

1 **REDUCING GREENHOUSE GAS EMISSIONS FROM TRANSPORTATION:**
2 **LESSONS FROM WEST COAST STATES**

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23 Text Word Count: 213 Words (Abstract) + 6,101 Words (Paper)
24 Tables Word Count: 500 Words (2 Tables)
25 Total Word Count: 6,814 Words (Under 35 References)

26 November 15, 2015

1 **ABSTRACT**

2 Planners and policymakers in the United States increasingly recognize climate change as a
3 critical challenge. Because the transportation sector accounts for one-third of all greenhouse gas
4 emissions (GHGs) linked to climate change, some states have passed legislation to reduce such
5 GHGs.

6 California, Oregon, and Washington are innovators in adopting climate goals into statute
7 and passing legislation to reduce GHGs from transportation, particularly related to vehicle miles
8 traveled (VMT.) In 2008, California adopted Senate Bill 375, requiring metropolitan areas to
9 undertake transportation and land use scenario planning to reduce GHGs from light-duty
10 vehicles. In Oregon, 2009 and 2010 legislation called for a Statewide Transportation Strategy for
11 reducing GHGs and for metropolitan areas to undertake scenario planning. In 2008, Washington
12 adopted legislation setting vehicle miles traveled reduction targets.

13 This paper summarizes efforts in these three west coast states to reduce GHGs from
14 transportation. Relying on document analysis and stakeholder interviews, this paper describes the
15 GHG reduction goals, and transportation sector targets, plans and policies for reducing GHGs
16 from VMT. This study examines how GHG reduction goals are integrated into state and regional
17 transportation plans. This study examines the similarities and differences between the states and
18 synthesizes perspectives gained from stakeholders to assess strengths and weaknesses. This study
19 offers lessons learned from California, Oregon and Washington.

20 *Keywords:* climate change, greenhouse gases, state departments of transportation,
21 metropolitan planning organizations, transportation planning
22

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1 INTRODUCTION

2 Planners and policymakers in the United States increasingly recognize climate change as a
3 critical challenge. Although there is not yet a comprehensive national response, several states
4 have adopted ambitious goals to reduce greenhouse gas emissions (GHGs) linked to climate
5 change. To achieve their goals, these states have adopted policies and strategies or delegated
6 authority to the regional or local level. GHGs from the transportation sector constitute
7 approximately one-third of all emissions in the U.S. (1). Reducing GHGs from transportation
8 rests on the “three-legged stool” of vehicle efficiency, fuel content, and vehicle miles traveled
9 (VMT) (2). Even with great improvements in vehicle efficiency and fuel content, increasing
10 VMT is expected to outweigh such gains. Total VMT generally rises with increasing population.
11 Moreover, at least until recently, VMT *per capita* has been rising as communities grow in size
12 and people tend to take more and longer trips, leading to total VMT growing faster than
13 population. Recent data shows that VMT per capita is beginning to increase again following its
14 the Great Recession, and especially in western states, though VMT has not risen to pre-Great
15 Recession levels in all states. (3). Acknowledging this connection, several state-level strategies
16 involve reducing GHGs by shifting transportation modes and promoting compact development
17 patterns. Unlike many of the strategies related to vehicle efficiency and fuel content, which may
18 be achieved through top-down federal action, reducing VMT requires changes in individual
19 choices. Although concerns around climate change provide an additional reason, some states
20 have been using transportation planning to provide alternative modes and land use planning to
21 encourage compact development for several decades. In this paper, we examine how the three
22 West Coast states—California, Oregon, and Washington—are seeking to reduce GHGs from the
23 transportation sector by reducing VMT. This study focuses on West Coast states rather than the
24 largest states because all three states have passed legislation related to reducing GHG.

25 This study proceeds as follows. Relevant literature on GHGs from the transportation
26 sector, state climate action plans, and implementation research are summarized. Then, this study
27 offers a conceptual framework explaining the process for setting targets, adopting plans, taking
28 actions, and reducing GHGs. Next, this study summarizes the approach in each state, looking
29 first at goals and then at implementation, including monitoring and results. Then, information
30 from our four case study states is synthesized, summarizing key similarities and differences
31 among state approaches and describing key strengths and weaknesses. Finally, key lessons
32 learned from efforts in California, Oregon, and Washington are described.

33 BACKGROUND

34 Currently, transportation end-use sector emissions constitute approximately 27% of GHGs from
35 fossil fuel combustion in the United States. Approximately 62% of transportation sector
36 emissions come from passenger cars or light-duty vehicles while the remainder come from
37 freight, aircraft, rail, ships and boats. From 1990–2012, transportation emissions rose by 18%
38 while vehicle miles traveled increased by 35% (1).

39 Emissions from transportation can be represented by a three-legged stool consisting of
40 vehicle types, fuel content, and VMT. Even if the federal government adopts stringent standards
41 for fuel economy (CAFE standards) and fuel content changes, rising VMT will outweigh gains in
42 these two sectors (2). Thus, to reduce transportation emissions, it is important to focus on
43 reducing VMT. This study focuses on state-level attempts to reduce transportation emissions by
44 reducing VMT.

45 Several scholars have explored the connection between VMT and development patterns.
46 Several studies describe the relationship between VMT and urban form discussing density,

1 diversity, and design (4, 5). Recent studies summarize the relationship between VMT and
2 development patterns, finding that compact development reduces VMT by 20–40%. Doubling
3 residential density reduces VMT by 5–12% but combining with mixed use and transportation
4 reduces VMT by up to 25% (2, 6, 7). This study does not provide a full description or critique of
5 the variation in the range of findings on the connection between VMT and development, but
6 refers to the literature to provide support for the assumption that development patterns impact
7 VMT.

8 To plan for reducing GHGs, several states have adopted state climate action plans. As of
9 2014, approximately 32 states have created state climate action plans, and 29 states have adopted
10 some kind of GHG reduction goal (1, 8). To meet GHG reduction goals, states include a broad
11 spectrum of policies covering energy efficiency and renewable energy, and many of these
12 climate action plans include GHG reduction strategies related to transportation. Among GHG
13 reduction strategies, “efficient vehicles” and “reduced fuel use” are the 4th and 5th most popular
14 strategies in state climate action plans, respectively (9).

