

THE RENDERING INDUSTRY PRESPECTIVE BIODIESIL

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What is Rendering?

Rendering 101

Volumes Rendered

Products of Production

Rendered Product Usage

Animal Production Usage

Biofuel Production with Fats

Biodiesel Production 100

Biodiesel by-products

Glycerin for feed use

Feed vs. Fuel – What Now?

What is Rendering?

Rendering is Cooking and Drying.

Rendering is Recycling.

Rendering is Essential to Public Health.



Rendering is Cooking and Drying



- Continuous flow or batch
- Steam cookers
- 245° to 290° F. for 40 to 90 minutes
- Inactivation of bacteria, viruses, protozoa, and parasitic organisms.

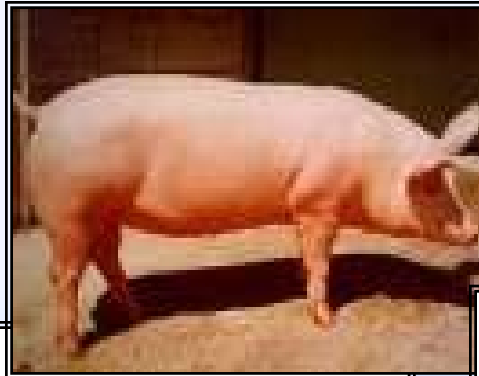
The Rendering Industry (U.S. and Canada)

- 273 Facilities in the U.S. and 29 in Canada
- \$3.5 billion annual revenue
- 60 billion lb raw material each year
- 162 million lb raw material each day



U.S. Animal Agriculture Annual Production

- 35 million cattle (49% of live wt. not used for human food)
- 100 million hogs (44% not used for human food)
- 8 billion chickens (37% not used for human food)
- 280 million turkeys (36% not used for human food)



Raw Materials

- **Offal**
- **Bones and fat**
- **Blood**
- **Animals dead on arrival, in transit or on farms**
- **Restaurant grease**
- **Feathers**



“Fallen” Animals (Died On Farms)

