



Biodiesel Use by Washington State Agencies

January through December 2019

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REPORT HIGHLIGHTS

- During 2019, biodiesel purchased by state agencies, including universities, totaled over 1.5 million gallons, or 6.9 percent of the fuel purchased to run diesel vehicles, vessels and equipment, and fire boilers to heat and power facilities. This is a significant improvement over the previous three years, when the level of biodiesel use by agencies was roughly 5.5 percent.
- Washington State Ferries (WSF) is the largest state agency consumer of diesel, accounting for 83 percent of all purchases. WSF purchased 1,200,837 gallons of biodiesel during 2019, 42 percent more than was purchased in 2018. WSF averaged 6.4 percent biodiesel, up from 4.5 percent in 2018. B10, which contains 10 percent biodiesel, was introduced to the fleet in July 2019, and by October had become the standard fuel for all vessels.
- Beyond maritime operations, the Washington State Department of Transportation (WSDOT) was the state's second largest purchaser of diesel, accounting for 12 percent of all purchases. WSDOT purchased 343,067 gallons of biodiesel during 2019, with an average blend level of 12.9 percent biodiesel. This level was down from 13.7 percent in 2018, and was the lowest since 2014.
- 14 agencies, including all six universities, purchased diesel during the year, accounting for the remaining five percent of fuel purchases. As universities are not required to procure fuel under the state's Master Contracts, their total diesel consumption has not been accurately accounted for in previous reports. In addition to contracted purchases, universities also purchased nearly two million gallons of diesel on the open market during 2019.
- The state departments of Corrections, Natural Resources, and Fish and Wildlife, along with the University of Washington and Washington State University, were the only other agencies to purchase biodiesel. Their combined procurement of 17,588 gallons of biodiesel accounted for only 1.5 percent of total fuel purchases.

BACKGROUND

This report covers January 1 through December 31, 2019, and focuses on bulk fuel purchased through state fuel contracts and on the open market to operate diesel-powered vessels, vehicles, and equipment, as well as generate electricity and heat for state facilities. The state's six universities are considered agencies for the purposes of this report. Fuel purchases by other post-secondary institutions are not included.

The term "biodiesel" means pure biodiesel unless clearly indicated otherwise. Biodiesel blends are specified by the capital letter "B" followed by the percentage of biodiesel. For example, B5 contains five percent biodiesel and 95 percent diesel. In tables and charts, biodiesel is expressed in B100 gallons. To avoid confusion, the term "fuel" is used to indicate a combination of all forms of diesel, including biodiesel.

As a part of the state's efforts to reduce emissions and dependence on foreign oil, and

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stimulate local production and use of biodiesel, state law has mandated that agencies use biodiesel-blended fuels to operate diesel-powered vessels, vehicles and construction equipment since 2009. Under current law, WSF is to use a minimum of B5 in all vessels as long as the price does not exceed the price of petroleum diesel by five percent. All other state agencies are to use a minimum of B20 on an annualized basis ([RCW 43.19.642](#)).

This policy is reinforced by procurement rules codified under [WAC 194-28](#), which directs state agencies to use biofuels and electricity, to the extent practicable, for publicly-owned vessels, vehicles and construction equipment. These rules reinforce the criteria cited in RCW 43.19.642 and highlight compliance expectations for the 16 agencies and universities with the highest levels of gasoline and diesel consumption. In addition, [Executive Order 20-01](#) (and preceding EO 18-01) directs agencies to reduce emissions of greenhouse gases and other toxins by procuring lower-emission options when “cost-effective and workable solutions are available.”

Per [RCW 43.19.646](#), the Washington State Department of Enterprise Services (DES) is to collaborate with key state agency stakeholders to compile and analyze the use of biodiesel fuel by state agencies as required by [RCW 43.19.642](#), and report findings and recommendations to the Governor and Legislature in an electronic format. For nine years, these reports were required every six months. In 2016, the Legislature changed the frequency of the report to an annual requirement.

Previous reports attempted to determine whether diesel and biodiesel procurement by agencies was intended for transportation purposes, facility energy needs, or both. Given the expanding policy framework around public sector use of fossil fuels, this report now includes all procurement of diesel-related fuels.

