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Agricultural Outlook Forum  
U.S. Department of Agriculture

February 21-22, 2008

Renewable Diesel from Animal Fat

Lou Burke



## **Renewable Diesel from Animal Fat**

**USDA Outlook Forum**

**Lou Burke**

**Manager Biofuels**

# Company Profile

- **An international, integrated energy company. 11.2 billion BOE reserves**
- **The 3<sup>rd</sup> largest integrated energy company in the United States**
- **2<sup>nd</sup> largest refiner in U.S. – 2 MMBPD, EU – 640 MBPD**
- **19 Refineries (15 wholly owned), 2.7 MBDP Worldwide**
- **Approximately 38,400 employees worldwide and assets of \$184 billion**
- **NYSE Ticker: COP**

# ConocoPhillips Biofuels

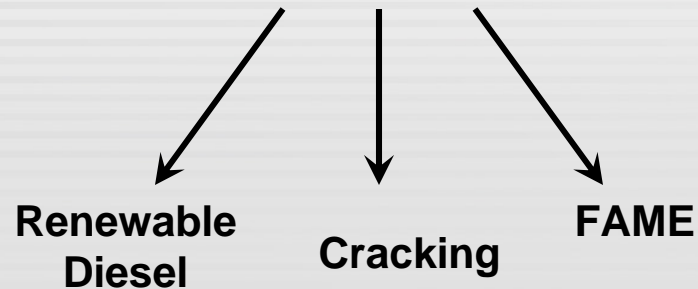
- We are a Blender
  - Ethanol in US and EU
  - Biodiesel in US and EU
- We are a Producer
  - Renewable Diesel in Ireland & US
- We are a Technology Developer
  - Internally
  - At Universities
  - With other commercial companies

# Biofuels Program Strategy

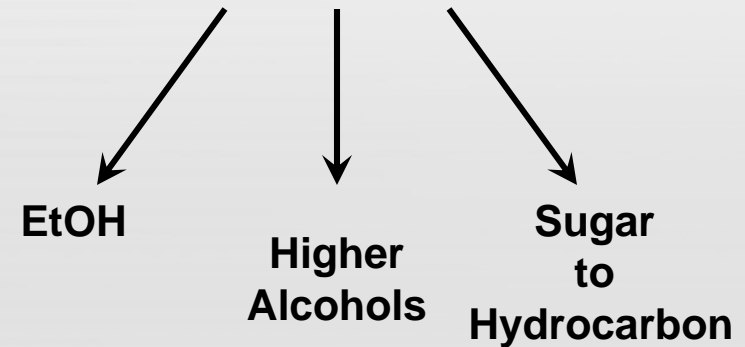
- ConocoPhillips plans to develop & implement biofuels technologies that will:
  - Establish attractive business opportunities
  - Utilize lower cost, more sustainable feedstocks
  - Maximize the use of existing infrastructure
  - Leverage COP's areas of expertise, competence and asset base
  - Minimize the carbon footprint and support COP's sustainable development strategies

