

Road Map

- Brief background on SDA
- Background on Glycerin
 - History
 - Sources and Uses
- Econometric Model
- What's Next



SDA: Background

- 1926: The American Soap and Glycerine Producers' Association
 - Mission: to pursue activities that would be of general benefit to ... consumers of oleochemicals, to the producers, and to those directly or indirectly supplying their raw materials
- Today: 100+ members (10% Oleochemical)
 - Mission: to continue to promote innovation in new uses of oleochemicals and encourage more effective use and broader application of oleochemicals ...



Glycerine Producers' Association Tag line (1926)

“As a product conditioning agent
and moisturizer, as a chemical
building block, as a safe and fully
accepted component of food,
pharmaceuticals and toilet goods –
Nothing takes the place of Glycerine”

Glycerine



WHY GLYCERIN USP?

FOR • FOODS • DRUGS • COSMETICS • TOILETRIES • PERSONAL CARE

WHY GLYCERIN USP?

purified prior to commercial sale. Synthetic glycerin is

chemical building blocks via several
ed to achieve the desired concentration
ity. Glycerin, whether recovered from
sized, is principally used as a highly
oduct, with a very high concentration

component of glycerin, has the chemical

It is a trihydric alcohol, possessing
econdary hydroxyl groups, which are
es and the basis for glycerin's versatility
rial. For example, glycerol esters, the
lycerin with various fatty acids form an
ratives that are extensively used in the
sical properties and characteristics of
nt as its chemical properties for many
alities enable glycerin to be used as a
mollient, thickener, solvent, dispersing
etener, bodying agent, antifreeze and
ot unusual for glycerin to contribute
attributes to a product or application.
ether as a reactant or as an additive,
ty and overall safety of glycerin is
nefit. Glycerin applications appear to
e imagination and creativity of the
ommunities.

marketed today is manufactured to
equirements of the United States
and the Food Chemicals Codex
nical grades of glycerin that are not
OC are available. Glycerin is used in
cts such as personal care preparations,
uticals and foods because of its

etergent Association. All rights reserved.

NOTHING TAKES THE PLACE
of
GLYCERINE

- 1583 ways to use it -

GLYCERINE PRODUCERS' ASSOCIATION

Glycerine: an overview

• terms • technical data • properties • per

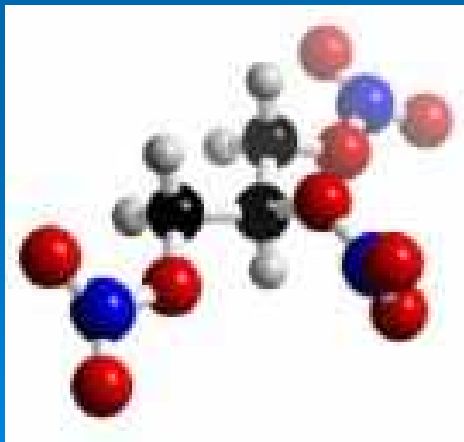
History of Glycerine

- Discovered (accidentally) in 1779 by Swedish chemist K.W. Scheele
 - Sweet principle of fat
- Studied in detail in the early 1800's by the French chemist Michel Eugene Chevreul
 - Renamed Glycerine (1811)
 - First patent related to its manufacture (1823)
- Empirical formula established as $C_3H_8O_3$ in 1836 (Pelouze)
- Structural formula established in 1883 (Berthelot and Lucca)



History of Glycerine (continued)

- Dynamite invented in 1866 by Alfred Nobel
 - Stabilization of trinitrolycerin (TNT) based on work by Sobrero working under Pelouze

