





RESEARCH QUESTION

What are best practices for reducing greenhouse gas emissions (GHG) from transportation in case study states—California, Maryland, Oregon & Washington especially by reducing vehicle miles traveled (VMT) from light-duty vehicles?

CONTEXT

- Nationally, roughly one-quarter of all GHG results from fossil fuel combustion in the transportation sector [1].
- GHG from motor vehicles is determined by the "three-legged stool" of vehicle efficiency, fuel content and VMT [2]. See Figure 1.
- Approximately 32 states have created climate action plans [3]; 20 states have adopted GHG reduction goals [4].
- Scholars have examined climate action plans [5], climate change in state transportation plans [6], and the implementation of Senate Bill 375 in California [7].
- Prior research on statutory mandates for reducing GHG from transportation is limited.



Figure 1. Focus of Research [2].

METHODOLOGY

- This study looks at four innovative case study states—California, Maryland, Oregon & Washington—that are looking to reduce GHG, in particular, from transportation. Moreover, each state except California has an innovative land use planning program.
- Methods in this study include document analysis of statutes, executive orders & regulations; state-level transportation, land use & climate plans; and other plans & programs.
- Methods also include semi-structured interviews asking 44 stakeholders about goals, efforts (plans & actions), and results (monitoring & outcomes). See Figure 2.



Figure 2. Conceptual Framework.

GHG REDUCTION GOALS & TARGETS

Each case study state has adopted overall GHG reduction goals for all sectors; each state except Maryland has also adopted reduction targets for vehicles. Policy choices vary across states. See Tables 1 & 2.

Question	Choice	Description		
Process?	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		
Geography?	Statewide	Set a single target for entire state		
	Ву МРО	Set different targets for each MPO		
Quantitui	GHG	Measure reductions in GHG as a result of local actions		
Quantity?	VMT	Measure reductions in VMT		
Representation?	Absolute	Target an absolute level to achieve		
	Relative	Target a percentage reduction from some reference		
Metric?	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)		
Reference?	Baseline	Measure changes compared to a past baseline year		
	Trend	Measure changes compared to the business-as-usual trend in some future year		
Obligation?	Mandatory	Each MPO is required to adopt a plan to meet its target		
	Voluntary	Each MPO may choose to pursue its target		

Table 1. Policy Options in Setting GHG Reduction Targets for Vehicles [8].

State	Year	Statewide GHG Goals	Light-Duty Vehicle Targets	Target Policy Choices	Key Legislation	
California	2020	0% below 1990	1% above to 8% below	bottom-up by MPO GHG relative per capita baseline (2005) mandatory	2005 · FO S-2-05	
	2035		1% above to 16% below		2005: E0 5 5 05 2006: AB32 2008: SB375 2011: EO G-11-024	
	2050	80% below 1990				
	2020	25% below 2006		legislated	2007: EO 01.01.2007.07	
	2030	40% below 2006		statewide GHG		
Maryland	2050	90% below 2006		relative total baseline (2006) n/a	2009: SB278 / HB315 2014: EO 01.01.2014.14 2016: SB323 / HB0610	
	2020	10% below 1990		top-down	2007: HB3543	
	2035		17% to 21% below	by MPO GHG		
Oregon 2050 75%	75% below 1990		relative per capita baseline (2005) voluntary (except Portland)	2009: HB2001 2010: SB1059 2011: OAR 660-044		
	2020	0% below 1990	18% below	legislated	2007: EO 07-02	
Washington	2035	25% below 1990	30% below	statewide VMT		
	2050	50% below 1990	50% below	relative per capita trend (2020) voluntary	2007: SB6001 2008: HB2815 2009: EO 09-05	

Table 2. Statewide GHG Reduction Goals & Light-Duty Vehicle Reduction Targets.



Figure 3. Analysis Themes.

Rebecca Lewis, Ph.D. <<u>rlewis9@uoregon.edu</u>> | Robert Zako, Ph.D. <<u>rzako@uoregon.edu</u>>

STATE APPROACHES

Based on document analysis and stakeholder interviews, researchers analyzed each state according to various themes. See Figure 3.

California

- Creates MPO-specific targets for passenger vehicle use; 18 MPOs create Sustainable Communities Strategies, which are updated every 4 years
- Caltrans includes scenarios to reach GHG target in 2040 California Transportation Plan
- Cap-and-trade program provides funding to implement Sustainable Communities Strategies
- Uses VMT threshold for California Environmental Quality Act (CEQA) review under Senate Bill 743 and exempts infill projects from CEQA review (Senate Bill 226)

Maryland

- Creates Greenhouse Gas Reduction Act Plan (multi-sector & multi-agency)
- Integrates state transportation, climate & land use plans
- Statutorily creates a Climate Change Commission to implement Greenhouse Gas Reduction Act Plan
- Relies on implementing existing programs
- Includes a sunset provision in statute in order to extend GHG reduction targets

Oregon

- Creates Statewide Transportation Strategy including 18 strategies
- Creates MPO-specific targets for light-duty vehicles; Portland MPO (Metro) adopted scenario to meet GHG
- reduction target (Climate Smart Strategy) but other MPOs haven't • Lack of funding to support investments to implement Climate Smart Strategy and legislation not adopted in 2015

Washington

- Statutory targets for reducing VMT for light-duty vehicles
- No MPO-specific targets; Seattle MPO (Puget Sound Regional Council) transportation plan makes progress in
- reducing GHG, but does not meet proportional share of state's goal • Study of how Growth Management Act could be used to address
- climate change Washington Transportation Plan 2035 describes meeting statewide GHG reduction goals through vehicle & fuel technology, system management & operations, land use, transportation options, and pricing strategies







STATE OF OREGON

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FINDINGS & RECOMMENDATIONS

- Researchers developed a series of finding and recommendations. See Table 3.
- A key finding (#2.1) is that there is a need to better "connect the dots" from goals to plans to actions to results. The 5-step management by objectives process is a way to do so. See Figure 4.

