

WA State Department of Ecology School Bus Anti-Idling Program

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Cause and Effect

50 % of our regions Greenhouse gases are the result of our transportation devices ... cars, trucks, buses, planes, boats, etc.



School buses in Washington

Lift buses in the state – 1,762 17%

Non-lift buses in state – 8,551 83%

Total 10,313 buses in 280 districts

(2014 WA registered vehicles totaled 5,095,150)



Auburn Public School Bus Data



Transportation Services Department Mission Statement:

“The Mission of the Transportation Services Department is to provide safe, dependable, cost-effective services for Auburn School District as directed by the school board and the superintendent within state and federal guidelines.”

Population about 75,000

About 15,000 students

Area 30 square miles

How can idling add up ?

Annual collective mileage is 1,300,000 miles

Average mpg of fleet = was 6.8, could be 7.8

Average daily fuel consumption = 854 gallons

Average mileage for fleet per day = 6,664 miles

Average daily cost = \$ 2,647 in fuel

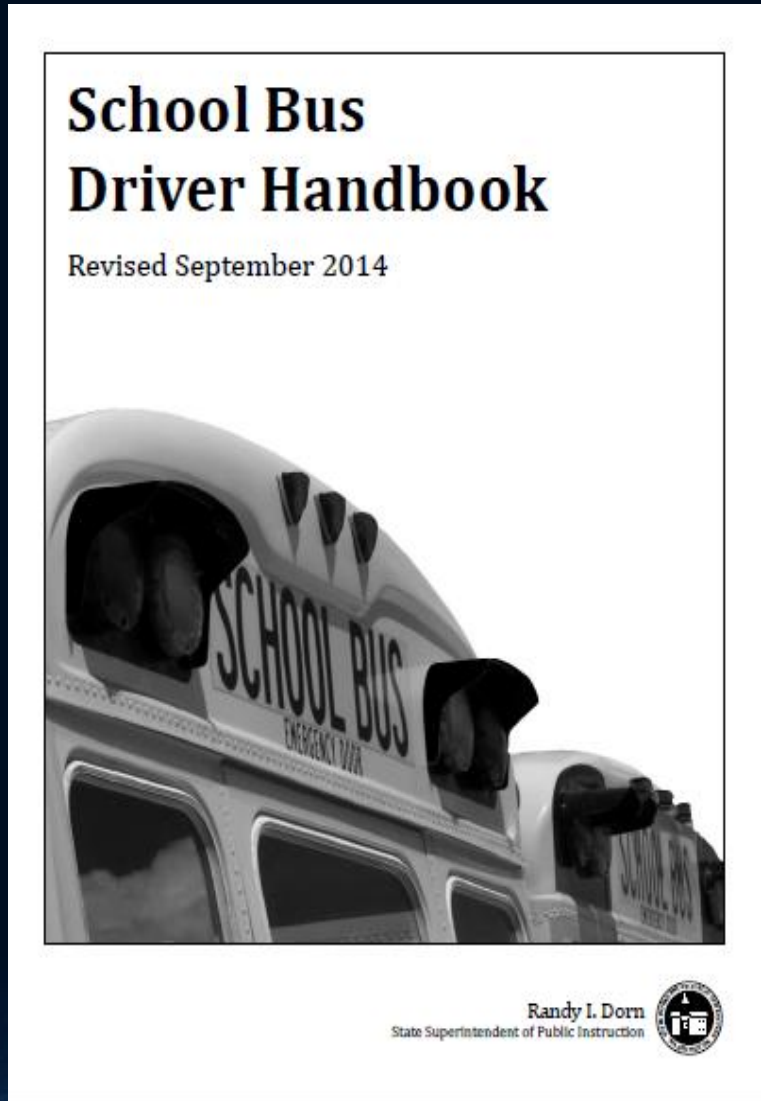
Average daily savings = \$ 391 in fuel

Savings of 23,334 gallons per year....

Or **\$72,335 saved/year**

12.3 % fuel budget

Revised WA State Bus Driver Handbook



Fuel Conservation (page 21)

“ Drivers can complete most of their pre-trip without running the engine.... and take no more than 5 minutes...”