1.91 million adult cattle/yr

2.92 million calves/yr

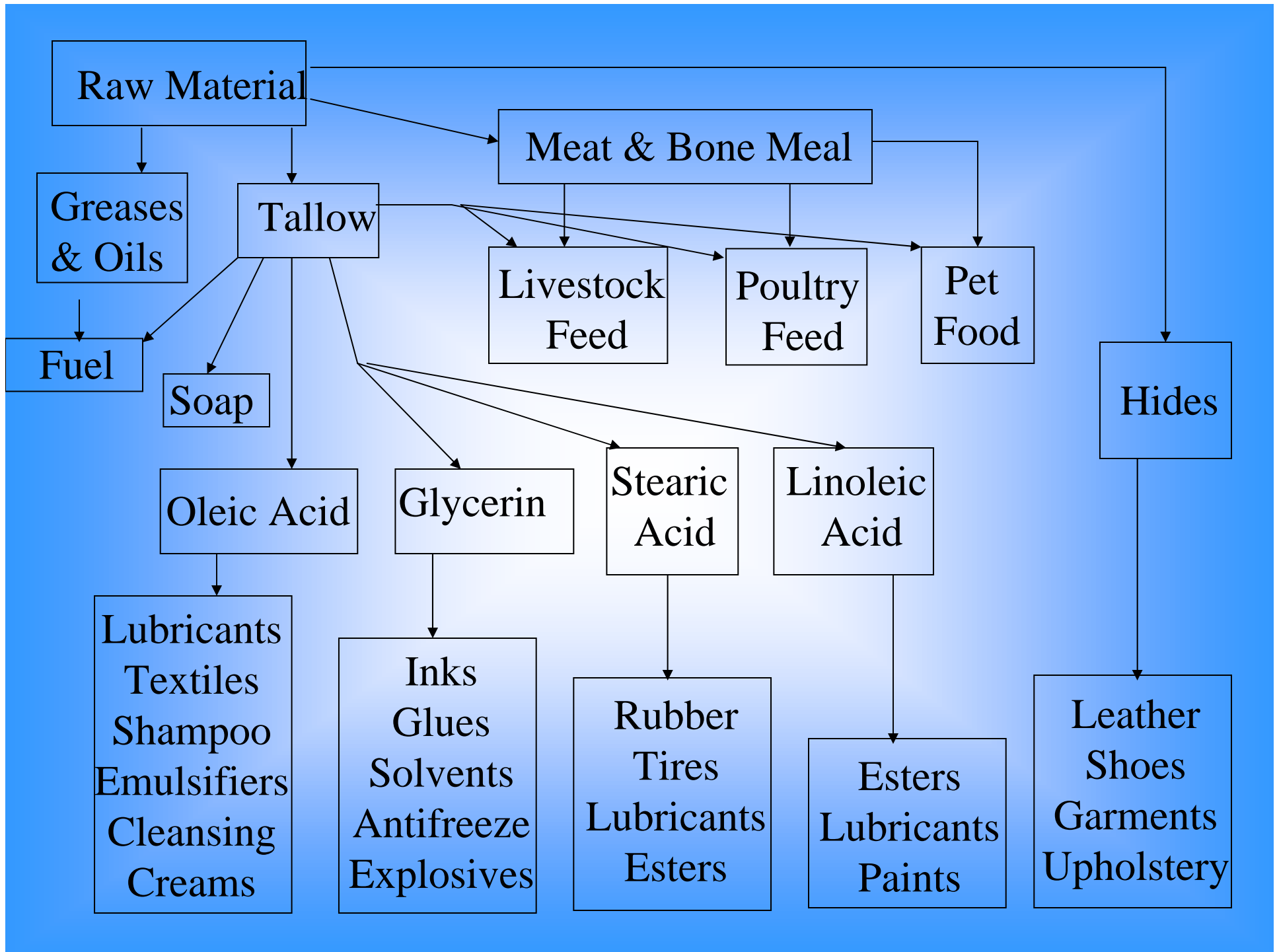
18 million swine/yr

350 million lb poultry/yr

Total = 4.4 billion lb/yr

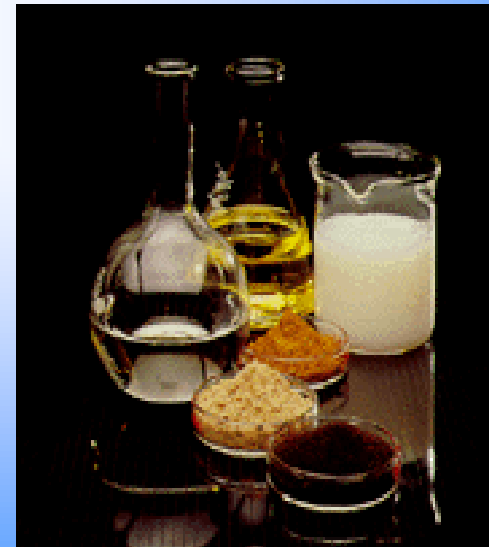
Approx. 2.2 billion lb/yr (50%) is rendered.

Approx. 4.5% of rendered products come from fallen animals.



The U.S. industry converts more than 54 billion pounds of animal by-products into usable commodities annually.

- Highly valued protein supplements for livestock, poultry, pets
- Tallow for the manufacture of fatty acids and as a source of energy in feed rations.



Tallows and Greases

• Edible Tallow	1.6 billion lb/yr
• Inedible Tallow	3.9
• Lard and Grease	1.3
• Yellow Grease	2.6
• <u>Poultry Fat</u>	<u>2.2</u>
• Total	11.6 billion lb/yr



