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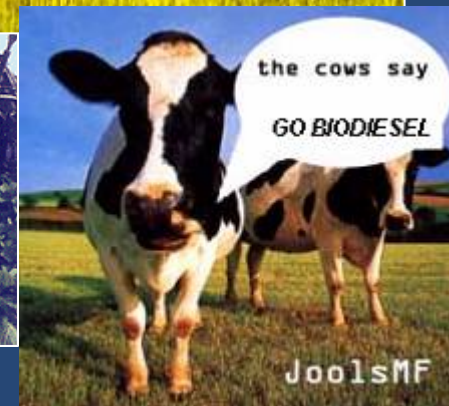
# Biodiesel Initiative Targeted Measure

Melanie Nadeau  
Natural Resources Canada  
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# Overview

- Background
- Opportunities
- Challenges
- NRCan Strategy
- Activities





# Background

- **Canada's Climate Change Action Plan**
  - Targeted Measure: 500 M litres/year production biodiesel by 2010
- **Biodiesel Initiative, announced in 2003**
  - Resource: \$ 11.9 M allocated to support programs that encourage wider usage of biodiesel
  - Purpose: to remove current technical and knowledge barriers to the commercialization and acceptance of biodiesel as an alternative transportation fuel in Canada
  - Final Outcome: to reduce GHG emissions for on-road and off-road vehicles through the use of biodiesel
  - Lead: CETC/NRCan and coordinated/managed through a cooperative effort with OEE/NRCan and Environment Canada





# Opportunities



- **Lower Emissions**
  - Reductions of CO, PM, HC, Sulfate, increase in NOx
- **Fuel Characteristics**
  - Free of sulphur and aromatics
  - Biodegradable, higher cetane number
- **Engine**
  - Improvement in lubricity
  - Extension of engine life?...
  - Burns in most engines, compatible
- **Economic Impacts**
  - Positive impact on agriculture and rural sectors
  - Industry interest – renderers, waste oils, greases





# Challenges



- **Feed stock supply**
  - Quantity, quality, cost, reliability
- **Fuel Quality**
  - Cold flow, fuel specs, stability
- **End-use**
  - Supply, distribution, applications, material compatibility
- **Lack of**
  - Successful industrial demonstrations and commercial production facilities
  - Established industry and infrastructure
- **Financing**
  - Economics, tax incentives/exemptions (~ 15-20% higher costs than conventional diesel)





# NRCan Strategy



- Public Awareness, Education and Outreach
  - Web-sites, publications, exhibits, outreach events
- Technical and Economic Assessments
  - Reports, advice, models
- On-road and Off-road End-User Technology Demonstrations
  - 5-10 end-use demonstrations
- Technical Information and Fuel Specifications
  - B2, B5, B20 and B100 emissions analysis, fuel specs, fuel property analysis
- International Technology Linkages
  - Joint studies, standards, technology transfer, shared knowledge
- Technology R & D and Pilot Plants
  - Improved feedstock, feedstock handling, process conversion, pilot plants



# Public Awareness, Education & Outreach

- NRCan is working with the Biodiesel Association of Canada (BAC) to create an industry association, including BAC website, and is participating in a biodiesel technical committee
- Completed a Q & A document as an educational tool to provide information on biodiesel to all stakeholders involved in biodiesel activities
- Through contributions made to various stakeholder associations, programs, and projects, awareness and education activities have been targeted to niche market user groups (e.g. agricultural community)





# Technical & Economics Assessments

- Provided input and review for 2 Canadian Agricultural New Uses Council (CANUC) reports
  - Assessment of the Opportunities & Challenges of a Bio-Based Economy for Agriculture & Agri-Food Research in Canada
  - Biodiesel and other chemicals from vegetable oils & animal fats
- “Status of Biodiesel in North America”
  - IEA Bioenergy Agreement (S&T)2 Consultants are preparing report, which is an update of a 200 report supported by the IEA
  - Comprehensive assessment, including GHG and more information and analysis on technology and economics
- “Canadian Biodiesel Initiative: Aligning Research Needs and Priorities With the Emerging Industry”
  - Provided as part of the Implementation Strategy for a National Biodiesel Research Initiative,
  - BIOCAP assessment of research gaps & priorities related to biodiesel development