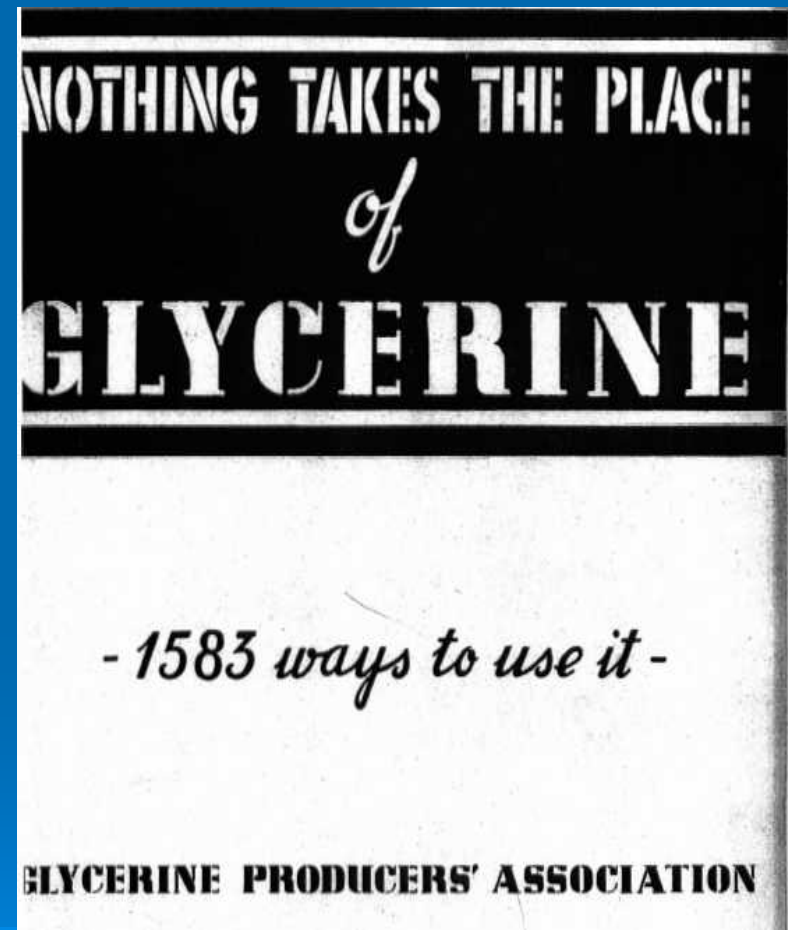


Sources

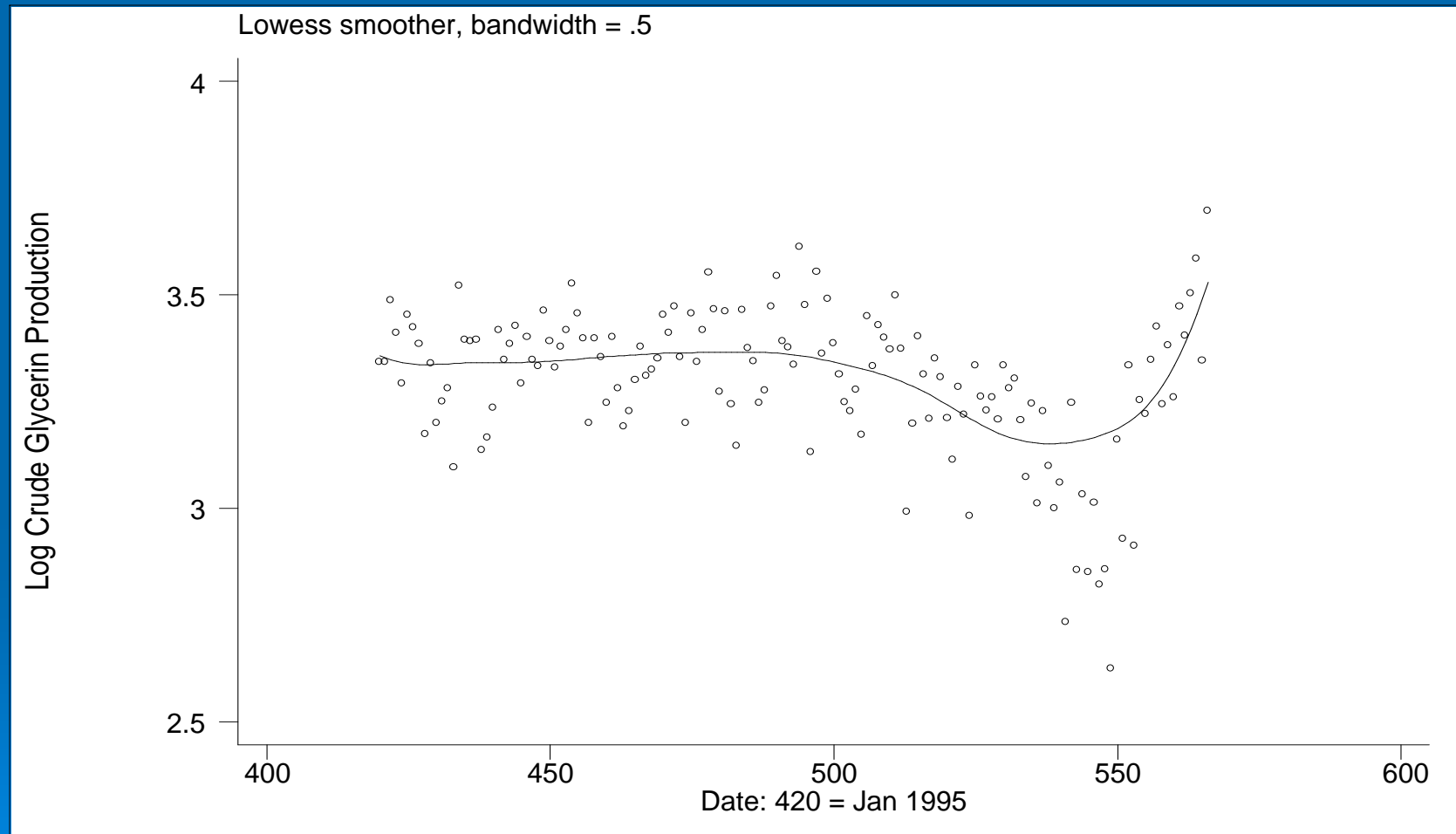
- **EVERYWHERE:** Occurs naturally in all living cells as triglycerides
 - Studying the processes in cells has influenced the industrial synthesis of glycerine
- **Industrial:** Fats and oils saponification, hydrolysis, or transesterification; can also be produced through fermentation or hydrogenolysis of carbohydrates

Uses

- Major uses include:
 - Food and Beverages
 - Drugs
 - Cosmetics and Toiletries
 - Resins
 - Lubricants
 - Textiles
 - Rubber and Plastics

