

BIODIESEL



Ntres 331

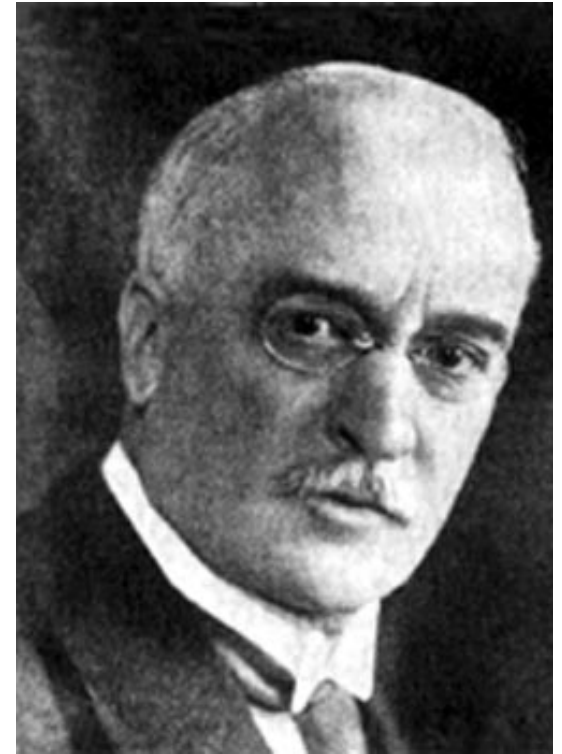
Sorrel Hatch, Karen Klima, Sean Auclair, Rachel
Philbrick, and Fraser Trimble

April 25, 2005

<http://journeytoforever.org/media/s/sunflowers.jpg>

Rudolf Diesel

- 1892 invented the original diesel engine
- peanut and vegetable oils
- Diesel's vision:
 - the common man
 - “[vegetable oils] make it certain that motor-power can still be produced from the heat of the sun, which is always available for agricultural purposes, even when all our natural stores of solid and liquid fuels are exhausted”(1912!)



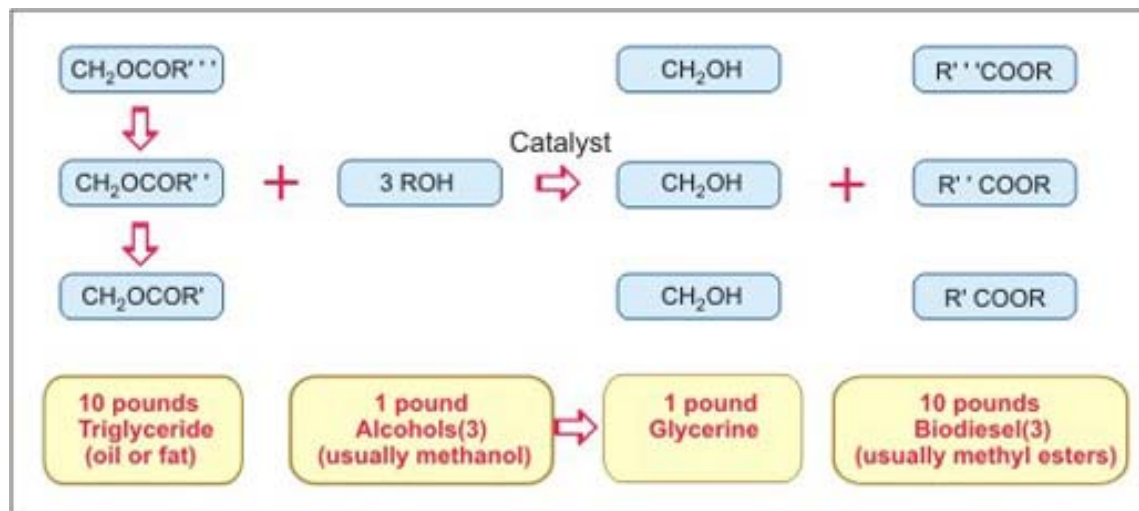
http://www.nrhs.com/web_exclusives/rudolph_diesel/

What is Biodiesel?

