

Washington State Department of Transportation

Strategy for Reducing Greenhouse Gas Emissions

June 30, 2011

1. Background

In 2009, the Legislature and Governor adopted the State Agency Climate Leadership Act (Engrossed Second Substitute Senate Bill 5560 – Chapter 519, Laws of 2009). The Act committed state agencies to lead by example in reducing their greenhouse gas (GHG) emissions to:

- 15 percent below 2005 levels by 2020.
- 36 percent below 2005 by 2035.
- 57.5 percent below 2005 levels (or 70 percent below the expected state government emissions that year, whichever amount is greater.)

The Act, codified in RCW 70.235.050-070 directed agencies to annually measure their greenhouse gas emissions, estimate future emissions, track actions taken to reduce emissions, and develop a strategy to meet the reduction targets. The strategy is required by law in RCW 70.235.050 section (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 [greenhouse gas reduction targets]. 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.

Starting in 2012 and every two years after each state agency is required to report to Ecology the actions taken to meet the emission reduction targets under the strategy for the preceding biennium.

The Washington State Department of Transportation (WSDOT) considers and incorporates sustainable practices in all our day to day operations. This strategy has been incorporated into our agency to help move us toward reducing our greenhouse gas emissions to the greatest extent possible.

We aim to conserve energy, fuels and funding while reducing greenhouse gas emissions. Our business practices are strategic and balanced by design using good environmental and economic sense. WSDOT's Sustainable Transportation approach is based on addressing greenhouse gas emissions through a broad array of strategies. Four primary greenhouse gas (GHG) reduction strategies are:

- Improve fuel - We support efforts to lower the carbon content of fuels and find alternative fuels.
- Advance vehicle and vessel technology - We support improved vehicle and vessel technology leading to vehicles and vessels that run on energy sources other than petroleum and better efficiency from each gallon.
- Support system efficiency - We operate our transportation system to maximize efficiency and improve traffic flow.
- Managing demand for transportation - We support efficient transportation options like carpooling, vanpooling, working from home, taking transit, riding your bike, walking or shopping closer to home.

For more information about WSDOT’s Sustainable Transportation approach contact Seth Stark, WSDOT Sustainable Transportation Lead at seth.stark@wsdot.gov or (360)705-7013.

2. Greenhouse Gas Emissions (GHG) from Agency Operations

A. Direct sources of GHG emissions from utility (building and non-building), vehicle fleet, and ferry energy use

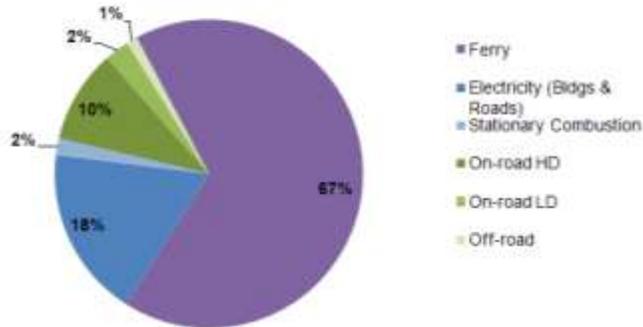
Emissions (MT CO₂e)

Source	2005*		2008		2009	
	MT CO ₂ e	Percent	MT CO ₂ e	Percent	MT CO ₂ e	Percent
Ferry Fleet	178,913	68%	172,618	63%	172,878	64%
Utility Use (Buildings & Highways)	47,857	18%	51,010	19%	50,936	19%
Vehicle Fleet (LD, HD, Off Road, Boats, Aviation)	34,352	13%	39,015	14%	35,007	13%
Subtotal	261,122	99%	262,643	96%	258,822	96%
Comparison to 2005			0.6%		-0.9%	
Employee Business Travel**	2,016	1%	2,724	1%	2,117	1%
Employee Commuting**	0	0%	8,533	3%	8,851	3%
Total	263,138	100%	273,900	100%	269,790	100%
Fugitive emissions***	0	0%	0	0%	42320	

*2005 Employee Business Travel does not include commercial air travel. **These sources are not included in baseline emissions, per Ecology. ***Fugitive emission methodology likely substantially overestimates emissions.