15 A few scholars have offered assessments of state climate action plans and offered
16 guidance for improving state climate action plans. In assessing the first generation of municipal
17 and state climate action plans, Wheeler identified key weaknesses in early plans: inadequate
18 goals; lacking strong actions and institutional and political commitment. Wheeler recommends
19 stronger near-term goals, robust monitoring and progress reporting, a broader range of actions,
20 and changing policies, regulations and incentives to reduce emissions, moving beyond existing
21 actions (10). Gallivan, ang-Olson, and Torchetta examined the integration of climate change into
22 state and regional transportation plans, examining 12 Departments of Transportation (DOTs) and
23 18 Metropolitan Planning Organizations (MPOs), finding that the level of integration varied
24 across state and regions (11). Other scholars have synthesized the research on climate change
25 and transportation research at state agencies and universities (12). Many of these articles provide
26 guidance for selecting greenhouse gas reduction strategies but overlook the challenge of
27 implementation and agency coordination. A few short new articles discuss various approaches to
28 implementation in U.S. States. Specifically, a 2012 issue of *TR News* examined state and local
29 action on climate change, focusing on agency implementation (13, 14, 15). Turner et al. (16)
30 outline the course of action for implementation in Maryland and predict potential challenges.
31 Barbour & Deakin (17) evaluate the progress implementing Senate Bill 375 in California,
32 focusing on the local and metropolitan level.

33 While several states have created climate action plans, many of which contain
34 transportation and land use strategies, and a few states have gone further in placing GHG
35 reduction goals and strategies in law, research on states with statutory mandates for reducing
36 GHGs and legislation aimed at the transportation sector is sparse.

37 **METHODOLOGY**

38 This project relies on document analysis and qualitative research methods to evaluate state
39 efforts to integrate transportation and land use planning to reduce GHGs from transportation.
40 First, researchers examined statutes and analyzed state-level transportation, land use and climate
41 plans; regulations; other plans and programs; and interim progress reports to obtain an
42 understanding of relevant climate, transportation and land use legislation and plans. Next,
43 between December 2014 and June 2015, the research team conducted confidential semi-
44 structured interviews with state agency staff and other stakeholders, including MPOs, local and
45 regional associations, and nongovernmental advocacy organizations. The research team
46 conducted 34 interviews in person or via phone. Interviews focused on understanding the policy

1 framework within each state and investigating the strengths, weaknesses and best practices from
2 each state.

3 **STATE APPROACHES**

4 States aiming to reduce GHGs generally follow a consistent process.

5 First, the governor or legislature establishes measurable *goals* for reducing GHGs. In our
6 case study states, each governor pressed their legislature to adopt such goals into law.
7 Furthermore, our case study states have adopted specific *targets* for reducing GHGs from
8 transportation.

9 Next to make progress, states often adopt *climate action plans* with recommended
10 policies and strategies for reducing GHGs, or embed such policies into existing transportation
11 plans. There is considerable variation in these “plans” across states. California adopted a
12 comprehensive state-level plan (18); Oregon and Washington have drafted but not formally
13 adopted interim comprehensive documents (19, 20).

14 Whether formally planned or not, reducing GHGs involves a variety of *strategies*, for
15 example: investing in multi-modal transportation, transportation demand management,
16 technological improvements, planning for compact development, etc. Some states have adopted
17 implementation mechanisms, like funding or regulatory relief, to aid in reducing GHGs. For
18 example, California uses cap-and-trade to fund implementation. Additionally, some states had
19 pre-existing programs in place that aid in reducing GHGs, though not the core focus.

20 Finally, to *monitor* progress towards GHG and VMT reduction goals, many states publish
21 progress reports, with key evaluation dates written into statute. Moreover, some states require
22 periodic updates to targets and plans.

23 **Goals**

24 In 2004, the West Coast Governors’ Global Warming Initiative released a report urging
25 California, Oregon, and Washington to adopt comprehensive *goals* for reducing GHGs (21). By
26 2007, each state had adopted such goals for reducing total statewide GHGs by various times to
27 various levels compared to the 1990 base year.

28 But the three states have taken different approaches to setting *targets* for reducing GHGs
29 from light-duty vehicles weighing less than 10,000 pounds (22). TABLE 1 summarizes each
30 state’s policy choices in setting GHG reduction targets for light-duty vehicles. Each of our case
31 study states used a different process for setting targets: California took a bottom-up approach;
32 Oregon a top-down approach; and Washington simply legislated targets. California and Oregon
33 have separate targets for each MPO, whereas Washington has just statewide targets. California’s
34 and Oregon’s targets are tied to GHG, allowing MPOs to achieve targets through a combination
35 a VMT reduction and other strategies; Washington’s targets are tied to VMT. California and
36 Oregon set targets relative to a baseline year (2005); Washington’s targets are relative to a
37 business-as-usual projection for 2020. Finally, in California all MPOs are required to plan to
38 meet the targets; in Oregon only the largest MPO (Portland) is required to do so; and in
39 Washington targets don’t apply at the MPO level. For all our case study states, targets are
40 expressed as percentage changes in per capita values. By 2011, each state had adopted such
41 targets.

42 TABLE 2 summarizes the statewide GHG reduction goals and light-duty vehicles
43 reduction targets. More details on each state’s goals and targets are provided below.

1 **TABLE 1 Policy Choices in Setting GHG Reduction Targets for Light-Duty Vehicles**

Question	Choice	Description
<i>Process?</i>	Legislated	Legislate targets without modeling how these relate to statewide GHG goals
	Top-Down	Use modeling to set targets to be consistent with statewide GHG goals
	Bottom-Up	Set targets based on what is technically / economically / politically feasible
<i>Geography?</i>	Statewide	Set a single target for entire state
	By MPO	Set different targets for each MPO
<i>Quantity?</i>	GHG	Measure reductions in GHG as a result of local actions
	VMT	Measure reductions in VMT
<i>Representation?</i>	Absolute	Target an absolute level to achieve
	Relative	Target a percentage reduction from some reference
<i>Metric?</i>	Total	Measure total levels (sensitive to population changes)
	Per Household	Measure levels per household (insensitive to population changes)
	Per Capita	Measure levels per capita (insensitive to population changes)
<i>Reference?</i>	Baseline	Measure changes compared to a past baseline year
	Trend	Measure changes compared to the business-as-usual trend in some future year
<i>Obligation?</i>	Mandatory	Each MPO is required to adopt a plan to meet its target
	Voluntary	Each MPO may choose to pursue its target

