Biodiesel WEBINAR

.gov - the Policy Perspective

Olof Hansen

U.S. EPA Region 9, San Francisco

Why is EPA Working on Biodiesel?

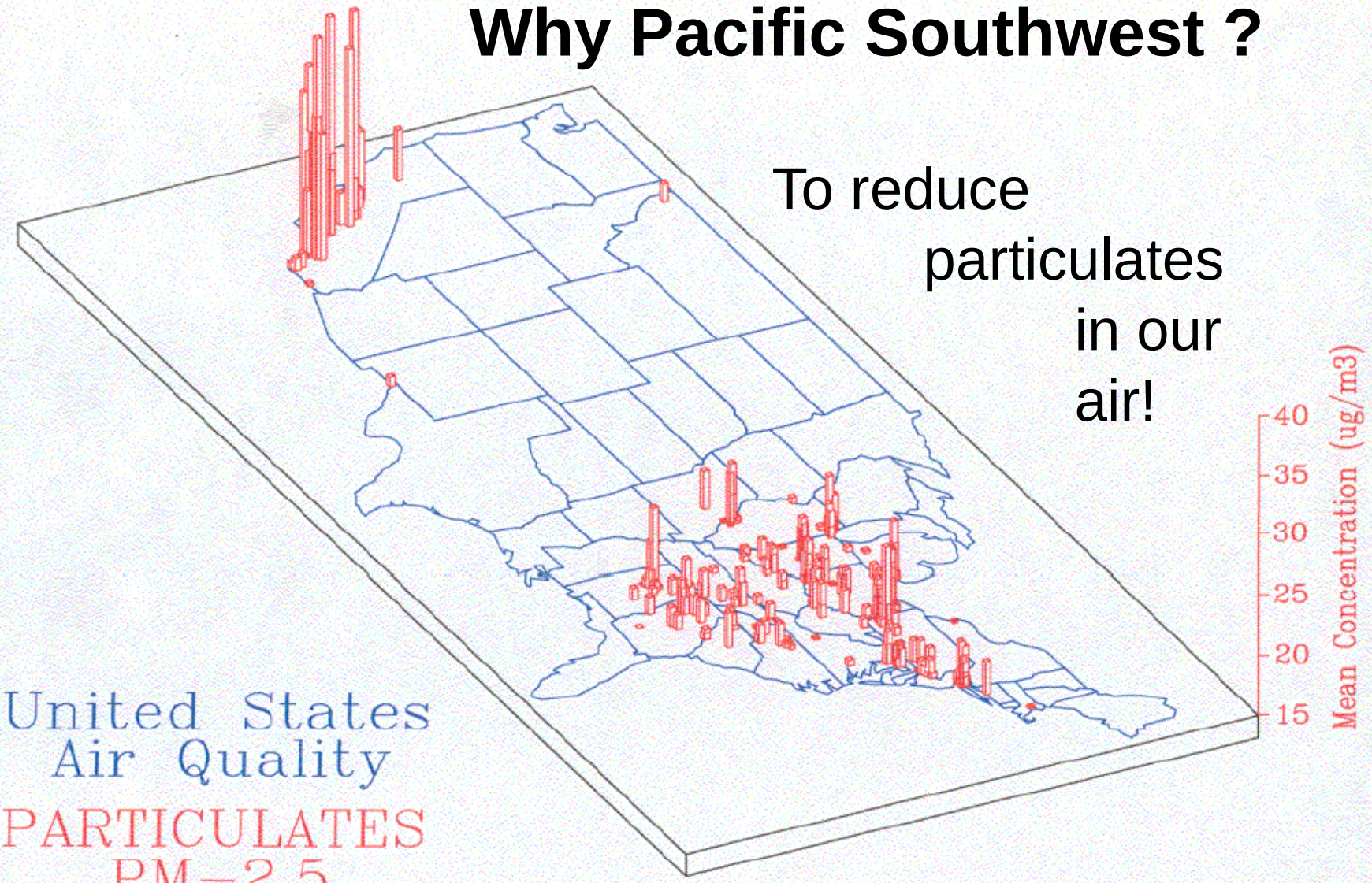
- “Advanced Energy Initiative: national goal of replacing more than 75 % of our oil imports by 2025…
- Biodiesel will help end dependency on foreign oil …
- Foreign oil will go the way of typewriter and walkman…
- Restaurant grease which would normally be thrown away, will be turned into fuel…
- Biodiesel is making the black puff of diesel smoke a thing of the past. “