B. Main sources of direct GHG emissions

2009 Inventory Emissions



C. GHG Reduction Targets

The targets in the tables below do not take into account how the agency's projected emissions may change due to service increases of our ferries fleet, and changes in maintenance activities.

2020 Reduction Targets

Source of GHG Emissions	2005 Total GHG Emissions	2009 Total GHG Emissions MT CO ₂ e	**2020 Target GHG Emissions MT CO ₂ e	***2020 Target Reduction MT CO ₂ e
Vehicle Fleet	34,352	35,007	29,199	(5,812)
Utility Use	47,857	50,936	40,678	(10,258)
Ferries Fleet	178,913	172,878	152,076	(20,802)
Total	261,122	258,822	221,954	(36,872)

** The 2020 target is based on a 15% reduction of 2005 recorded emissions

*** Reductions are based on the 2009 recorded

2035 Reduction Targets

Source of GHG Emissions	2005 Total GHG Emissions	2020 Target GHG Emissions MT CO ₂ e	**2035 Target GHG Emissions MT CO ₂ e	***2035 Target Reduction MT CO ₂ e
Vehicle Fleet	34,352	29,199	21,985	(7,214)
Utility Use	47,857	40,678	30,628	(10,050)
Ferries Fleet	178,913	152,076	114,504	(37,572)
Total	261,122	221,954	167,118	(54,836)

** The 2020 target is based on a 36% reduction of 2005 recorded emissions

*** Reductions are based on meeting 2020 reduction targets

2050 Reduction Targets

Source of GHG Emissions	2005 Total GHG Emissions	2035 Target GHG Emissions MT CO ₂ e	**2050 Target GHG Emissions MT CO ₂ e	***2050 Target Reduction MT CO ₂ e
Vehicle Fleet	34,352	21,985	14,600	(7,386)
Utility Use	47,857	30,628	20,339	(10,289)
Ferries Fleet	178,913	114,504	76,038	(38,466)
Total	261,122	167,118	110,977	(56,141)

** The 2050 target is based on a 57.5% reduction of 2005 recorded emissions

*** Reductions are based on meeting 2035 reduction targets

3. Overarching Strategies: Current agency strategies that reduce emissions

WSDOT is working under several legislative directives, executive orders, and agency policies that result in reducing emissions. Examples of activities we are engaged in include:

- Report facility energy use. Benchmark Reporting Public Facilities and conduct energy audits for required facilities by 2012.
- Install outlets for electric vehicle charging in our state fleet parking and maintenance facilities.
- Participate in the development of a statewide integrated climate change response strategy.
- Work cooperatively with the four largest metropolitan planning organizations to develop and adopt regional transportation plans that will provide additional transportation alternatives and reduce GHG emissions and annual per capita VMT.
- Work with the Office of the Governor in the development of a West Coast Green Highway Initiative.
- Use as much biofuels or electricity in our fleet, vessels and construction equipment as possible within our authorized budget, and supply and infrastructure availability.
- Ensure that all owned light duty passenger vehicles achieve an average fuel standard of 40 mpg and light duty vans and SUVs achieve 27 mpg as vehicles come available to meet the standard.
- Participate in the Washington State Energy Strategy update.
- Implement commute trip reduction strategies to meet defined goals.
- Implement a no idling and fuel conservation policy for our vehicle fleet.

4. Greenhouse Gas Reduction Strategies for Direct Emission Sources

WSDOT identified several strategies for meeting the 2020 reduction goal and prioritized them according to achievability, initial cost, and payback. The use of biodiesel in fleet and ferries is mandated by RCW 43.19.648 and is reflected as a prioritized strategy. Most strategies are anticipated to be phased in over time to accommodate an implementation process and funding availability. Identified costs are estimated based on 2011 cost indexes, and highlights the need for additional appropriations to cover new upfront costs and operational costs to implement these strategies. We defined “new upfront costs” listed in the table below as new funds needed for a one time implementation; and/or new additional funds needed annually for operational costs of a strategy. The cost estimates do not include current budgeted operational costs, on-going maintenance or replacement costs once the life cycle of a strategy is met. We will monitor the strategies to better estimate the costs associated long-term maintenance, if any.