This report also incorporates diesel alternatives other than biodiesel for the first time. For a number of months in early 2019, WSF purchased co-refined diesel for three of their refueling terminals. Co-refined diesel incorporates the same biogenic feedstocks used to make biodiesel (e.g., waste grease, tallow, vegetable oils) directly into the petroleum refining process. While this likely reduces resulting greenhouse gas emissions, the benefits for a specific fraction of fuel, such as diesel, can only be quantified through consistent laboratory testing. Therefore, consumers cannot claim greenhouse gas emission reductions without these tests, which were not provided to WSF.

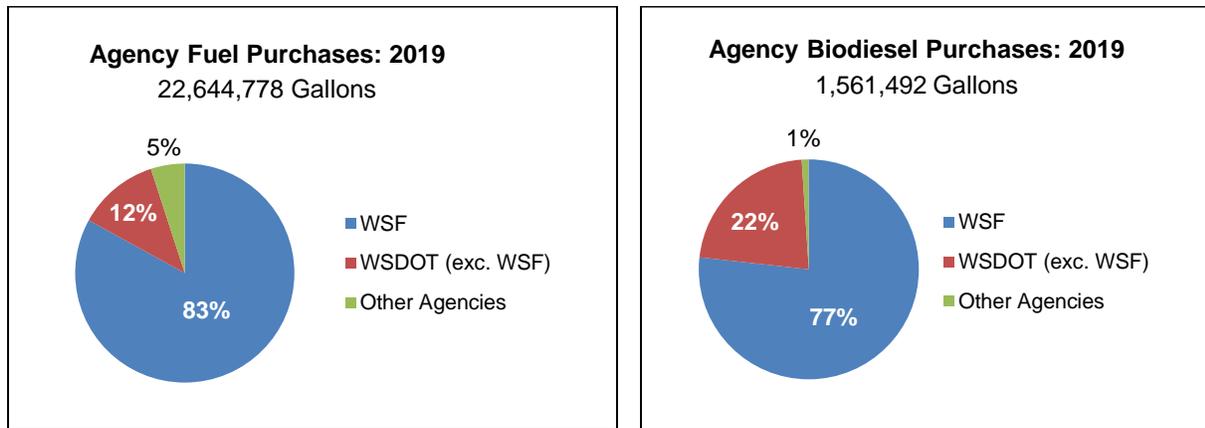
Producers of co-refined diesel may mislabel their product as “renewable diesel,” which is actually a fuel made solely from biogenic feedstocks to be chemically equivalent to petroleum diesel. The University of Washington was the only agency to procure both renewable diesel and blends of renewable diesel and biodiesel. UW’s motor pool purchases beginning in the fourth quarter of 2019 were the first by an agency. The emission reduction benefits of renewable diesel are well-known and consistent with the policy goals cited above. It is therefore considered “biodiesel” for the purposes of this report. While still comparatively expensive, renewable diesel is becoming more available in the marketplace, and will likely be a component of future DES Master Contracts.

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STATE BIODIESEL PURCHASES

State agencies are required to purchase bulk fuel through state fuel contracts that cover gasoline, heating oil, and diesel (including biodiesel). Many cities, counties, school districts, institutions of higher education, and transit systems also use the contracts. In 2019, state agencies and universities purchased 22.6 million gallons of diesel fuel, including 1.56 million gallons of biodiesel.

As the largest consumer of diesel among state agencies, WSF accounted for 83 percent of fuel purchases, including 77 percent of biodiesel purchases. WSDOT accounted for another 12 percent of fuel purchases, including 22 percent of biodiesel purchases. Other agencies and universities accounted for the balance of five percent of fuel purchases, including one percent of biodiesel purchases.



State Ferries Use

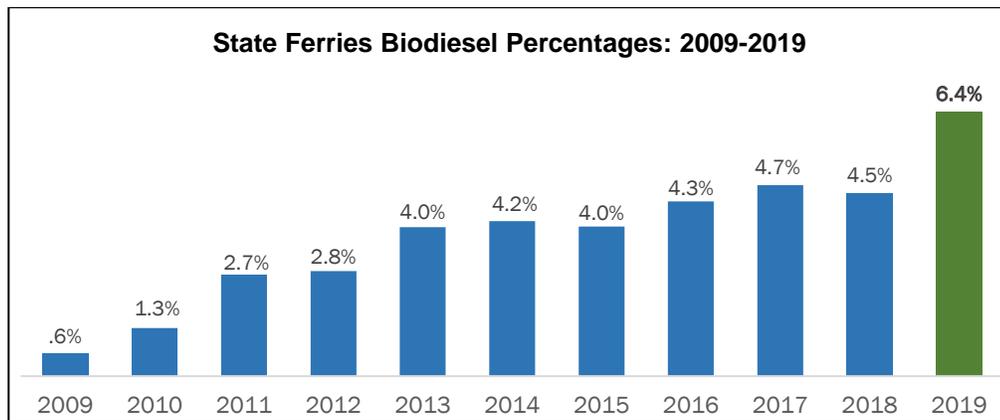
- WSF purchased 1,200,837 gallons of biodiesel during 2019. This is a 42 percent increase from the 843,467 gallons purchased in 2018. Overall, WSF purchases averaged 6.4 percent biodiesel for 2019, up from 4.5 percent for 2018.