U.S. EPA Administrator Steve Johnson

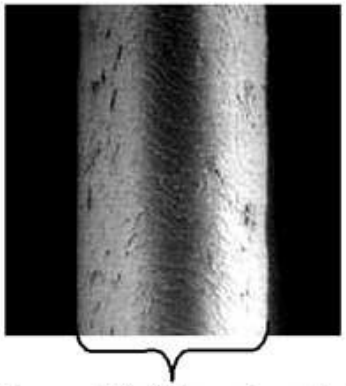
NATIONAL BIODIESEL CONFERENCE & EXPO 2006

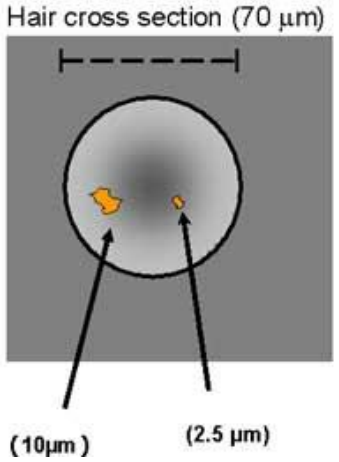
Why Pacific Southwest ?

To reduce particulates in our air!



Diesel Emissions Pose a Significant Environmental Health Problem





- Diesel exhaust
  - Serious health impacts
    - exacerbates asthma,
    - respiratory & cardiac illness
  - Possible human carcinogen
    - over 70% of the cancer risk from all air toxics
  - Degrades air quality
    - Particulate Matter
    - Ozone
  - Contributes to climate change

EPA's Diesel Regulations

- Clean Diesel Truck/Bus Rule: Dec 2000
- Clean Air Non-road Diesel Rule: May 2004
- ULSD for highway diesel engines: 2006
- Low sulfur diesel for non-road engines: 2007,
- ULSD for non-road engines: 2010, and
- ULSD for locomotives and marine engines: 2012.

- When fully implemented in 2030, this **will annually prevent** up to:
  - 2,000 premature deaths,
  - One million lost work days,
  - 15,000 heart attacks and
  - 6,000 children's asthma-related emergency room visits
- Combined, these stringent regulations will achieve
  - $150 billion in health benefits

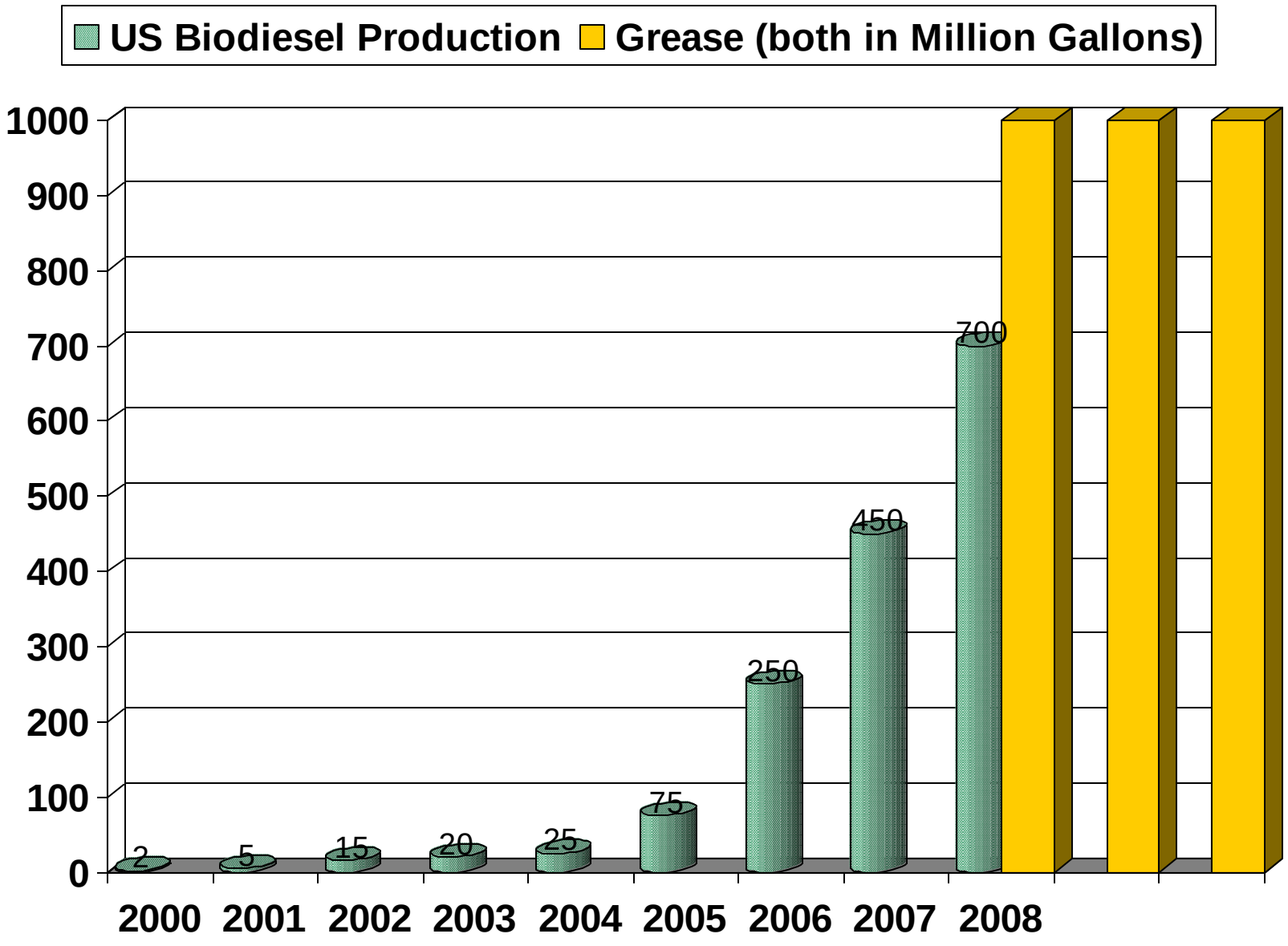
But what can be Done with the 11 Million Diesel Engines in Use today?