2 **TABLE 2 Statewide GHG Reduction Goals and Light-Duty Vehicle Reduction Targets**

State	Year	Statewide GHGs Goals (relative to 1990)	Light-Duty Vehicle Targets	Target Policy Choices	Key Legislation
California	2020	0% below	1% above to 8% below	bottom-up by MPO GHG relative per capita baseline (2005) mandatory	2005: EO S-3-05 2006: AB32 2008: SB375 2011: EO G-11-024
	2035		1% above to 16% below		
	2050	80% below			
Oregon	2020	10% below		top-down by MPO GHG relative per capita baseline (2005) voluntary (except Portland)	2007: HB3543 2009: HB2001 2010: SB1059 2011: OAR 660-044
	2035		17% to 21% below		
	2050	75% below			
Washington	2020	0% below	18% below	legislated statewide VMT relative per capita trend (2020) voluntary	2007: EO 07-02 2007: SB6001 2008: HB2815 2009: EO 09-05
	2035	25% below	30% below		
	2050	50% below	50% below		

1 *California*

2 In 2005, Governor Schwarzenegger issued Executive Order S-3-05, setting the goal to reduce
3 statewide GHGs by 2050 to 80% below 1990 levels. In 2006, the legislature passed Assembly
4 Bill 32, the California Global Warming Solutions Act, setting the goal to reduce statewide GHGs
5 by 2020 to 1990 levels.

6 In 2008, the legislature passed Senate Bill 375, the Sustainable Communities and Climate
7 Protection Act, directing the California Air Resources Board (CARB) to develop targets for each
8 MPO to reduce GHGs from light-duty vehicles as a result of local actions. In 2011, after
9 coordinating a bottom-up effort, CARB issued Executive Order G-11-024 setting achievable
10 targets for each of California's 18 MPOs.

11 *Oregon*

12 In 2007, the legislature passed House Bill 3543, setting statewide GHG reduction goals
13 exceeding those in California's AB32.

14 In 2009 and 2010, the legislature passed House Bill 2001, the Jobs and Transportation
15 Act, and Senate Bill 1059, directing the Land Conservation & Development Commission
16 (LCDC) to set targets for MPOs to reduce GHGs from light-duty vehicles as a result of local
17 actions. Meeting these targets, in combination with anticipated federal and state actions, would
18 result in reductions consistent with Oregon's statewide GHG reduction goals. In 2011, LCDC
19 adopted OAR 660-044, setting targets for each of Oregon's 6 MPOs. But achieving the targets is
20 voluntary for all but the Portland MPO.

21 *Washington*

22 In 2007, Governor Gregoire issued Executive Order 07-02 and the legislature passed Senate
23 Bill 6001, setting statewide GHG reduction goals exceeding those in California's AB32.

24 In 2008, the legislature passed House Bill 2815, setting *statewide* VMT reduction targets
25 for light-duty vehicles. Although HB2815 directs the Department of Ecology to "convene a
26 collaborative process to develop a set of tools and best practices to assist state, regional, and
27 local entities in making progress towards the [targets]," the statute does not impose a
28 requirement on MPOs. Indeed, in 2013 the Washington State Court of Appeals ruled that "the
29 current statutory framework does not require that the [Seattle MPO] adopt a transportation plan
30 ... that achieves its proportional share of the state's goals for reducing GHGs" (23).

31 **Implementation**

32 Although all three states started with similar statewide GHG reduction goals, each has taken a
33 different policy approach to achieving those goals and monitoring progress in the transportation
34 sector.

35 *California*

36 California's ambitious goal to reduce GHGs via land use and transportation planning is unique in
37 its scale. California delegated the responsibility for reducing GHGs from the transportation
38 sector to its 18 MPOs. California has 18 MPOs, but just four of the MPOs in the largest
39 metropolitan areas (Los Angeles, San Francisco, San Diego, and Sacramento) account for 80%
40 of the state's population, or over 30 million people. Each MPO is responsible for adopting a
41 coordinated land use and transportation plan (Sustainable Communities Strategy, or SCS) that
42 will reduce VMT per capita and thereby reduce GHGs. Further, California passed specific
43 legislation directing the California Department of Transportation (Caltrans) to plan to reduce

1 GHGs and include scenarios into the 2040 California Transportation Plan to show how Caltrans
2 will achieve maximum feasible emissions reductions to reach GHG reduction targets, as
3 described below.

4 CARB anticipates that 29% of the total GHG reductions needed to meet California's
5 2020 goal will come from the transportation sector (18). SB375 requires each MPO to create a
6 SCS for achieving its GHG reduction target. While CARB sets the GHG reduction target for
7 each MPO, the implementation strategy to achieve the target is left completely up to the MPO.
8 SB375 is explicit in maintaining the delegation of land-use authority to local governments, and
9 thus whether an MPO will meet its GHG goal depends, in part, on its ability to coordinate with
10 local governments to implement the SCSs.

11 Senate Bill 391 (2009) directs Caltrans to update the California Transportation Plan every
12 five years to address how the state will achieve maximum feasible emissions reductions in order
13 to meet the GHG reduction goals. SB391 specifically directs the state's transportation agencies,
14 California State Transportation Agency (CalSTA) and Caltrans, to reach GHG reduction goals
15 from the transportation sector. SB391 called for Caltrans to conduct scenario planning on how
16 the agency will meet the transportation sector GHG reduction goal of 80% below 1990 levels by
17 2050. The 2040 California Transportation Plan will be adopted in late 2015.