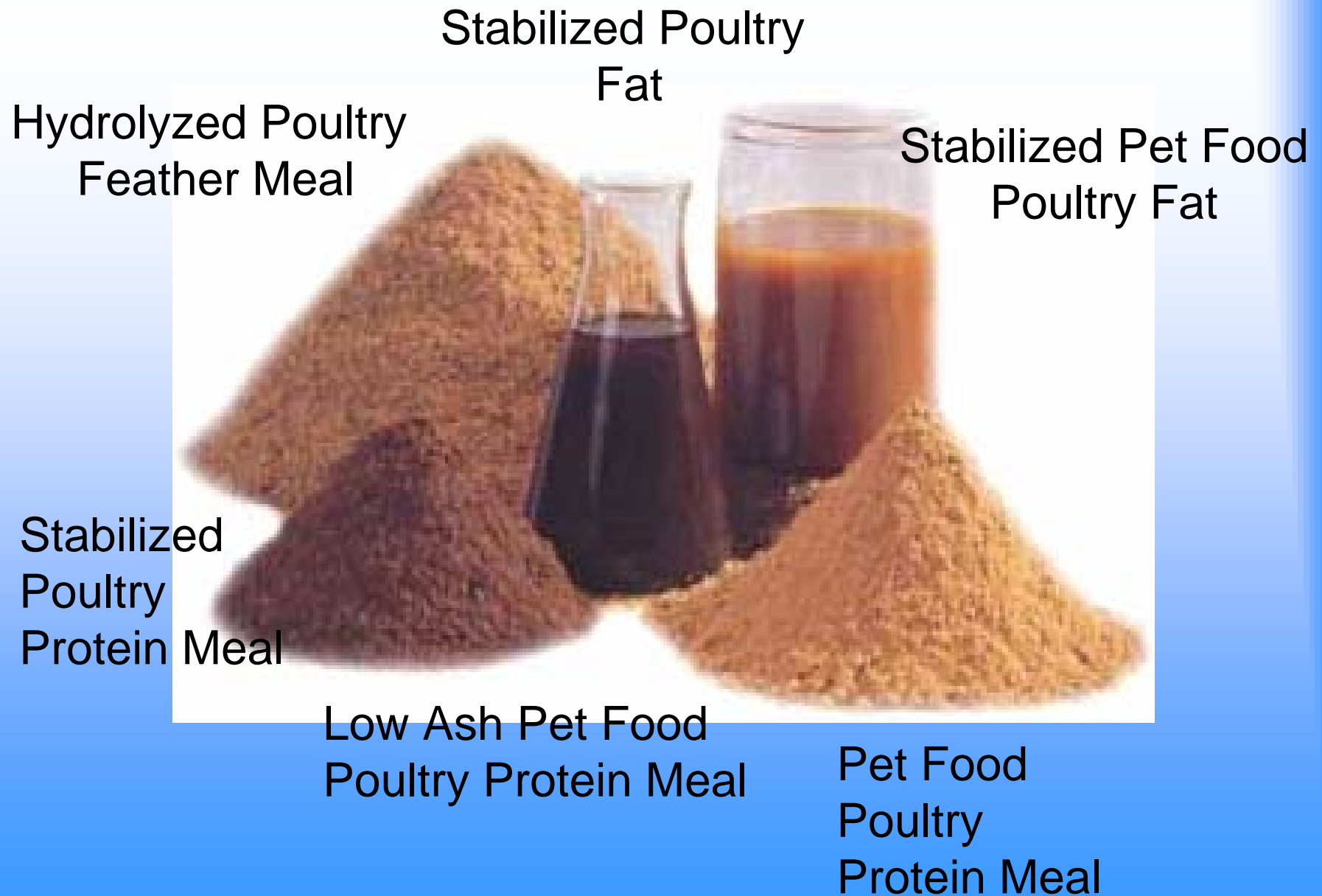
Protein Meals – 9.2 billion lb/yr

125 AAFCO-defined animal by-products



- Meat Meal
- Meat and Bone Meal (can be species specific)
- Blood Meal
(Flash/Spray/Ring/Batch Dried)
 - Can be whole or only hemoglobin
- Poultry By-Product Meal
- Poultry Meal
- Hydrolyzed Poultry Feather Meal

Examples of a Few Finished Products



Total U.S. Lipid Production

• Edible Tallow	1.6 billion lb/yr	
• Inedible Tallow	3.9	
• Lard and Grease	1.3	
• Yellow Grease	2.6	
• <u>Poultry Fat</u>	<u>2.2</u>	
Subtotal		11.6 billion lb./yr.
• U.S. Vegetable Oil Production (<u>Soybean, corn, canola, etc.</u>)		22.4 billion lbs./yr.
Grand Total Lipid Production		34 billion lbs./yr.

WHAT ARE THEY?

