



Biodiesel Use by Washington State Agencies

January through December 2016

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REPORT HIGHLIGHTS

- During 2016, biodiesel purchased by state agencies under state fuel contracts reached a new high, totaling almost 1.2 million gallons. This is the fourth year in a row that state agency biodiesel purchases topped 1 million gallons.
- Washington State Ferries (WSF) is the largest state agency consumer of diesel fuel. WSF purchased 808,000 gallons of biodiesel during 2016, which is about 115,000 gallons more than that purchased in 2015. This increase was due primarily to overall increased fuel use. WSF averaged 4.3 percent biodiesel in 2016, up from 4.0 percent in 2015, with fuel containing 5 percent biodiesel (B5) the standard fuel for the fleet.
- In its activities outside the state's ferries fleet, the Washington State Department of Transportation (WSDOT) is the state's second largest purchaser of diesel fuel. WSDOT purchased 366,000 gallons of biodiesel during 2016, almost identical to the amount purchased in 2015. Biodiesel made up 17 percent of total diesel fuel purchased in Western Washington and 12 percent in Eastern Washington in 2016. Statewide, WSDOT averaged 14 percent biodiesel. Other agencies and the state's higher education institutions accounted for bulk purchases of less than 22,000 gallons.

BACKGROUND

As a part of the state's efforts to reduce its dependence on foreign oil, reduce emissions, and stimulate local production and use of biodiesel, state law has mandated state agencies to use biodiesel fuels to operate diesel-powered vessels, vehicles, and construction equipment since 2009. Under current law, Washington State Ferries (WSF) is to use a minimum of 5 percent biodiesel in all vessels as long as the price of B5 does not exceed the price of diesel by 5 percent or more. All other state agencies are to use a minimum of 20 percent biodiesel by total volume to operate diesel vessels, vehicles, and construction equipment. (See [RCW 43.19.642](#) and [WAC 914-28](#).)

State law ([RCW 43.19.646](#)) requires the Department of Enterprise Services (DES) to compile and analyze the use of biodiesel fuel by state agencies and report its 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 amended RCW 43.19.642 so that reporting is now an annual requirement. DES collaborates with key state agency stakeholders to prepare the report.

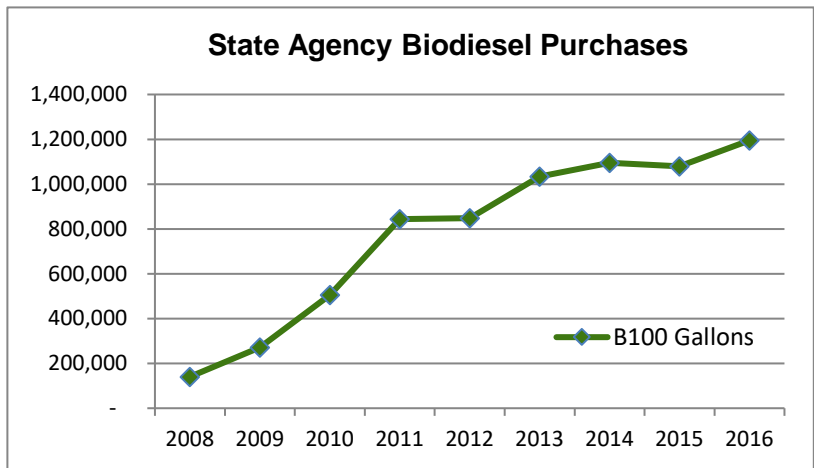
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This report covers January 1 through December 31, 2016, and focuses on bulk fuel purchased through state fuel delivery contracts to operate diesel-powered vessels, vehicles, and equipment. The term “biodiesel” means pure biodiesel (B100) unless clearly indicated otherwise. Biodiesel blends are specified by the capital letter “B” followed by a value representing the volume percentage of biodiesel, such as B5 and B20. Therefore, B5 contains 5 percent biodiesel and 95 percent diesel. In tables and charts, biodiesel is expressed in B100 gallons.