18 To implement SB375, California adopted several incentive and regulatory programs to
19 encourage and compel implementation of Sustainable Communities Strategies. A CARB
20 regulation, called the AB32 Cost of Implementation Fee Program, created a mandatory cap-and-
21 trade program based on mandatory emissions reporting from the state's largest industrial GHG
22 emitters. Fees collected from the cap-and-trade program are used to fund the various state
23 agencies charged with achieving GHG reduction goals. Because transportation causes 35–40% of
24 California's GHGs, a large portion of funds collected from the cap-and-trade program are
25 allocated for the implementation of SCS projects by MPOs aimed at reducing GHGs from the
26 transportation sector (24). The Strategic Growth Council is the administrator of these cap-and-
27 trade funds and is responsible for allocating them to projects that are consistent with the SCSs
28 through its Affordable Housing and Sustainable Communities grant program. In June 2014, the
29 California legislature passed Senate Bill 862, the Budget Act of 2014, which secured 35% of
30 revenue from the cap-and-trade program for SB375 projects and the state's high-speed rail
31 program. Senate Bill 743 calls for a change in the way transportation impacts are measured in the
32 California Environmental Quality Act (CEQA) review process. The Office of Planning and
33 Research's (OPR) draft guidelines recommend using a VMT threshold to determine whether
34 development requires CEQA review. If the development is near existing transit and VMT is
35 expected to be low, the development can forego CEQA review, effectively streamlining and
36 promoting infill development and decreasing statewide VMT. New CEQA criteria for
37 transportation projects are meant to "promote the reduction of greenhouse gas emissions, the
38 development of multimodal transportation networks, and a diversity of land uses" (Cal. Public
39 Resources Code §21099). OPR promulgated rules for SB743 implementation in 2014.

40 In 2011, the legislature passed Senate Bill 226, which exempts certain infill development
41 projects from CEQA review. The development project must be surrounded by 75% existing
42 urban development, comply with an existing SCS, and meet density guidelines for residential
43 development. When outside of an MPO boundary, review developments must meet the rule's
44 definition of a "small walkable community project" to be exempt from CEQA review. Rules for
45 SB226 were promulgated by OPR and are based off of a VMT performance measure.

1 California's approach requires a certain degree of monitoring. AB32 requires that CARB
2 update a Scoping Plan every five years that evaluates progress and identifies strategies for
3 reaching GHG reduction goals. Related to transportation and land use planning, SB375 requires
4 the updating of targets every 8 years and plans every 4 years. Although CARB reviews and
5 accepts SCSs under SB375, the statutes do not require CARB or other agencies to monitor and
6 evaluate the implementation of SCSs. While MPOs update regional transportation plans (RTPs)
7 and SCSs every four years, there is not a systematic approach to monitoring the implementation
8 of SCSs.

9 The May 2014 First Update Scoping Plan presents key accomplishments made by
10 California thus far in reducing GHG from all sectors, including transportation, which saw an
11 overall decrease of 1.7% from 2000 to 2012 (18). While these reductions are partly attributable
12 to decreased driving concurrent with the economic recession of 2008, the continued decrease in
13 GHGs from the transportation sector since its 2005 peak is poised to continue. A nearly 11%
14 decrease in GHGs from the transportation sector between 2000 and 2012 points towards early
15 success in achieving the state's ambitious overall GHG reduction goals.

16 *Oregon*

17 HB2001 (2009) and SB1059 (2010) set Oregon's approach to reducing GHGs from
18 transportation: 1) develop a Statewide Transportation Strategy (STS) for reducing GHGs from all
19 modes, and 2) develop land use and transportation scenarios for reducing GHGs from light-duty
20 vehicles in some MPOs.

21 In 2013, the Oregon Transportation Commission (OTC) "accepted" the STS, but did not
22 formally adopt it as part of the Oregon Transportation Plan. The STS contains 18 strategies
23 related to vehicle and engine technology advancements; fuel technology advancements;
24 transportation options; efficient land use; and pricing, funding and markets. In 2014, the Oregon
25 Dept. of Transportation (ODOT) detailed strategies to begin implementing the STS within 2–5
26 years. ODOT has updated several modal and topical plans to incorporate the STS (25).

27 In 2014, the Portland MPO adopted a scenario to meet its target for reducing GHGs from
28 light-duty vehicles. Implementing this scenario will require new funding to support investments
29 in transit, bicycling and walking (26). In its 2015 session, the legislature tried but failed to pass a
30 new transportation-funding package. The 2015 legislature did not address efforts to reduce
31 GHGs from transportation through scenario planning established in HB2001 and SB1059,
32 though relevant provisions expire at the end of 2015.

33 As of mid-2015, no other MPOs have made significant progress towards meeting their
34 (voluntary) targets.

35 Under HB3543 (2007), the Oregon Global Warming Commission (OGWC) is required to
36 report biennially on progress in achieving the GHG reduction goals. In 2010, OGWC adopted an
37 interim plan to achieve Oregon's goals for 2020. But as HB3543 gave OGWC no statutory
38 authority, this plan does not set state policy (19). The 2013 OGWC progress report concludes
39 that "Oregon is not on track" to meet its 2020 goal (27). The report relies, in part, on a detailed
40 biennial inventory of Oregon's GHGs (28).

41 *Washington*

42 Washington's intended centerpiece policy for reducing GHGs is to implement the cap-and-trade
43 program the Western Climate Initiative proposed in 2008 (20, 29). But as of 2015, it has yet to
44 do so.

1 Washington is the first state to adopt statutory targets for reducing VMT for light-duty
2 vehicles. HB2815 (2008) set targets for reducing *statewide* VMT. To achieve these targets,
3 HB2815 directed the departments of Transportation, Ecology, and Commerce to convene a
4 collaborative process to develop tools and best practices to assist MPOs in achieving the targets.
5 But as noted above, MPOs are not required to achieve the targets.

6 In 2008, Senate Bill 6580 called for a study of how Washington's Growth Management
7 Act, first adopted in 1990, could be used or revised to address climate change. But the legislature
8 did not embrace the recommendations.

9 In 2009, Governor Gregoire issued Executive Order 09-05, directing the Department of
10 Transportation to work with the four largest MPOs (Seattle, Olympia, Vancouver, and Spokane)
11 to "cooperatively develop and adopt" regional transportation plans to achieve the VMT targets.

12 In 2010, the Seattle MPO adopted a RTP that includes a four-part strategy for reducing
13 GHGs from transportation: 1) build upon the VISION 2040 Regional Growth Strategy to
14 promote compact development, 2) transition to a user fee/roadway pricing system, 3) promote
15 multi-modal transportation, and 4) recognize the role of vehicle and fuel improvements (30). But
16 as noted above, HB2815 does not impose a requirement on any MPO to achieve a particular
17 target (23).