Enter: **Biodiesel**

- **Domestic, renewable** fuel
- Only alternative non-fossil fuel that **passed** the Clean Air Act Tier I and II **health** effects **testing**
- **Reduction of** virtually all regulated **air emissions** (60% reduction of asthma causing PM, nearly 80% reduction of green house gases, 100% reduction of sulfur oxides causing acid rain)
- Great potential for **resource conservation**: used frying oil (UFO) can be converted to biodiesel
- **Non-toxic** and biodegradable -- no need for Exxon-Valdez type spill cleanup

Benefits of Waste-derived Biodiesel

- Conserves Resources
  - Up to 3 billion gallons of waste grease generated in the US/yr
- Recovers High Yields of Energy
  - Diverts resources and energy away from landfills
- Saves Costs
  - Waste grease costs a lot less than virgin soy oil
- Protects Water Quality and Infrastructure
  - 80% of US sewage overflows from Fats, Oils and Grease (FOG)
- Reduces air emissions
  - 86% reduction of GHG emissions for biodiesel derived from waste oil feedstock based on lifecycle analysis for the renewable fuel standard (RFS-II)


US Biodiesel Production
Grease (both in Million Gallons)
1000
900
800
700
600
500
400
300
200
100
0
2
5
15
20
25
75
250
450
700
2000
2001
2002
2003
2004
2005
2006
2007
2008

