lung function. Fine particulates can pose more serious health risks because they are easily inhaled and have the ability to penetrate deeper into lung tissue. As with many pollutants, sensitive populations such as children and the elderly are more susceptible to these health risks. Particulate emissions from diesel exhaust are of particular concern due to their toxicity. The U.S. Environmental Protection Agency (EPA) has concluded that diesel exhaust is a probable human carcinogen, and diesel particulate matter is the most likely portion of the exhaust to pose a risk (EPA, 2002).

Particulate matter can also cause environmental damage. Particles can be carried by the wind for long distances before

What is PM_{10} and $PM_{2.5}$?

PM_{10} is particulate matter that has a diameter of 10 micrometers or less.

$PM_{2.5}$ is fine particulate matter that has a diameter of 2.5 micrometers or less.

being deposited on the ground or in the water. Water bodies may become acidic, changes may occur to the nutrient balance in both water and in the soil, forests and crops may be damaged, and the diversity of ecosystems may be affected. Particulate matter is also the primary cause of reduced visibility, or haze, affecting specific national park and wilderness areas. In addition, particulates can cause aesthetic damage to buildings and stone, such as staining and accelerated decay.

Carbon Monoxide

Motor vehicles are the primary source of carbon monoxide (CO), but other sources include industry, outdoor burning, and non-road mobile sources such as off-road vehicles and lawnmowers. Areas of high CO concentrations are usually localized, occurring near congested roadways and intersections. These localized areas of elevated CO levels are referred to as CO hot spots. High levels generally occur in autumn and winter months during conditions of light winds and stable weather, which prevent dispersion of the emissions.

CO reduces the blood's oxygen-carrying capability. Acute health effects include headaches, slowed reflexes, weakened judgment, and impaired perception. Chronic effects include aggravation of pre-existing cardiovascular disease and increased heart disease risk in healthy individuals. At very high levels, CO is poisonous and can be fatal.

Ozone

Ozone in the upper atmosphere provides protection from harmful ultraviolet radiation from the sun; ozone in the lower atmosphere, referred to as ground-level ozone (also known as smog), poses numerous health and environmental risks. The term ozone in this chapter refers to ground-level ozone.

Ozone is formed when its precursors, nitrogen oxides (NO_x) and volatile organic compounds (VOCs), chemically react in the presence of sunlight. Peak ozone levels occur during the warmer summer months. Ozone is a regional concern because it, along with its precursors, can be carried hundreds of miles from its origins. Maximum ozone levels generally occur at

What is carbon monoxide?

Carbon monoxide (CO) is a colorless, odorless, poisonous gas produced when carbon-containing fuel is not burned completely.

How is ozone formed?

Ozone is formed when emissions of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) chemically react in the presence of sunlight.

locations several miles downwind from the sources. Sources of the precursor pollutants to ozone—NO_x and VOCs—include mobile sources, industry, commercial solvents, wood burning, and natural (biogenic) sources such as forests.

Ozone is an eye and respiratory tract irritant and increases the risk of respiratory and heart diseases. Ozone can cause breathing difficulty for susceptible populations (e.g., asthmatics and the elderly), and may lead to impaired lung function and premature death. Ozone can also affect the environment, causing damage to crops and other plant life, waterways, and ecosystems.

Hazardous Air Pollutants or Air Toxics

Hazardous air pollutants, also referred to as air toxics, are chemicals emitted into the atmosphere that cause or are suspected to cause cancer or other severe health effects, such as birth defects or reproductive problems. At the state and regional level, Washington State Department of Ecology (Ecology) and Puget Sound Clean Air Agency (PSCAA) list 400 pollutants as air toxics. This list includes the 188 national hazardous air pollutants set by EPA as well as additional pollutants believed to be harmful. Hazardous air pollutants are a subset of air toxics, but the terms are often used interchangeably. Examples of air toxics include benzene, perchlorethylene, methylene chloride, formaldehyde, and asbestos, as well as diesel particulate matter and wood smoke.

Air toxics are emitted by a variety of sources, including industry, small facilities such as dry cleaners, motor vehicles, non-road mobile sources (such as trains, boats, lawnmowers, etc.), and outdoor and indoor wood and debris burning. In the Puget Sound region, particulate matter from diesel exhaust represents more than 70 percent of the potential cancer risk from air toxics (PSCAA).

Air toxics are pollutants known or suspected to cause cancer and other serious health effects. These health effects include respiratory illnesses such as asthma and reduced lung function, damage to the immune system, neurological problems, and reproductive problems such as reduced fertility. Once deposited into the soil and waterways, air toxics can build up in the food

What are hazardous air pollutants or air toxics?

Hazardous air pollutants, also referred to as air toxics, are chemicals emitted into the atmosphere that cause or are suspected to cause cancer or other severe health effects, such as birth defects or reproductive problems. Asbestos and wood smoke are two examples of hazardous air pollutants.

chain, resulting in human consumption of contaminated plants, fish, and other animals.

Greenhouse Gases and Climate Change

Some greenhouse gases occur naturally in the atmosphere, trapping solar energy and warming the earth's surface. These gases include carbon dioxide (CO₂), nitrous oxide, and methane. If not for this greenhouse effect, the earth would be about 60 degrees cooler. However, more greenhouse gases are being added into the atmosphere, causing more heat to be trapped and the earth's surface to warm even further. The earth's surface temperature has risen by about 1 degree Fahrenheit in the past century, with accelerated warming during the past two decades; the decade between 1998 and 2007 has been the warmest on record for the last 100 years (National Academy of Sciences, 2006; IPCC, 2007).

Levels of CO₂ are higher now than at any time in the past 650,000 years, and according to EPA and the Intergovernmental Panel on Climate Change (IPCC), most of the warming in recent decades is very likely the result of human activities. There is 90 percent certainty that the burning of fossil fuels and other human activities are driving climate change (IPCC, 2007). Climate change refers to a significant change in long-term weather patterns around the world, as measured by temperature, rainfall, wind patterns, etc. Global warming refers to an average global increase in the earth's temperature.

The primary source of greenhouse gases is the burning of fossil fuels to generate electricity and power engines. Other sources include industry, agriculture, and landfills. In the Puget Sound region, 50 percent of the emissions are attributable to transportation sources, including motor vehicles, aircraft, construction equipment, and boats (PSCAA, 2005).

Expected consequences from climate change include an increase in global temperatures, resulting in a rising of the sea level. Other effects include a change in precipitation and impacts to local climates, which could alter forests, crop yields, and water supplies. Climate change may also affect human

What are greenhouse gases?

Greenhouse gases come in several forms. These gases include carbon dioxide (CO₂), nitrous oxide, and methane. CO₂ makes up the bulk of the greenhouse gas emissions from the transportation sector. Any process that burns fossil fuel releases CO₂ 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.

health, animals, and many types of ecosystems. For example, deserts may expand into existing rangelands, and features of some national parks may be permanently altered. The Puget Sound region may experience warmer summers and longer, wetter winters. Such effects could reduce forests in the Cascade Mountains and decrease snow packs. Reduced snow packs are likely to drastically change water availability in the region, which in turn will require a change in the way current water demands for agriculture, salmon populations, and energy uses are managed. Climate change is also likely to result in more winter floods and higher water temperatures that would further stress salmon populations, and potentially increase heat-related pollution such as ozone (UW Climate Impacts Group, 2007). Policy considerations related to the impacts of climate change specific to transportation infrastructure are included in the Transportation 2040 plan.

3 What regulations apply to air quality?

Numerous federal, state, and local regulations relate to air quality in the central Puget Sound region, including those under the federal Clean Air Act and the Washington Clean Air Act. For example, there are controls on industrial emissions, indoor and outdoor burning, and vehicle engines and fuels. This section focuses on those regulations pertinent to the scope of Transportation 2040 and the alternatives being considered, relative to the pollutants discussed in the previous section.

