Innovative Natural Resource Solutions LLC
Phone 207-772-5440, www.inrsllc.com

Managing Diesel Risk for Biomass Users

Large consumers of biomass and other low-value forest products are exposed to significant risk as a result of volatile diesel prices. Diesel is used in every step of the biomass fuel production process – harvesting, skidding, chipping, and transport from the woods to the plant. As diesel prices climb, this can quickly impact biomass fuel costs, and make energy projects uneconomic. This has become increasingly true over the past few years, as pricing for natural gas (which often drives electricity prices) and oil have been uncoupled.

Using existing over-the-counter markets, Innovative Natural Resource Solutions LLC (INRS) has developed a way to manage this risk, allowing biomass project owners to mitigate one of the biggest unknowns – the cost of diesel, and its' impact on biomass fuel prices. The strategy is summarized below. For more information, or to discuss ways this can be customized to meet your needs, please contact INRS' Eric Kingsley at kingsley@inrsllc.com, 207-772-5440 (office), or 207-233-9910 (cell).

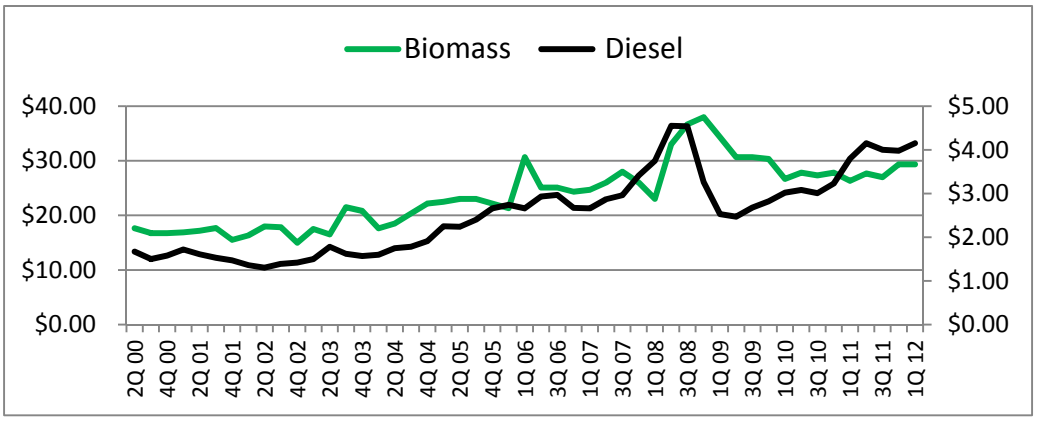
Diesel as a Component of Biomass

Diesel fuel is used in every step of the biomass production process - how much is the question. Using fuel consumption data from a number of loggers involved in the production of biomass fuel – using a range of equipment types – INRS has developed a calculator to help estimate the amount of diesel used in the production of a single ton of biomass fuel. By knowing just a few important variables – including average trucking distance biomass fuel travels and the payload a truck carries – we can estimate the amount of diesel fuel used. A summary display of the INRS diesel calculator, *with calculations and estimates blocked*, is shown below.

Miles (one way)		75	variable	insert distance from logging site to market, road miles
Diesel ($ / gallon)	$	4.20	variable	insert current price of diesel
Tons per Load (tons)		30	variable	insert assumed payload per delivery
Road Gallons			calculation	gallons used for transport of load of chips to market (round trip)
Road Diesel Cost	$		calculation	dollars of diesel to transport load of chips to and from market
Road Diesel $ / ton	$		calculation	dollars used per ton of wood chips to transport biomass fuel
Chipping ($/ton)	$		calculation	dollars of diesel fuel used to chip a single ton of biomass fuel
Landing costs ($/ton)	$		calculation	dollars of diesel used to handle a tons of biomass at a log landing
In-woods ($/ton)	$		calculation	dollars of diesel used to fell and skid a ton of biomass
Total Woods Cost ($/ton)	$		calculation	dollars of diesel used - all in woods operations for biomass fuel
Total Diesel Cost ($/ton)	$		estimate	cost of diesel per ton of fuel, delivered
Total Diesel (gallon/ton)			estimate	gallons of diesel used in production of a green tons of chips

Generally, the amount of diesel varies between 2.0 and 3.0 gallons per green ton. Distance from forest to plant, payload, equipment type and other factors all influence this – and getting it right is important. While it might be a small rounding error on one green ton of biomass fuel, it can be substantial when you are buying biomass fuel by the truckloads.