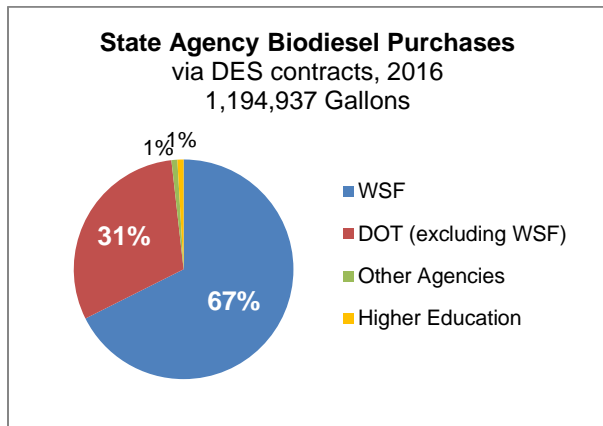
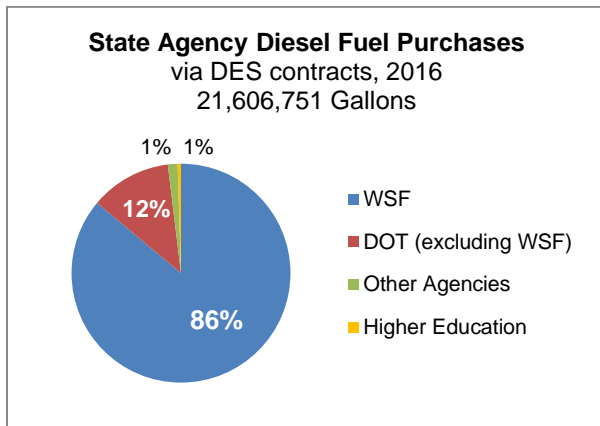
STATE BIODIESEL PURCHASES

State agencies are required to purchase bulk fuel through the state fuel contracts which cover gasoline, heating oil, and diesel fuel (including biodiesel). The contracts are also used by many higher education institutions, cities, counties, school districts, and transit systems.

In 2016, state agencies and higher education institutions purchased 21.6 million gallons of diesel fuel through state fuel contracts, including almost 1.2 million gallons of biodiesel. Since the biodiesel use mandate was enacted, state agency purchases have increased significantly and topped 1 million gallons for the fourth year in a row in 2016.



As the largest consumer of diesel fuel among state agencies, WSF purchased 86 percent of the diesel fuel and 67 percent of the biodiesel purchased during 2016. Other purchases made by state agencies for diesel-powered vehicles and equipment made up 14 percent of total diesel fuel purchased and 33 percent of the biodiesel purchased on state contracts.



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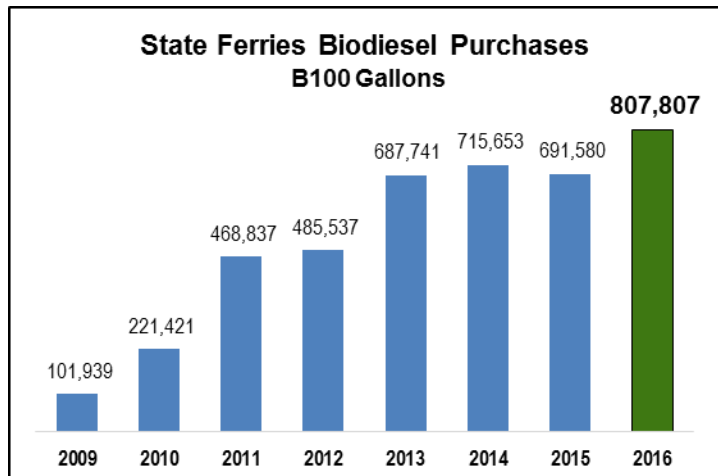
WASHINGTON STATE FERRIES (WSF) BIODIESEL USE

- WSF purchased 807,807 gallons of biodiesel during 2016. This is a 17 percent increase from the 691,580 gallons purchased during 2015. Total fuel purchased during the period increased 7.5 percent, due to the impact of a new vessel put into service mid-2015, and to upsized routes. Overall, WSF purchases averaged 4.3 percent biodiesel for 2016, up from 4.0 percent for 2015.