National Ambient Air Quality Standards

Under the federal Clean Air Act, EPA established National Ambient Air Quality Standards (NAAQS) for six principal, or criteria, pollutants considered harmful to public health and the environment. Primary standards set limits to protect public health; secondary standards set limits to protect the environment, including protection against decreased visibility and damage to wildlife, plants, and buildings. The six criteria pollutants are CO, lead, nitrogen dioxide, particulate matter (PM₁₀ and PM_{2.5}), ozone (NO_x and VOCs), and sulfur oxides. Air quality is monitored and areas are designated according to whether or not they meet the NAAQS for each pollutant. Geographic regions that meet the NAAQS are referred to as attainment areas; areas that do not meet the NAAQS are

What is the Clean Air Act?

The United States Clean Air Act describes legislation enacted by Congress to control air pollution on a national level. The first Clean Air Act was the Air Pollution Control Act of 1955, followed by the Clean Air Act of 1963, the Air Quality Act of 1967, the Clean Air Act Extension of 1970, and Clean Air Act Amendments in 1977 and 1990. Numerous state and local governments have enacted similar legislation, either implementing federal programs or filling in locally important gaps in federal programs.

designated nonattainment to that standard. Once designated nonattainment, the Clean Air Act requires the preparation of an attainment plan to demonstrate how an area will thereafter meet and maintain the NAAQS. Once a nonattainment area has subsequently met the NAAQS for a period of time, the area may be redesignated as a maintenance area. A maintenance plan is required for these areas to demonstrate that the NAAQS will continue to be met in the future. Maintenance and attainment plans for individual regions comprise the State Implementation Plan (SIP) for Air Quality for a given state. The terms maintenance plan, attainment plan, and SIP are often used interchangeably.

Maintenance plans will often contain control strategies to ensure attainment of the standards related to the pollutant sources. Depending on the pollutant, these sources can include transportation, industry, and wood smoke. An emissions inventory will be prepared, estimating the emissions from each of these sources. This inventory will be used to identify the appropriate level of emissions from each source that will ensure the region will maintain the standards. As an example, a motor vehicle emissions “budget” may be prepared for certain pollutants, which is a ceiling of total emissions from on-road mobile sources in the region that cannot be exceeded.

In 1978, the central Puget Sound region was classified as a nonattainment area for CO and ozone. In 1987, the industrial areas of the Seattle Duwamish River, Kent Valley, and Tacoma Tidelands were classified as nonattainment areas for PM₁₀. The Seattle and Tacoma industrial areas include the ports of both those cities. In 1996, having met the federal standards for several years, the region was redesignated by EPA as a maintenance area for CO and ozone; the three PM₁₀ nonattainment areas were redesignated as maintenance areas in 2001. As required, each of these areas has approved maintenance plans in place. Approval of both the CO and ozone maintenance plans occurred in 1996, with subsequent updates to both plans approved in 2004; approval of the PM₁₀

maintenance plan occurred in 2000, with the plan becoming effective in 2001.

In June 2004 EPA officially designated areas to a new ozone standard, and in April 2005, to a new particulate matter standard. The original ozone standard for which the Puget Sound region was in maintenance was based on a 1-hour concentration. The new standard is based on an 8-hour average concentration and replaced the 1-hour standard as of June 15, 2005. The new particulate matter standard is for PM_{2.5}, and is in addition to the existing PM₁₀ standard, which remains in place. EPA further strengthened the standard for PM_{2.5} in 2006, and strengthened the ozone standard in 2008.

Both the new PM_{2.5} and ozone standards have recently been violated in the Puget Sound region. The South Tacoma (Wapato Hills/Puyallup River Valley) area was designated by EPA as nonattainment to the new PM_{2.5} standard in December 2008. This designation became effective with the October 2009 Federal Register notice published by EPA.¹

Ecology, in coordination with PSCAA, must develop an attainment plan within 3 years of this designation to demonstrate how the area will come back into compliance with the standard. The primary source of PM_{2.5} emissions in this newly designated area is wood-burning activities, but mobile sources represent approximately 27 percent of the emissions².

The region has also experienced exceedances of the new ozone standard, with a final exceedance in summer 2008 leading to a violation of the standard. In January 2010, EPA proposed a revision to the 2008 ozone standard, and put all area

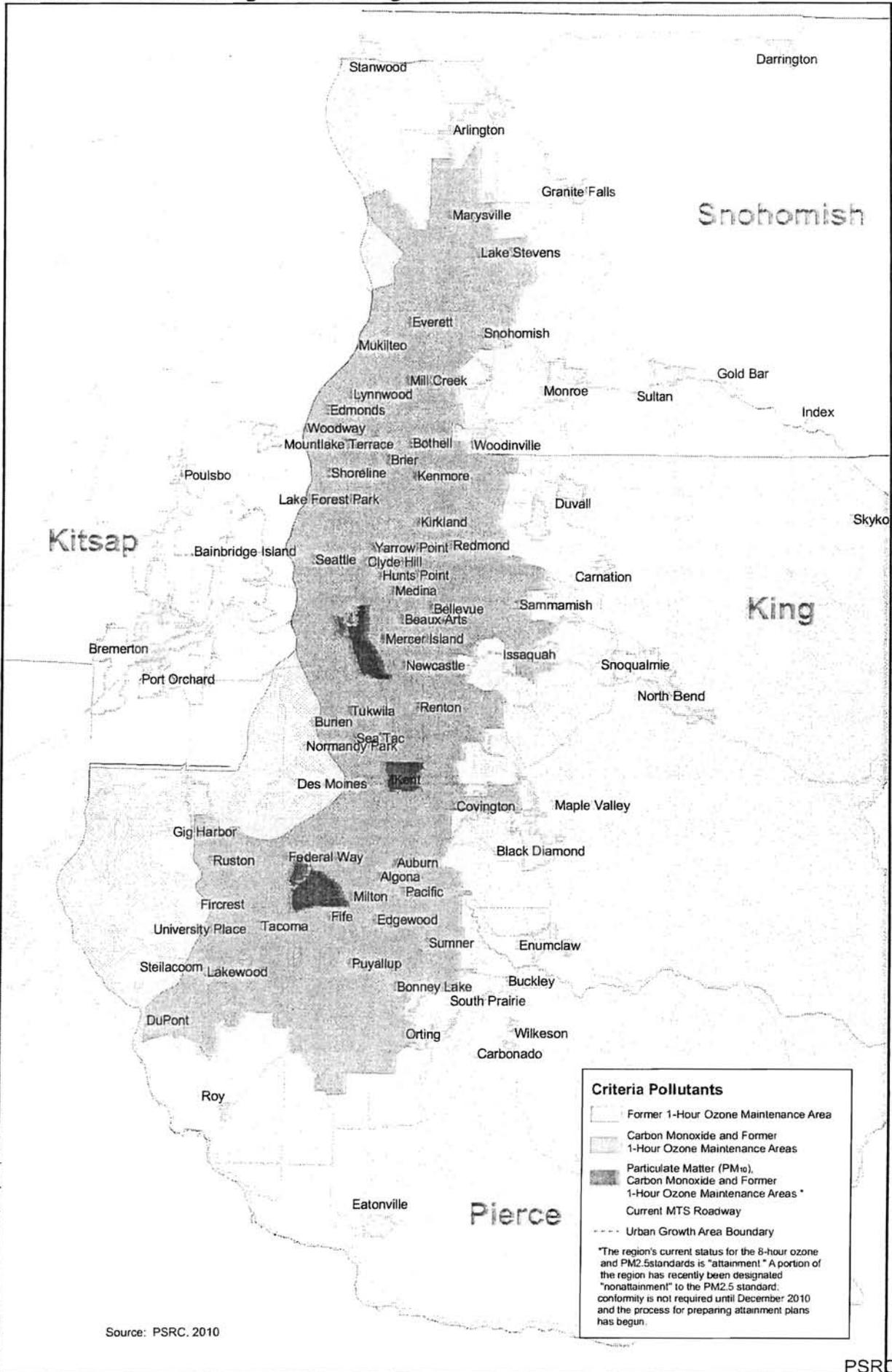
¹ The December 2008 notice did not become effective until the October 2009 Federal Register notice.

² The final source apportionments will be completed as part of the attainment plan process.

designations to the 2008 standard on hold. The revised standard is expected to be finalized by August 2010.