“After 3-5 minutes of warm-Up, drive at low speed to warm bus up...”

Fuel Conservation

Diesel Emission and Anti-Idling Policies

The Environmental Protection Agency (EPA) has asked school districts to voluntarily establish idling restrictions for school buses. According to the EPA, some health studies have shown that exposure to diesel exhaust may increase the risk of lung damage and severity of asthma attacks as well as a possible increase of cancer risk. Other studies indicate that there may be little increased risk to drivers and their passengers. Testing will continue to determine the effects of diesel use. Children's respiratory systems are not fully developed, and that means they breathe twice as much air as adults per pound of body weight. Restricting idling could greatly reduce the possibility of harmful exposure. Until conclusive results are available, the EPA has made the following recommendations that drivers should be aware of:

- Drivers should turn off engines upon reaching the school or as soon as engine specifications permit.
- If severe climate conditions require idling, drivers should idle buses off school grounds and only as long as necessary.

Your district may have already instituted an idling policy or procedure. Know your district's guidelines and follow them. The good news is that newer diesel engines have technology included that reduces dangerous emissions.

Limit Warm-Up Time in Place

Drivers can complete most of their pre-trip inspection without the engine running. The pre-trip time with the engine running should take no more than five minutes and will allow drivers to complete the electrical portion of the inspection and any brake check. Air-brake equipped school buses need only be run long enough to build air pressure prior to departure from the bus garage (three to five minutes at most). School buses with hydraulic braking systems need no more than a 30-second warm-up. Time must be allowed for inspection of necessary items.

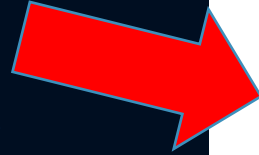
Continue Warm-up Time Driving at Low Speed on the Road

While a cold engine doesn't get the fuel mileage it will when warm, it gets much more than the zero miles per gallon when the bus is sitting and idling. When using minimal warm-up time, drivers should drive slowly until the temperature gauge reads 140 degrees or "normal operating temperature". After the three- to five-minute warm-up, drive at low speeds (25 to 35 mph) for the first few blocks to warm the rest of the bus. (Only when it is very cold will a longer warm-up distance be needed.)

Fuel Conservation

continued (page 22)

“the most fuel efficient way to accelerate is briskly and steadily without flooring it and up-shift without lugging the engine...”



Driving for Fuel Conservation

Acceleration

Accelerating too slowly or too fast wastes fuel. As a bus begins to move, inertia and surface rolling resistance must be overcome. This requires a great deal of fuel—as much as three times the amount needed to maintain a cruising speed. Also, lower gear ranges used in acceleration (and low speeds) use more fuel. Therefore, the most fuel-efficient practice is accelerating briskly and steadily (without flooring it), and shift up through the gears to cruising gear as soon as possible without lugging the engine. This reduces the time driving in the lower, less fuel-efficient gears. A bus accelerating in higher, more fuel-efficient gears is your goal.

Moving up Hills

Starting out from a stop on level ground requires one acceleration technique; moving up a hill requires another. The steeper the hill to climb, the more power is needed to gain and maintain speed. By accelerating just before ascending a hill, better momentum is gained for less fuel than if one accelerates while going uphill. By easing off the accelerator near the top of the hill, one allows the bus's momentum to carry it over the crest and use less fuel. Generally, your goal is to maintain higher rpm's while going uphill to avoid lugging the engine. Follow the engine manufacturer's guidelines and your district's policies.

Maintaining Fuel-Efficient Speed

All vehicles have a speed range in which they can achieve their best fuel economy. The fuel-efficient speed range varies from vehicle to vehicle, but most are efficient at speeds between 25 and 45 mph with smooth and steady driving. Remember that unnecessary or excessive braking or accelerating wastes time and fuel. Speed fluctuations generally mean that a driver accelerates unnecessarily, has an unsteady foot on the throttle, is indecisive, or all of the above. Pumping the throttle is especially wasteful, whether starting the vehicle, just getting underway, going up a hill, or trying to maintain driving speed.