-Feedstocks: soybeans, canola, peanut, corn, and cottonseed and animal fats such as tallow, yellow grease, and lard

-Transesterification:

- alcohol + feedstock oils
- catalyzed by adding lye
- products are glycerin and fatty acid methyl esters (FAME)
- glycerin coproduct valuable for pharmaceuticals and cosmetics



<http://www.treeoilsindia.com/products.htm>

Current Use

- Runs in any diesel engine
 - B100(100% pure), B20 (20%)
- No negative impacts on performance or mileage
- Public Transportation**

Potential Use

- commercial shipping (rail, ship, **trucking**)
- farming equipment



<http://www.ride-on.com/images/tractortrailer3.jpg>

Production: Home-grown vs. Commercial



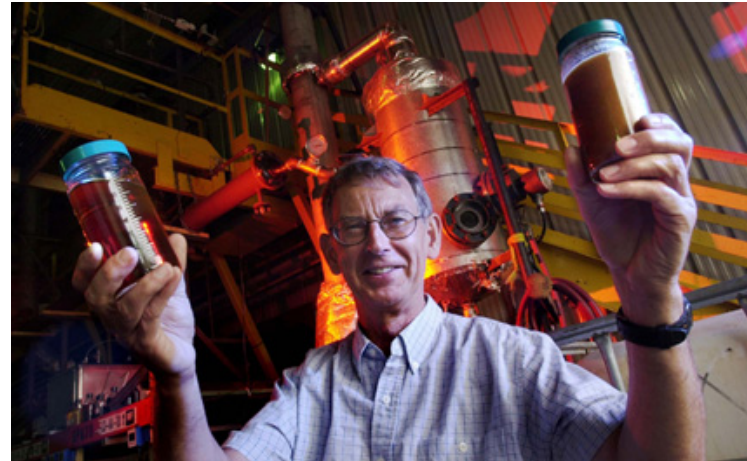
FuelMeister™

<http://biodieselsolutions.com/home/home.asp>



Home-made

http://journeytoforever.org/biodiesel_processor4.html



BIOX Process

Dr. David Boocock, U. of Toronto

<http://www.bioxcorp.com/>

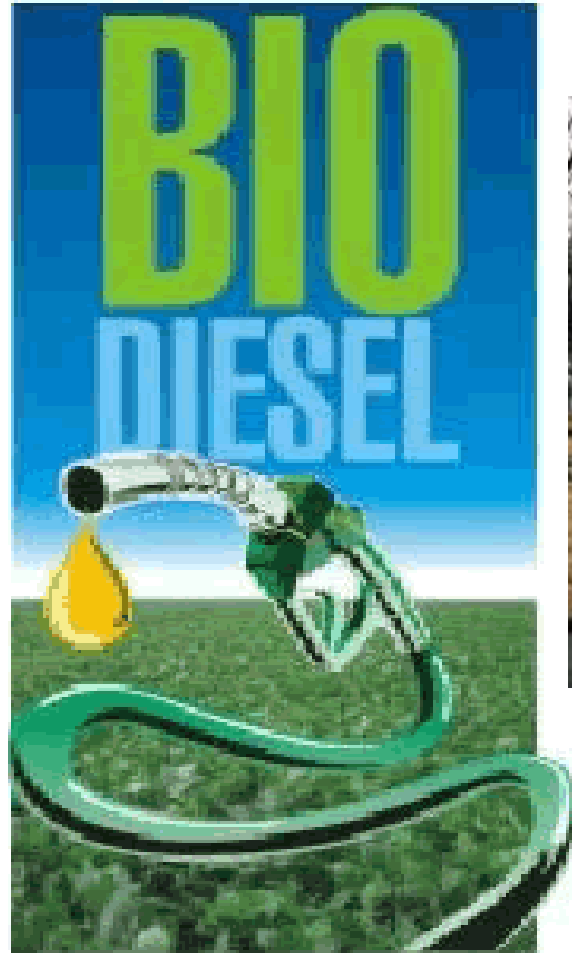


<http://www.esemag.com/0501/diesel.html>

Environmental Impacts of Biodiesel



<http://www.intertekcb.com/newsitete/st/news/images/biodieselfueling.jpg>



<http://www.tecpar.br/cerbio/imagens/Marca%20Biodiesel.gif>



[www.msenergy.ms/images/ Biodiesel%20bus.png](http://www.msenergy.ms/images/Biodiesel%20bus.png)