A. 2020 Goal Strategies and Actions with Low to No Cost

Strategies and Actions	GHG Reduction Estimate Annual (MTCO ₂ e)	New Upfront Cost Estimate (\$)	Payback Period Estimate (Years)	Date to Implement Estimate
Building Energy Use				
Strategy 1: PC power savings <ul style="list-style-type: none"> Target = 3000 computers Implement power savings policy 	248	N/A	N/A	By 2017
Strategy 2: PC reductions <ul style="list-style-type: none"> Target = 254 computers 	34	N/A	N/A	By 2015
Strategy 3: Telework <ul style="list-style-type: none"> 31% of eligible employees telework on average one day week 	42	\$336,485		By 2015
Strategy 4: Compressed work schedules <ul style="list-style-type: none"> 95 eligible % employees working 9/80s or 50% employees working 4/10s 	120	N/A	N/A	By 2015
Vehicle Fleet Energy Use				
Strategy 1: Increase biodiesel use to B20 statewide <ul style="list-style-type: none"> Purchase 411,262 gals of B100 	7,175		N/A	By 2013
Strategy 2: Reduce gas consumption by an additional 5% <ul style="list-style-type: none"> 78,790 gal/yr saved 	692	N/A	N/A	By 2015
Strategy 3: Reduce diesel consumption by an additional 5% <ul style="list-style-type: none"> 108,227 gal/yr saved 	2,395	N/A	N/A	By 2015

Ferries Energy Use				
Strategy 1: Jumbo Mark 11 ferry engine use reductions <ul style="list-style-type: none"> Reduce 3 engines to 2 engines; 460,000 gal/yr saved 	4,622	N/A	N/A	Ongoing
TOTALS:				
	15,328	\$336,485		

B. 2020 Goal Strategies and Actions with Medium Cost

Strategies and Actions	GHG Reduction Estimate (MTCO_{2e})	New Upfront Cost Estimate (\$)	Payback Period Estimate (Years)	Date to Implement Estimate
Building Energy Use				
Strategy 1: Upgrade and/or replace interior light fixtures <ul style="list-style-type: none"> Target = 13,000 fixtures Changing T12s to T8s 	1,070	\$1,012,000	8	By 2019
Non-Building Energy Use				
Strategy 1: Upgrade and/or replace traffic pedestrian heads <ul style="list-style-type: none"> Target =1,400 Replacing to LED 	293	\$490,000	62	By 2013
Vehicle Fleet Energy Use				
Strategy 1: Convert 360 small sedans and small SUVs to hybrids or EVs <ul style="list-style-type: none"> Purchase 360 small SUVs or EVs 	1,714	\$3,600,000	6	By 2020
Ferry Energy Use				
Strategy 1: Increase biodiesel to B5 <ul style="list-style-type: none"> Purchase 850,0000 gallons of B100 	8,647	\$1,258,000	N/A	By 2012
Strategy 2: Increase B5 to B10 <ul style="list-style-type: none"> Purchase 850,0000 gallons of B100 	8,647	\$1,258,000	N/A	By 2015
Strategy 3: Install positive restraint system – Edmonds/Kingston terminal <ul style="list-style-type: none"> Decreases pushing time at the dock Saves 200,000 gals/yr 	2,054	\$650,000	1.0	By 2020
TOTALS:				
	24,479	\$8,608,000		

C. 2020 Goal Strategies and Actions with High Cost

Strategies and Actions	GHG Reduction Estimate (MTCO ₂ e)	New Upfront Cost Estimate (\$)	Payback Period Estimate (Years)	Date to Implement Estimate
Ferry Energy Use				
Strategy 1: Use liquefied natural gas (LNG) on 2 new Super Class vessels	2,687	\$18,000,000	17	2020
TOTALS:	2,687	\$18,000,000		

