

# Issues Surrounding a B5 State Mandate in Missouri

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### Diesel Consumption and Soy-Diesel Production

Missouri currently has 47 million gallons of bio-diesel production capacity with an additional 78 million gallons of capacity under construction, to be completed by the end of 2007, totaling 125 million gallons of capacity. It is worth noting that while existing capacity is located in central and north-east Missouri, capacity under construction is spread throughout the state including the southwest and Bootheel. Missouri's diesel consumption for use in transportation is estimated at 1,277 million gallons in 2007 and may grow to 1,482 million gallons by 2017 [1]. Setting aside issues of demand impacts from a mandate, given this level of demand, a B5 (5% by volume bio-diesel inclusion rate) mandate suggests bio-diesel consumption would be 60.9 million gallons in 2007, growing to 74.1 gallons of consumption in 2017. It is therefore likely that by mid-2007, bio-diesel capacity in the state will be well in excess of 5% of diesel transportation demand as indicated in Table 1.

Table 1: Bio-diesel Capacity and State level Diesel Demand, 2007

	Million Gallons
Current Biodiesel Capacity <sup>1</sup>	47.0
Biodiesel Capacity Under Construction <sup>1</sup>	78.0
Total Biodiesel Capacity by Dec 31, 2007	125.0
MO Diesel Consumption for Transportation <sup>2</sup>	1217.7
5% of Consumption, B5 mandate	60.9
Capacity in excess of 5% mandate	64.1

<sup>1</sup> National Biodiesel Board

<sup>2</sup> Energy Information Administration

### Soy-Diesel Profitability

A matrix of soy-diesel profitability is presented in Table 2 to investigate the impacts of a counter-cyclical payment to keep bio-diesel production facilities from being "upside down" from high soybean oil prices and low bio-diesel prices. If a payment were created which offsets negative returns, one could approximate costs of the program under different soybean oil and bio-diesel prices. For example, consider two possible scenarios from Table 2:

Scenario 1) \$2.80 per gallon bio-diesel price and \$0.30 soybean oil prices for a payment of \$0.06 gallon and,

Scenario 2) \$2.70 per gallon bio-diesel price and \$0.34 soybean oil prices for a payment of \$0.47 a gallon.

These two scenarios represent possible soybean oil prices and bio-diesel prices from the FAPRI stochastic model, but are not necessarily the most likely outcomes. Additional probability details can be provided after the release of the FAPRI stochastic baseline in March.

Table 2: Soy-Diesel Refinery Profitability Matrix

		Soybean Oil Prices Per Pound								
		0.22	0.24	0.26	0.28	0.3	0.32	0.34	0.36	0.38
Biodiesel Price Per Gallon	2.20	-0.044	-0.198	-0.352	-0.506	-0.660	-0.814	-0.968	-1.122	-1.276
	2.30	0.056	-0.098	-0.252	-0.406	-0.560	-0.714	-0.868	-1.022	-1.176
	2.40	0.156	0.002	-0.152	-0.306	-0.460	-0.614	-0.768	-0.922	-1.076
	2.50	0.256	0.102	-0.052	-0.206	-0.360	-0.514	-0.668	-0.822	-0.976
	2.60	0.356	0.202	0.048	-0.106	-0.260	-0.414	-0.568	-0.722	-0.876
	2.70	0.456	0.302	0.148	-0.006	-0.160	-0.314	-0.468	-0.622	-0.776
	2.80	0.556	0.402	0.248	0.094	-0.060	-0.214	-0.368	-0.522	-0.676
	2.90	0.656	0.502	0.348	0.194	0.040	-0.114	-0.268	-0.422	-0.576
	3.00	0.756	0.602	0.448	0.294	0.140	-0.014	-0.168	-0.322	-0.476
	3.10	0.856	0.702	0.548	0.394	0.240	0.086	-0.068	-0.222	-0.376
	3.20	0.956	0.802	0.648	0.494	0.340	0.186	0.032	-0.122	-0.276
	3.30	1.056	0.902	0.748	0.594	0.440	0.286	0.132	-0.022	-0.176
	3.40	1.156	1.002	0.848	0.694	0.540	0.386	0.232	0.078	-0.076
	3.50	1.256	1.102	0.948	0.794	0.640	0.486	0.332	0.178	0.024
	3.60	1.356	1.202	1.048	0.894	0.740	0.586	0.432	0.278	0.124