- **Edible Tallow**
- **Edible Lard**
- **Tallow, Bleachable Fancy Tallow (BFT)**
- **Choice White Grease (CW)**
- **Poultry Fat (PF)**
- **Yellow Grease (YG)**
- **Brown Grease**
- **Listed in order of highest quality and price to lowest.**

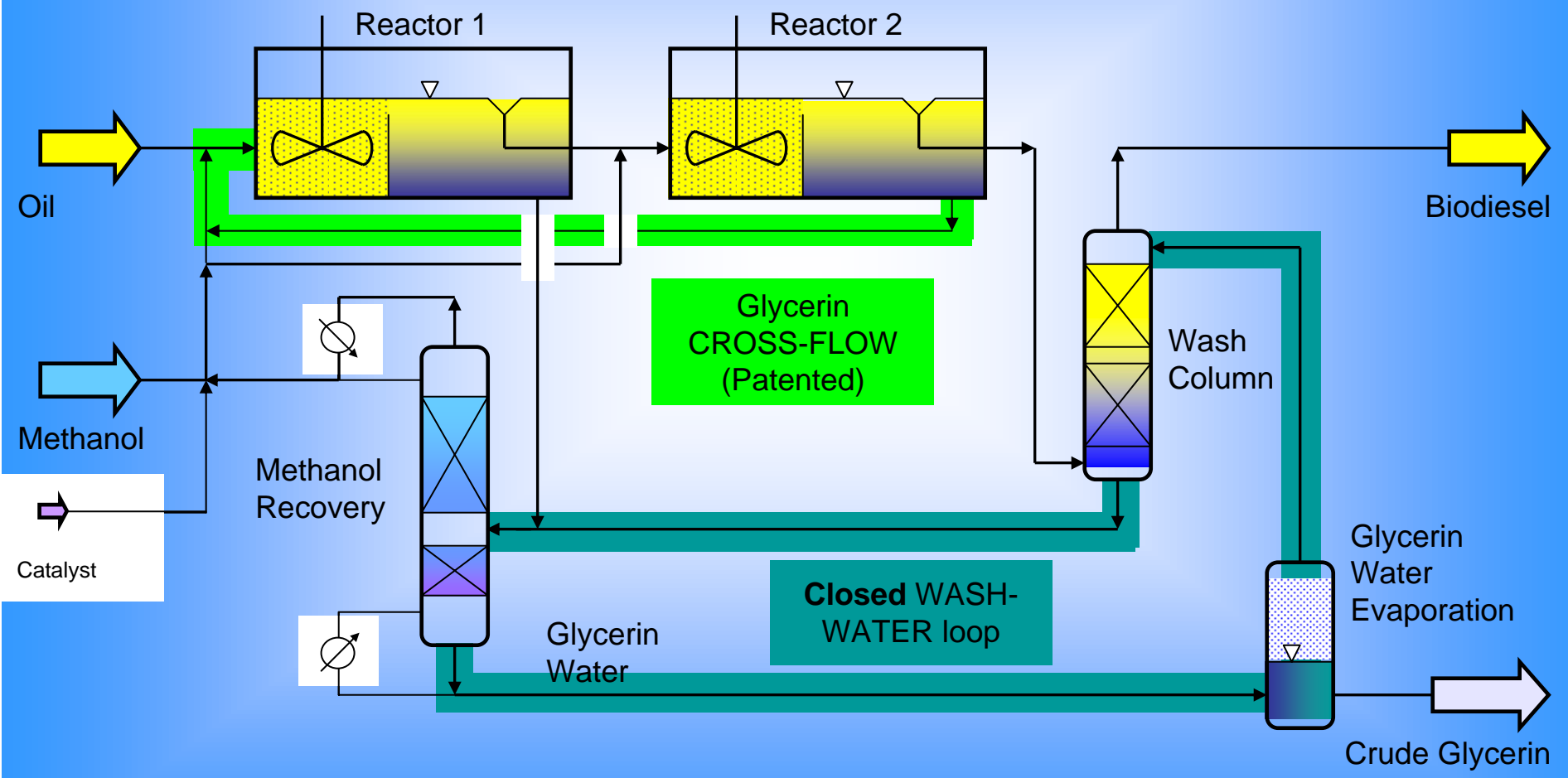
Biodiesel Production from Fats & Oils

Biodiesel is defined as mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats.