18 In 2015, the Washington State Transportation Commission released the policy-level
19 Washington Transportation Plan 2035. The plan recommends promoting bicycling and walking
20 as viable transportation options, and making significant progress toward meeting statewide GHG
21 reduction goals through vehicle and fuel technology, system management and operations, land
22 use, transportation options, and pricing strategies (31).

23 Washington's Commute Trip Reduction program aims to reduce drive-alone commute
24 trips through employer-based programs. When first adopted in 1991, it aimed to improve air
25 quality, reduce traffic congestion, and reduce fuel consumption; now it has the added result of
26 reducing GHGs.

27 Under HB2815 (2008), the departments of Ecology and Commerce are required to report
28 biennially on Washington's GHGs. The latest report indicates a decrease in GHGs from the
29 transportation sector, but attributes this to a weak economy. The report does not compare the
30 progress to Washington's GHG reduction goals (32).

31 **SYNTHESIS**

32 Though each of these states began with a common origin under the West Coast Governors'
33 Global Warming Initiative and each state had established GHG reduction goals in statute by
34 2007, their approaches to reducing GHGs from transportation vary considerably. This section
35 synthesizes information described in individual case study sections above to illuminate key
36 similarities and differences among case study states. This section also provides a description of
37 key strengths and weaknesses among state approaches to reduce GHGs from transportation.

38 All case study states established ambitious statutory goals for reducing GHGs and require
39 some level of monitoring, although the type of progress report varies significantly across states.
40 California and Oregon require periodic reports including GHG monitoring and progress on
41 policy implementation. Washington simply monitors GHG and VMT levels, but does not report
42 on progress towards meeting goals.

43 The policies by which these states plan to reduce GHGs vary tremendously. California
44 and Oregon set a different target for each MPO and delegate each responsibility for developing
45 strategies to reduce GHGs from transportation. California and Oregon rely on land use and

1 transportation scenario planning, although only California requires all MPOs to participate.
2 Washington is unique in establishing VMT targets.

3 In assessing state approaches, specific criteria are considered: 1) policy framework;
4 2) state level; 3) metropolitan level; 4) implementation mechanisms, and 5) monitoring.

5 **Policy Framework**

6 All three states adopted ambitious goals to reduce GHGs in statute. The goals vary across states,
7 but all of these states seek to reduce statewide GHGs by 50–80% below a 1990 baseline by 2050.
8 However, as Wheeler concluded in describing first generation climate action plans, the shorter-
9 term goals are still conservative. Washington and California seek to reach 1990 levels by 2020,
10 while Oregon seeks a 10% reduction below 1990 levels (10). California and Oregon also set
11 targets for MPOs to reduce GHGs from transportation.

12 Oregon and Washington stakeholders described the importance of collaboration amongst
13 western states in adopting legislation and learning from one another. In both California and
14 Washington, stakeholders applauded the leadership of the governor. In Oregon, the impetus for
15 adopting climate change provisions into HB2001 was not championed by the governor or
16 legislators but was a political push by advocacy groups, so stakeholders noted a lack of
17 leadership or ownership over the approach.

18 In examining transportation-specific targets, in California, stakeholders described the
19 effectiveness of using a performance metric to guide planning and noted that allowing MPOs
20 flexibility in reaching targets was a key strength. Rather than mandating that MPOs implement
21 specific policies or programs, MPOs were granted flexibility in deciding how to reach targets
22 through a combination of transportation and land use strategies.

23 **State Level**

24 Since transportation-specific legislation was adopted, California and Washington were the only
25 states to update long-range transportation plans (LRTPs). Oregon created the STS and
26 Implementation Plan and has updated modal plans to be consistent with the STS, but it is unclear
27 to what extent these plans guide investments. California is the only state that requires its DOT to
28 illustrate how the LRTP reaches a specific GHG target. In Washington, several studies have been
29 commissioned by the legislature related to coordinating state agencies in efforts to reduce GHGs,
30 but little policy has emerged from these studies.

31 After transportation-specific legislation went into effect, some California stakeholders
32 noted improved coordination among state agencies and described a shift of culture in the state
33 DOT related to an increased focus on GHGs, but in all states, shifting the culture of
34 transportation agencies is slow. Other state agencies charged with overseeing or collaborating in
35 plans and efforts to reduce GHGs note challenges in shifting the focus of DOTs. In Oregon and
36 Washington, long-standing state-level growth management programs were a key strength
37 described at the state level. Because one strategy for reducing VMT relies on compact
38 development, having state-level growth management programs set the states up for success in
39 making progress towards goals. But, in California, the lack of state-level growth management
40 was seen as a key obstacle in making progress towards goals.

41 **Regional Planning**

42 California and Oregon delegate some responsibility for reaching GHG reduction goals to MPOs.
43 In Washington, HB2815 establishes statewide targets, but these are voluntary at the metropolitan
44 and local levels (23). California requires all MPOs to create SCSs and integrate SCSs with RTPs.

1 In Oregon, only the Portland and Eugene MPOs were required to conduct scenario planning and
2 only the Portland MPO was required to adopt and implement the preferred scenario. Thus,
3 comprehensiveness varies across states.

4 In describing key strengths, several stakeholders in California and Oregon noted that
5 MPOs were a logical focus for undertaking planning. But California's MPOs and the Portland
6 MPO have more authority than typical. In California, several stakeholders described improved
7 models and plans coordination as a result of the requirements of SB375. In Oregon, requiring
8 Portland to adopt a plan and making the process voluntary for other MPOs was seen as a good
9 way to provide an example to other MPOs and show that goals could be met by implementing
10 current plans. But, this means that progress in Oregon has been confined to the Portland area.
11 While the Eugene and Corvallis MPOs have taken some steps, neither has adopted a plan for
12 reducing GHGs from transportation. Though all MPOs in California must participate, the process
13 does not adequately recognize that MPOs vary in planning capacity. Further, because MPO
14 boards are controlled by local officials, gaining buy-in from some MPOs has been challenging.
15 In both California and Oregon, several stakeholders described how there was not enough funding
16 set aside for planning. In Washington, there is no comprehensive approach to addressing GHGs
17 in metropolitan plans, and only the Seattle MPO has voluntarily embedded reducing GHGs into
18 its plans (30).