Exhibit 6-1 illustrates the region's current maintenance area boundaries. The PM_{2.5} and ozone redesignations are not reflected on this map, because they are still ongoing processes. Exhibit 6-2 identifies the current NAAQS for each of the criteria pollutants.

Exhibit 6-1. Central Puget Sound Region Maintenance Areas



Source: PSRC, 2010

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Exhibit 6-2
National Ambient Air Quality Standards

Pollutant	Primary Standards		Secondary Standards	
	Level	Averaging Time	Level	Averaging Time
Carbon monoxide	9 ppm (10 mg/m ³)	8-hour ⁽¹⁾	none	
	35 ppm (40 mg/m ³)	1-hour ⁽¹⁾		
Lead	0.15 µg/m ³ ⁽²⁾	rolling 3-month average	same as primary	
	1.5 µg/m ³	quarterly average	same as primary	
Nitrogen dioxide	0.053 ppm (100 µg/m ³)	annual (arithmetic mean)	same as primary	
Particulate matter (PM ₁₀)	150 µg/m ³	24-hour ⁽³⁾	same as primary	
Particulate matter (PM _{2.5})	15.0 µg/m ³	annual ⁽⁴⁾ (arithmetic mean)	same as primary	
	35 µg/m ³	24-hour ⁽⁵⁾	same as primary	
Ozone	0.075 ppm (2008 standard)	8-hour ⁽⁶⁾	same as primary	
	0.08 ppm (1997 standard)	8-hour ⁽⁷⁾	same as primary	
	0.12 ppm	1-hour ⁽⁸⁾ (applies only in limited areas)	same as primary	
Sulfur dioxide	0.03 ppm	annual (arithmetic mean)	0.5 ppm (1,300 µg/m ³)	3-hour ⁽¹⁾
	0.14 ppm	24-hour ⁽¹⁾		

Notes: ppm = parts per million mg/m³ = milligrams per cubic meter µg/m³ = micrograms per cubic meter

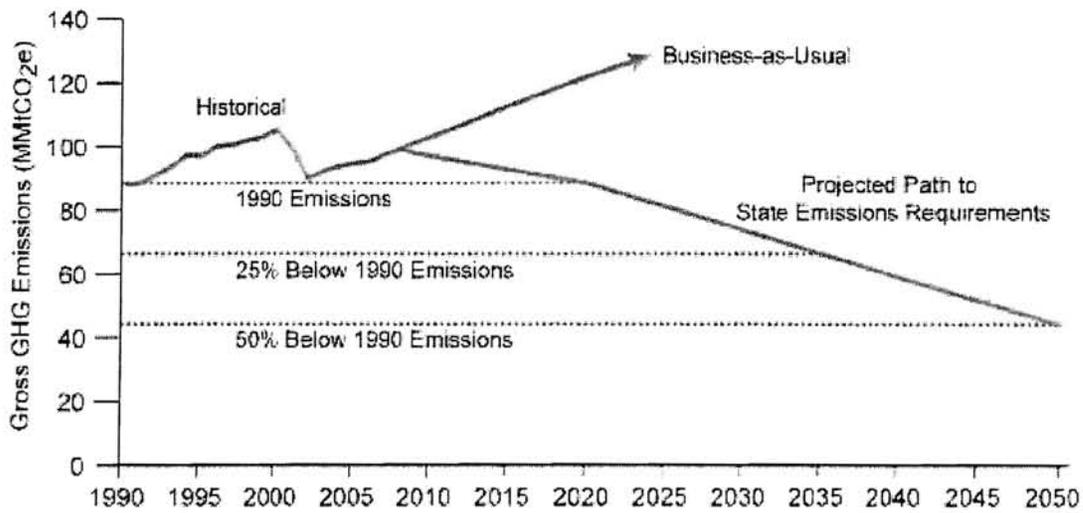
1. Not to be exceeded more than once per year.
2. Final rule signed October 15, 2008.
3. Not to be exceeded more than once per year on average over 3 years.
4. To attain this standard, the 3-year average of the weighted annual mean PM_{2.5} concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m³.
5. To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m³ (effective December 17, 2006).
6. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective May 27, 2008).
7. (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
(b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
8. (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is < 1.
(b) As of June 15, 2005, EPA revoked the 1-hour ozone standard in all areas except the 8-hour ozone nonattainment Early Action Compact (EAC) Areas.

Source: EPA, 2009.

Greenhouse Gases

At this time, there are no federal standards related to greenhouse gases. The state of Washington has passed several pieces of legislation related to the reduction of greenhouse gases, including setting statewide goals to reduce emissions to 1990 levels by 2020, 25 percent below 1990 levels by 2035, and 50 percent below 1990 levels by 2050 (Exhibit 6-3). In addition, the state has set benchmarks for reducing annual statewide per capita vehicle miles traveled (VMT). These benchmarks are to decrease annual statewide VMT per capita by 18 percent by 2020, 30 percent by 2035, and 50 percent by 2050. These reductions are from a forecasted statewide VMT baseline of 75 billion in 2020; trucks over 10,000 pounds gross vehicle weight are exempted. Currently, no emission reduction goals have been established for individual sectors (e.g., transportation, industry) or specific emission goals or VMT benchmarks established for specific regions.

**Exhibit 6-3
Greenhouse Gas Reduction Goals**



Source: CTED, 2008

There may be future federal and state legislation that sets requirements for reducing greenhouse gas emissions and/or VMT, pertinent to the transportation and growth management planning activities conducted by PSRC. In the absence of such requirements, PSRC has taken an active stance to address the

state's climate change goals in the VISION 2040 policies and in the development of Transportation 2040. Each alternative has been evaluated for greenhouse gas emissions as well as total and per capita VMT (refer to Question 5 later in this chapter). The data produced from this analysis will help to inform the region and state on the potential benefits from alternative combinations of transportation and land use strategies in reducing emissions and VMT. In addition to the information contained in the Potential Mitigation Measures section of this chapter, the Transportation 2040 plan discusses the potential benefits from improvements in technology (vehicles and fuels), as well as policy considerations such as market penetration and cost issues.

Transportation Conformity

Transportation conformity is a mechanism to ensure that transportation-related activities—plans, programs, and projects—are reviewed and evaluated for their impacts on air quality prior to funding or approval. The intent of transportation conformity is to ensure that new projects, programs, and plans do not impede an area from meeting and maintaining air quality standards. Specifically, regional transportation plans, improvement programs, and projects may not cause or contribute to new violations, worsen existing violations, or interfere with the timely attainment of air quality standards or the required interim emission reductions towards attainment. Positive findings of conformity are required by the federal Clean Air Act, the Clean Air Washington Act, and the federal transportation act (the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users—SAFETEA-LU) to allow regions to proceed with transportation project implementation in a timely manner.

A regional transportation conformity analysis must show that the total regional emissions produced by projects in the long-range transportation plan and the short-range transportation improvement program, plus activity on the existing transportation system, do not exceed the motor vehicle emissions budget identified in the maintenance plan for each criteria pollutant (refer to the previous section). In the Puget

What is SAFETEA-LU?

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) is a bill that governs United States federal surface transportation spending. It was signed into law by President George W. Bush on August 10, 2005 and expired on September 30, 2009. Congress is working on a replacement bill for the next six-year period.

Sound region, based on the pollutants for which the region is in maintenance to the standard, conformity is demonstrated for CO and PM₁₀. Because the 1-hour ozone standard has been revoked and the region is currently in attainment of the 8-hour ozone standard, demonstrations of conformity are no longer required for this pollutant. Conformity to PM_{2.5}, based on the newly designated nonattainment area in Pierce County, is required to be demonstrated by December 14, 2010. PSRC is working with the region's air quality consultation partners on the procedures and parameters for conducting this analysis, which will be concluded after Transportation 2040 is adopted.

4 What are the current conditions and trends for air quality?

National Pollutant Trends

Nationally, emissions of the six criteria pollutants have declined by 41 percent since 1990, even while population, VMT, and energy use have increased. This decline is a result of regulatory and voluntary control programs in a variety of sectors, including mobile sources and industry. However, many parts of the country are in violation of one or more of the NAAQS, and ozone and fine particulates present particular challenges. Emissions of air toxics are also on the decline, with a decrease in emissions of certain pollutants such as benzene of 5 percent or more per year between 2000 and 2005.

