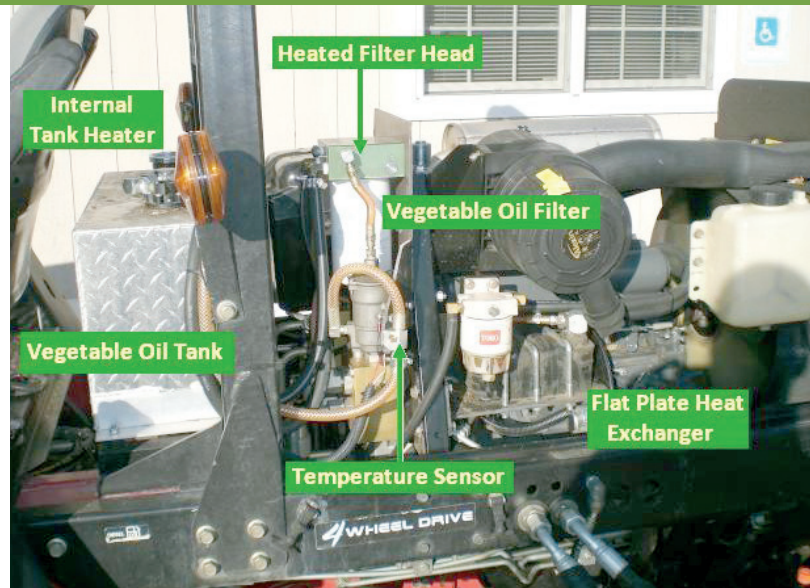


FEATURE II

Bryan Stromme, *Billy Casper Golf*

Waste Vegetable Oil as a Fuel Source for a Golf Course Rough Mower



Jason Wolf, Superintendent at Whisper Creek Golf Club, Huntley, Illinois, a Billy Casper Golf facility, operates a diesel-engine rough mower that burns waste vegetable oil (WVO) as an alternative fuel source. Doug Waldron, Equipment Technician, is responsible for installing and maintaining the conversion kit in the rough unit. Reduced environmental impact and lower fuel costs are the primary project benefits.

Restaurants with deep fat fryers produce WVO. Ordinarily they have a disposal vendor, who charges to haul the waste oil. The Whisper Creek team harvests 55 gallons of WVO each week from the restaurant adjacent to the clubhouse, at no charge to either party. WVO from any kitchen contains water and debris (like chicken parts!). The team must remove this debris before it can be used as engine fuel. An electric-powered centrifuge is used to remove the contaminants.



Doug Waldron and Jason Wolf

The team stores the WVO in 55-gallon drums at the maintenance shop for immediate use as an alternative fuel.

Whisper Creek's 58 Horsepower, 2001 Toro 4500-Diesel mower now operates on WVO. A simple conversion kit allows the alternative fuel source to power the unit. The mower starts each time using diesel fuel. The WVO heats to 160-180 degrees Fahrenheit via an internal tank heater. A dashboard switch allows the operator to change the fuel supply from diesel to 100% WVO. A heated oil filter and

inline, flat-plate heat exchanger are used to maintain temperature prior to injecting the WVO into the engine's cylinders. The operator switches the fuel supply back to diesel to purge the entire system prior to shut down.

The conversion kit and centrifuge filter/pump cost \$1,800. Installation of the conversion kit and building the transport trailer took 20-24 labor hours. Driving to the restaurant, extracting the WVO

from the kitchen holding tank, processing it through the centrifuge filter, and pumping into 55-gallon storage tanks takes approximately one hour.

Data collection at Whisper Creek reveals that this rough mower burns diesel and WVO at equal rates of one and a half gallons of fuel per hour. This unit shows no horsepower or operation variance while burning WVO.

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400 hours (average annual usage at Whisper Creek)
X 1.5 Gallons per Hour
X \$2.75 estimated diesel cost =
\$1,650 per year in diesel fuel savings by using WVO.

Break Even Point =
Early in YEAR TWO of operation under these conditions.

Return on Investment (over 5,000 usage hours) = 101 %

This conversion is a great accomplishment for the Whisper Creek team both within Billy Casper Golf and the golf industry. They are protecting the environment by reducing diesel usage and saving the owners money each time the unit mows. This project is a winner because it is simple to convert, uses a safe alternative fuel that is cheap and easy to store, and reduces environmental impact. Restaurant revenues might even increase once golfers at Whisper Creek catch the great new smell of the mower's emissions. -OC



Vegetable oil transport trailer

Vegetable oil powered rough unit in action.