Finding		Recommendation	Who?	Model
1	Leadership		,	
1.1	States leading despite absence of comprehensive national effort	a) Other states should follow the lead of those already addressing climate changeb) Need comprehensive national effort	Executive; Legislature; President; Congress	California
1.2	Political polarization makes progress difficult	Insulate implementation from the political process by relying on a Climate Change Commission rather than the legislature	Legislature	Maryland
1.3	States learn from other states, e.g., WCGGWI, WCI, PCC	Multistate collaboration can be helpful for encouraging action	Executive; State agencies; Regional collaborations	Oregon; Washington
1.4	"Tragedy of the Commons" nature of climate change discourages state, regional and local governments from acting	Focus on co-benefits of reducing GHG, in particular, from transportation sector	Executive; Legislature; State agencies; MPOs	Portland MPO
1.5	Changes in <i>political</i> leadership undermines consistent implementation	Require interim reports and sunset clauses so legislature must stay engaged	Legislature	Maryland
1.6	Changes in <i>state agency</i> leadership undermines consistent implementation	Establish a commission with broad authority drawn from leaders in the public and private sectors that uses staggered appointment terms to insulate from political changes	Legislature	Maryland
1.7	Emphasis often varies across administrations; each attempts to make mark with new policies	Need consistent leadership—executive, legislative giving advice to agencies	Executive; Legislature	n/a
1.8	Advocacy groups play important role in pushing policy agenda	Advocacy groups push for incremental policy change, calling for modest steps with clear accountability to keep issue present	Advocacy groups	1000 Friends of Oregon
2	Policy Framework			
2.1	Failure to "connect the dots"	Consider a SMART approach to establishing goals, that are Specific, Measurable, Actionable, Realistic and Time-bound	Legislature	Maryland; California
2.2	MPOs can be effective instrument	If MPOs are strong, they can be an effective instrument for reducing GHG	Legislature	California
3	Goals			
3.1	Goals often set in a vacuum by legislature without understanding of implications	 a) Set SMART goals b) Set goals with understanding of impact of existing policies, new policies and new funding sources c) Use a hybrid approach of "how far can you get?" and "what would it take?" 	Legislature; State agencies	Baltimore MPO
3.2	Often difficult to link results back to actions	Develop a set of performance measures more closely tied to actions	State agencies; MPOs	Oregon
3.3	MAP-21 calls for performance measures	Regardless of federal efforts, develop state and regional performance measures related to GHG reduction	State agencies; MPOs	n/a
4	Planning			
4.1	Integrate RTPs with plans to reduce GHG	Require MPOs to show how RTPs reduce GHG and give MPOs oversight over project selection	Federal agencies: State agencies	California
4.2	MPOs vary in capacity	Provide technical and financial support for planning	State agencies	Oregon; California
5	Institutional Relationships		-	
5.1	Transportation agencies are not designed to deal with GHG	Use SSTI to assess transportation agency	State agencies	California
5.2	Transportation agencies often make all decisions related to transportation placement, even though decisions impact land use and GHG	Incorporate other state agencies into decision-making	State agencies	n/a
5.3	MPOs are not strong in all states	Give MPOs oversight over project selection	Legislature	California
5.4	County governments are strong	or UGB expansion)	State agencies	n/a
6	Implementation			,
6.1	State authority over land use provides an opportunity to encourage compact development	Make provision of transportation funding contingent on approval of land use plans focused on compact development. In states with strong land use planning, make boundary expansion contingent on scenario planning	State agencies	n/a
6.2	Lacking flexible funding sources to implement plans	Remove constitutional limitations on gas tax	Legislature	n/a
6.3	Cap-and-trade funding provides flexible funding source to implement plans	Encourage competitive cap-and-trade programs or carbon taxes to implement plans and projects	Legislature	California
6.4	Regulations prevent compact development	Relax regulations to incentivize compact development, bicycle/pedestrian infrastructure and transit infrastructure	Legislature	California
7	Monitoring			
7.1	States lack institutional structure to provide oversight of implementation of plans	Provide monitoring and enforcement to state agency with staff, funding, authority	Legislature	n/a
7.2	Need to hold MPOs accountable	Track VMT and GHG at MPO level	State agencies	California; Oregon
7.3	Plans are not monitored for implementation	Rely on civic sector to monitor plans.	State agencies; Civic sector	California
8	Regional & Local Support			
8.1	Citizen buy-in important to sustained efforts	Build public support by emphasizing co-benefits of reducing GHG	Public agencies	All
8.2	Difficult to get buy-in as state agencies	Rely on civic sector to build coalitions	Civic sector	Maryland; California

Table 3. Findings & Recommendations.

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