Alternatively, total emissions of greenhouse gases have increased 15 percent since 1990. This is primarily due to CO₂ emissions from the combustion of fossil fuels (EPA, 2007).

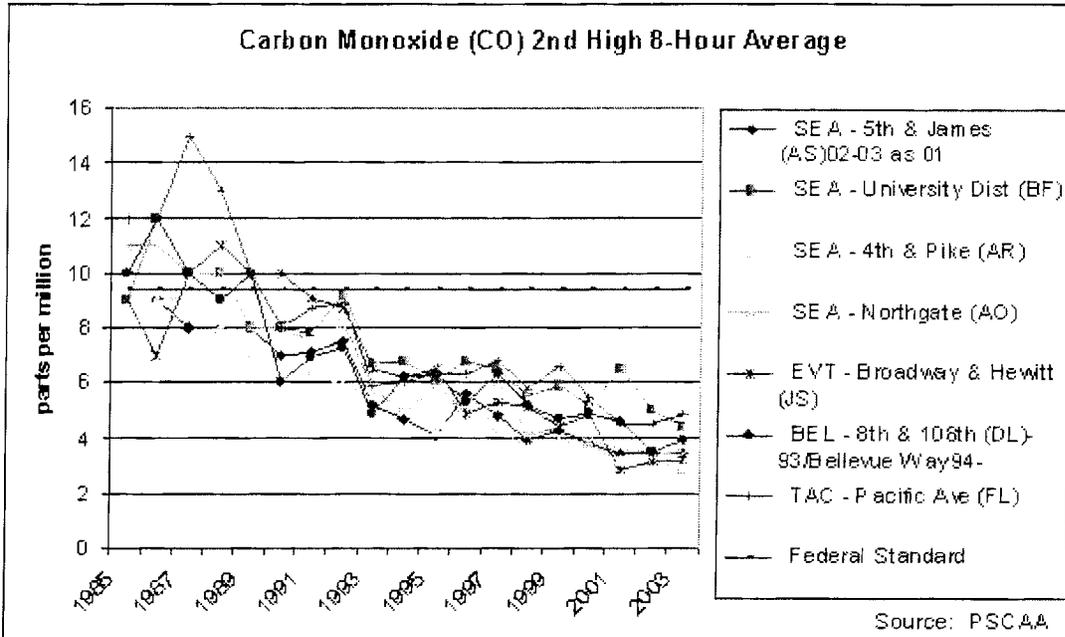
Regional Pollutant Trends

Regional air pollution trends have generally followed national patterns over the last 20 years, with the level of criteria air pollutants decreasing over the last decade to levels below the federal standards. Levels of CO in particular have decreased substantially in the region (Exhibit 6-4). On-road gasoline vehicles represent over 70 percent of CO emissions in the region (PSCAA, 2006b). Decreases in CO concentrations have resulted in large part from federal emission standards for new vehicles and the gradual replacement of older, more polluting vehicles. Local oxygenated fuels programs, inspection and

maintenance programs, and traffic control measures have also played a role in the declining CO emission trend.

Exhibit 6-4

Carbon Monoxide Trends in the Central Puget Sound Region



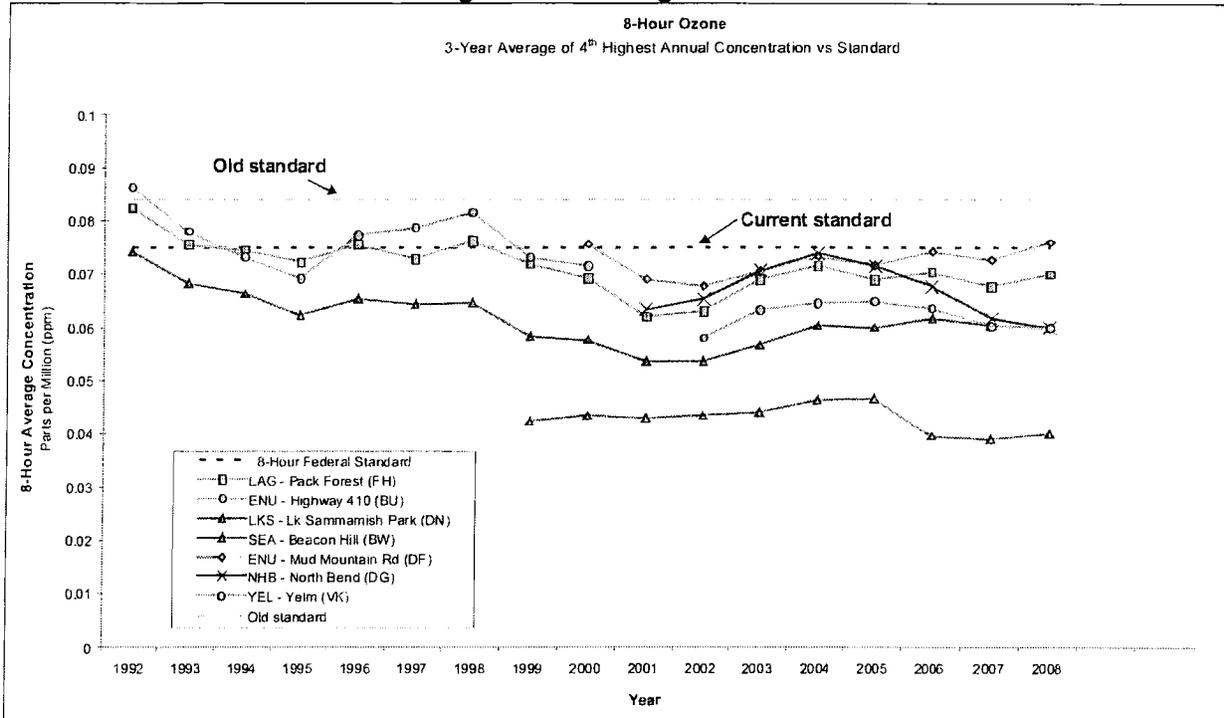
Source: PSCAA, 2006b

Emissions of sulfur oxides, NO_x , and lead are below levels of concern in the Puget Sound region and have been for many years. Levels of sulfur oxides in the region have shown significant decreases in the last 20 years, and PSCAA ceased monitoring for this pollutant in 1999. Lead in the ambient air is no longer considered a public health concern, and it has not been monitored in the region since 1999. Although NO_x is a concern in the region due to its role in the formation of ozone (along with VOCs in the presence of sunlight), emissions of this pollutant have been dramatically reduced in the region.

Emissions of ozone and fine particulates, however, have been of concern in recent years. In fact, as stated in the previous section, the region has recently violated the more stringent standards set by EPA and is soon to be designated as nonattainment of both standards.

Exhibit 6-5 illustrates the ozone trend in the region since 1992. The dashed black line represents the current federal standard; the high ozone concentrations that occurred last summer, plus several previous years' exceedances, have resulted in a violation of the standard. While the emissions are originating primarily in urban areas, the highest concentrations of ozone are measured in communities 10 to 30 miles downwind from the source, in areas such as North Bend and Enumclaw. Because of the complex chemical reactions occurring in the formation of ozone, the reduction of the precursor pollutants (VOCs and NO_x) does not produce proportional reductions in ozone. In the Puget Sound region, it has been determined that at a certain level, reducing emissions of NO_x may actually increase ozone concentrations. Therefore, reducing VOCs will be the most effective way to reduce ozone.