Anticipating Traffic Conditions

Anticipating traffic conditions can save more fuel than any other driving behavior, particularly in urban rush hour driving. You can avoid unnecessary braking and acceleration by looking 12 to 15 seconds ahead. By anticipating traffic slowdowns as early as possible, you can decrease your speed, conserve fuel and save money by simply taking your foot off the accelerator. Anticipate lane changes or braking by other

Idling = NO CENTS

Idling = ↑ Vehicle wear & tear

Idling = ↑ Air Pollution

Idling = ↑ Wasted Fuel

Idling = ↑ Overall fleet costs

Idling = ↓ Engine Life

Size Does NOT Matter

Waluke 21 buses

Auburn 100 buses

Puyallup 170 buses

Avg. mpg ranges from 6.8-9.0

Average potential savings =
12.0 % of fuel budget



A Sample of the Year

District	gallons/day	Miles/year	Miles/day	Old mpg	New mpg	\$ saved	Gallons Saved	% Savings	CO2 reductions lbs	# Drivers
Auburn	980	1,300,000	6,664	6.8	7.8	70,380	23,334	12.3	503,496	145
North Shore	1,235	1,445,000	8027	6.5	7.5	104,760	33,176	16.3	735,264	135
Kent	1,387	1,596,408	8,869	6.3	7.3	112,860	31,140	12.4	691,308	128
South Kitsap	817	1,000,000	5,556	6.8	7.8	133,380	36,000	11.8	799,200	86
Mukilteo	884	1,097,820	6,099	6.8	7.8	70,920	20,160	12.8	447,552	68
Shoreline	475	568,735	3,160	6.7	7.7	41,580	11,867	14	259,740	45
Puyallup	1,047	1,711,403	9,509	9	10	60,652	17,329	11	383,616	168
Wahluke	142.5	174,209	968	6.8	7.8	11,585	3,245	13	72,039	21
Sultan	223	40,044	1,446	6.5	7.5	18,900	5,400	14	119,880	28
Longview	393	498,373	2,769	7.05	8.05	30,605	8,820	13	195,804	72
Tumwater HS	139	155,000	861	6.2	7.2	12,600	3,600	14.3	80,568	12
Oak Harbor	391	492,888	2,738	7	8	26,460	8,820	12.5	197,391	44
West Valley	583	740,724	4,115	7	8	25,650	7,380	22.6	165,164	39
Prosser	273	315,742	1,745	7	8	35,820	9,900	20	221,562	37
Shelton	568	746,621	4,148	7.3	8.3	44,280	12,240	13.7	273,931	38
Chimicum	314	410,125	2,279	7	8	18,900	5,400	12	120,852	29
Anacortes	240	258,612	1,437	6	7	28,349	6,300	16.9	140,994	17
North Thurston	1,198	1,510,000	8,388	7	8	94,000	26,857	16	601,060	126
Bremerton	334	359,069	1,995	5.9	6.9	28,364	8,058	13.4	180,338	42
Olympia	478	86,000	4,158	8.4	9.4	22,226	6,480	8	145,022	78
Renton	894	959,897	5,333	5.96	6.96	80,640	23,040	14.3	511,488	120
Totals	12,995.5	15,466,670	90,264	6.85 mpg	7.85 mpg	\$1,072,911	308,546 gallons	14.0 % avg	6,846,269	1,598

An excellent example of savings...

Oak Harbor

Public Schools

Through driver re-training, Espar heaters, and idling monitoring, the district has saved:

		<u>Miles</u> <u>Driven</u>
2011-2012	Diesel Fuel Use: 56,619	215,407
2012-2013	Diesel Fuel Use: 50,858	396,224
2013-2014	Diesel Fuel Use: 55,875	309,809
2014-2015	Diesel Fuel Use: 48,655	458,371

“Since your presentation we have hired one additional office person for 30 hours per week and we have increase our bus purchases from two buses to three! It really works for us!” Francis Bagarella, Transportation Director, Oak Harbor Schools

From 2011 to 2015, the Oak Harbor School District traveled 47% farther, on 15% less fuel.