State Ferries Biodiesel Purchases: 2009 to 2019

Year	Diesel Gallons	Biodiesel Gallons	Total Gallons	Biodiesel %
2019	17,633,816	1,200,837	18,834,653	6.4%
2018	17,806,078	843,467	18,649,545	4.5%
2017	17,976,949	882,214	18,859,163	4.7%
2016	17,799,290	807,807	18,607,097	4.3%
2015	16,687,482	691,580	17,379,062	4.0%
2014	16,480,334	715,653	17,195,987	4.2%
2013	16,701,761	687,741	17,389,502	4.0%
2012	16,749,738	485,537	17,235,275	2.8%
2011	17,107,676	468,837	17,576,513	2.7%
2010	16,915,217	221,421	17,136,638	1.3%
2009	16,733,093	101,939	16,835,032	0.6%

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- WSF’s progress using biodiesel has occurred in stages. WSF began using B5 for vessels fueled by truck from the Harbor Island truck facility in Seattle in 2009. Vessels fueled by truck from Anacortes began using B5 in 2011. Installation of infrastructure for in-line biodiesel blending at the Seattle Harbor Island dock facility was completed in early 2013.
- After completing a pilot test in 2018 that found no negative impacts of B10 on vessel equipment, performance, and maintenance, WSF implemented fleet-wide use of B10 in July 2019. Use of a self-propelled bunkering vessel to deliver B10 via vessel-to-vessel delivery was pilot tested in October 2019 at Pier 15. After successful testing, vessel-to-vessel fuel delivery started at the Kingston Terminal in November 2019, with plans to expand to other central Puget Sound locations.
- All delivery locations received biodiesel fuel during 2019, with 9 of the 11 locations averaging at least five percent biodiesel. Notably, Kingston Terminal, which started vessel-to-vessel fueling in November, averaged 9.7 percent biodiesel. Fuel at the Seattle Dock Facility, which accounted for 37 percent of all fuel delivered during this period, averaged 6.8 percent biodiesel. Fuel deliveries to Anacortes and Friday Harbor averaged only 4.5 and 3.3 percent biodiesel, respectively, but were supplemented by co-refined diesel from a Ferndale-based refinery. Had this been biodiesel, use of diesel alternatives would be over five percent at both locations.
- WSF uses Portland, Oregon as a reference city for B5 prices. For 2019, the price of Portland B5 was, on average, lower than diesel by 1.1 percent.
- WSF reported no biodiesel-related quality or performance issues during the period.



Land Sector Use

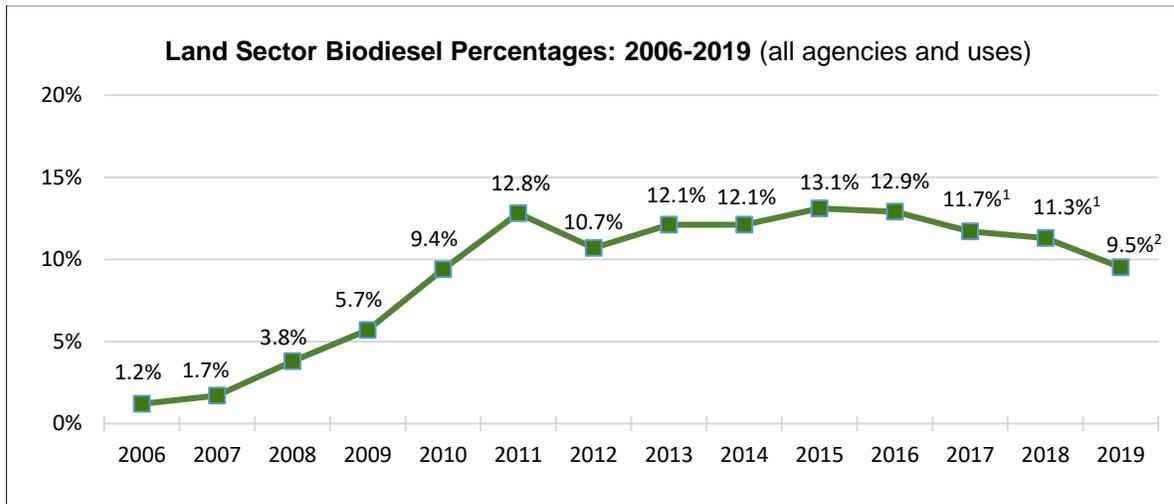
Agency purchases of biodiesel for non-marine uses totaled 360,655 gallons in 2019, about 9.5 percent of total diesel purchases, down from 12.5 percent in 2018. WSDOT is the largest single user other than WSF, purchasing 2.66 million gallons of fuel in 2019. Biodiesel comprised 12.9 percent of WSDOT purchases, down from 13.7 percent in 2018. The average price difference between neat diesel and B5 at wholesale racks in the state varied from none to roughly one cent per gallon.