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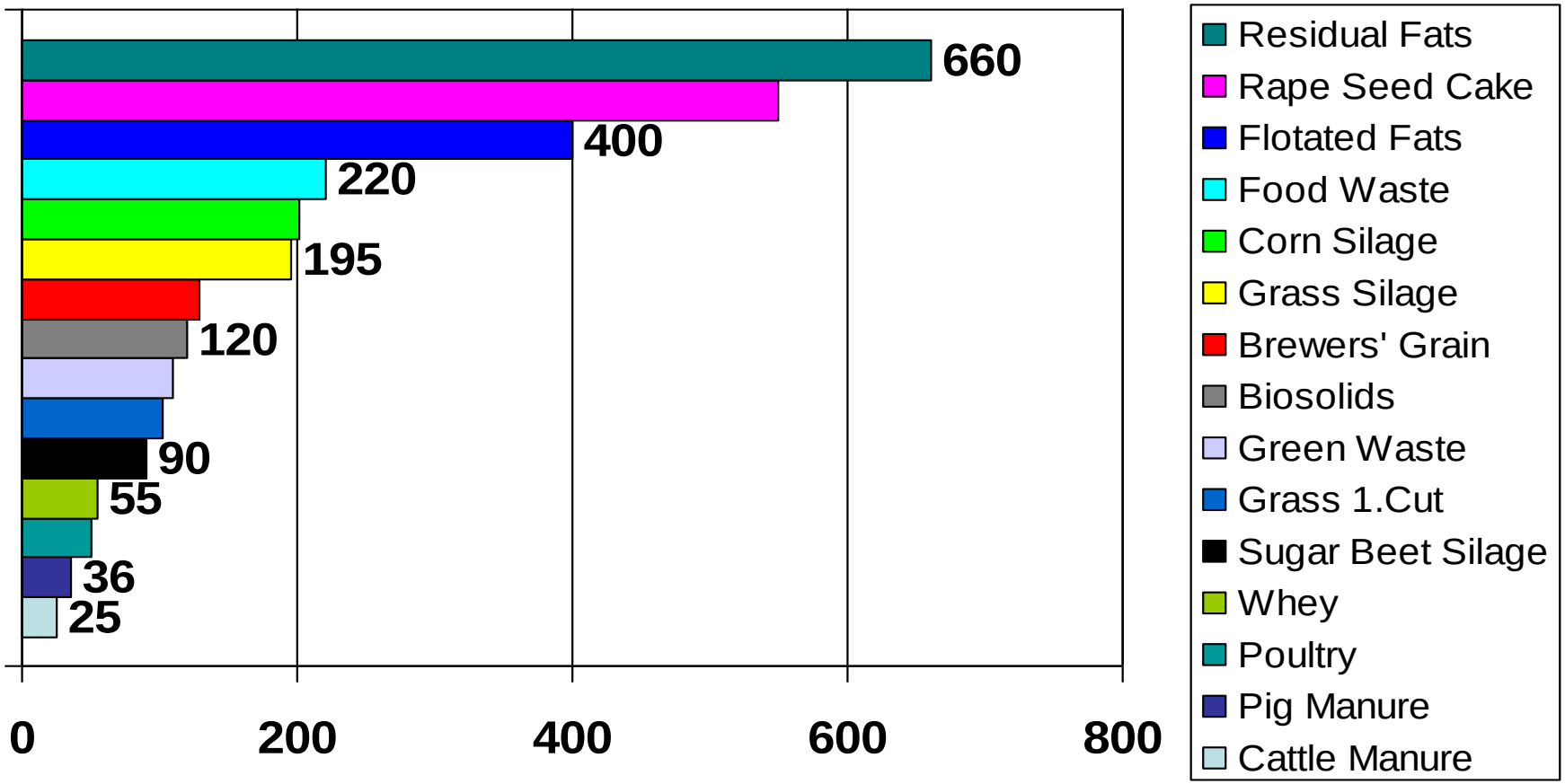
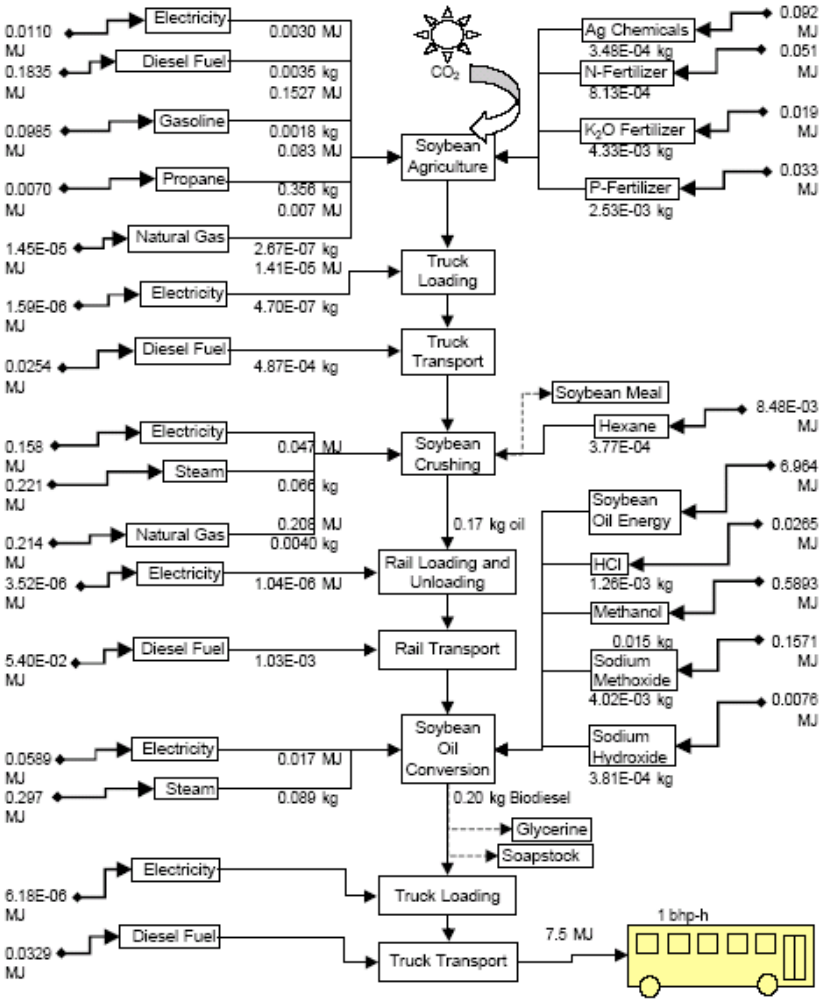
High Energy Yield in FOG (Fats-Oil-Grease)