19 **Implementation**

20 Implementation mechanisms adopted by states have varied considerably. Only California has
21 adopted new legislation and policies aimed at implementing SB375. In Oregon and Washington,
22 programs that predate GHG legislation like Oregon's urban growth boundaries (UGBs) and
23 Washington's Commute Trip Reduction serve as key elements in the approach. In Oregon,
24 Portland's Climate Smart Communities Scenarios effort found that implementing existing
25 transportation plans would achieve the GHG reduction targets, but there is insufficient funding to
26 do so.

27 Unrelated to GHG legislation, Washington is making investments in mass transit
28 expansion. California is investing in high-speed rail and offering competitive funding for SB375
29 implementation through cap-and-trade funds. However, the lack of funding was overwhelmingly
30 the most discussed obstacle in all states. Even in states making investments, there was not
31 enough funding, funding sources are often constrained, and states and MPOs must balance needs
32 for maintenance with expansion of transit. In California, stakeholders offered some examples of
33 jurisdictions that changed the transportation project prioritization process, but overall noted that
34 there seems to be a time lag in shifting RTP funding, likely owing to the sometimes decades-long
35 project time frame in transportation planning.

36 **Monitoring and Results**

37 All three states rely on tracking the levels of GHG and VMT to monitor progress towards goals.
38 California and Oregon require reports that evaluate progress towards goals and describe
39 implementation mechanisms like policies, programs and incentives. Both California and Oregon
40 revise targets on a periodic basis. California is unique in requiring periodic updates of MPO
41 plans to reduce GHGs from transportation. Washington develops regular GHG inventories, but
42 there is no requirement to describe policy implementation to the legislature or executive on an
43 ongoing basis. Often GHG tracking occurs within an environmental agency while the actions that
44 affect GHG emerge from state, regional and local transportation agencies. While states are
45 generally on track to reach 2020 goals, progress to date is partially attributed to high gas prices

1 and high unemployment during Great Recession. Recent VMT data raise questions about the
2 longevity of recent trends (3).

3 Though states are tracking levels of GHG and VMT, states are not monitoring the
4 implementation of plans to examine whether policies and programs are having their intended
5 effects and whether transportation choices and land use patterns are shifting as a result. No state
6 has a comprehensive monitoring program in place. In California, CARB is a strong agency and is
7 given responsibility for approving SCS plans, but has no role in tracking implementation. MPOs
8 have to show that adopted plans will meet targets (unless the MPO adopts Alternative Planning
9 Strategies) but are not held accountable for actually reaching the targets. In Oregon, OGWC
10 publishes biennial report cards but has no real oversight or authority. In Washington, state
11 agencies are required to report biennially on Washington's GHGs.

12 **Lessons Learned**

13 The states examined are unique in adopting statutory GHG reduction goals and legislation
14 targeting the transportation sector. In each of these states, there is public support and political
15 will for climate change policy. While national climate legislation is lacking, these states are
16 exemplars in adopting state-level legislation to reduce GHGs. In these states, the initial
17 legislation setting goals and requiring plans to determine how goals will be met is a starting place
18 for making progress towards reducing GHGs from transportation. But this research finds that
19 sustained leadership and momentum on common legislation and policies is key to successful
20 implementation. In states (like California) where the governor or executive took ownership over
21 legislation, implementation has been strong and consistent. In states where the executive and
22 legislature did not take ownership over the programs and the players are changing, focus has
23 waned since legislation went into effect. Though scenario planning models and resulting plans
24 are improving, plans will not be successful without adequate funding and a reorientation of
25 transportation funding. In an era when transportation funds are sparse and several funding
26 sources are constitutionally or statutorily constrained, finding adequate funding for plans
27 designed to reduce GHGs is a major obstacle. Though these states possess general public support
28 for climate change policies, it can be difficult to gain enough support to reverse ingrained
29 policies and institutions that encourage driving.

30 However, several stakeholders talked about how selling the public on GHG reduction
31 efforts were more successful when framed in a discussion of "co-benefits." By describing the
32 benefits related to public health, walkable communities, and affordable housing that occur when
33 reducing GHGs, it is easier to get public buy-in while broadening the focus beyond just climate
34 change.

35 In adopting policies, environmental groups have been important players in pushing
36 legislation and sustaining emphasis on implementation. In California and Washington,
37 environmental groups have filed lawsuits against MPOs related to their responsibilities under
38 state law. In crafting a policy designed to reduce GHGs, it was logical to rely on MPOs and
39 allow for flexibility to reach targets. In monitoring progress, states currently lack strong
40 oversight over implementation. While state agencies are involved in target setting and plan
41 approval, there is little oversight of the plans once adopted. Providing authority, budget, and staff
42 to an agency charged with oversight could improve the monitoring of plans.

43 **DISCUSSION**

44 This study describes efforts of three innovative west coast states to mitigate GHGs from the
45 transportation sector. With the impetus of the West Coast Governors' Global Warming Initiative,

1 California, Oregon, and Washington adopted GHG reduction goals into statute. While this study
 2 focuses explicitly on transportation, these states have been leaders in adopting a broad range of
 3 plans and policies to reduce GHGs across sectors. Each state adopted legislation focused on
 4 GHGs from transportation, though the approach varies by state.

5 This study describes the key similarities and differences between state approaches to
 6 reduce GHG from transportation. Distinguishing elements of state approaches include:

- 7 • California and Oregon set GHG reduction targets for each MPO, but California is the
 8 only state that requires all MPOs to show how they will reach targets.
- 9 • Washington is the only state that sets VMT reduction targets.
- 10 • California and Oregon require that DOTs illustrate how the state will reach GHG targets.
- 11 • California provides cap-and-trade funding and uses regulatory relief to incentivize
 12 implementation.
- 13 • All states require periodic GHG inventories and California and Oregon require periodic
 14 reports.
- 15 • No states consistently monitor implementation of plans.

16 This study relies on over 30 interviews from stakeholders representing state agencies,
 17 MPOs and nonprofit groups to assess strengths and weaknesses of state's approaches to reducing
 18 GHG from transportation. Findings are organized along dimensions including planning,
 19 oversight, and implementation mechanisms. Key findings from interviews include:

- 20 • Planning: Because MPOs vary in capacity, it is important to provide technical support
 21 and funding for planning, especially in smaller MPOs. This is particularly true in California
 22 where MPOs range drastically in size.