**Exhibit 6-5
Ozone Trends in the Central Puget Sound Region**

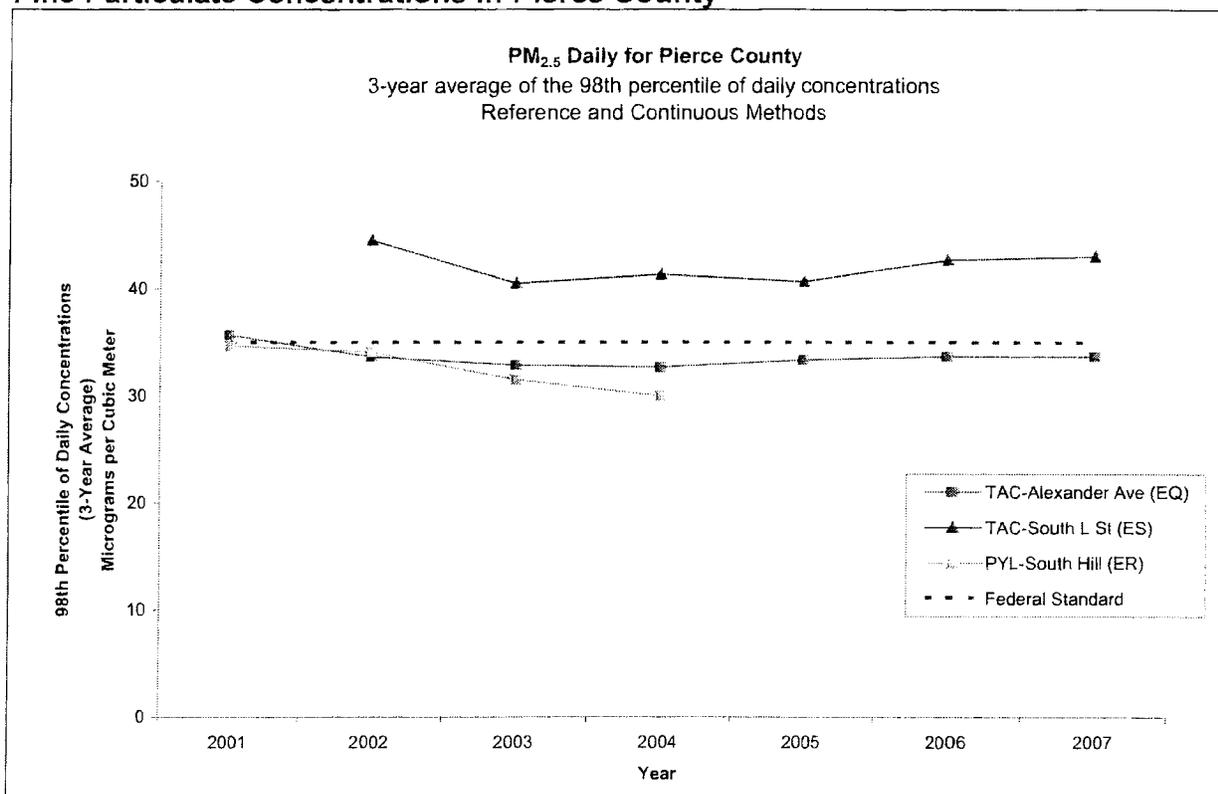


Source: PSCAA, 2009

Exhibit 6-6 shows the PM_{2.5} concentrations in Pierce County since 2001; the graph illustrates that the Tacoma area has now violated the new standard. Other monitors throughout the

region are close but have not yet violated the fine particulate standard. As stated previously, the primary source of PM_{2.5} emissions in the Tacoma area is wood burning activities, with mobile sources representing approximately 27 percent of the emissions. A similar composition of sources can be found in other parts of the region for this pollutant, although the percentage share between mobile sources and wood burning has seasonal differences. Emissions of coarse particulates, or PM₁₀, in the region have remained below the federal standard since the early 1990s.

Exhibit 6-6
Fine Particulate Concentrations in Pierce County



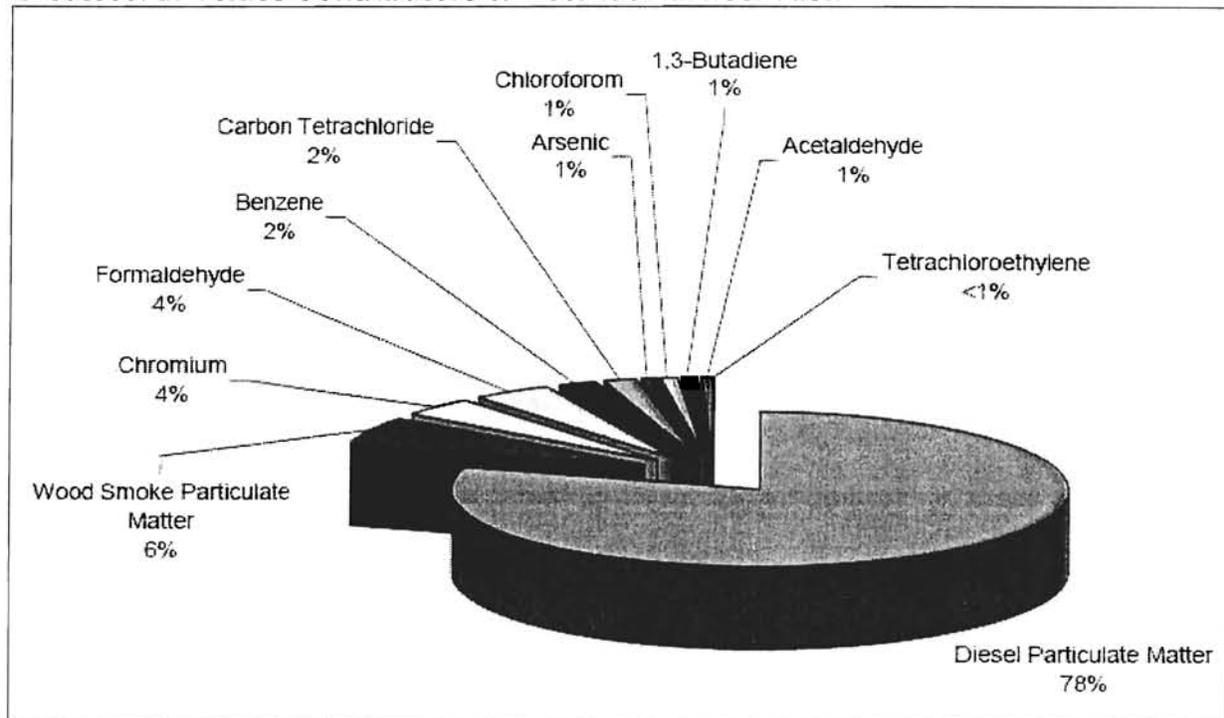
Note: All South Hill data are Federal Reference Method (FRM) from 2000 to 2007. Alexander Avenue data are FRM from 1999 to 2002 and nephelometer data from 2003 to 2007. South Hill data are FRM from 1999 to 2002 and nephelometer data from 2003-2004; incomplete nephelometer data were collected from South Hill in 2005.

Air toxics are present in the region at levels posing a health risk, and EPA has placed the region in the top 5 percent of the country for potential cancer risk from air toxics (PSCAA, 2006a). As shown in Exhibit 6-7, diesel particulate matter from diesel-fueled vehicles and equipment accounts for approximately 78 percent of the potential cancer risk from all

air toxics in the central Puget Sound region. At 6 percent, particulate matter from wood smoke represents the second-highest potential cancer risk in the region (PSCAA, 2003). Monitoring in the region for 17 air toxics has occurred since 2000. While 2000 to 2005 is a relatively short span of time on which to draw conclusions for regional trends, concentrations decreased in that time for all but one air toxic (PSCAA, 2006a).

Exhibit 6-7

Greatest Air Toxics Contributors to Potential Cancer Risk



Source: PSCAA, 2006a

Finally, while transportation sources account for 50 percent of the greenhouse gas emissions in the Puget Sound region, emissions are expected to grow fastest in the buildings and facilities sector and electricity supply (PSCAA, 2004). This is due in large part to the region's increasing reliance on natural gas and coal-based electricity sources, because the region's hydropower resources have largely met their maximum potential. The 2 years for which there are regional inventories—2000 and 2005—indicate an overall increase of

approximately 0.8 million metric tons of CO₂ equivalent during this 5-year time period, or 1.7 percent; the percentage by source has stayed roughly the same.