Washington State Ferries Biodiesel Use: 2009 to 2016

Year	Diesel Gallons	Biodiesel Gallons	Total Gallons	Biodiesel %
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%

- WSF’s progress using biodiesel has occurred in stages, corresponding with the availability of in-line blended B5 fuel. 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 blending at the Seattle Harbor Island dock facility was completed in early 2013.



- During 2016, most delivery locations received B5 fuel, with 7 of the 10 locations averaging 4.5 to 5.0 percent biodiesel. Notably, fuel at the Seattle Dock Facility, which accounted for about 38 percent of all fuel delivered this period, averaged 4.8 percent biodiesel while fuel deliveries to Friday Harbor averaged 2.9 percent biodiesel, as about 41 percent of the deliveries were diesel rather than B5.
- On average, the price of B5 for WSF exceeded the price of diesel by 2.4 percent.
- The Governor’s proposed Transportation Budget for the 2017-19 biennium includes funding to conduct a pilot project for using 10 percent biodiesel for fueling ferries.
- WSF did not report any biodiesel-related quality or performance issues during the period.

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LAND SECTOR USE

State agency purchases of biodiesel for use in vehicles and equipment totaled 387,000 gallons in 2016, about the same number of gallons purchased the previous year. Overall state agency biodiesel purchases averaged 12.9 percent of total diesel fuel purchased under the state fuel contract.

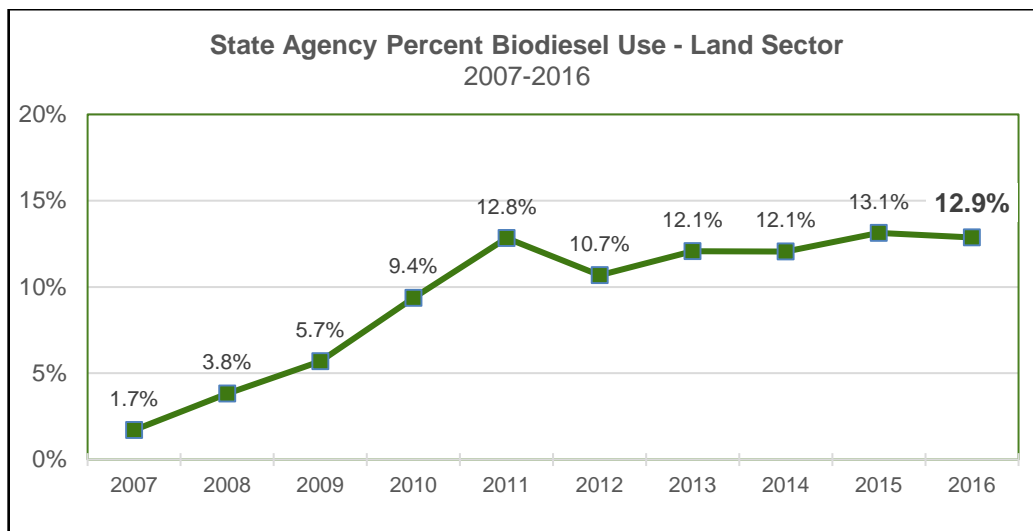
In the land sector, Washington State Department of Transportation (WSDOT) is the largest single purchaser of diesel fuel. In 2016, WSDOT purchased 2.6 million gallons of diesel fuel, accounting for 12 percent of all diesel fuel and 31 percent of all biodiesel purchased by state agencies under the state fuel contract. WSDOT maintains a comprehensive statewide network of fueling stations that serves the majority of the state’s diesel-powered vehicles and equipment. Of the nine other agencies purchasing diesel fuel under the state contract, only four purchased more than 30,000 gallons of bulk fuel during the period – the departments of Corrections, Natural Resources, Fish and Wildlife, and Social and Health Services.