Biodiesel and Sustainability

Biodiesel is made from natural, renewable resources

<http://www.envisionag.com/Soybean%20Field.jpg>



Soybean, Corn, and
other Vegetable Oils



<http://www.mikeska.com/graphics/Fries.jpg>

Recycled
Cooking
Grease



http://www.gov.on.ca/OMAFRA/english/live/stock/beef/facts/info_maincattf3.jpg

www.discoveryfarms.org/.../harrison/pig.jpg

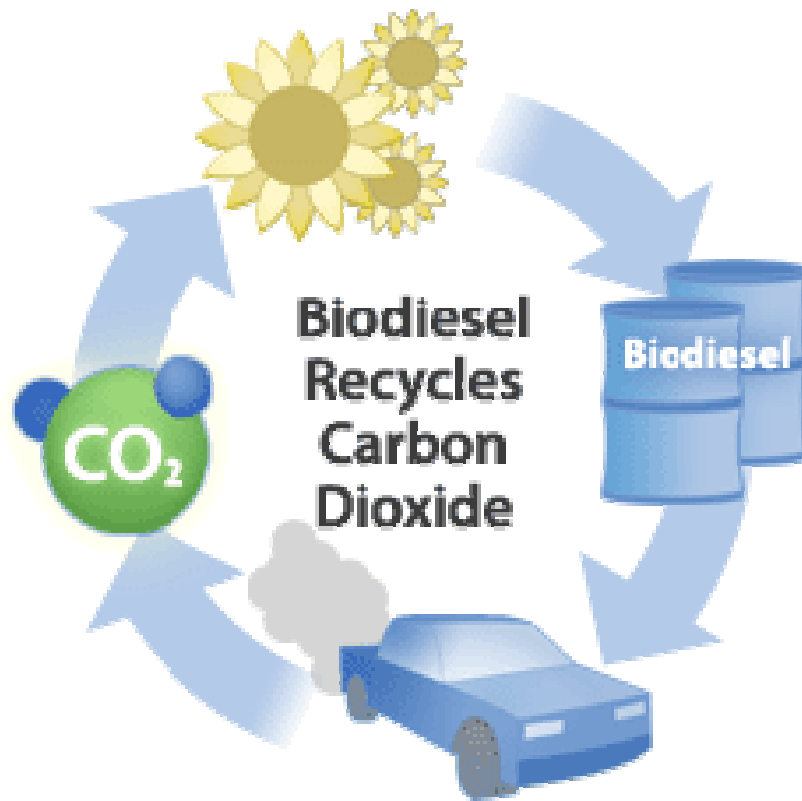


Fats, Lard and Tallow



Biodiesel

Biodiesel and Global Warming



www.vibesproject.ca/whatis_enviro.shtml

Biodiesel does **NOT** contribute to the problem of Global Warming

Carbon dioxide released after burning biodiesel is captured again by plants or animals.

The net carbon balance is zero



www.energea.at/images/raps.jpg

Biodiesel and Environmental Safety

Biodiesel is an all natural,
environmentally safe product

Table salt is ten times more
toxic than biodiesel!!!!!!