(Courtesy of M-Con Bio and Farmatic Biotech Energie AG, Yields in m3 gas/ton)

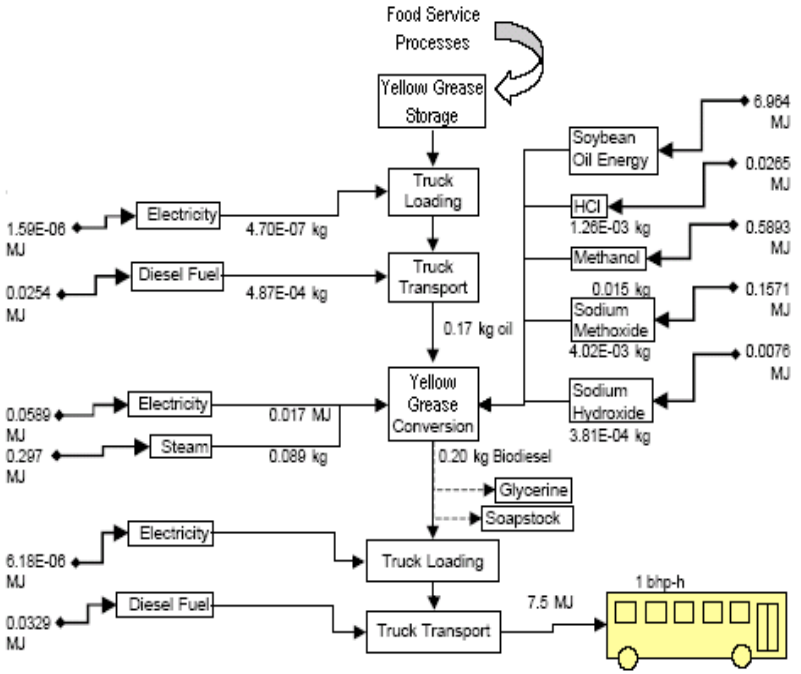
Life Cycle Analysis for Biodiesel

Left: Soybean Oil - Right: Waste Grease



LCA shows great fossil energy ratio benefits:

Petroleum Diesel	0.8
Soybean Biodiesel	3.2
Yellow Grease Biodiesel	4.6 – 6.4



Reproduced from Sheehan et al., 1998

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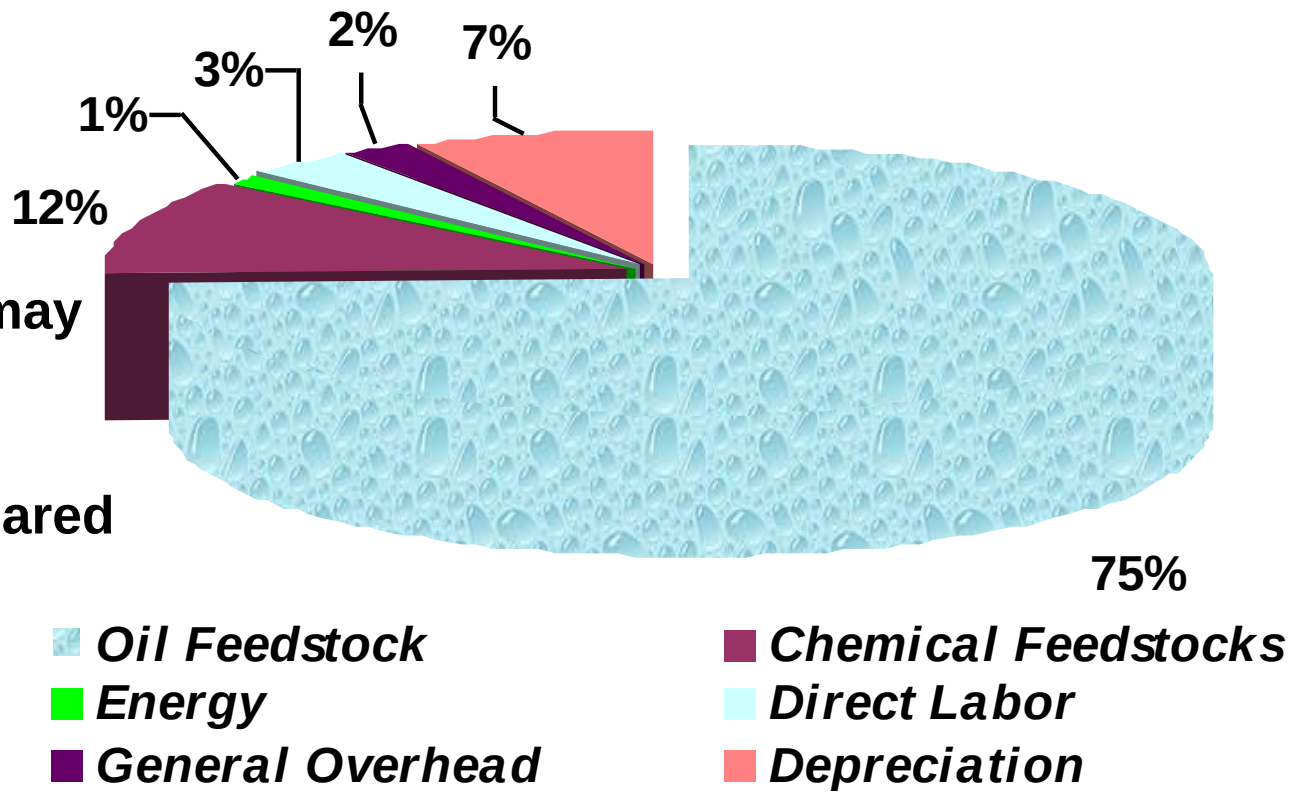
What are the Economic Benefits?

Cost Breakdown for Biodiesel Production



Waste cooking oil may reduce biodiesel production costs

by 75% when compared to virgin oil

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Waste Grease to Biodiesel or Anaerobic Digester

- **Energy** derived for producing biodiesel is greater than for producing electricity through anaerobic digestion (1120 versus 1010 KiloJoule/Liter).
- Net **greenhouse gas emission** reductions are substantially greater for biodiesel production than AD (0.48 versus 0.23 kg CO2/L).
- **Economic** benefits of producing biodiesel may be greater over the long term than producing electricity through AD capacity.
- **Many organic** wastes are suitable for **ADs**, however **few** are suitable feedstock for **biodiesel**.