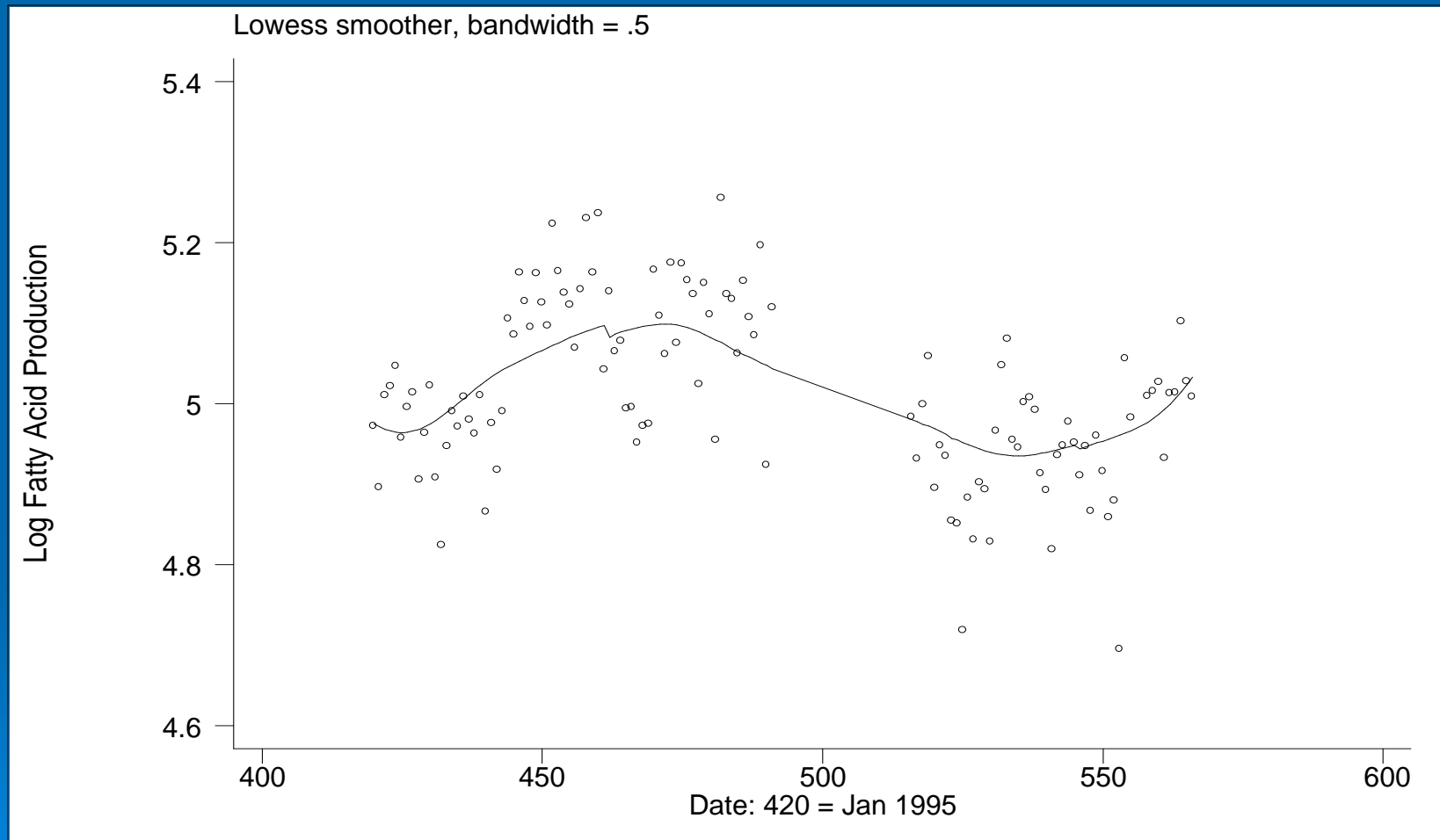


Glycerine Production Jan 1995 – Mar 2007



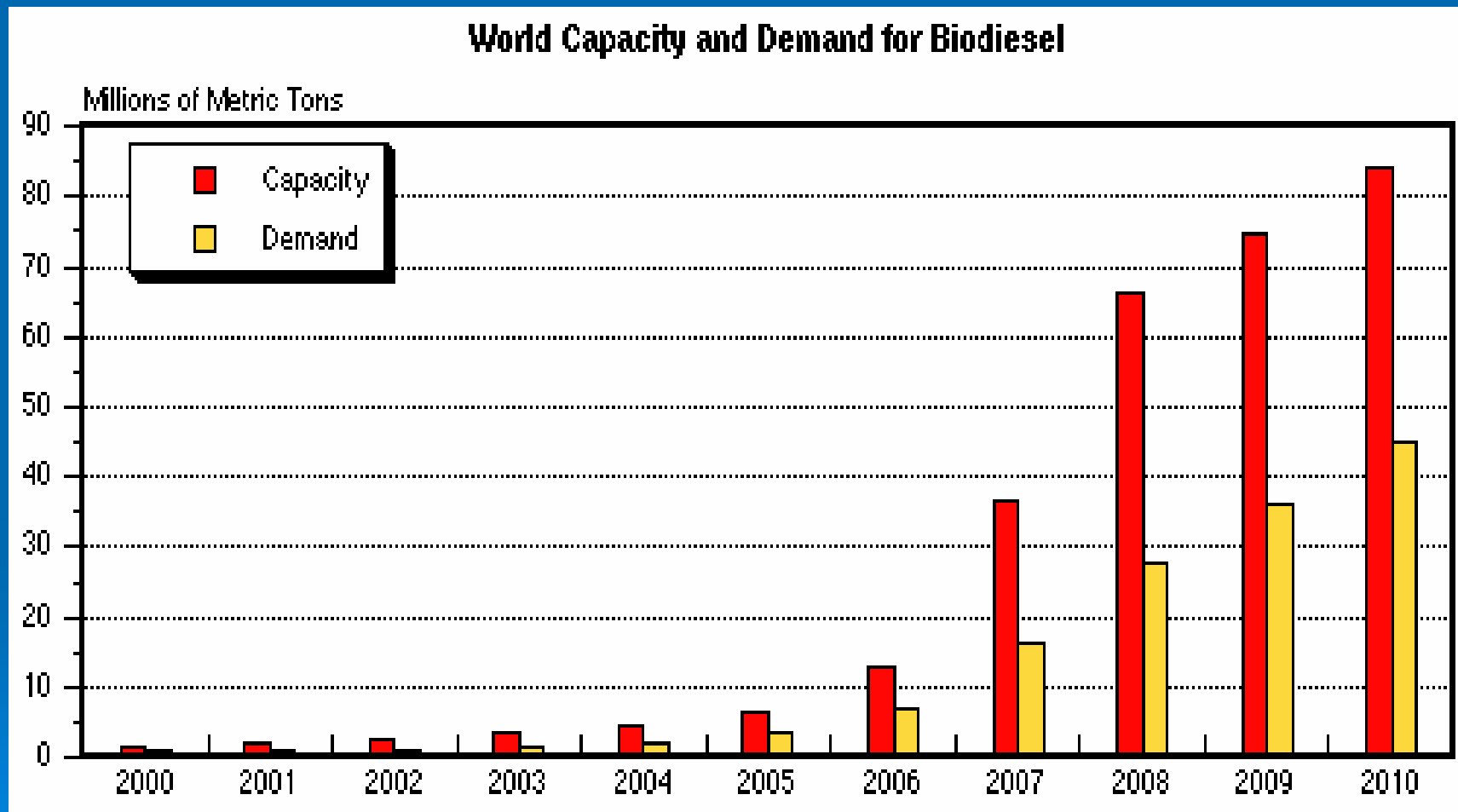
Source: Bureau of the Census

Fatty Acid Production Jan 1995 – Mar 2007



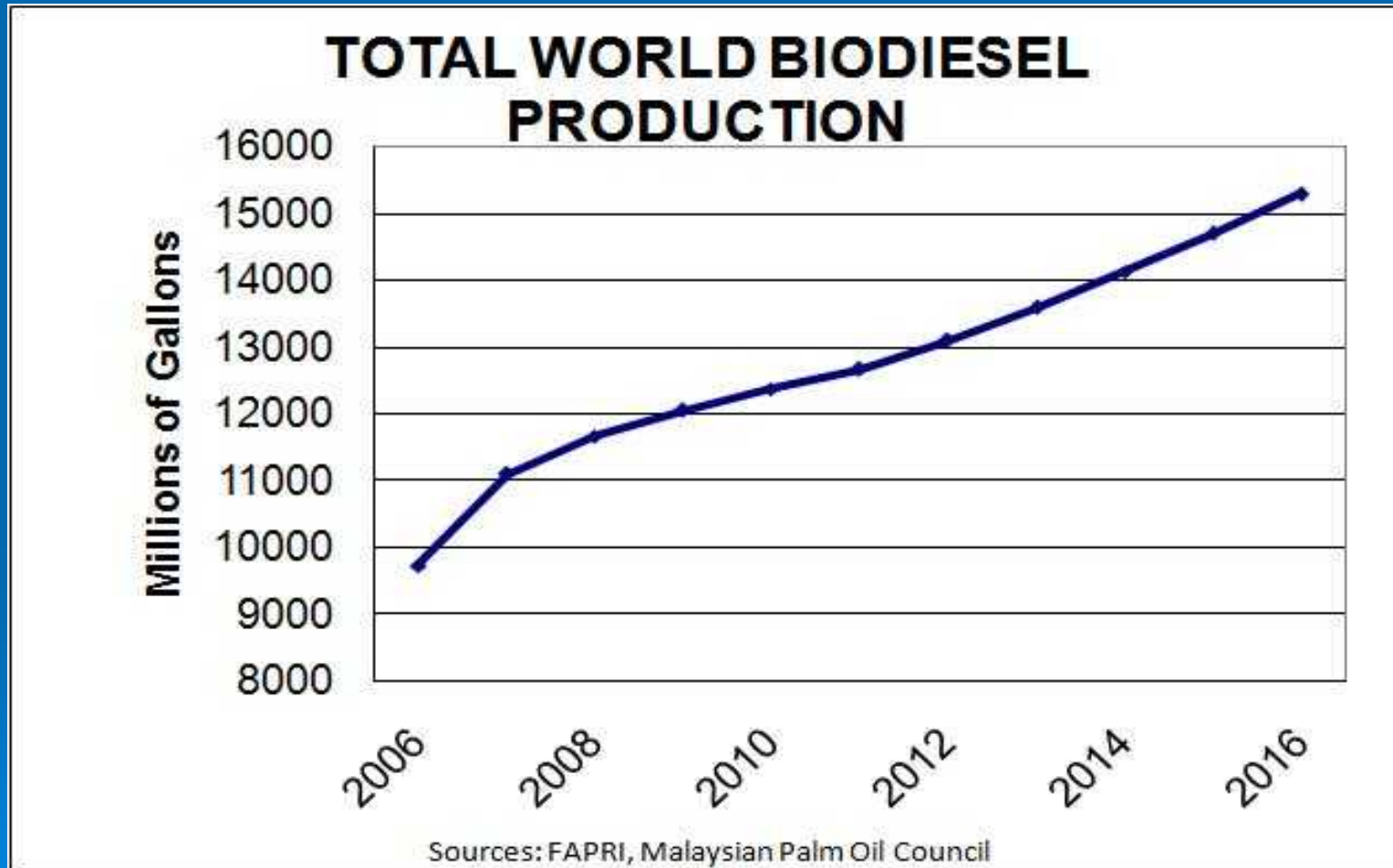
Source: Bureau of the Census

World Biodiesel Capacity and Demand 2000-2010



Source: Chemical Economics Handbook

Projected Biodiesel Production



SDA Glycerine Innovation Award

- Recognizes outstanding achievement for research into new applications for glycerine with particular emphasis on commercial viability
- Winners:
 - 2003 – Joia Spooner-Wyman – Fuel oxygenate (DBG) reducing particulate matter emissions from compression ignition engines