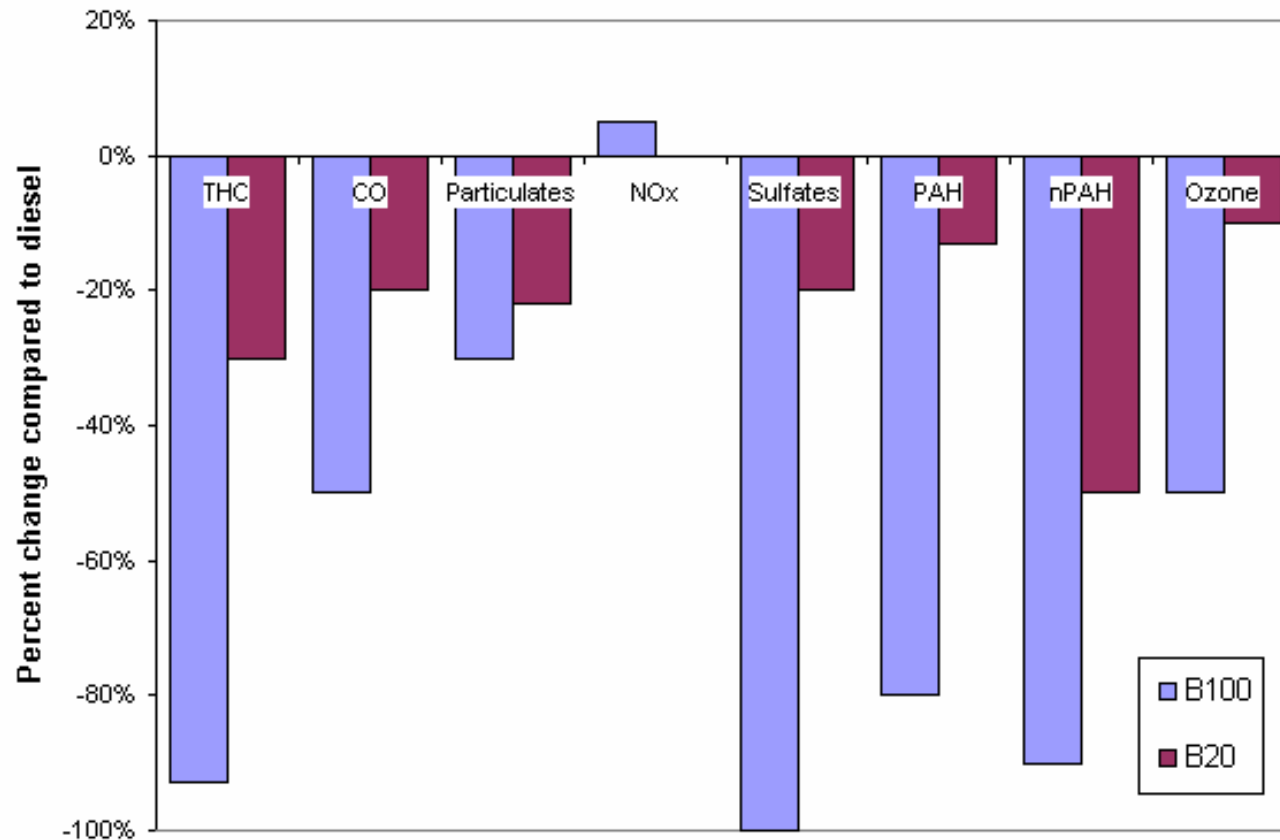
Biodiesel is safe to transport and store

Biodiesel biodegrades almost completely in
the environment in one month

Biodiesel produces much fewer emissions than
petroleum based diesel



Emissions Reductions as a result of using Biodiesel



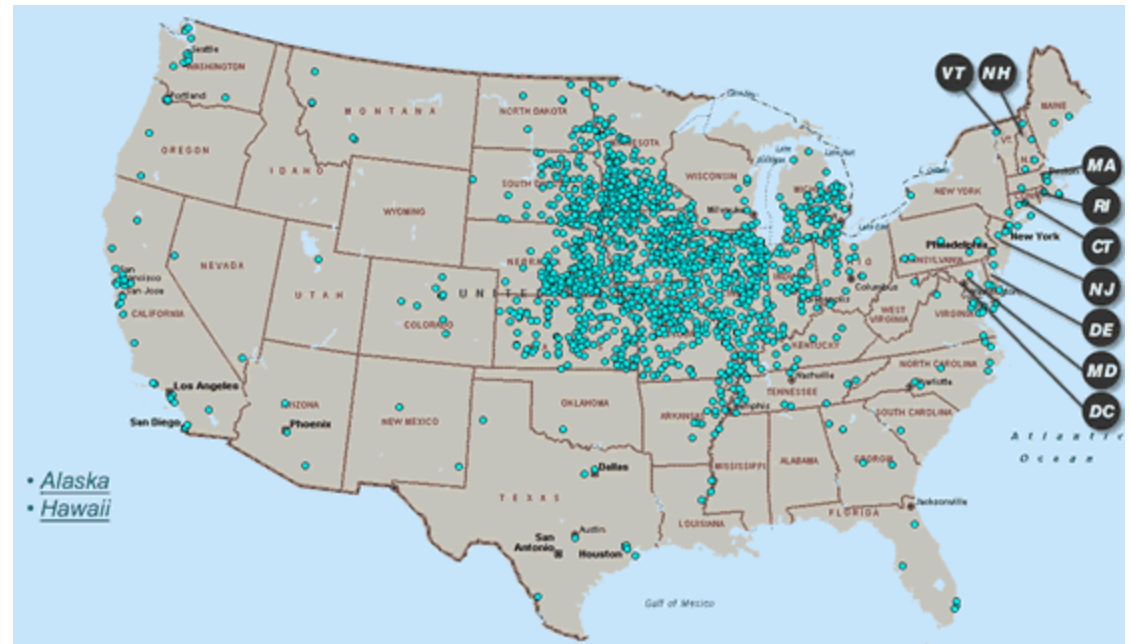
<http://www.gobiodiesel.org/tiki-index.php?page=BiodieselBasics>