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Land Sector Biodiesel Purchases: 2019

Agency	Diesel Gallons	Biodiesel Gallons	Total Gallons	Biodiesel %
WSDOT	2,319,664	343,067	2,662,731	12.9%
Other Agencies	1,129,806	17,588	1,147,394	1.5%
Total	3,449,470	360,655	3,810,125	9.5%

Of the 14 other agencies and universities purchasing fuel, biodiesel comprised 4.8 percent of diesel used for fleets, and only .5 percent of diesel used for facilities, for a combined blend level of 1.5 percent. Only Corrections, Natural Resources, Fish and Wildlife, UW and WSU purchased biodiesel during the year.



¹ Percentages shown in prior reports for 2017 and 2018 adjusted to include WSDOT diesel-only tank deliveries omitted from this chart after the 2016 report.

² Biodiesel purchased by agencies other than WSDOT were significantly lower this year as a result of accounting, for the first time, for all diesel used by university facilities.

WSDOT Regional Purchases

WSDOT maintains a statewide network of 105 diesel fueling sites that serves the majority of the state's diesel-powered vehicles and equipment. 11 of the sites do not receive biodiesel due to cold winter temperatures and low fuel turn-over (no fuel use for four to six months, or longer). All remaining sites received some amount of biodiesel during the year.

Since 2012, WSDOT's efforts to achieve a B20 blend level on an annualized basis have been hampered by older tanks that fail to meet EPA guidance regarding materials compatibility. These tanks are limited to B20, so lower-level winter blends cannot be balanced by blends above B20 in the summer months. WSDOT has replaced tanks at 10 sites since 2015, and estimates \$121 million is needed to replace the 38 remaining tanks with B20 limitations. The agency has requested \$10 million for the 2021-23 biennium to replace the highest priority, single-walled tanks at White Pass and Morton.

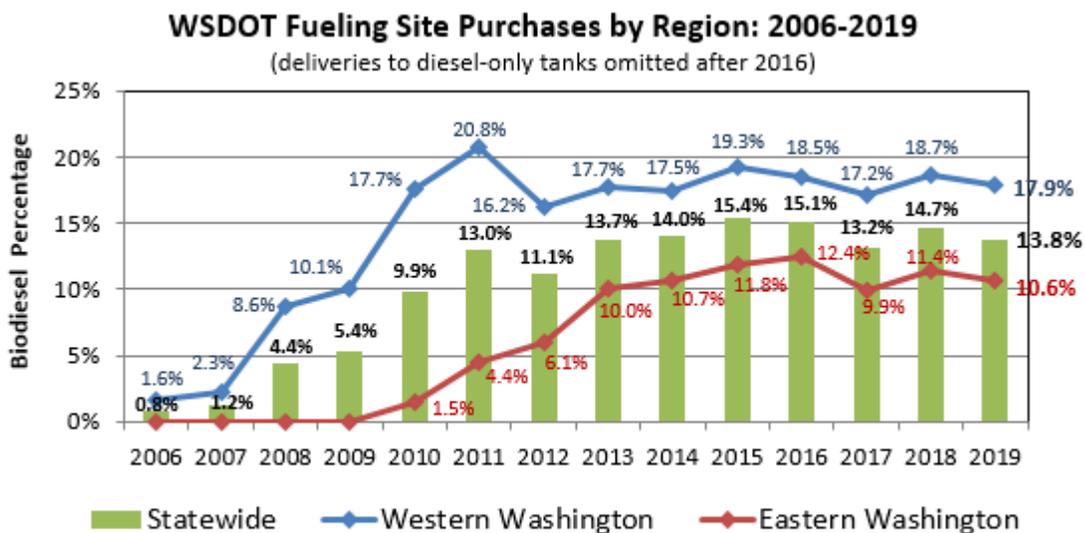
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On the west side of the state, WSDOT has 48 sites in three regions of aggregated counties. Seven of these sites received no biodiesel. Overall biodiesel use in west side sites eligible for biodiesel fell to 17.9 percent from 18.7 percent in 2018. The Olympic region saw the highest level of biodiesel use, followed closely by the Southwest region. The Northwest region lagged behind due to inconsistent vendor deliveries.