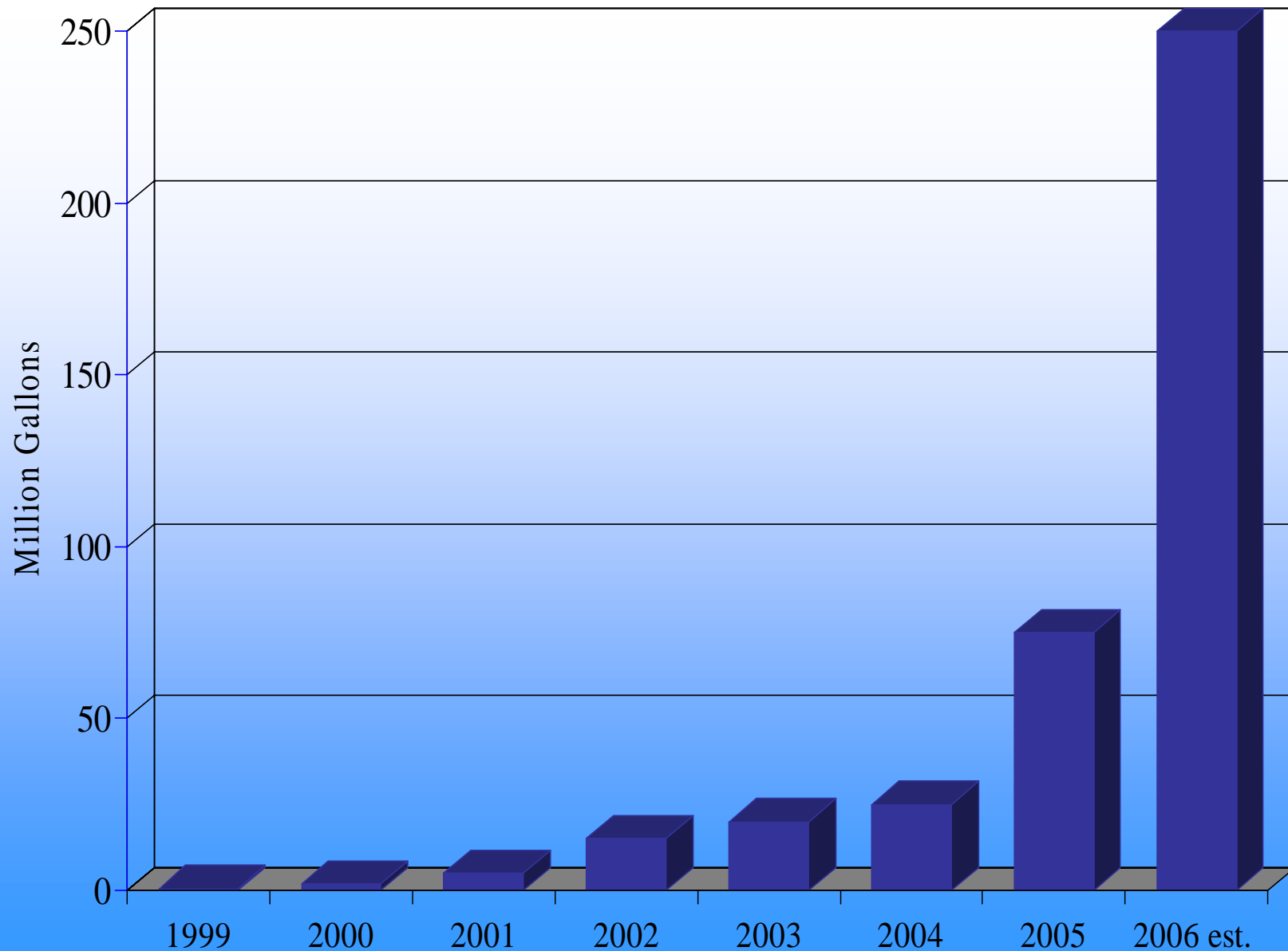
Biodiesel is made through a chemical process called transesterification whereby the glycerin is separated from the fat or vegetable oil in the presence of methanol and a catalyst.

The process leaves behind two products -- methyl esters (the chemical name for biodiesel) and glycerin (a valuable byproduct usually used in cosmetics, soaps and other products).