# Biofuel Pathways

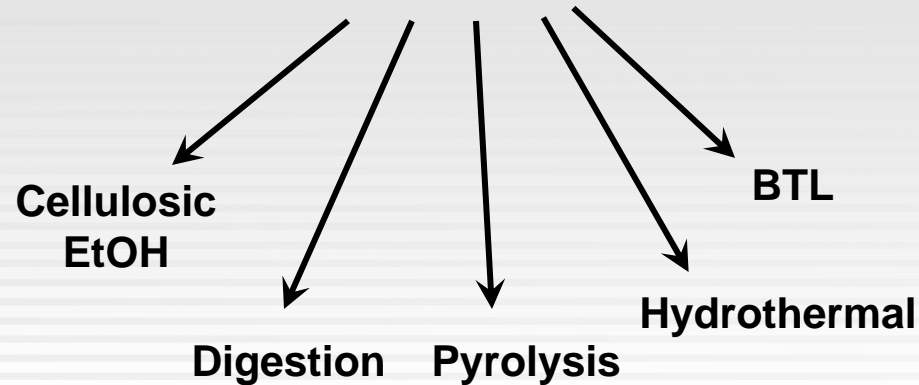
## Fats & Oils



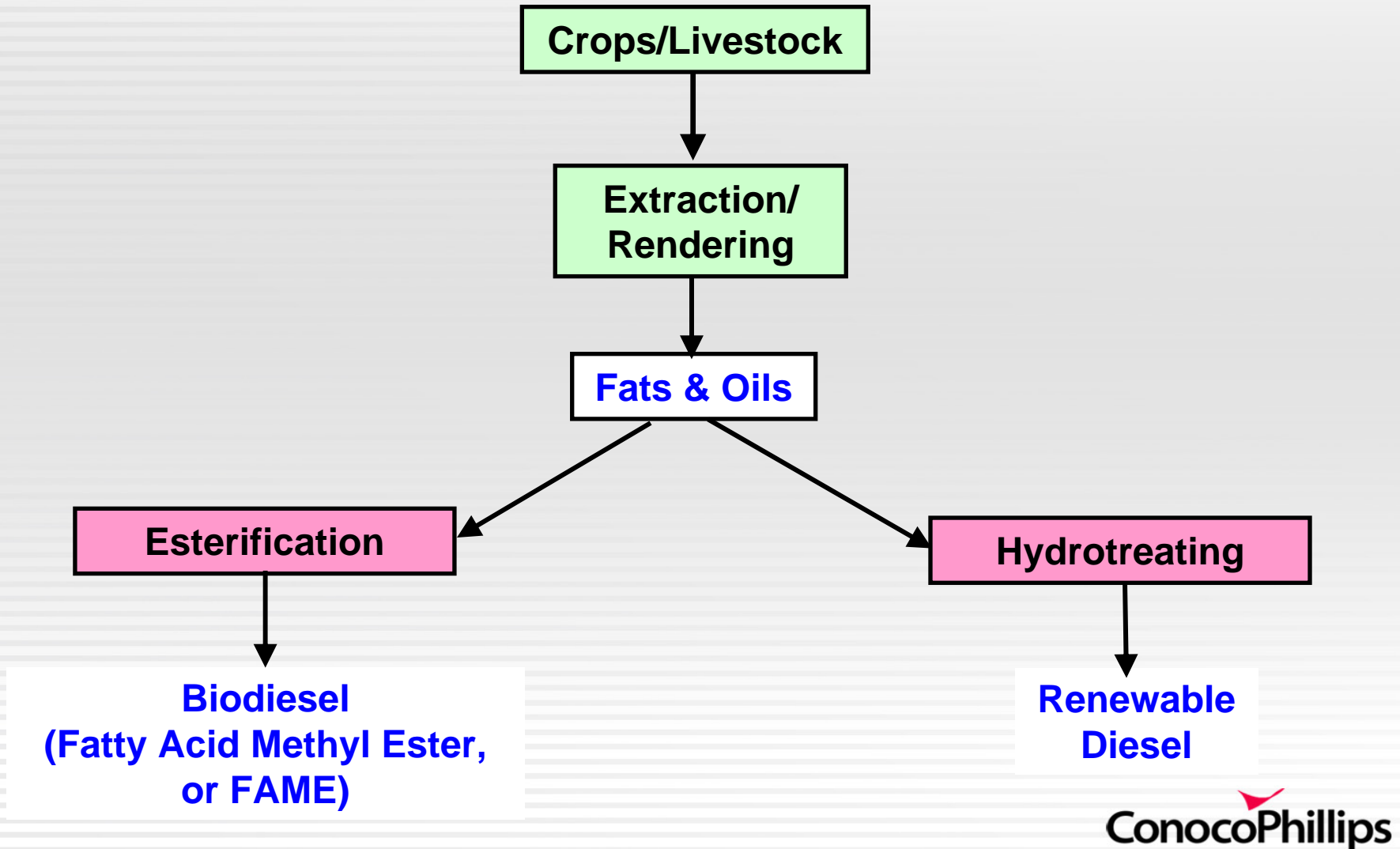
## Starches and Sugars



## Biomass

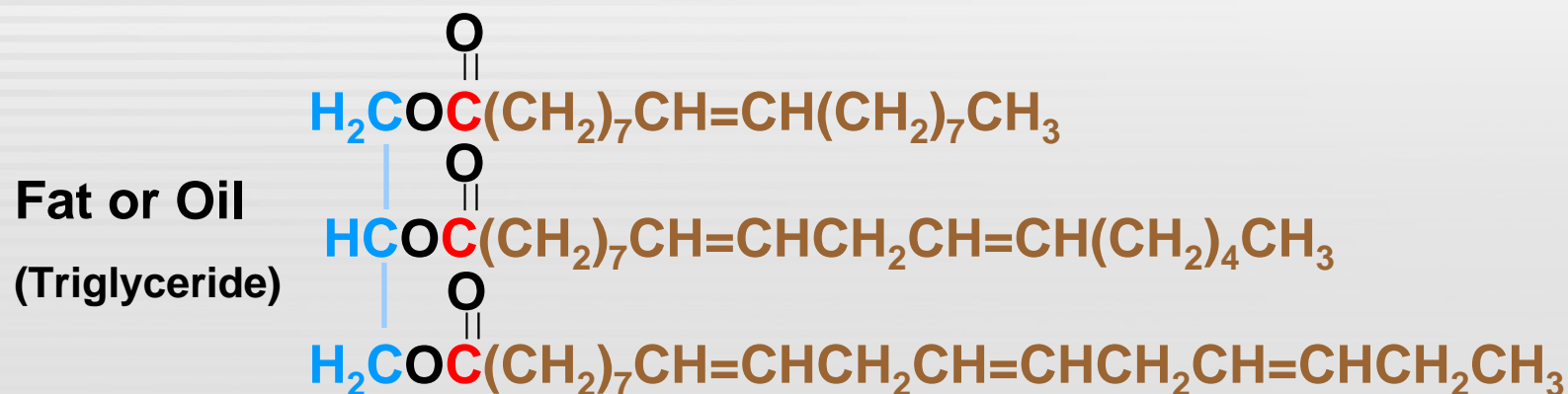


# Fats & Oils Processing Options

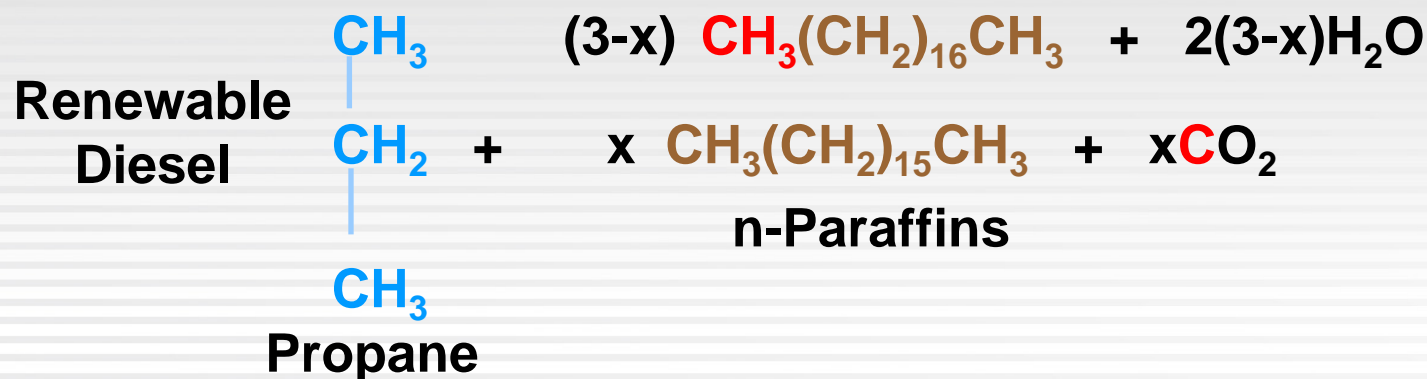




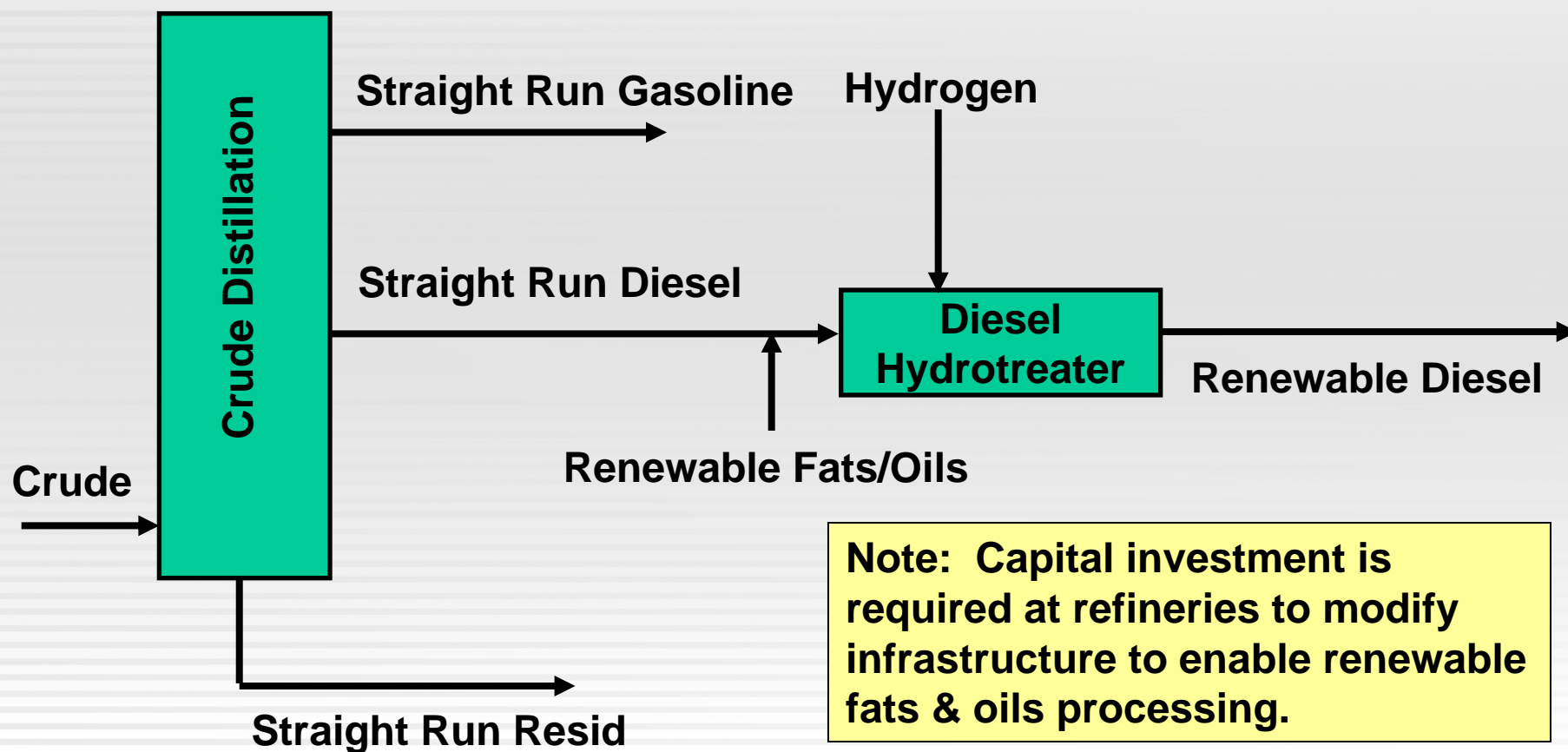
# Renewable Diesel Chemistry



Hydrotreating  Heat, Hydrogen, Catalyst

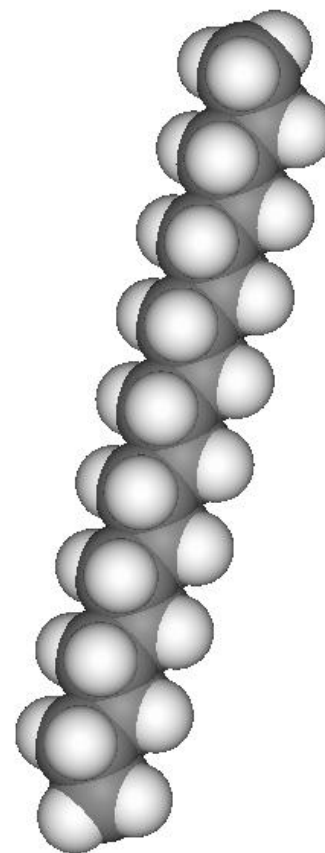


# Renewable Diesel Process



# Typical Renewable Diesel

- Paraffinic ( $C_{15}$ - $C_{18}$ )
- No Oxygen
- No Double Bonds