D. 2020 Goal Strategies Total

2020 Reduction Target	Total GHG Reduction Estimate (MTCO ₂ e)	New Upfront Cost Estimate (\$)		
36,872				
TOTALS:	42,494			

5. Greenhouse Gas Reduction Strategies for Other Emission Sources (Employee Business Travel and Commuting)

The agency also quantified greenhouse gas emissions from employee commuting and business travel. GHG emissions from these sources were not included in the 2005 baseline because of insufficient data, and are therefore not included in the reduction targets. Also, the agency has less operational control over these sources. The agency evaluated these sources separately in this strategy and identified reduction strategies for these sources. The strategies presented below are based on the agency's current workforce numbers and does not include projected downsized numbers.

Source of GHG Emissions	2009 GHG Emissions (MTCO ₂ e)
Business Travel	2,117
Employee Commuting	8,851

E. 2020 Goal Employee Travel Strategies

Strategies and Actions	GHG Reduction Estimate (MTCO ₂ e)	New Upfront Cost Estimate (\$)	Payback Period Estimate (Years)	Date to Implement Estimate
Employee Business Travel				
Strategy 1: Implement a Employee Process <ul style="list-style-type: none"> • Increase tele/video and go-to meetings • Use rideshare matching program • Use transit/Orca card • Step by step process before checking out a car. 		TBD		
Strategy 2: Set-up a centralized check out system for cars at individual facilities.				
Employee Commuting				
Strategy 1: Telework <ul style="list-style-type: none"> • 31% of eligible employees telework on average one day week 	512	Same as above		
Strategy 2: Compressed work schedules <ul style="list-style-type: none"> • 96 % of eligible employees working 9/80s or 50% employees working 4/10s 	443	N/A		
TOTALS:	955		N/A	N/A

6. Next Steps and Recommendations

- WSDOT focused on viable strategies for the 2020 goal in this plan. Future emission targets in 2035 and 2050 are too uncertain to estimate based on WSDOT's dynamic business practices.
- Several mega-projects currently in the planning process could change our assumptions of future estimated emissions. For example, preliminary analysis has shown that the SR 99 - Alaskan Way Viaduct and Seawall Replacement project currently designed as a deep bore tunnel, could increase our agency's electricity usage by ten percent. In addition, three new ferry vessels are being added to the ferries fleet.
- WSDOT plans to implement strategies that are currently funded or required by law. Most strategies outlined in this plan are not currently funded or are significantly underfunded.
- We will not be able to implement the entire plan without additional appropriations.
- Cost to implement all strategies outlined in this plan: roughly \$45,365,407.

- One-time new upfront costs: roughly \$24,042,000.
- New annual operational costs: roughly \$2,562,485.
- Additional appropriations required: roughly \$44,541,880 over the next eight years.
- WSDOT will establish a measurement and monitoring process to track and assess progress on the GHG reduction strategies stated in this plan.
- Given the identified uncertainties, current reductions in revenue, and WSDOT's movement to create a "sustainable workforce", the strategies outlined in this plan should be considered a working document and will be adjusted periodically.
- Recommendations for budgetary and other incentives, especially from business travel
 - \$44,541,880 is needed beyond regularly anticipated appropriations over the next eight years to implement all strategies outlined in the plan.
 - The state should maintain and enhance existing budgetary incentives for state employee commuting and business travel, including the STAR transit pass for all Thurston County state employees and the ORCA pass for travel on Central Puget Sound transit services.
 - The state should establish a common commuting and travel program for all state employees across all state agencies so that incentives and policies are consistent and implemented with a more efficient economy of scale.
 - Evaluate the potential of setting budgetary rewards and penalties for agencies or specific divisions within agencies for meeting emissions reduction targets for employee travel.

For more information please contact Brooke Hamilton at hamiltb@wsdot.wa.gov or 360-705-7011. <http://www.wsdot.wa.gov/SustainableTransportation>