

## Microwave-assisted Pyrolysis - Biodiesel Distillate "Bottoms" Recovery System

Basis:	10	-mgpy Biodiesel Plant =	92%	Distillate Yield
Bottoms:	8%	Bottoms yield		
Annual Bottoms =	869,565	gallons per year =	103.52	Gallons/hour
Bottoms Recovery =	85%	yield from microwave pyrolysis		
Bottoms Recovery =	739,130	gallons per year from microwave pyrolysis		

### **Estimated Economic value of Distillation Bottoms :**

869,565	Gal/Yr x	\$1.10	/ Gal =	\$956,522	per Year
		(\$0.15	/ Lb )		

### **Estimated Economic value of Recovered Bottoms :**

739,130	Gal/Yr x	\$3.50	/gal =	\$2,586,957	per Year
		(\$0.477	/ Lb )		

**Gross Economic Value = \$1,630,435 per Year**

### Net Operating Costs:

#### Pilot Unit: Microwave Pyrolysis

	31.5	KW for	80	Kg/hour
	31.5	KW for	176.368	Lbs/hour
			103.52	Gals/hour
<b><u>Scale up to 10 mmgy =</u></b>	<b>135.7</b>	<b>KW for</b>	<b>759.8</b>	<b>Lbs/hour</b>

Annual kWhrs =	<b>1,139,958</b>	<b>kwhrs/year</b>
cost per kwhr =	<b>\$0.15</b>	<b>\$/kwhr</b>
Annual Cost =	<b>\$170,994</b>	<b>\$/year</b>

**Net Economic Value = \$1,459,441 per Year**

### Estimated Capital Cost

	<u>\$\$</u>	<u>%</u>
Process Equipment:	\$928,000	29.0%
Piping	\$512,000	16.0%
Electrical	\$256,000	8.0%
Instruments	\$224,000	7.0%
Thermal Insulation	\$192,000	6.0%
Structures, foundations	\$288,000	9.0%
Engineering Design	\$480,000	15.0%
Construction Management	\$320,000	10.0%

**Total Project Cost = \$3,200,000 100.0%**

**Simple Payback Period = 2.193 Years**  
45.61% % ROI