5 How were the alternatives analyzed?

NO_x, VOCs, ozone, CO, PM₁₀, and PM_{2.5} emissions for on-road mobile sources for the alternatives were estimated using PSRC's travel demand model and EPA's MOBILE6.2 vehicle emissions modeling software. EPA's draft Motor Vehicle Emission Simulator (MOVES) software was used to estimate greenhouse gas emissions represented as CO₂ equivalents (and hereafter referred to as CO₂). Emissions were calculated on an individual link basis, based on the VMT and speed of each link. This calculation was performed separately for five time periods (a.m. peak, midday, p.m. peak, evening, and night). The calculated emissions of individual links were then summed for each of the five time periods, which in turn were summed for the total daily emissions. No modeling was performed for air toxics, but emissions are expected to vary among the alternatives similarly to the other pollutants. Refer to Appendix E for further details on the air quality modeling parameters.

CO and PM₁₀ emissions were modeled within their respective maintenance areas as well as for the entire region. This approach allows modeled emissions under each alternative to be compared to the motor vehicle emission budget for each maintenance area. Emissions of all other pollutants were modeled for the entire region, because there are no currently designated maintenance or nonattainment areas in the Puget Sound region for these pollutants. The method for performing conformity analyses is slightly different than that used to analyze the entire region and reported in Exhibit 6-8; refer to Appendix E for further details.

6 What effects on air quality are common to all alternatives?

Exhibit 6-8 presents the results of each alternative for all pollutants analyzed (for the entire region). Exhibit 6-9 shows

Where can I learn more about EPA MOBILE6.2 and MOVES?

For more information about the vehicle emissions modeling software used by the EPA, refer to <http://www.epa.gov/otaq/models.htm>.

the percent change of emissions from each of the action alternatives (Alternatives 1 through 5 and the Preferred Alternative) compared to the Baseline Alternative. Exhibit 6-10 compares the CO and PM₁₀ emissions for each alternative against the motor vehicle emission budget for those two pollutants within their respective maintenance areas (as illustrated in Exhibit 6-1).

In addition to on-road mobile sources, emissions from the energy consumption of buildings were estimated for each of the alternatives. The energy consumption from these facilities is described in Chapter 11: Energy; the corresponding CO₂ emissions related to this energy consumption are included in Exhibit 6-8 and 6-9 (refer to Appendix E for additional information on the methods used).

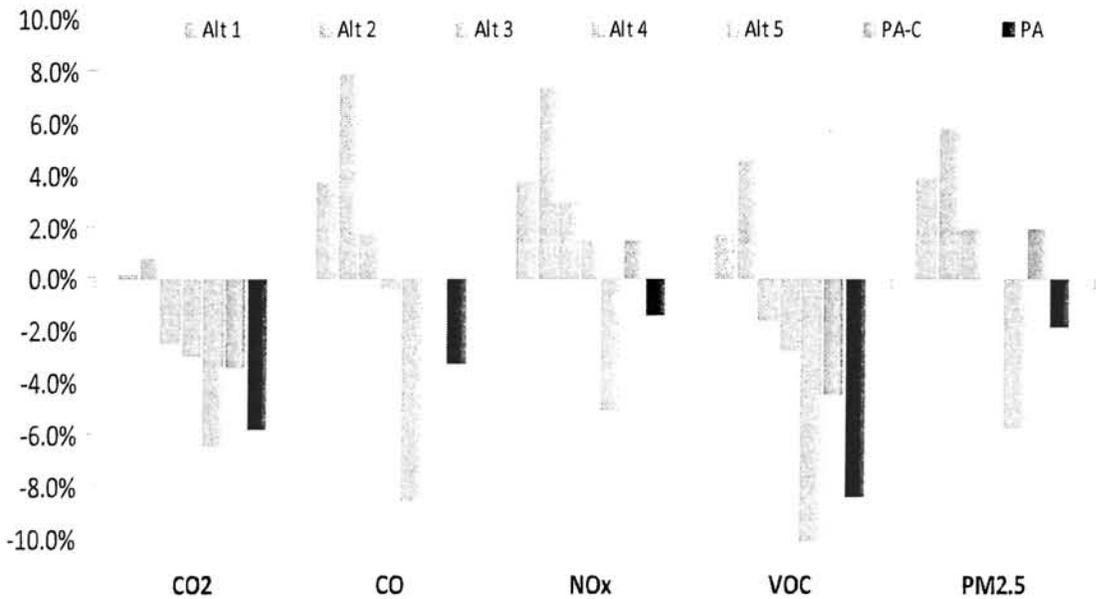
As demonstrated in Exhibit 6-10, all of the Transportation 2040 alternatives remain below the motor vehicle emission budgets for the two pollutants for which the region is in maintenance status. As shown in Exhibits 6-8 and 6-9, emission trends compared to the base year show a decrease for the criteria pollutants but an increase for CO₂. As described in the previous section, regulatory and technological improvements such as the Tier II emission standards, which will reach full implementation by 2009, have played a significant role in the declining trend in these emissions. Because CO₂ emissions from mobile sources are more directly related to the amount of carbon in the fuel and the amount of fuel burned, the trend for these emissions is different than that of the other pollutants. The criteria pollutants are more affected by vehicle emission control technologies and improvements in fuel combustion because carbon is the main component of petroleum fuels. CO₂ emissions are less affected by these technologies and more by improvements to the fuel economy of vehicles and lowering the carbon content of fuels.

Exhibit 6-8³
Emissions (annual tons)

	2006	2040 Baseline Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	PA-C	PA
CO2 Mobile	17,158,000	23,648,000	23,708,000	24,020,000	22,789,000	22,568,000	21,257,000	22,308,000	21,526,000
CO2 buildings	8,893,000	13,176,000	13,154,000	13,086,000	13,105,000	13,136,000	13,169,000	13,245,000	13,141,000
Total CO2	26,051,000	36,824,000	36,862,000	37,106,000	35,894,000	35,704,000	34,426,000	35,553,000	34,667,000
CO	497,400	387,000	402,200	418,200	394,600	386,300	354,600	387,600	374,900
NOx	57,900	13,700	14,200	14,700	14,100	13,900	13,000	13,900	13,500
VOC	34,500	17,800	18,100	18,600	17,500	17,300	15,900	17,000	16,300
PM2.5	1,770	520	540	550	530	520	490	530	510

Exhibit 6-9⁴
Percent Change from 2040 Baseline Alternative

Percent Change in Emissions from 2040 Baseline



³ This exhibit has changed since the DEIS.

⁴ This exhibit has changed since the DEIS.

Exhibit 6-10⁵**Transportation Conformity Analysis**

	Motor Vehicle Emission Budget*	2040 Baseline Alt	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Preferred Alternative (Constrained)
CO (daily tons)	2,512	1,164	1224	1278	1208	1187	1084	1188
PM ₁₀ (daily pounds)								
Kent	232	83	88	91	87	88	85	84
Duwamish	844	299	296	291	299	296	275	288
Tacoma	461	236	247	252	250	254	231	240

Source: From the Central Puget Sound Region Maintenance Plan for each pollutant. Note: Conformity is applied only to the financially constrained portion of the Transportation 2040 plan; for the full conformity determination, including analysis of interim years, refer to Appendix E of the Transportation 2040 plan.

7 What effects on air quality are specific to individual alternatives?

As illustrated in Exhibits 6-8 and 6-9, Alternative 2 has the largest increase in emissions compared to the Baseline Alternative for all pollutants. Alternative 1 has an emissions increase for all pollutants compared to the Baseline Alternative, and Alternatives 3 and 4 show a mix of increases and decreases, depending on the pollutant. Alternative 5 shows the largest decrease in emissions for all pollutants. The full Preferred Alternative reduces emissions of all pollutants compared to the Baseline Alternative. The full Preferred Alternative has lower emissions of all pollutants than Alternatives 1 through 4, while emissions are higher than in Alternative 5. The results from the full Preferred Alternative are closest to the results of Alternative 5 than any of the other alternatives. The financially constrained portion of the Preferred Alternative has higher emissions than the full Preferred Alternative, and demonstrates a mix of increases and decreases compared to the other alternatives, depending on the pollutant.