Biodiesel in the United States

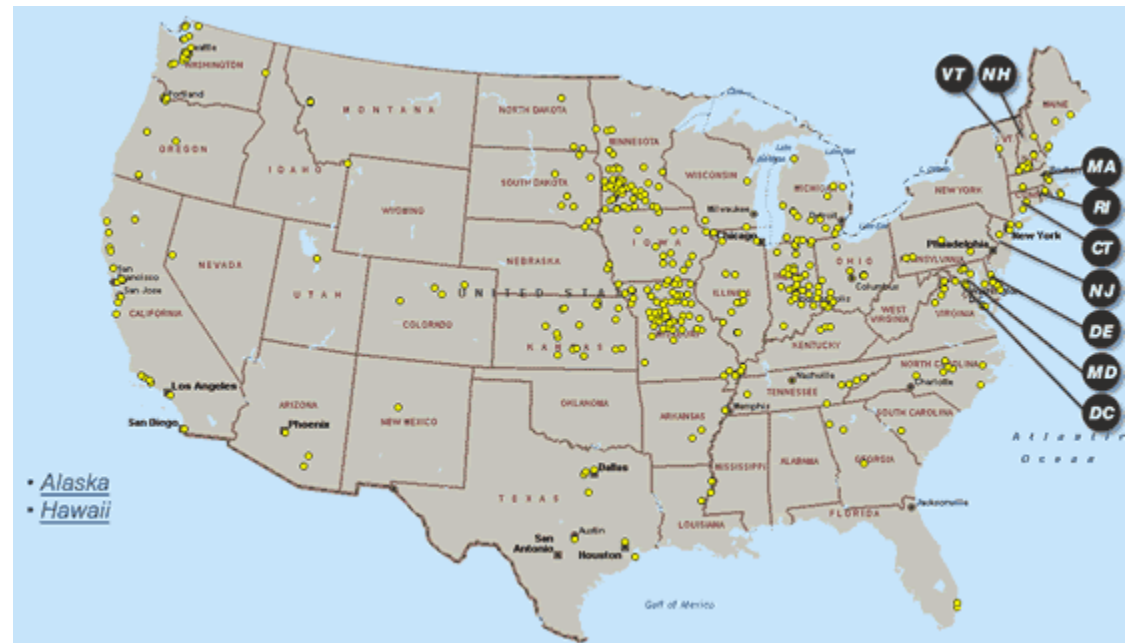


Source: http://www.jeffandcarol.com/images1/toweb/biodiesel_bus.JPG

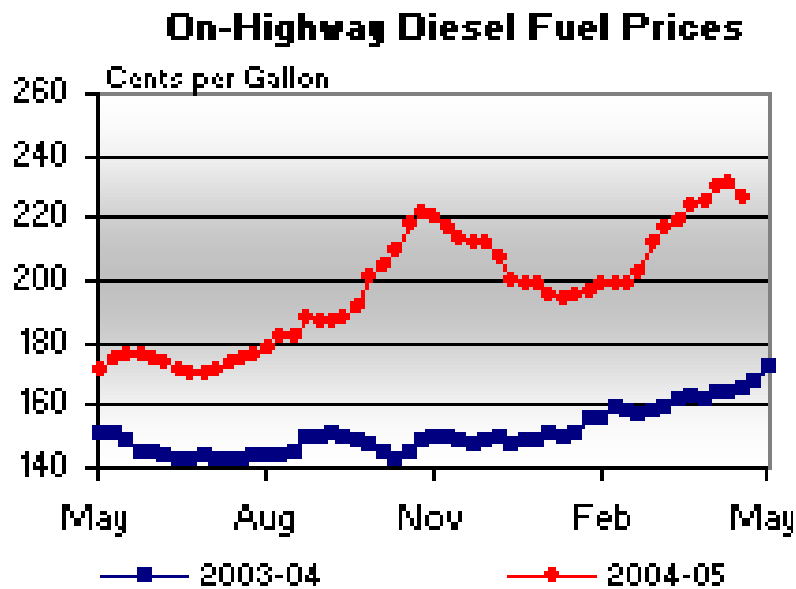
Biodiesel Distributors in U.S.



Biodiesel Retailers in U.S.

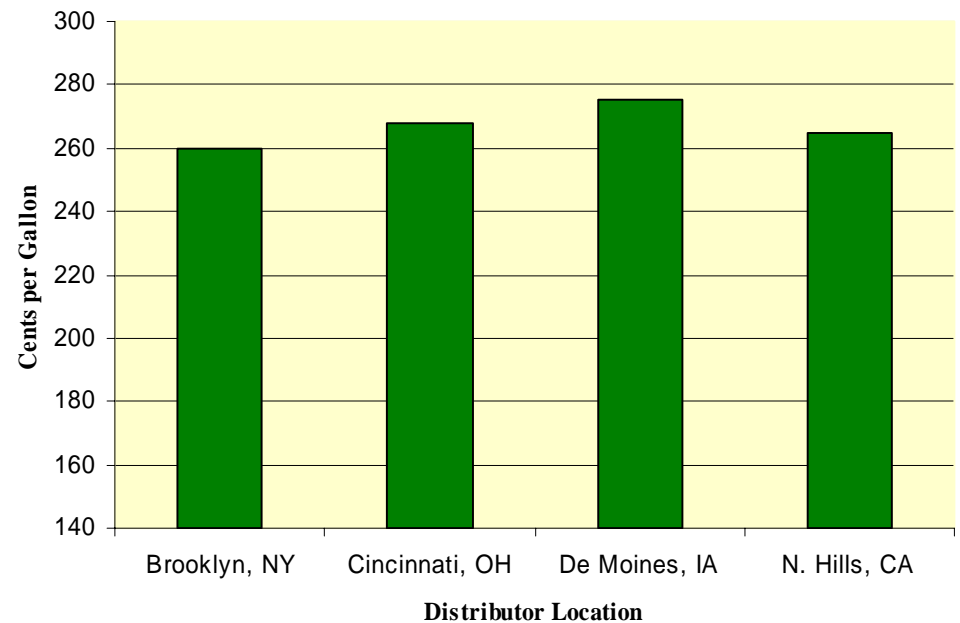


The Price Differential



Source: <http://tonto.eia.doe.gov/oog/info/gdu/gasdiesel.asp>

Current Prices for Pure Biodiesel



Government Regulations

- ASTM D 6751
- Biodiesel Fuels Credit (Form 8864)
- Clean Air Act Amendments (1990)
- Energy Policy Act (1992) and Amendments (1998)

The Navy



Source: http://www.military.cz/usa/navy/uss/carriers/stennis/jcs_battlegroup.jpg

- World's largest consumer of biodiesel

- June 1, 2005 deadline:

“These goals are intended to reduce the Nation’s dependence on foreign oil, to improve the nation’s air quality, and to exercise federal leadership in the use and development of alternative fuels.”