Among the 16 higher education institutions purchasing diesel fuel off the state contract, the University of Washington was the largest purchaser, accounting for 55 percent of the fuel purchased for diesel-powered vehicles and equipment, including all of the biodiesel.

State Agency Biodiesel Purchases (Land Sector): 2016

Agency	Diesel Gallons	Biodiesel Gallons	Total Gallons	Biodiesel %
WSDOT	2,223,895	365,854	2,589,749	14.1%
Other Agencies	293,952	10,411	304,363	3.4%
Higher Education	94,677	10,866	105,543	10.3%
Total	2,612,524	387,130	2,999,654	12.9%

On a percentage basis, the biodiesel content of diesel fuel purchased by state agencies for use in vehicles and equipment has averaged above 10 percent for the last six years. Prior to 2011, a lack of availability in Eastern Washington limited efforts to use biodiesel fuels.



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DETAILS ON WSDOT PURCHASES AND USE

- Overall, WSDOT’s total biodiesel purchases in 2016 were up 1 percent, while total fuel purchases were up 3 percent from 2015. As a result, biodiesel compared to the total diesel volume was down slightly, from 14.5 percent to 14.1 percent.
- WSDOT had 45 fuel sites with biodiesel fuel available in Western Washington. Almost 90 percent of the deliveries to these sites were B20; most of the other deliveries were B10. Vendors experienced delivery issues on 10 days and delivered diesel instead of the ordered biodiesel blend. This impacted at least seven sites. Higher blend fuels or B99 was subsequently delivered to achieve the desired blends.
- WSDOT had 53 fuel sites with biodiesel fuel available in Eastern Washington. Almost half of the deliveries to these sites were B20; another quarter were B10, with the rest of the deliveries primarily B5 to B8. Total biodiesel purchases for Eastern Washington sites reached a new high in 2016 and were 10 percent higher than total biodiesel gallons purchased in 2015.

WSDOT Biodiesel Purchases by Region: 2016				
Region	Diesel Gallons	Biodiesel Gallons	Total Gallons	Biodiesel %
Westside	997,253	201,464	1,198,717	16.8%
Eastside	1,226,642	164,389	1,391,031	11.8%
Statewide Total	2,223,895	365,854	2,589,749	14.1%

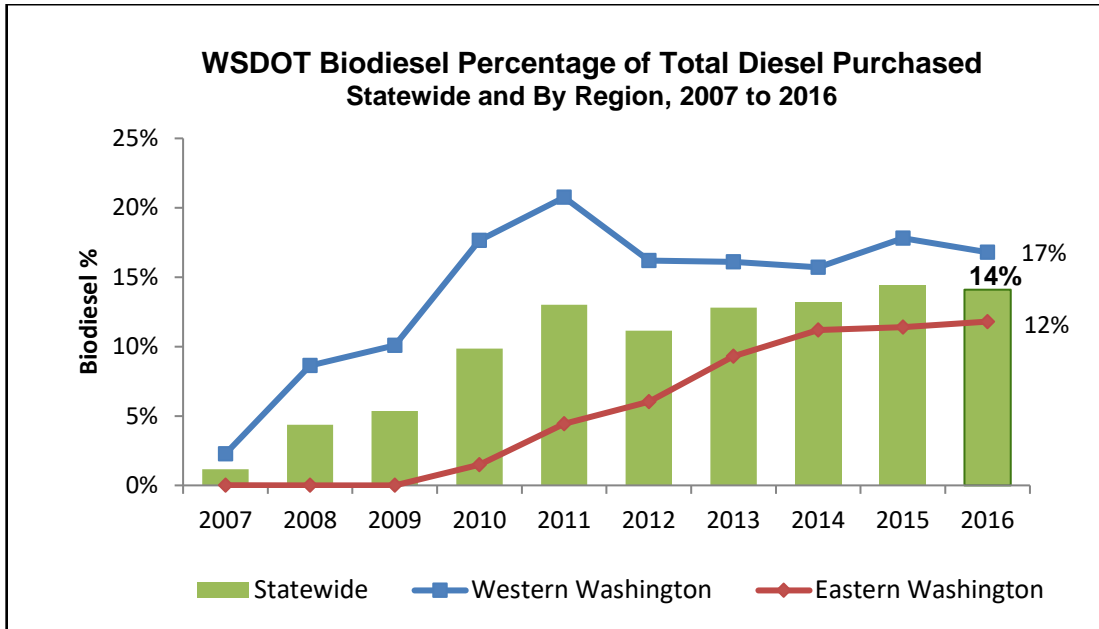
Note: Includes 11 sites where no biodiesel is delivered.