As shown in Exhibits 6-11 and 6-12, Alternative 5 has the lowest percentage of single-occupant vehicle (SOV) trips, and the highest percentage of transit and bike/walk trips. Alternative 2, on the other hand, has the highest percentage of SOV trips and the lowest percentage of bike/walk trips; the share of transit trips in Alternative 2 is lower than in Alternative 1 and Alternatives 3 through 5, but is equivalent to

⁵ This exhibit has changed since the DEIS.

the transit share of trips in the Baseline Alternative. These mode share differences correlate with the emission results in Exhibits 6-8 and 6-9. The Preferred Alternative has a lower percentage of SOV trips, and a higher percentage of transit and bike/walk trips than the Baseline Alternative. The mode shares in the Preferred Alternative are similar to those in Alternatives 4 and 5.

Exhibit 6-11⁶
2040 Mode Shares (percent)

	Baseline	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Preferred Alternative (Constrained)	Preferred Alternative
SOV	44	43	45	43	43	42	43	42
Shared Ride	40	40	42	40	40	40	40	40
Transit	4	5	2	4	5	5	5	5
Bike/Walk	12	12	1	12	12	13	12	12
Total	100%	100%	100%	100%	100%	100%	100%	100%

Note: Numbers may not add to 100% due to rounding.

Exhibit 6-12⁷
Total Vehicle Miles Traveled (VMT)

	Baseline	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Preferred Alternative (Constrained)	Preferred Alternative
Total VMT	102,519,000	106,647,000	110,481,000	104,059,000	101,643,000	94,063,000	102,539,000	99,511,000

In terms of total VMT, Alternative 5 has the lowest VMT and Alternative 2 the highest among the alternatives. Chapter 4: Transportation discusses more fully the differences among the alternatives in terms of average daily speed and other indicators, including differences among facility types. Because individual pollutants react differently to changes in speed, these nuances may help to explain why Alternatives 3 and 4 display decreases in emissions of certain pollutants but increases in others. The full Preferred Alternative has lower VMT than the Baseline Alternative and all other alternatives except Alternative 5. The financially constrained portion of the Preferred Alternative is very similar in total VMT to the

⁶ This exhibit has changed since the DEIS.

⁷ This exhibit has changed since the DEIS.

Baseline Alternative; total VMT is less than shown in Alternatives 1 through 3, but higher than Alternatives 4 and 5.

Daily VMT per Capita Reductions

HB 2815 sets benchmarks for reducing statewide annual per capita VMT. The benchmark is based on a statewide forecast of 75 billion VMT by 2020; trucks over 10,000 pounds gross vehicle weight are exempted. The methodology for estimating the daily VMT per capita resulting from each Transportation 2040 alternative is different than the annual statewide benchmarks as described in the legislation. To make a reasonable and valid comparison, assumptions were made regarding the forecasted statewide 2020 annual VMT, the percentage of VMT attributed to trucks over 10,000 pounds, the forecasted 2020 statewide population, and the appropriate conversion factor from annual VMT per capita to daily VMT per capita. These assumptions are further discussed in Appendix E.

Based on these assumptions, average statewide daily VMT per capita in 2020 for passenger vehicles and light trucks is estimated to be approximately 27 miles. The statewide benchmarks would then be 22.1 miles by 2020, 18.9 miles by 2035, and 13.5 miles by 2050. In contrast, the PSRC regional forecast of 2020 daily VMT per capita is approximately 20.1 miles per day for passenger vehicles and light trucks, which is 26 percent lower than the state's forecast of VMT per capita in 2020. Exhibit 6-13 shows the daily VMT per capita results for each of the Transportation 2040 alternatives, for passenger vehicles and light trucks.

Exhibit 6-13⁶
Daily VMT per Capita for Passenger Vehicles and Light Trucks

	2020 Regional Baseline	Baseline Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Preferred Alternative (Constrained)	Preferred Alternative
Daily per Capita VMT	20.1	18.6	19.4	20.1	18.8	18.3	16.8	18.5	17.9
Percent Reduction from 2020		-8%	-4%	0%	-6%	-9%	-16%	-8%	-11%

⁶ This exhibit has changed since the DEIS.

The mobile source emission analyses do not include emissions from transit vehicles. At this time, PSRC's travel demand models do not represent all transit vehicle miles on the transportation network. As such, the impact from transit vehicles on emissions is not represented in the quantified analyses, although the subsequent transit ridership and distribution of trips among modes is captured. Each of the Transportation 2040 alternatives contains different levels of transit investment for light rail, commuter rail, and bus service. Each vehicle type has different emission characteristics; therefore, total ridership and the number of miles traveled by the vehicles will affect the total resulting emissions.

Greenhouse Gas Emissions and Technology

In addition to the pricing, transit, efficiency, and other strategies included in each of the Transportation 2040 alternatives (refer to Chapter 3: Plan Alternatives for more complete alternative descriptions), the PSRC Transportation Policy Board also directed staff to consider the potential effects from improved vehicle and fuel technologies on each alternative with respect to reducing greenhouse gas emissions. These technologies are discussed in greater detail in Question 9 and in the Transportation 2040 plan. However, as an example of the ultimate potential such technologies might provide, a scenario to replace the current fleet of passenger vehicles and light trucks with all electric vehicles was evaluated. With the caveat that achieving a full fleet replacement by 2040 would most likely require a shift from current policy and market mechanisms, the potential CO₂ emission reductions for such a scenario within the Transportation 2040 alternatives is in the range of 60 percent. This represents the approximate share of CO₂ emissions from passenger vehicles and light trucks for each alternative; replacing the existing fleet with electric vehicles that produce zero CO₂ emissions from the tailpipe (these calculations do not take into account upstream emissions that may result from the generation of electricity) would therefore remove the same proportionate share of total emissions for each alternative. For each of the alternatives, this scenario would reduce emissions in the range of approximately 50 percent from base year 2006 levels. Based on the analysis



Greater electric vehicle use would reduce greenhouse gas emissions.

Source: Wikimedia Commons, 2008

results, the Transportation 2040 plan includes a Four-Part Greenhouse Gas Strategy to address the reduction of greenhouse gas emissions. This strategy includes land use, transportation choices, user fees, and technology. The Transportation 2040 plan also contains more information on the potential benefits of these strategies.

8 What cumulative effects on air quality could occur if the Transportation 2040 actions coincide with other planned actions?

Beyond the transportation-related impacts described previously, all of the alternatives would result in development and construction activity in various areas throughout the region. Construction would likely generate localized dust and exhaust emissions from vehicles and other equipment. In addition, these construction activities would likely contribute to localized traffic congestion, which may temporarily worsen localized emissions. The potential quantities of generated dust and exhaust emissions would depend on the amount of construction activity associated with each alternative. Specific impacts would be analyzed and addressed during project-level analysis of individual projects.

The surface transportation-based forecasts used for the air quality analysis do not attempt to predict other changes in regional and external pollution that could affect regional air quality. Growth outside of the region could also increase vehicle emissions in nearby metropolitan areas.

9 How can the effects to air quality be mitigated?

Individual projects may require mitigation, which would be identified during future project-level planning and environmental review. Each of the alternatives is estimated to result in emissions well below the motor vehicle emission budget for the pollutants for which the region is in maintenance (CO and PM₁₀); therefore, mitigation to reduce these emissions would not be required. However, given that certain pollutants are still a concern in the region (e.g., ozone and PM_{2.5}),

What are cumulative effects?

Cumulative effects address the impact on the environment that results from the incremental impact of the action being considered when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

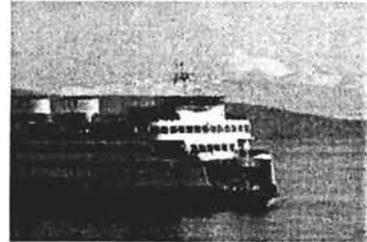
existing programs and measures to ensure the region's continued attainment and maintenance status should continue.

There have been many improvements in vehicle and fuel technologies over the past several decades, resulting in dramatic reductions in mobile source emissions. However, with population and VMT continuing to grow, emissions from mobile sources are still a concern, particularly with issues related to climate change taking prominence in our world today. Some of the current innovations occurring in our region include a conversion of transit buses to diesel/electric hybrid engines and the use of ultra-low-sulfur diesel or biodiesel fuel.