(Department of the Navy memo)

Biodiesel in Europe



EU Directives-2003

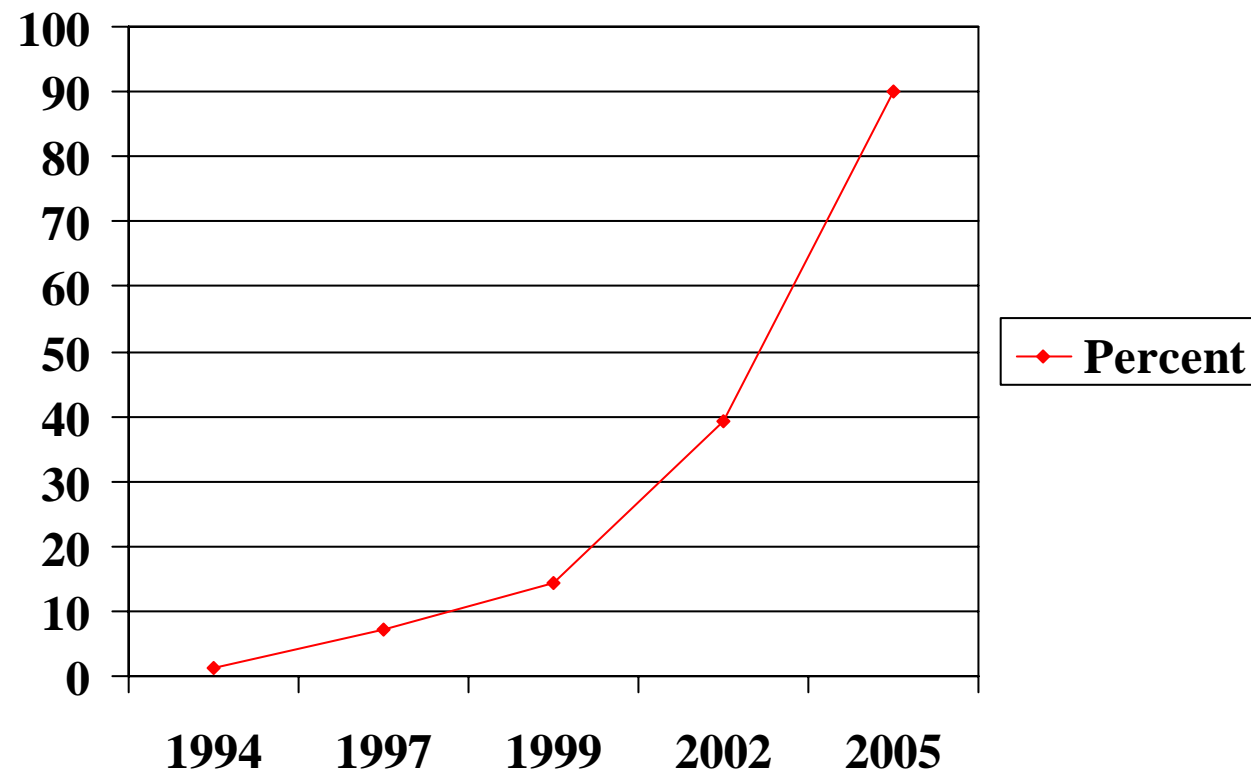
- tax treatment of biofuels
- alternative fuels provide up to 20% of automotive fuel by 2020.



Case Study: Graz, Austria



Percent of Biodiesel-powered Buses in Graz Fleet



Emissions

- Biodiesel emit less CO, CO₂, SO₂, and soot
 - 1460 kg less of CO
 - 1,250,000 kg less of CO₂
 - 1380 kg less of SO₂
 - 510 kg less of soot



Results

- Reduced harmful exhaust emissions
- Established frying oil as a renewable resource
- Created jobs
- Raised public opinion of Graz's public transportation system
- Need to change engine oil and oil filters twice as often
- Uses 6% more fuel