- In Heart of Diesel Fuel ( $C_{10}$ - $C_{22}$ )
- High Cetane
- Feedstock Independent
- Cold Flow Issues



# Renewable Diesel Highlights

- No New Molecules-No New Fuel Specs Needed
  - Meets D 975 and EN 590 Specifications
  - Extremely High Cetane
  - Utilizes existing distribution infrastructure
  - No vehicle constraints
- Excellent GHG performance
- Criteria Pollutant Screening
  - NO<sub>x</sub>, HC, CO, and PM all improved vs. petroleum diesel

# Other Renewable Diesel Projects

- BP: 1,900 BPD, Australia - 2007 (Co-processing)
- Neste/OMV: 4,000 BPD, Austria - 2009
- Neste: 3,400 BPD, Finland - 2007, Second Plant - 2009
- Nippon Oil: Commercial Within 3 Years
- Petrobras: Four Refineries 4,000 BPD - 2007 (Co-processing)
- UOP/ENI - 2009

From publicly available sources

# Other Activities

- ADM Partnership
  - Biomass to “Bio-crude” to fuel
  - Thermo-Chemical conversions
- ISU Partnership
  - Programs range from cropping systems to conversion technologies
  - Focused primarily on thermochemical conversion
  - Recently received DOE grant for BTL
- Other partnerships
  - C2B2
  - Others