- WSDOT’s experience with biodiesel fuels and testing biodiesel blends up to B90 has demonstrated the importance of: (1) managing biodiesel concentration based on climate and conditions; and (2) limiting biodiesel at sites with low fuel turn-over. Currently, WSDOT has 11 sites that it has determined are not feasible for biodiesel use because they are in areas that experience cold winter temperatures and have low fuel turn-over (no fuel use for periods of four to six months or longer). These 11 sites accounted for 173,967 gallons of the fuel delivered during 2016. If these fuel deliveries are excluded from the data, biodiesel made up 18.5 percent of total fuel purchased in Western Washington and 12.4 percent in Eastern Washington, with a statewide percentage of 15.1 percent.
- WSDOT continued to employ best practices for using biodiesel. Operational issues included: (1) Replacing fuel dispenser filters at twice the previous rate; (2) Using a more porous filter to minimize filter failure; and (3) Cleaning tanks at a higher frequency. WSDOT continues to experience higher rates of fuel injector and filter failure which may be attributable to biodiesel use.
- WSDOT has begun replacing its fuel tanks to meet certification requirements to store biodiesel blends above B20. It replaced fuel tanks at four sites in 2016 and plans to do so at another four sites in 2017. WSDOT does not have plans to use biodiesel blends above B20, the national standard, at this time. WSDOT plans to test using renewable diesel once it becomes available.

WSDOT biodiesel purchases have averaged above 15 percent for seven years in Western

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Washington and topped 10 percent for the past three years in Eastern Washington. Prior to May 2012, some sites in Western Washington provided biodiesel blends of up to B40. Use of these blends was suspended subsequent to a 2012 review of EPA regulations and newly published guidance on materials compatibility. Before 2011, the lack of biodiesel availability from contractors serving Eastern Washington limited WSDOT's efforts to use biodiesel fuels in that region.



FUEL QUALITY

The Washington State Department of Agriculture (WSDA) monitors the quality of diesel and biodiesel used by state agencies as part of the state's Motor Fuel Quality Program. During 2016, WSDA submitted 154 diesel and biodiesel blend fuel samples to a contract 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 134 diesel samples, 18 B20 samples, and two B99 samples. The diesel samples included 37 samples from pumps with the added label "may contain up to 5% biodiesel." Eleven of these samples were found to contain biodiesel, with most testing as B5. One diesel sample without the added label tested as B5.

Test results continued to show problems with diesel fuel meeting flash point specifications. Of the 44 samples that did not meet ASTM specifications, 36 samples (82 percent) 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 the tank management of transport trucks or design flaws with underground storage tank systems. All B20 and B99 fuel samples met ASTM specifications.

WSDA issued 20 notices of correction and two civil penalties to businesses for selling diesel fuels that did not meet specifications. In addition, WSDA issued one notice of correction and one civil penalty for labeling violations.

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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 5% biodiesel.

STATE CONTRACTING

DES's four fuel delivery contracts serve a wide array of functions and customers.

