A Discussion of the Synthesis of Fuel from biomass

Introduction

- Biomass Gasification Fischer Tropsch Fuel Syntheses.
- BGFT for short

Overview

- Why BGFT
- Some technical points
- Our calculations and the Economics

Petroleum Cause & Effect

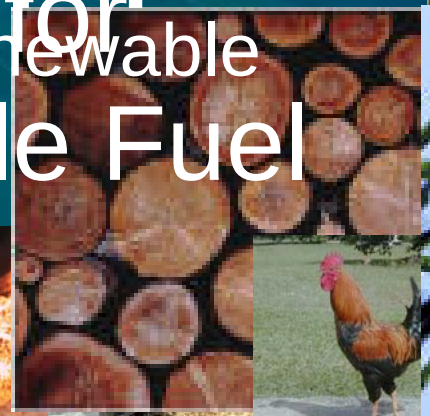
Problems

- Pollution
  - CO2 (Carbon Dioxide)
  - Nitrous and Sulfur Oxides
  - Acid Rain
- Non-renewable
- Imports

Need for Renewable Fuel

Government Environmental Regulation Movement

- Quotas
- Tax Credits
- Alternative & Renewable Fuel



Possible Distribution

SES Provides Renewable Fuel Solution

Biomass converted to Renewable Fuel

Petroleum companies blend and distribute

You and I drive on renewable fuel

Technology Overview

Biomass

Hydrocarbon Fuel

Gasifier

Gas cleanup

Shift reactor

Fischer-Tropsch reactor

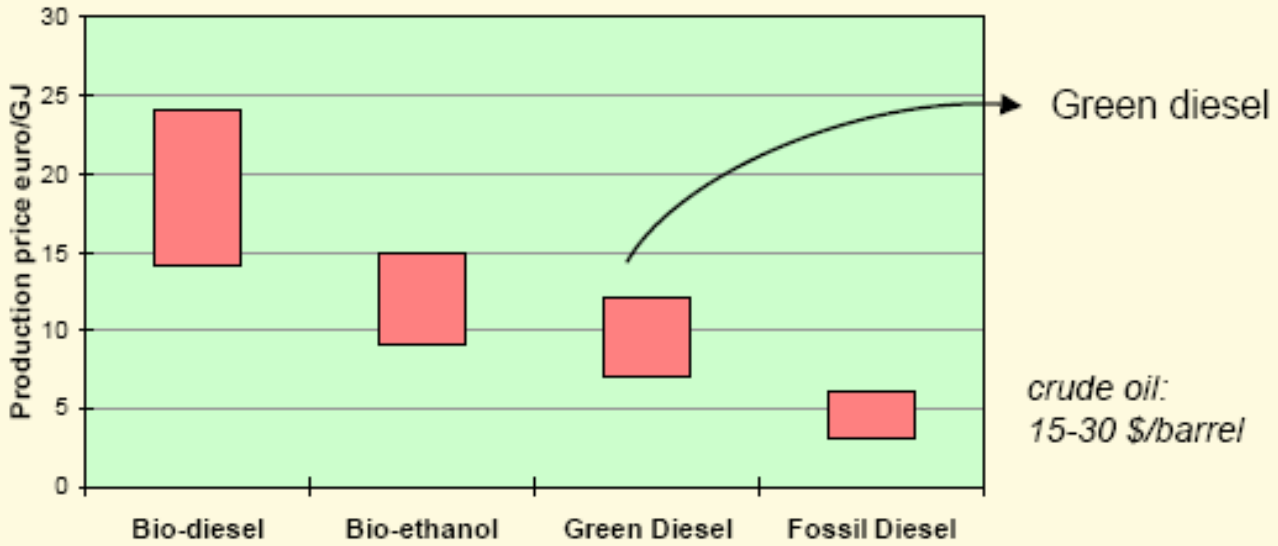
FT feed requirements

Impurity	Removal level
$H_2S + COS + CS_2$	< 1 ppmV
NH_3 + HCN	< 1 ppmV
HCl + HBr + HF	< 10 ppbV
alkaline metals	< 10 ppbV
solids (soot, dust, ash)	essentially completely
organic compounds (tars)	below dew point
- *class 2 (hetero atoms)*	*< 1 ppmV*