 - 2004 – Masahiko Fukayama and Noriko Fujio – Environmentally-friendly anti-freeze for use on roadways
 - 2005 – Andrew Guo – Material to boast the rigidity of soy-based polyurethane materials

SDA/NBB Glycerine Innovation Award Winners

- 2006 – Galen Suppes Mohan Dasari, Chuang-Wei Chiu, and William R. Sutterlin – Conversion of glycerine from biodiesel production, into propylene glycol that can be used to make antifreeze and other products
- 2007 – Bruno Jestin and Philippe Krafft (Solvay) – Epicerol™ technology – Conversion of glycerin into epichlorohydrin
 - Initial plant to convert 10 kilotons of glycerin

Potential High Volume Uses of Glycerin

- Glycerin substitution for ethylene glycol in engine coolant formulations
 - ASTM Task Force working on this through Committee D15 (D3306 – Coolant Standard)
 - Ford announced a 20% substitution in ALL their engines by 2012 (announced Dec 2006)
- Emulsion Explosives

What's Next?

- U.S. Crude glycerine production is forecasted to double by 2015
 - Glut in an already tight market
- Without new uses, crude glycerine will become a waste-product instead of a co-product
 - Other issues will arise: cost-of-business recalculations, waste-management
- Encourage research into new uses of glycerin