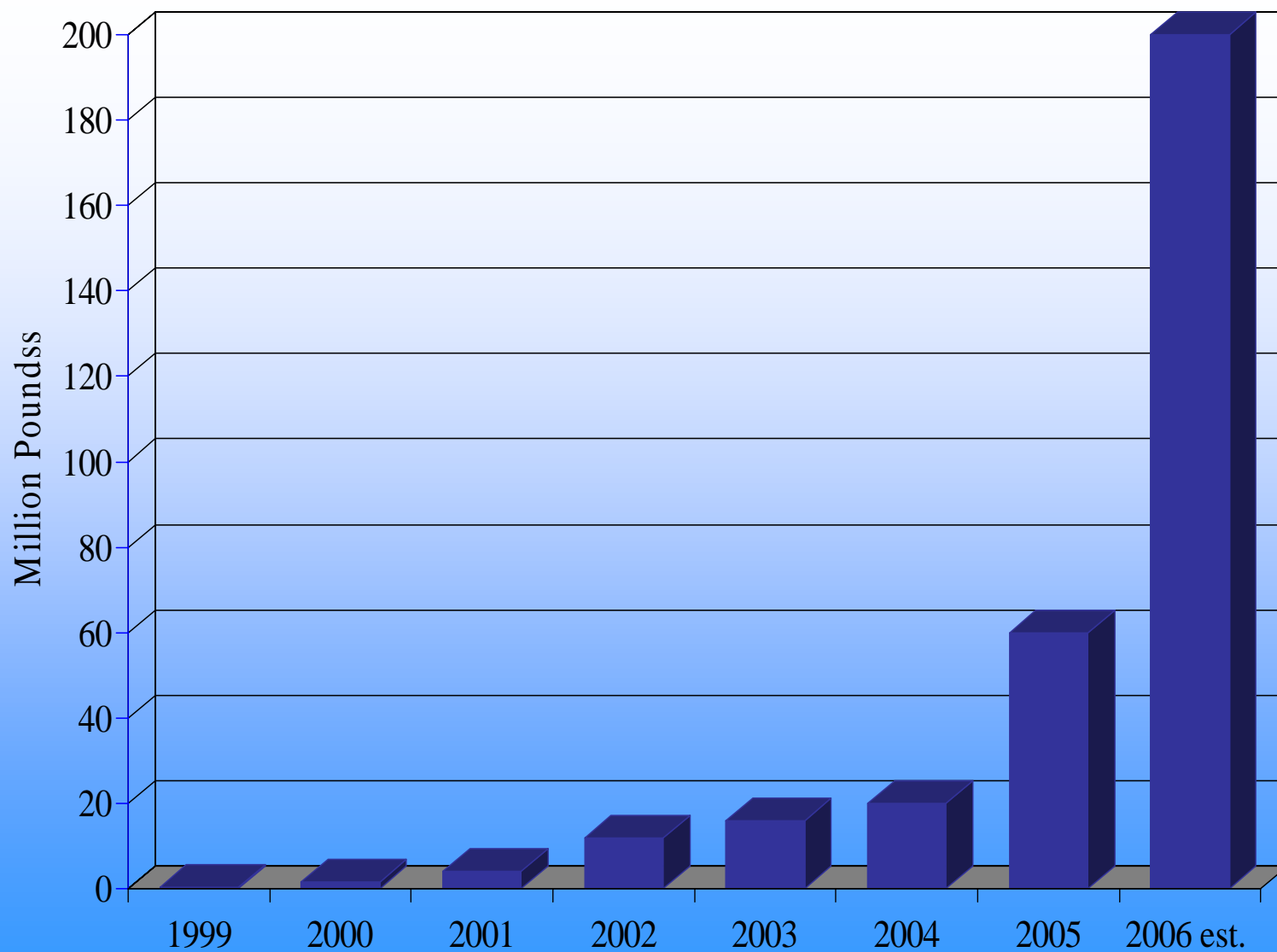
Transesterification



Biodiesel Production is Increasing



Glycerin is a By-Product of Biodiesel Production



Glycerin

One pound of glycerin is produced for every gallon of biodiesel refined.

- Glycerin is used in soaps, toothpaste, cosmetics, pharmaceuticals
- Glycerin is a substitute for other glycols
 - Antifreeze, concrete conditioner etc.
- Glycerin is a GRAS feed ingredient
 - High metabolizable energy source

Glycerin

Glycerin has 90% of the energy value of feed fat.

Feeding trials are going on with glycerin being used as both an energy source and a binder in feed pellets.

Just as with Dried Distillers Grains (DDG's), numerous feeding trails are going on with cattle, hogs and poultry and added glycerin.

FEED vs. FUEL

It is not a zero sum game.

Market dynamics do not operate in a vacuum.

Supply and demand move decision makers.

Planning for the future.

Scenarios already in play