Source: FAPRI Estimates

Based on the two scenarios, one can calculate the potential payments under various alternative ways of implementing the program assuming that benefits are directed at bio-diesel plants in Missouri. Three of many alternative methods for implementing the program are discussed here:

- 1) countercyclical payments on all production,
- 2) fixed funding level divided by the gallons produced and,
- 3) paying a countercyclical payment only on the amount of production required to meet the mandate.

#### Alternative 1: Countercyclical Payments on all Production

If the payments are based on Missouri's total bio-diesel productive capacity of 125 million gallons, estimated outlays would total \$7.5 million and \$58.5 million under outcome 1 and 2, respectively. It is likely that in a period when payments are being made, productive capacity would not be fully utilized and thus reducing outlays slightly below this estimate since not all bio-diesel plants have the same cost structure. This program allows for all of Missouri's soy-diesel production to be covered by a countercyclical payment, but exposes the state treasury to large potential outlays. Expansion of capacity beyond the expected January 1, 2008 level would raise potential outlays.

#### Alternative 2: Fixed Funding Level

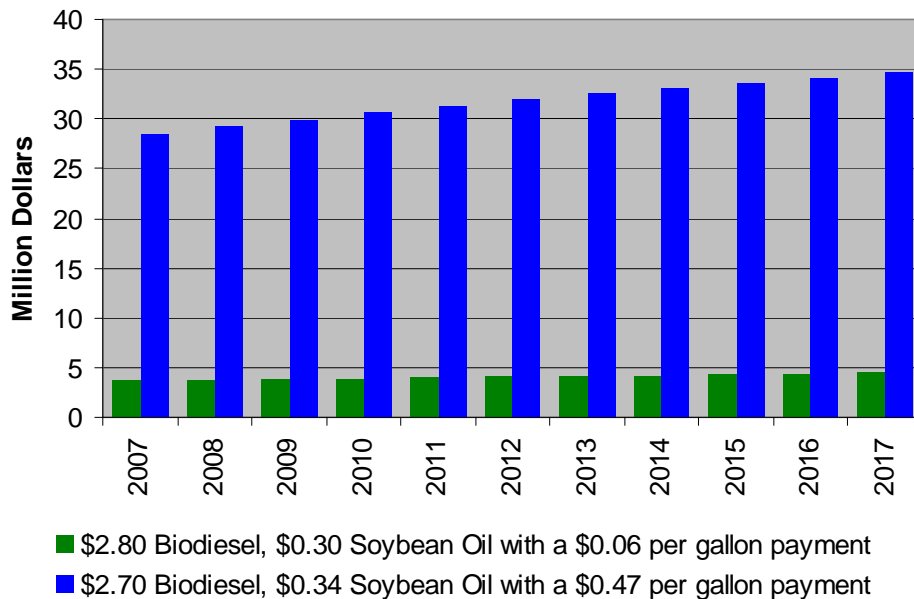
Maximum outlays could be capped at a fixed dollar amount and payment rates per gallon reduced when potential outlays would exceed this amount (similar to the Bio-fuels program administered by the Farm Service Agency that expired in 2006). Without considering state level demand it is possible and even likely, given our capacity relative

to a B5 mandate, that payments would be made on the production of bio-diesel that would not be consumed within the state. This program limits the amount of countercyclical support since current and planned soy-diesel plant capacity will likely exceed a B5 mandate by more than 50 percent, limiting state treasury exposure.