Third Party Validation

Perspectives of Green Diesel

Comparison with green alternatives

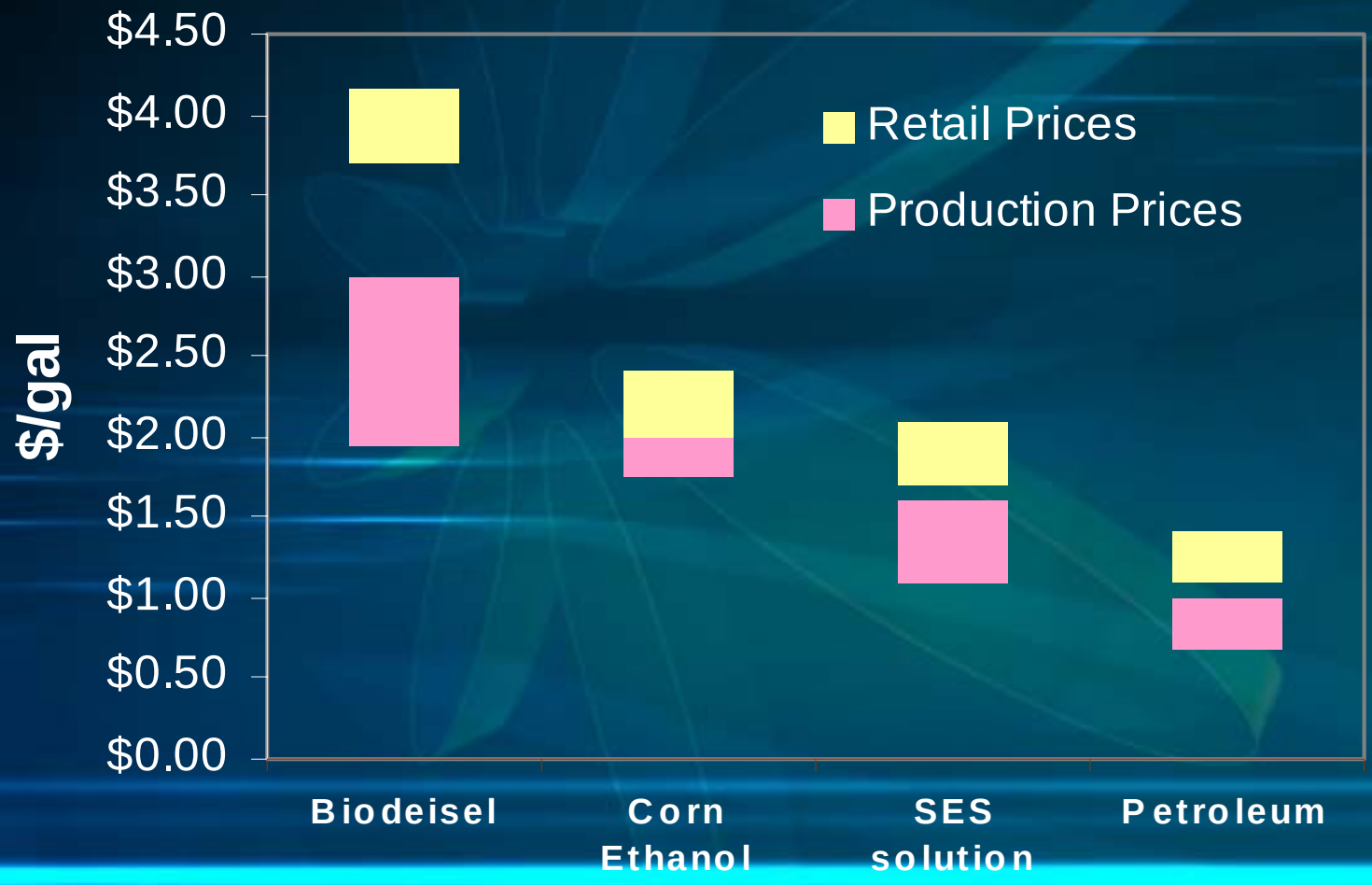


Real production prices; not subsidies, no tax incentives

(24) ECN Biomass – ThermoNET meeting, Helsingor, 17-20 October 2003

ECN

Market & Production Price



Calculations

	Biomass/Black Liquor		Diesel additive produced		Barrels	
North America	2.22E+08	ton/yr	8,119,000,000	gal/yr	193,309,524	barrel/yr
Black Liquor	1.75E+08	ton/yr	6,411,000,000	gal/yr	152,642,857	barrel/yr
One Plant	7.28E+05	ton/yr	26,620,000	gal/yr	633,810	barrel/yr
US	1.40E+08	ton/yr	5,120,000,000	gal/yr	121,904,762	barrel/yr

	Barrels		$/yr
North America	193309523.8	barrel/yr	16238000000
Black Liquor	152642857.1	barrel/yr	12822000000
One Plant	633809.5238	barrel/yr	53240000
U.S.	121904761.9	barrel/yr	10240000000