Diesel school buses have changed quite a bit over time...

1950's vintage bus...

2016 vintage bus...



5 Idling Scenarios



Morning Pre-trip warm up



Inter-trip – Individual and Communal



Specials – Weekday and weekend



Handicapped or Lift Buses



Re-gen and Routing

Specials

Separate trips requiring greater distances, longer down time, etc.
Such as football games, basketball games, ski trips, a day at the zoo, etc.



High School sports

Football Games

- 2 buses for the players
- 1 bus for cheerleaders
- Extra buses for fans



Ski Trips



Zoo

Handicapped or lift gate buses

Washington Administrative Code:

WAC 392-145-031 General school bus driver requirements.

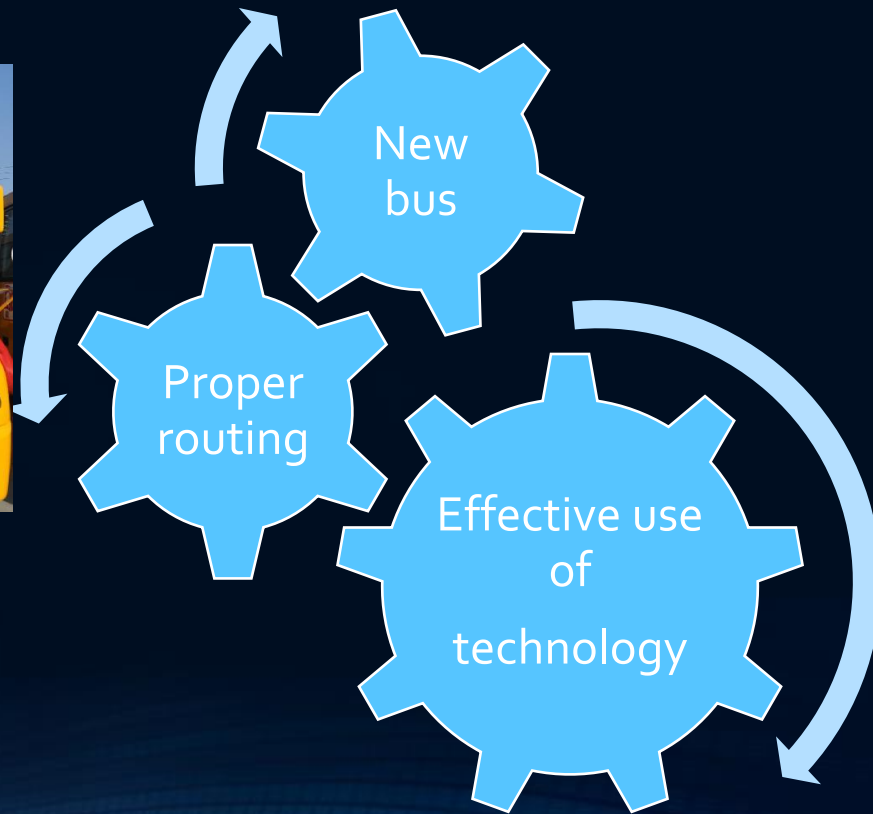
The following are school bus driver requirements:

(4) Except in accordance with district policy no school bus driver shall leave the driver's seat without first securing the school bus by setting the parking brake, placing the transmission in the manufacturer's recommended position, **shutting off the engine, and removing the key from the ignition switch.** The keys shall be kept in the driver's or other authorized school official's possession.



Re-Gen and Routing

Selecting the right bus for the right route may NOT be the politically correct thing to do. Newer buses require a duty cycle with specific requirements that need to be met in order to utilize and optimize emissions reduction devices.



The moral of the story.....

Be careful what you do on your day off.....

Citizens with passion can effect change.....

Everyone needs to pull together to make big changes.....

Times and technology change, behavior is harder to change....

Persistence pays off....

Knowledge is power.....



**Thank you for your time and attention;
If you would like help developing a similar program,
please feel free to contact us:**

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