Recently, substantial increases in fuel prices have hit rural communities hard. Residents in these communities often have limited access to public transportation and must travel long distances to access shopping and medical care. Recent energy price increases have encouraged rural communities to evaluate energy conserving technologies and alternative energy production opportunities. Distributed small scale biodiesel production has been touted as an environmentally-friendly domestically-supplied energy source by many popular press articles which have received considerable interest. Rural communities now need the tools necessary to evaluate the viability of such projects.

One such opportunity is the production of biodiesel. Biodiesel is fuel produced by a chemical reaction between a vegetable oil, an alcohol and a catalyst. Producing a gallon of biodiesel requires approximately one gallon of vegetable oil, 0.12 gallons of methanol and a small amount of catalyst. The biodiesel produced can be used in diesel engines without modification and therefore can be used by current diesel engine owners.

The cost of vegetable oil accounts for over 80% of the total cost of producing biodiesel. Obtaining an affordable source of oil, therefore, is critical for financially viable production. Oil can be obtained by purchasing it as virgin or recycled oil. A biodiesel producer can also process oilseeds as part of the larger biodiesel process to obtain oil. Recycled oil is often the cheapest option but may only be available in limited quantities, especially in rural areas.

Availability of vegetable oil is directly linked to the profitability of oilseed crops to farmers. In the U.S., biodiesel production has mainly utilized soybean oil although oils from canola, safflower, sunflower, flax, camelina and others are also technically viable. Recently, however, from a financial perspective oilseed crops, excluding soybeans, have had difficulty competing with other crops such as wheat, barley and corn for farm land. In 2008, for example, U.S. planted acres of canola, flax, mustard, rapeseed, safflower and sunflower were all less than in 2003.

Mechanical extraction from oilseeds requires relatively little capital investment, has few environmental concerns and is able to recover between 60 and 80 percent of oil contained in raw feedstocks. For example, if a processor starts with 100 pounds of canola (40 percent oil content) then approximately 30 pounds of oil will be recovered if the equipment recovers 75 percent of the oil. About 65 pounds of meal will also be produced and 5 pounds of material will be lost due to a reduction in moisture content.

Biodiesel production is relatively simple in many respects. It can be produced in almost any quantity, from laboratory demonstration processes to millions of gallons per year. Biodiesel for personal use is commonly produced in 20 to 200 gallon batches. Small scale production requires more labor and methanol (because excess methanol often cannot be recovered and reused as is common for larger facilities) than larger facilities. Small scale equipment is relatively inexpensive and can be operated with minimal training. Even small commercial facilities are usually able to recover and reuse excess methanol but these facilities still have higher labor costs than larger facilities.

Any commercial biodiesel production must satisfy fuel quality standards. Biodiesel fuel quality standards are defined by ASTM 6751. Commercial producers need a fuel quality testing program to ensure their biodiesel meets these standards. Testing is costly and likely precludes commercial production of small amounts of fuel. For example; a $1,400 test completed on a 200 gallon batch of biodiesel adds $7 to the cost of each gallon but the same test performed on 2,000 gallon batch adds only $0.70 to each gallon. An appropriately designed quality assurance program is part of all successful biodiesel business plans.

Byproducts are another important factor in biodiesel production. Depending on the oilseed and the type of processing, between 65 and 85 percent of the raw seed will be turned into protein meal. Protein meal is generally used for livestock feed. Each 1,000 gallons of biodiesel produced also produces 100 to 150 gallons of glycerin, which can be refined for use in cosmetics or other applications. Small scale producers often have difficulty finding markets for glycerin. The availability of markets for these byproducts may help determine the size of a production facility.

Another factor is the stability of government subsidies. Currently numerous subsidies exist for biodiesel production, including a $1 per gallon blenders tax credit. Many are scheduled to expire between 2010 and 2014. Any business that receives approximately 20% of total revenue from some type of government program faces significant risk that program funding may be reduced or eliminated.

Biodiesel may become a real option for local producers who are willing to invest a small amount of capital and labor. More information is available at www.ampc.montana.edu/energyinformation.html. The material for this article came from Joel

Schumacher, MSU Extension Economics Associate Specialist. Contact Mark Major at the Teton County Extension office at (406)466-2491 or mbmajor@montana.edu for more information.