- 23 • Planning: Requiring MPOs to integrate RTPs with plans to reduce GHGs can be an
 24 effective tool, if MPOs have authority over project selection. Relying on RTPs is effective in
 25 California because MPOs have a high level of oversight over project selection. Oversight: States
 26 need an agency with authority and staff to provide oversight and monitoring of implementation
 27 of plans. Oregon created a Global Warming Commission to oversee GHG reduction efforts but
 28 failed to provide adequate legislative authority or staff.

- 29 • Implementation mechanisms: State authority over land use planning offers an opportunity
 30 to encourage compact development to reduce VMT, but MPOs can use incentives (or holdback
 31 funding for transportation) to persuade locals to participate. States must work with in the
 32 existing land use policy framework as strengthening the state role is unlikely in many states.

- 33 • Implementation mechanisms: States and MPOs lack flexible funding sources to
 34 implement plans. Constitutional restrictions on gas tax money limits the amount of funding
 35 available to fund transit and bicycle or pedestrian projects.

- 36 • Implementation mechanisms: Cap-and-trade programs can provide a flexible funding
 37 source to implement plans. California provides an example of using competitive cap-and-trade
 38 funding to implement plans and projects.

39 As these states continue to implement and modify policies and plans to reduce GHGs
 40 from transportation, they should consider the following recommendations in four categories:

41 1. Planning Authority:

- 42 • Require MPOs to show how RTPs will reduce GHGs.
- 43 • Require performance measures related to GHGs and other metrics in the
 44 transportation project selection process.

45 2. Performance-Based Funding and Approval:

- 1 • Make provision of transportation funding contingent on approval of land use
2 plans focused on compact development to reduce GHGs.
- 3 • In states with strong land use planning like Oregon, make land use plan revision
4 or urban growth area/boundary expansion contingent on engaging in scenario
5 planning to reduce GHGs.
- 6 • Institute a cap-and-trade (or carbon tax) program and set aside funds to be used
7 for implementation through a competitive process.
- 8 • Remove constitutional and statutory limitations on the use of transportation
9 revenue sources.
- 10 • Relax regulations to incentivize compact development and bicycle and pedestrian
11 and transit infrastructure.
- 12 3. Oversight:
 - 13 • Provide monitoring and enforcement authority to a state agency with staff and
14 authority.
- 15 4. Regional and Local Support:
 - 16 • Build broad public support for actions that reduce GHGs from transportation by
17 emphasizing concurrent benefits such as sustainable economic development,
18 public health, reduced congestion, and greater accessibility.

19 **ACKNOWLEDGMENT**

20 This research was funded in part by the National Institute for Transportation and Communities
21 (NITC), a program of the Transportation Research and Education Center at Portland State
22 University and a U.S. Department of Transportation university transportation center. This
23 research also received funding from the University of Oregon Faculty Research Award Program.
24 The analysis and interpretation and any errors are solely those of the author(s).

25 **REFERENCES**

- 26 1. U.S. Environmental Protection Agency. *Inventory of U.S. Greenhouse Gas Emissions*
27 *and Sinks: 1990–2013*. Publication EPA 430-R-14-004, April 15, 2015.
28 www.epa.gov/climatechange/ghgemissions/usinventoryreport.html. Accessed July 31,
29 2015.
- 30 2. Ewing, Reid, Keith Bartholomew, Steve Winkelman, Jerry Walters, & Don Chen.
31 *Growing Cooler: The Evidence on Urban Development and Climate Change*. Urban
32 Land Institute, Washington, D.C., 2007.
- 33 3. United States Federal Highway Administration, 2015, U.S. Driving Nears 1 Trillion
34 Miles in First Four Months of 2015, www.fhwa.dot.gov/pressroom/fhwa1546.cfm.
35 Accessed July 31, 2015.
- 36 4. Ewing, R, & R. Cervero. Travel and the built environment: a synthesis. In *Transportation*
37 *Research Record: Journal of the Transportation Research Board*, No. 1780,
38 Transportation Research Board of the National Academies, Washington, D.C., 2003,
39 pp. 87–114.
- 40 5. Crane, R. The influence of urban form on travel: an interpretative review. *Journal of*
41 *Planning Literature*, Vol. 15, No. 1, 2000, pp. 3–23.
- 42 6. Cambridge Systematics & Urban Land Institute. *Moving Cooler: An Analysis of*
43 *Transportation Strategies for Reducing Greenhouse Gas Emissions*. Urban Land
44 Institute, Washington, D.C., 2009.