- The state's Bulk Fuel contract (#00311) is in its sixth year and encompasses all regions of the state with five vendors and 16 contracts. The vendors are Associated Petroleum Products (APP), RE Powell, PetroCard, Wilcox & Flegel and Coleman Oil. Provisions of the Bulk Fuel contract related to biodiesel include:
 - Biodiesel can be made from any feedstock so long as it meets ASTM specifications.
 - Contractors must provide biodiesel fuel in any percentage from B1 to B100.
 - Contractors must provide state agencies with biodiesel that is at least 51 percent in-state sourced.
- During 2016, DES became aware of customer interest in and local availability of renewable diesel and other emerging renewable fuel options. In light of this interest and other desired changes, DES determined it would be in the state's best interest to rebid the Bulk Fuel contract. DES plans to maintain contract #00311 until it is superseded by the rebid contract. The contract rebid process is expected to begin early in 2017.
- There are three state fuel delivery contracts that serve Washington State Ferries (WSF):
 - Seattle Dock Facility (#00414): This sole source contract with Maxum Petroleum Co. provides B5 and diesel fuel, and describes how B6 to B20 blends might be added. The contract's current term expires September 4, 2018.
 - Marine Refueling Services-Truck Delivery (#02207): Work to amend this contract, also with Maxum, is underway to provide for pricing and delivery of B10 for a pilot project and to add the 51 percent in-state sourced requirement. DES will be rebidding the contract and plans to extend this contract to the maximum term date of April 27, 2018 to ensure no break in service and adequate time for the rebid.
 - Keller Ferry (#07613): This contract is with Connell Oil. Its current term expires in January 2018.
- Two contracts – the Bulk Fuel and the Seattle Dock Facility – require contractors to provide state agencies with biodiesel of which at least 51 percent was produced in-state or of which at least 51 percent of the feedstock was sourced in-state. To ensure compliance with this contract provision, DES reviews invoices or bills of lading provided by fuel contractors to document the date, quantity, and source of biodiesel purchases. For 2016, DES determined that the biodiesel provided by four of the six vendors under these two contracts met the 51 percent requirement.

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OTHER ACTIVITIES RELATED TO BIODIESEL USE BY STATE AGENCIES

- The interagency Alternative Fuels and Vehicles Technical Advisory Group (AFV-TAG) met six times in 2016, with much of the group's focus on transportation electrification. The group includes the 12 agencies and four universities that collectively represent more than 98 percent of state agency fuel use. The group's objective is to facilitate implementation of the alternative fuel and vehicle rule adopted in May 2013 ([WAC 194-28](#)). With respect to biodiesel, the rule restates existing law calling for agencies to use a minimum of 20 percent biodiesel on an annualized basis.
- The Department of Commerce filed a revised draft rule regarding similar alternative fuel and vehicle procurement requirements for local governments in May 2016, and held a public hearing on the proposed rule in July. The rule was adopted in October ([WAC 94-129](#)) and goes into effect June 1, 2018. AFV-TAG membership is expanding to include the 65 local governments that meet the threshold for annual reporting.
- Prices for B99 biodiesel fuel dropped to their lowest levels in state contract history in 2016. The average of the daily prices posted by DES for contract #00311 for B99 for the last six months of 2016 was \$1.60 per gallon. The average for ULSD #2 clear for that same period was \$1.63.

RECOMMENDATIONS/ACTION ITEMS

- Continue preparatory work and planning for a year-long pilot test of B10 with one ferry.
- Add the 51 percent in-state sourced biodiesel requirement to the Marine Refueling Services contract. Take necessary steps to rebid the contract in 2017.
- As part of the planned rebid of the Bulk Fuel Contract, specify that all diesel purchases are, at a minimum, B5, where feasible.
- Address changes in the biodiesel market and work to provide competitively-priced biodiesel and other alternative fuel products that keep current with agency needs and the marketplace.
- Use the Alternative Fuels and Vehicles Technical Advisory Group to integrate efforts to increase the use of biodiesel and other alternative fuels by state and local government.
- Continue fuel quality monitoring to ensure standards are met.

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