Washington State Ferries is currently researching the use of biodiesel fuel for use on the ferry system. The ferry system has already converted their entire fleet to run on ultra-low-sulfur diesel fuel. Much work has also been done to reduce emissions from port-related activities, such as using cleaner fuels, electric shore power, and other activities. The Diesel Solutions program run by PSCAA, in partnership with Ecology and EPA, has been working since 2001 to retrofit diesel engines in public and private fleets. The goal of Diesel Solutions is to retrofit or replace 100 percent of these fleets by 2040, resulting in a 90 percent reduction in particulate matter emissions.

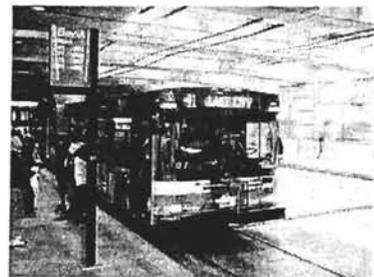
The use of ultra-low-sulfur diesel fuel in highway engines has the potential to reduce emissions of particulate matter and NO_x by more than 90 percent when the current heavy-duty vehicle fleet has been completely replaced by 2030 (AFDC, 2009). The use of biodiesel, depending on the percentage blended with conventional diesel, can reduce emissions of CO, particulate matter, sulfates, hydrocarbons, and air toxics. Biodiesel also has the potential to reduce greenhouse gas emissions by 10 to 50 percent, depending on the blend. There are larger issues with the use of biodiesel, however, related to the upstream energy impacts from production (dependent on the agricultural source, for example).

Another fuel improvement currently being researched is to reduce the carbon content of fuel. The state of California established a Low-Carbon Fuel Standard in 2007, with a goal



Washington State Ferries (WSF) is developing strategies that would lower ferry emissions.

Source: WSDOT, 2009



Using low-carbon fuels in transit reduces greenhouse gas emissions.

Source: King County Metro Transit, 2003

of reducing the carbon intensity of fuels 10 percent by 2020. The 2008 Climate Action Team in the state of Washington has also recommended a low-carbon fuel standard as one of several “most promising” strategies to reduce greenhouse gas emissions in the transportation sector.

There are also many innovations in vehicle technologies that are either currently in the market or are being researched for future implementation. These include hybrid electric vehicles, plug-in hybrid or full electric vehicles, and hydrogen fuel cells. The potential tailpipe emission reduction from each of these technologies depends, in part, on the market penetration of the vehicles. The length of time it takes for these vehicles to enter the market, including at what percentage, is significant when discussing the impacts on climate change. “Traditional” hybrid electric vehicles have the potential to reduce greenhouse gas emissions in the range of 30 percent, and plug-in hybrid electric vehicles have the potential of reducing greenhouse gas emissions in the range of 30 to 60 percent (EPA, 2007). Many other factors, such as the source of electricity, play a role in the potential for upstream emission reductions from these technologies. Fuel cell vehicles may present the most promising technology in terms of tailpipe emission reduction, but they also present the most challenges (including costs, transport and storage of hydrogen, safety, and distribution systems).

An expanded analysis of the potential benefits from improvements in vehicle and fuel technology, as well as policy considerations such as market penetration and cost issues, are included as part of the Transportation 2040 plan. As with travel-related strategies, it will take a mix of strategies to result in the most effective emission reductions possible from vehicle and fuel technologies. However, the literature and research to date suggests that to achieve the maximum emission reduction from the transportation sector, a mix of all strategies must be undertaken—travel reduction, efficiency improvements, and vehicle and fuel technology improvements. It is also important to note that these quantified analyses do not capture all of the possible benefits from the investments assumed for each of the

Greenhouse Gas Strategy

For more information about PSRC’s Greenhouse Gas Strategy, refer to Appendix L: Greenhouse Gas 4-part Strategy.

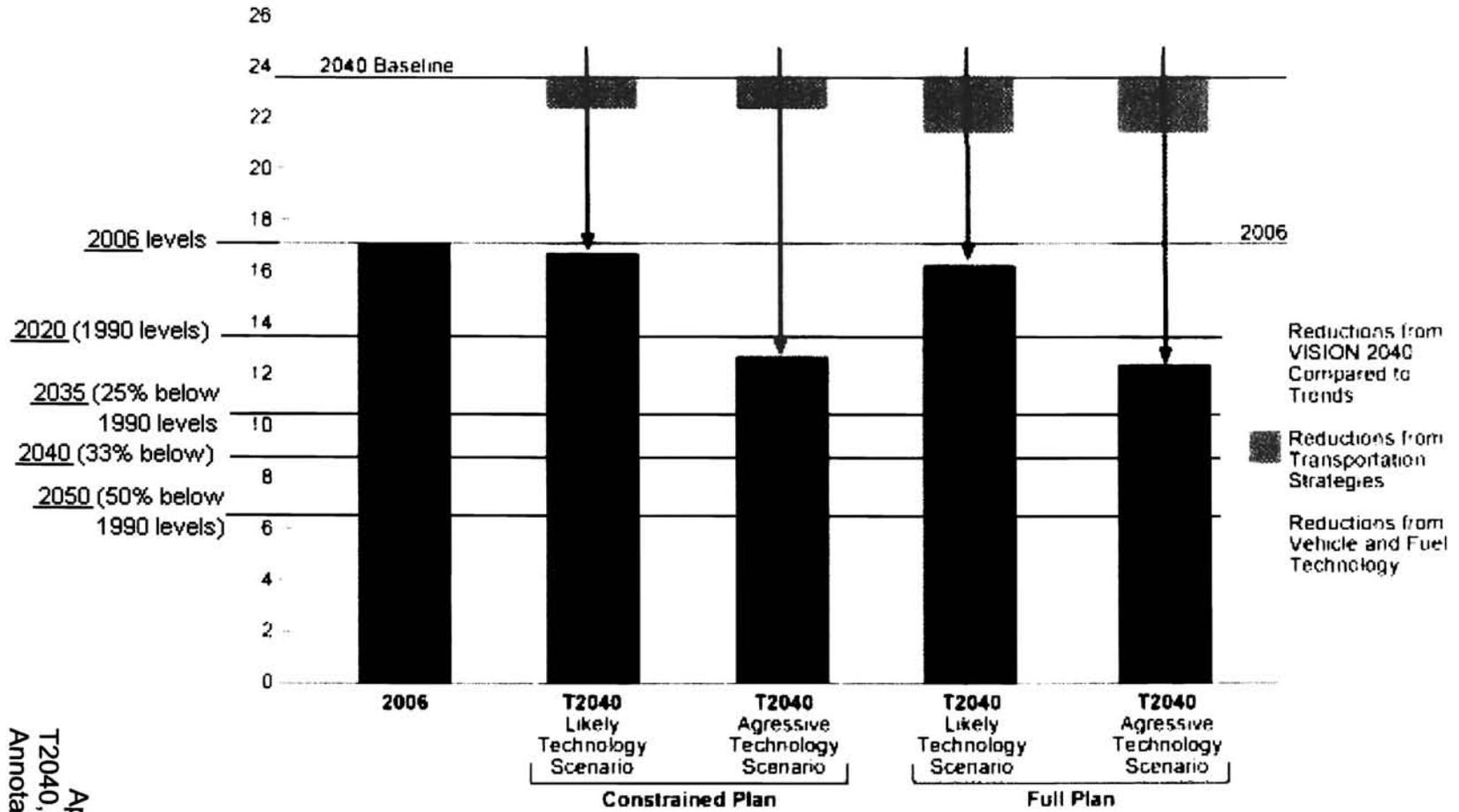
Transportation 2040 alternatives, due to the limitations of the analytical models. Additional emission reductions may be possible from components such as additional sidewalk infrastructure, travel demand management programs, and Intelligent Transportation System (ITS) investments.

10 Are there any significant unavoidable adverse impacts to air quality?

Future project-level environmental review would determine if applicable air quality standards would be exceeded at specific locations. Where this occurs, potential mitigation for such impacts would be evaluated and implemented as appropriate to address the impact. If all mitigation measures required as part of subsequent project-level actions are implemented, no significant unavoidable adverse air quality impacts are expected under any of the alternatives.

Appendix E

Figure 18. Greenhouse Gas Emissions (CO₂ Emissions in Millions of Tons)



Appendix E
T2040, Ch. 3, Fig. 18,
Annotated