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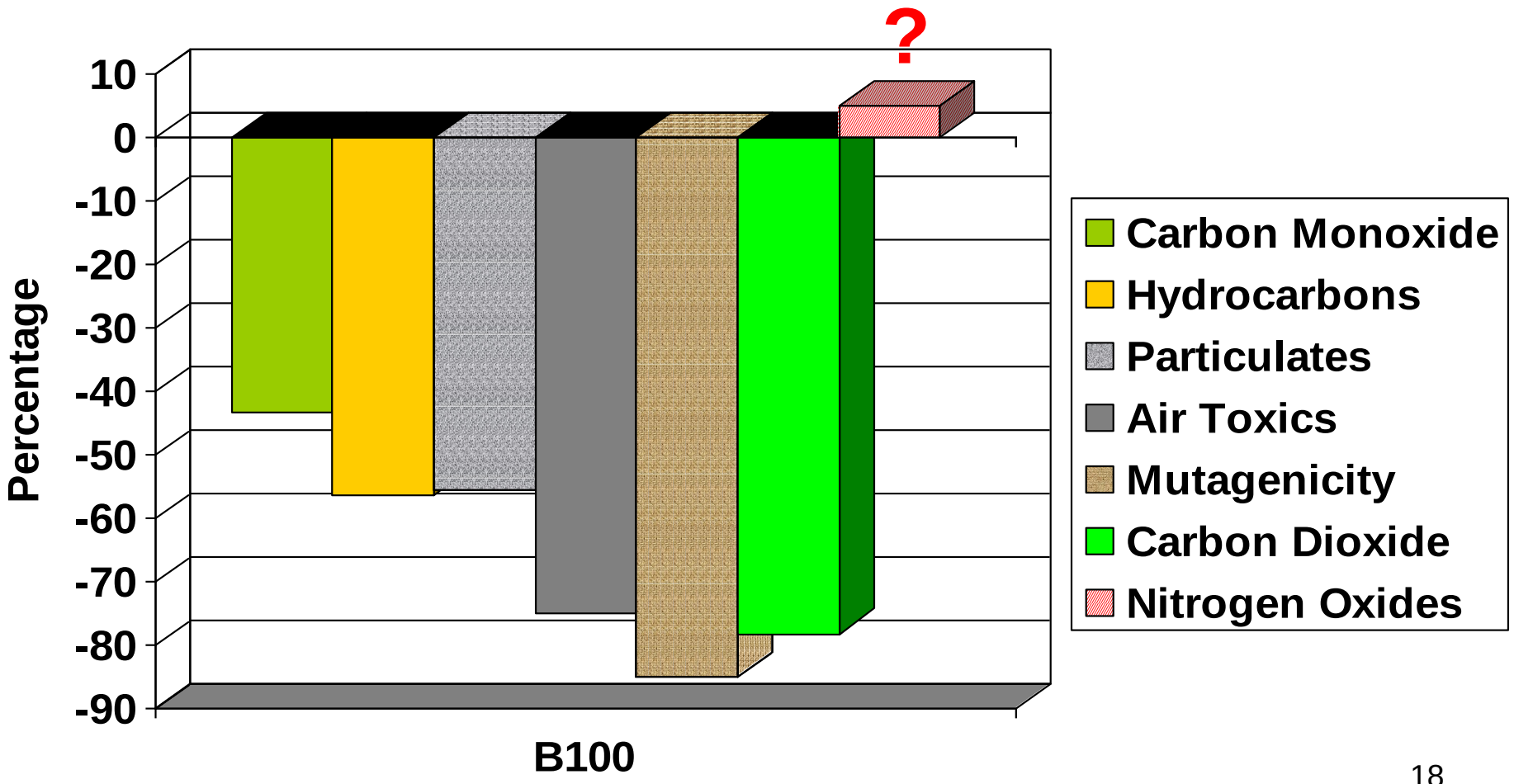
Air Quality: Emission Difference between Biodiesel and Petrodiesel



Source: Draft EPA Report *EPA420-P-02-001*

Benefits of Waste-derived Biodiesel (continued)

- Closed-loop economic model
  - In urban settings, FOG is an urban “crop” to be harvested and used locally in a sustainable cradle-to-cradle fashion.

- Co-location of supply and demand
  - Fats-Oil-Greases are generated in large quantities in locales such as universities, wastewater treatment plants, military bases, corporate campuses where demand for fuel is high as well (large fleets).

- Community based – “by-product synergy”
  - One industry’s waste (restaurant grease) is another’s feedstock (biodiesel manufacturer) providing for beneficial use of a by-product.

- Public environmental education impact
  - Higher population density in urban centers allows for environmental education from community based programs.

Resources/Funding/Grants

A centralized site for all Federal Grants
www.grants.gov

Federal Sustainable Transport Program, e.g. Clean Cities
http://www.westcoastdiesel.org/programs.htm#federal

State of California Grants, e.g. Alternative and Renewable Fuel and Vehicle Technology Program by CEC
www.getgrants.ca.gov

California Integrated Waste Management Board's Grant Writing Tips
http://www.ciwmb.ca.gov/Grants/Tips.htm

EPA Grant Writing Tips
http://www.epa.gov/ogd/recipient/tips.htm

Thank you

Olof Hansen

U.S. EPA Pacific Southwest Region

hansen.olof@epa.gov

(415) 972-3328

http://www.epa.gov/region9/biodiesel