On the east side, WSDOT has 57 sites in three regions of aggregated counties. Four of these sites received no biodiesel. Overall biodiesel in east side sites eligible for biodiesel fell to 10.6 percent from 11.4 percent in 2018. All three regions received roughly the same amount of biodiesel. Inconsistent vendor deliveries continued to be a problem.

WSDOT Fueling Site Purchases by Region: 2019 (diesel-only tanks omitted as of 2016)				
WSDOT Region	Diesel Gallons	Biodiesel Gallons	Total Gallons	Biodiesel %
Westside	896,643	195,080	1,091,723	17.9%
• Olympic	309,171	74,439	383,610	19.4%
• Southwest	215,954	47,765	263,719	18.1%
• Northwest	371,518	72,876	444,394	16.4%
Eastside	1,242,440	147,910	1,390,350	10.6%
• North Central	302,657	36,112	338,769	10.7%
• East	394,356	46,026	440,382	10.5%
• South Central	545,427	65,772	611,199	10.8%
Total	2,139,083	342,990	2,482,073	13.8%

WSDOT also procured small amounts of diesel, totaling 12,980 gallons, for 17 facilities throughout the state. It's assumed this diesel was used for heating purposes and not vehicles. Only one purchase contained biodiesel.



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FUEL QUALITY

The Washington State Department of Agriculture (WSDA) monitors the quality of diesel and biodiesel fuels as part of the state's Motor Fuel Quality Program. During 2019, WSDA submitted 86 diesel and biodiesel blend fuel samples to a contracted laboratory to test compliance with ASTM quality standards. Samples were obtained from fuel terminals, retail outlets, and state and local government fueling sites. They included 76 diesel samples, nine B20 samples, and one B99 sample. The diesel samples included 33 samples from pumps with the added label "may contain up to five percent biodiesel." 16 of these samples contained biodiesel.

Test results continued to show problems with diesel meeting flash point specifications, but continued improvement over prior years. Of the 10 samples that did not meet ASTM specifications, seven failed to meet flash point specifications. Flash point failures do not affect engine performance but can be an indicator of contamination. These failures are often caused by contamination with small amounts of gasoline usually attributed to tank management in transport trucks or design flaws with underground storage tank systems. WSDA issued four notices of correction for selling diesel fuel that did not meet specifications. All B20 and B99 fuel samples met ASTM specifications. All terminal testing results passed.

Overall, WSDA did not identify any significant quality issues with biodiesel fuels during this reporting period. WSDA reported that it is harder and harder for its inspectors to find retail stations offering fuels with more than five percent biodiesel.

STATE CONTRACTING

DES has four Master Contracts that provide multiple types of fuel products and are utilized by numerous purchasers across the state. Contracts must provide agencies with biodiesel that is primarily produced in-state, or from in-state feedstocks.

Bulk Fuel (#00311) provides bulk fuel and will-call fuel deliveries for products such as gasoline, diesel and biodiesel. There are five contractors servicing eight regions across the state: Associated Petroleum Products (APP), Christensen (dba RE Powell), PetroCard, Wilcox & Flagel and Coleman Oil. The current term ends on May 20, 2021.

In 2016, purchasers sought changes to the contract that would address emergencies and interest in renewable diesel, lower administrative transaction costs, and provide more competitive biodiesel pricing. DES subsequently rebid this contract but the procurement was cancelled in September 2018. DES is developing a new solicitation and anticipates awarding new contracts in early 2021.