<http://www.trendsetter-europe.org/index.php?ID=1053>



<http://www.trendsetter-europe.org/index.php?ID=1055>

The Future of Bio Diesel

Where We Can
and Can't Go



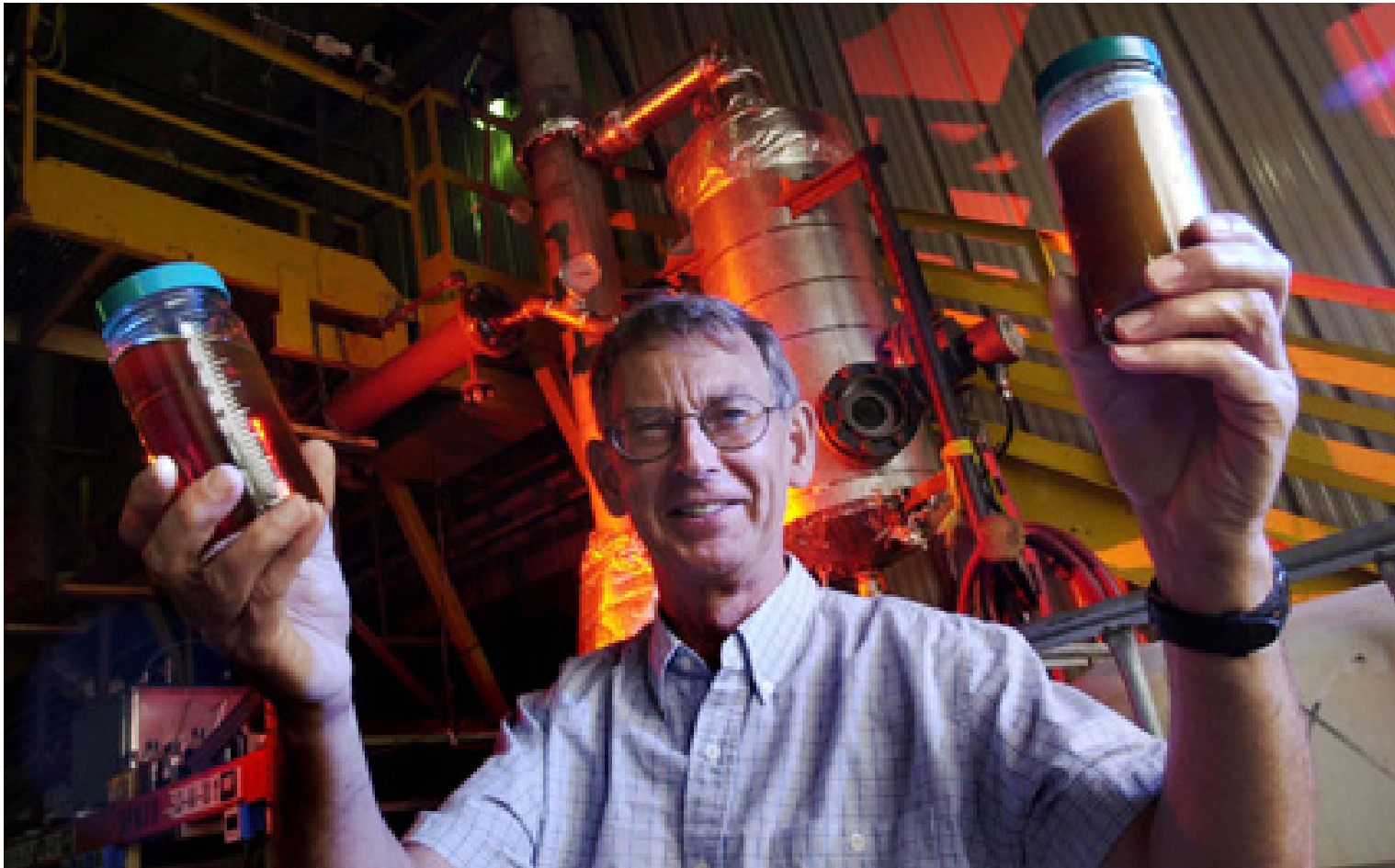
Bioxcorp.com

How We Can
Get There



Bioxcorp.com

The BIOX Process



Dr. David Boocock, Inventor of the BIOX process

www.bioxcorp.com

Public Transportation

- Major US Cities
- Public Busses
 - 559 Million Gallons of Diesel
- Increased Demand for BD



<http://nhts.ornl.gov/2001/presentations/polzin/Transit23B.jpg>

A Cleaner World



http://www.acme.com/jef/photos/08feb2003_sunny_day_2/mvc-3885.jpg

QUESTIONS?