- 1 7. National Research Council. *Driving and the Built Environment: The Effects of Compact*
2 *Development on Motorized Travel, Energy Use, and CO₂ Emissions*. Transportation
3 *Research Board Special Report*, No. 298, Transportation Research Board of the National
4 Academies, Washington, D.C., 2009.
- 5 8. U.S. Department of State. *United States Climate Action Report 2014*, Chap. 5: Projected
6 Greenhouse Gas Emissions. www.state.gov/e/oes/rls/rpts/car6/index.htm. Accessed July
7 29, 2015.
- 8 9. Pollak, M., B. Meyer, & E. Wilson. Reducing Greenhouse Gas Emissions: Lessons from
9 state climate action plans. *Energy Policy*, Vol. 39, 2011, pp. 5429–5439.
- 10 10. Wheeler, S.M. State and Municipal Climate Change Plans: The First Generation. *Journal*
11 *of the American Planning Association*. Vol. 74, No. 4, 2008, pp. 481–496.
- 12 11. Gallivan, Frank, Jeff Ang-Olson, & Diane Turchetta. Toward a Better State Climate
13 Action Plan: Review and Assessment of Proposed Transportation Strategies. In
14 *Transportation Research Record: Journal of the Transportation Research Board*,
15 No. 2244, Transportation Research Board of the National Academies, Washington, D.C.,
16 2011, pp. 1–8.
- 17 12. ICF International. *Synthesis of Climate Change and Transportation Research Efforts at*
18 *State DOTs, State Universities, and Federal Level*. 2011.
19 climatechange.transportation.org/pdf/CCandTransSynthesis_NCHRP_7%2015%2011.pdf
20 [f](http://climatechange.transportation.org/pdf/CCandTransSynthesis_NCHRP_7%2015%2011.pdf). Accessed July 29, 2015.
- 21 13. Noland, R.B., & C. Burbank. Implementing Climate Change Policies: State and Local
22 Innovations to Mitigate and Adapt to Climate Change. *TR News*, No. 281, July–Aug.,
23 2012, pp. 3–4.
- 24 14. Johnson, G.C., N. Annelin, K. Schuster. Climate Change Adaptation in Michigan:
25 Preparations, Strategies, and Examples. *TR News*, No. 281, July–Aug., 2012, pp. 5–9.
- 26 15. Campoli, G. Facing Up to Climate Change: Planning and Implementation at the Vermont
27 Agency of Transportation. *TR News*, No. 281, July–Aug., 2012, pp. 13–14.
- 28 16. Turner, Colleen Reitz, J.A. Frazier, & Robert G. Kaiser. How Will State Transportation
29 Agencies Handle the Issue of Climate Change: A Case Study from the State of Maryland.
30 In *Proceedings of the Transportation Land Use, Planning, and Air Quality Conference*,
31 held in Denver, Colorado, July 28–29, 2009, pp. 86–94. American Society of Civil
32 Engineers, Reston, VA.
- 33 17. Barbour, Elisa, & Elizabeth A. Deakin. Smart Growth Planning for Climate Protection:
34 Evaluating California’s Senate Bill 375. *Journal of the American Planning Association*,
35 Vol. 78, No. 1, 2012, pp. 70–86.
- 36 18. California Air Resources Board. *Assembly Bill 32 Scoping Plan*. May 22, 2014.
37 www.arb.ca.gov/cc/scopingplan/scopingplan.htm. Accessed on July 30, 2015.
- 38 19. Oregon Global Warming Commission. *Interim Roadmap to 2020*. Oct. 28, 2010.
39 www.keeporegoncool.org/content/roadmap-2020. Accessed on July 29, 2015.
- 40 20. Washington State Dept. of Ecology, & Washington State Community, Trade and
41 Economic Development Dept. *Growing Washington’s Economy in a Carbon-*
42 *Constrained World A Comprehensive Plan to Address the Challenges and Opportunities*
43 *of Climate Change*. Publication no. 08-01-025, Dec. 2008.
44 fortress.wa.gov/ecy/publications/SummaryPages/0801025.html. Accessed on July 30,
45 2015.

- 1 21. West Coast Governors' Global Warming Initiative. *Staff Recommendations to the*
2 *Governors*. Nov. 2004.
3 www.oregon.gov/energy/GBLWRM/docs/WCGGWINov04Report.pdf. Accessed July
4 28, 2015.
- 5 22. Michele, Lauren. Target and Goal Setting. [policyinmotion.com/state-transclimate-](http://policyinmotion.com/state-transclimate-policy/transclimate-policy/target-and-goal-setting)
6 [policy/transclimate-policy/target-and-goal-setting](http://policyinmotion.com/state-transclimate-policy/transclimate-policy/target-and-goal-setting). Accessed July 28, 2015.
- 7 23. Washington State Court of Appeals. *Cascade Bicycle Club v. Puget Sound Regional*
8 *Council*. July 22, 2013. www.courts.wa.gov/opinions/pdf/675494.pdf. Accessed on
9 July 30, 2015.
- 10 24. Fulton, W. Will Climate Change Save Growth Management in California? In Knapp,
11 Gerrit-Jan, Zorica Nedovic-Budic, & Armando Carbonell (eds.). *Planning for States and*
12 *Nation-States in the U.S. and Europe*. Lincoln Institute of Land Policy, Cambridge, MA,
13 2015.
- 14 25. Oregon Dept. of Transportation. *Oregon Statewide Transportation Strategy: A 2050*
15 *Vision for Greenhouse Gas Emissions Reduction*. March 20, 2013.
16 www.oregon.gov/odot/td/osti/pages/sts.aspx. Accessed on July 29, 2015.
- 17 26. Metro. *Climate Smart Strategy for the Portland metropolitan region*. 2014.
18 www.oregonmetro.gov/climate-smart-strategy. Accessed on July 29, 2015.
- 19 27. Oregon Global Warming Commission. *Report to the Legislature*. August 2013.
20 [www.keeporegoncool.org/sites/default/files/ogwc-standard-](http://www.keeporegoncool.org/sites/default/files/ogwc-standard-documents/OGWC_2013_Rpt_Leg.pdf)
21 [documents/OGWC_2013_Rpt_Leg.pdf](http://www.keeporegoncool.org/sites/default/files/ogwc-standard-documents/OGWC_2013_Rpt_Leg.pdf). Accessed on July 30, 2015.
- 22 28. Oregon Departments of Environmental Quality, Energy, and Transportation. *Oregon's*
23 *Greenhouse Gas Emissions Through 2010: In-Boundary, Consumption-Based and*
24 *Expanded Transportation Sector Inventories*. July 18, 2013.
25 www.oregon.gov/deq/AQ/Documents/OregonGHGinventory07_17_13FINAL.pdf.
26 Accessed July 29, 2015.
- 27 29. Western Climate Initiative. Design Recommendations for the WCI Regional Cap-and-
28 Trade Program. Sept. 23, 2008.
29 [www.ecy.wa.gov/climatechange/WCIdocs/092308WCI_DesignRecommendations_full.p](http://www.ecy.wa.gov/climatechange/WCIdocs/092308WCI_DesignRecommendations_full.pdf)
30 [df](http://www.ecy.wa.gov/climatechange/WCIdocs/092308WCI_DesignRecommendations_full.pdf). Accessed July 30, 2015.
- 31 30. Puget Sound Regional Council. *Transportation 2040: toward a sustainable*
32 *transportation system*. May 20, 2010. [www.psrc.org/transportation/t2040/t2040-](http://www.psrc.org/transportation/t2040/t2040-pubs/final-draft-transportation-2040)
33 [pubs/final-draft-transportation-2040](http://www.psrc.org/transportation/t2040/t2040-pubs/final-draft-transportation-2040). Accessed July 31, 2015.
- 34 31. Washington State Transportation Commission. *Washington Transportation Plan 2035:*
35 *Policy Plan*. Jan. 2015. wtp2035.com. Accessed July 30, 2015.
- 36 32. Washington State Dept. of Ecology. *Washington State Greenhouse Gas Emissions*
37 *Inventory 2010–2011*. Dec. 2014.
38 fortress.wa.gov/ecy/publications/SummaryPages/1402024.html. Accessed July 30, 2015.