**Alternative 3: Payments limited to Mandate Quantities**

Payments could be made based upon the implied quantity from a B5 mandate by either limiting payments to bio-diesel producers for a set quantity or making payments to Missouri based blenders. Using the 2007 estimated Missouri soy-diesel demand of 60.9 million gallons, under scenarios 1 and 2, state outlays would be \$3.6 million and \$28.5 million, respectively. Figure 1 illustrates the expansion in state outlays with the expected growth in state diesel consumption. By limiting payments to 5% of Missouri diesel transportation demand and making payments to soy-diesel producers, there is the additional concern of allocating payments among producers. The quantity on which payments are made can be made either by allocating each producer a share of state demand or a first come first serve claim on the total quantity covered, both of which are potentially complicated and market distorting.

Figure 1: State Demand Based Payment Outlays, Under Alternative Input and Output Prices



**A B5 Mandate and Out-of-State Competition**

Impacts under a B5 mandate which requires all diesel used for transportation in the state to contain 5% bio-diesel by the end of 2007, are likely to be limited and/or localized to areas of favorable bio-diesel basis. While a mandate will raise demand in the state, it does not determine who will service the demand or the profitability of Missouri producers. To the extent that local capacity does not exceed local mandated demand, bio-diesel producers may see benefits from the mandate in greater demand and prices. In

regions where capacity is in excess of mandated demand, the marginal productive capacity still sets the price. If the entirety of B5 bio-diesel demand was met by Missouri producers, this would still account for less than 50% of the productive capacity expected to be online by December 31, 2007. With national capacity operating at less than 40% currently, the mandate may help increase capacity utilization in the state and improve potential profitability in the absence of bio-diesel inflows into the state. However, neighboring states of Iowa and Illinois currently have 191.5 million gallons of capacity and Iowa, Illinois, and Nebraska have 270 million gallons of capacity under construction. With the excess capacity that will be generated, without a broader mandate, bio-diesel prices would likely not be significantly supported by a B5 mandate in Missouri alone, although increased local demand may reduce transportation costs associated with shipping production out of state improving local basis for some producers.

[1] The Energy Information Administration provides state level distillate demand for 2004 and future demand is then estimated by indexing demand to the EIA forecasts for national demand.

## Summary Points

### **Two possible profitability outcomes:**

**Scenario 1)** \$2.80 per gallon bio-diesel price and \$0.30 soybean oil prices for a payment of \$0.06 gallon and,

**Scenario 2)** \$2.70 per gallon bio-diesel price and \$0.34 soybean oil prices for a payment of \$0.47 a gallon.

### **Alternative 1: Countercyclical Payments on all Production**

- Countercyclical payment on all production (capacity of 125 million gallons by end of 2007:
  - Scenario 1) cost of \$7.5 million
  - Scenario 2) cost of \$58.5 million
- Open-ended as to costs to state treasury.
- Does not tie support to quantities used in the state (potential to make payments on biodiesel sent to out of state markets).

### **Alternative 2: Fixed Funding Level**

- Set the maximum amount of funding and when payments on quantities exceed this amount, scale back the payment rate to reach the maximum outlay level.
- Countercyclical payment on all production.
  - Outlays depend upon where the maximum is set.
- Limits costs to state treasury to a fixed outlay.
- Does not tie support to quantities used in the state (potential to make payments on biodiesel sent to out of state markets).

### **Alternative 3: Payments limited to Mandate Quantities**

- Countercyclical payment limited to 5% of transportation diesel demand or 60.9 million gallons in 2007.
- Open-ended as to costs to state treasury.
- Problem of how to allocate covered quantities to producers.
  - By share of capacity.
  - By first come first served up to the sale of mandated quantities.
  - These methods are likely to be further market distorting.
- Countercyclical payments on 5%:
  - Scenario 1) cost of \$3.6 million in 2007
  - Scenario 2) cost of \$28.5 million in 2007

### **A B5 Mandate and Out-of-State Competition**

- No direct outlay by state treasury.
- With Capacity more than twice that needed for mandate, it is not clear the size of the benefit to producers.
- May improve returns by improving local basis (reducing the distance biodiesel is shipped).
- Does not ensure that mandate will be met by Missouri production (but again, with 2 times the needed capacity, any inflows will be regional).