Marine Refueling Services (#05718) provides diesel and biodiesel blends to WSF via pier-to-vessel, truck-to-vessel and vessel-to-vessel transfers at multiple locations. The contractor is Maxum Petroleum. The current term ends December 15, 2020, with automatic one-year extensions available through 2028.

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Pier 15 (Seattle Dock Facility) (#00414) provided diesel and biodiesel blends to WSF via pier-to-vessel transfers at Pier 15 in Seattle. The contract was cancelled due to an overlap with Marine Refueling Services (#05718).

Over the Water Marine Refueling (Keller Ferry) (#07613) provides diesel and biodiesel blends to WSF for the Keller Ferry on the Columbia River between Ferry and Clark counties. The contractor is Connell Oil. The current term ends on January 13, 2022, with extensions available through 2024.

RECOMMENDATIONS

Department of Enterprise Services

- Revise and/or rebid contracts as needed to provide competitively priced biodiesel and other alternative fuel products, such as renewable diesel.
- Establish, and require contractors to use, standardized nomenclature to reduce confusion and errors in reporting, including types and uses of fuels (e.g., vehicles, facilities), customer names, and delivery locations.
- Establish B5 as the default diesel fuel unless purchasers request a different fuel.
- Ensure fuel purchasers and contractors understand the distinction between co-refined diesel and renewable diesel as agencies are required to monitor their greenhouse gas emissions and need accurate carbon accounting.

State Ferries

- Continue to address any gaps in delivery of biodiesel blends by ensuring fuel contractors fulfill the terms of their contracts. WSF worked closely with contractors to resolve chronic issues with biodiesel deliveries and is now consistently receiving B10 throughout the fleet.

Department of Transportation

- Continue to address any gaps in delivery of biodiesel blends by ensuring fuel contractors fulfill the terms of their contracts.
- Increase biodiesel blend levels in certain WSDOT tanks that received less biodiesel in 2019 than similar tanks in the vicinity, especially those in areas with moderate temperatures that handle relatively high volumes of fuel. These include Bellingham, Mount Vernon, Monroe, Arlington and Oakesdale.
- Seek legislative appropriations to replace key older WSDOT fuel tanks so those locations are able to store higher levels of biodiesel blends.
- Use biodiesel blends to meet facility heating needs at locations with consistent fuel turnover, including Port Angeles and Issaquah. Blends up to B40 are safe for use in diesel-fueled boilers.

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Other Agencies

- Work through the Alternative Fuels & Vehicles Technical Advisory Group jointly administered by Commerce and WSU's Energy Program to substantially increase biodiesel use by universities and agencies other than WSDOT and WSF. Specific opportunities are listed below.
- UW and WSU purchased substantial volumes of diesel for campus power plant operations in Seattle and Pullman, respectively. Both could readily increase their use of biodiesel blends.
- Corrections purchased diesel for ten facilities, but biodiesel blends at only two: Cedar Creek (17 percent) and the Washington Corrections Center in Shelton (five percent). In addition to substantially increasing the biodiesel blend level at Shelton, other corrections centers purchasing a significant amount of diesel on a regular basis that could be using biodiesel blends include Larch, Airway Heights, Monroe, and the Washington State Penitentiary in Walla Walla.
- Fish & Wildlife's diesel purchases were primarily for their Lacey headquarters, which consistently procured B5 during the year. The agency could increase the biodiesel blend level for Lacey, and consider biodiesel for their Aberdeen facility.
- Natural Resources procuring biodiesel blends for both Forks (13 percent) and Loomis (11 percent). DNR purchased diesel for three other sites, but the only one well-suited for biodiesel based on consistent fuel use and volumes is Yacolt.
- Social & Health Services purchased diesel for six facilities, but no biodiesel. The best opportunities to increase agency biodiesel use based on consistent fuel consumption and volumes would be the Fircrest Residential Habilitation Center in Shoreline, and the Consolidated Support Services building in Medical Lake.
- Parks & Recreation purchased diesel for 16 facilities, but no biodiesel. Most locations used very modest levels of fuel, but there are three others that based on consistent fuel consumption and volumes would be candidates for biodiesel: Fort Flagler, Deception Pass, and Spanaway Lake.
- Prior biodiesel reports attempted to quantify diesel use by Pierce County ferries servicing the McNeil Island Corrections Center. Given that this ferry also calls at other locations, and that a relatively low volume of fuel was being consumed to meet DOC's specific needs, an estimate is no longer included in this report.

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