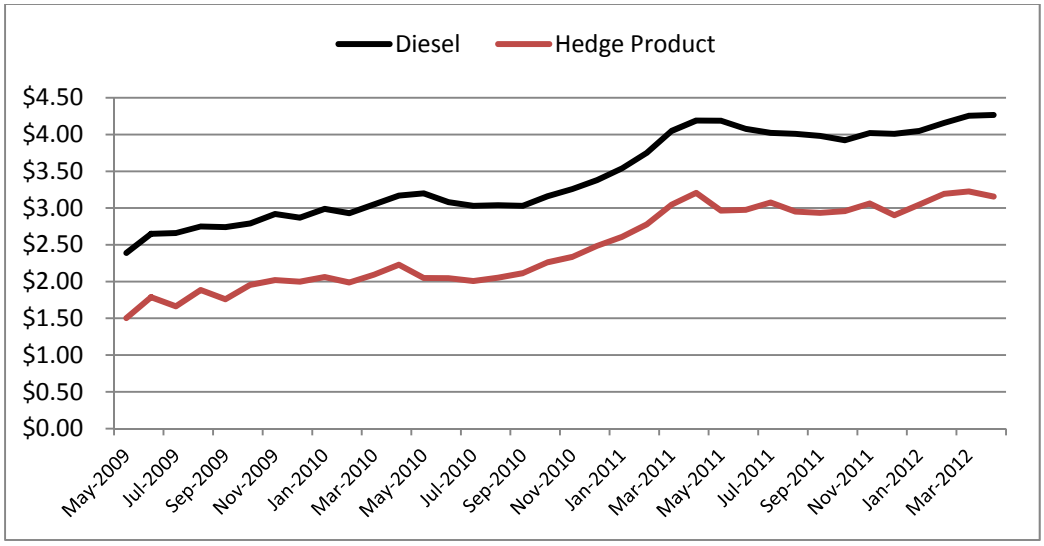
While diesel isn't the only input to biomass fuel costs, it is the biggest driver of change in biomass prices. Using quarterly data INRS has compiled in New England, the figure below shows the average biomass price per green ton (in green, using the left axis) and average diesel price per gallon (in black, using the right axis). There's a strong relationship – the two correlate at the 0.799 level since 2000. Biomass prices vary by region, but INRS' experience across the United States shows that this biomass-diesel price relationship is relatively consistent wherever forest-derived biomass is used.



Managing the Risk in Biomass Prices

Once you know how much diesel is used to manufacture and transport a green ton of biomass fuel, and you know the volume of fuel you expect to purchase in a given month, you can manage the risk associated with diesel.

INRS has identified a heavily traded over-the-counter product that is closely correlated with diesel fuel prices (the two correlate at the 0.99 level – almost perfect correlation.) By purchasing options in this market, a large-scale consumer of biomass fuel can mitigate the risk of upward price pressure on diesel, and the resulting increase in biomass fuel prices.



By purchasing the appropriate options on this hedge product, a biomass user can cost-effectively manage against price increase risk. Using price quotes from May 2012, INRS has developed the following example to illustrate how a biomass user can mitigate against diesel price risk, and the associated costs.

Example of Managing Diesel Risk

A 16 MW plant using 15,000 green tons a month has a hypothetical diesel exposure of 2.7 gallons of diesel per green ton delivered, for a total diesel risk of 40,500 gallons per month. The near month (June) options for the hedge product at a correlated diesel price of $3.83 per gallon can be purchased for $4,725 plus a $70 round-trip transaction fee (buy and sell). This equates to a transaction cost of $0.32 per green ton.

For this modest outlay, the biomass plant is protected against rises in diesel price – if the diesel price rises, the plant is able to sell the option for a profit, which can be used to offset the associated increase in diesel prices. If diesel prices drop, the plant benefits by not exercising the option but enjoying the associated price reduction in biomass fuel prices. The plant does incur a transaction cost of $0.32 per green ton, but this is a small premium to pay for the associated price protection the plant enjoys.

In this example, if the average price of diesel were to rise to $4.25 per gallon in the near month, the facility would expect to see an increase in biomass fuel cost of $17,010 ($1.13 per green ton). At the same time, the value of the option would be expected to increase by $17,640, essentially offsetting the increase in diesel cost.

Similarly, if the average diesel price were to drop to $3.30 per gallon in the near month, the facility would expect to see a decrease in biomass fuel costs of $21,465 ($1.43 per green ton). The value of the option would drop to $0.00, so the facility would benefit by enjoying the lower biomass fuel cost.

Options on the hedge are available up to 5 years out. Each month is priced differently, at current market levels, so a facility will need to determine its risk tolerance and the per-ton premium it can pay to mitigate diesel risk. By using the options market, plants can significantly limit their exposure to diesel risk – and thus biomass fuel price risk – and help secure fuel prices that make a project economic.

Developing a Diesel Risk Mitigation Strategy for Your Project

By using existing markets, large-scale biomass users can manage one of the greatest price risks a facility faces – volatility of diesel fuel prices. To discuss your operating or planned biomass project, and explore how INRS can customize a strategy that allows you to appropriately manage diesel risk, please call Eric Kingsley at 207-772-5440 (office), 207-233-9910 (mobile), or email kingsley@inrsllc.com. We can help you understand your exposure to diesel, plan ways to manage that risk, and identify brokerages that can quickly execute on your strategy.