# End-User Technology Demos

- **Biodiesel End-Use Survey**
  - Entitled “Early Adopters of Biodiesel”, was sent out to biodiesel end users
  - Results from survey used to provide picture of biodiesel end-use in Canada, will help in coordination of future demos
- **Biodiesel Byway**
  - Project established with FIBA Canning Inc., to encourage the use of biodiesel as an alternative fuel for long-haul commercial transport applications
  - Identify and address problems in vehicle operation, fuel blending, sourcing & handling, cold weather operations
  - Emissions & fuel efficiency testing on all 3 rigs



# End-User Technology Demos (Cont'd)

- **Biomer**
  - A 9-month project underway beginning June 2004, in which 12 cruisers from 4 different companies are running on biodiesel
  - Demonstration of biodiesel as a viable alternative for fueling boats of various sizes/types in tourist-intensive areas
  - Project follows a four-level implementation: determining fuel characteristics, measuring emissions, measuring engine performance, and measuring biodegradability and toxicity



# End-User Technology Demos (Cont'd)

- **Future Truck 2004 Student Challenge**

- Support of the U of Alberta Engineering team that are using a biodiesel fuel blend in the 2004 Challenge
- Along with information packages, displays and presentations, vehicle was used as a showcase at various events throughout Western Canada to promote biodiesel as a transport fuel



- **Vehicle Fleet**

- NRCan purchased two VW Jettas for use in its vehicle fleet
- Jettas will run on biodiesel blends for internal promotion of biodiesel
- Biodiesel fuel storage tank installation and fully-functional at NRCan car pool facility





# Technical Info & Fuel Specs

- “Centre of Excellence”
  - Alberta Research Council and NRCan is working together to develop a fuel quality assurance program for biodiesel end-users and to establish an industry protocol and standards for fuel analysis
- Ocean Nutrition, Mulgrave, NS
  - Demonstration of a new feedstock, fish-oil, to produce biodiesel
  - Environment Canada’s ERMD is leading work to establish fuel properties, emissions and performance for the fish-oil based biodiesel
- The Canadian General Standards Board (CGSB)
  - Working together with NRCan to develop a fuel quality standard for biodiesel
- Biodiesel Safety Assessment: Toxicity
  - Generate toxicity data required for the safety assessment of combustion emissions of engines operating on biodiesel
  - Toxicity tests, performed by Health Canada, collected on 8 highway trucks running on canola based B100 and B20, and D100.





# International Technology Linkages

- **Biosafety Assessment: Animal Fat in Biodiesel**
  - ATFCan is examining the health effects related to biodiesel use focusing on answering key questions and quantifying risk levels
  - Key areas of interest include: prions, viruses, bacteria, heavy metals, dioxins, antibiotics
- **NBB Cold Flow tests**
  - Objective is to accurately determine what temperatures biodiesel and #1 & #2 diesel will blend at different blend rates within acceptable standards
  - Document and review each proposed blend scenario at different temperatures for truck rack loading into top and bottom loading transports
  - Provide results and offer suggestions for B100 blending parameters
- **IEA Bioenergy Task 39, VIEWLS**
  - Support to Chair of IEA Task 39, Liquid Biofuels, to ensure Canadian representation
  - Synthesis of data and recommendations from international efforts, primarily the VIEWLS database, to predict socio-economic, environmental, and security implications of domestic biofuels production

URL: <http://viewls.viadesk.com/>



# Technology R&D and Pilot Plants

- **Feedstock:**
  - Report on the potential availability of oilseed crops for biodiesel production, particularly green canola, and other potential low cost feedstocks will be prepared in cooperation with stakeholders
  - Research program being put together with stakeholders to develop higher oil yield varieties of rape, soya, and other commercial oil seed crops, including mustard and choke cherry



# Technology R&D and Pilot Plants (Cont'd)

- **Processes:**
  - Research projects with Ontario Ministry of Agriculture & Food (OMAF) and with:
    - U of T to examine the optimization of the biodiesel esterification process using ethanol/methanol mixtures
    - University of Guelph to investigate the conversion of co-product glycerol to value added products
  - CETC has developed a Super Cetane Technology that uses hydrotreating technology to convert oil feedstocks to a high cetane diesel additive. Work is underway to optimize the hydrogen utilization and fuel component of this process
  - Discussions underway with stakeholders about other technical options to produce diesel from biomass with the intent to develop technology development projects in these areas (I.e. Fischer-Tropsch synthetic diesel)





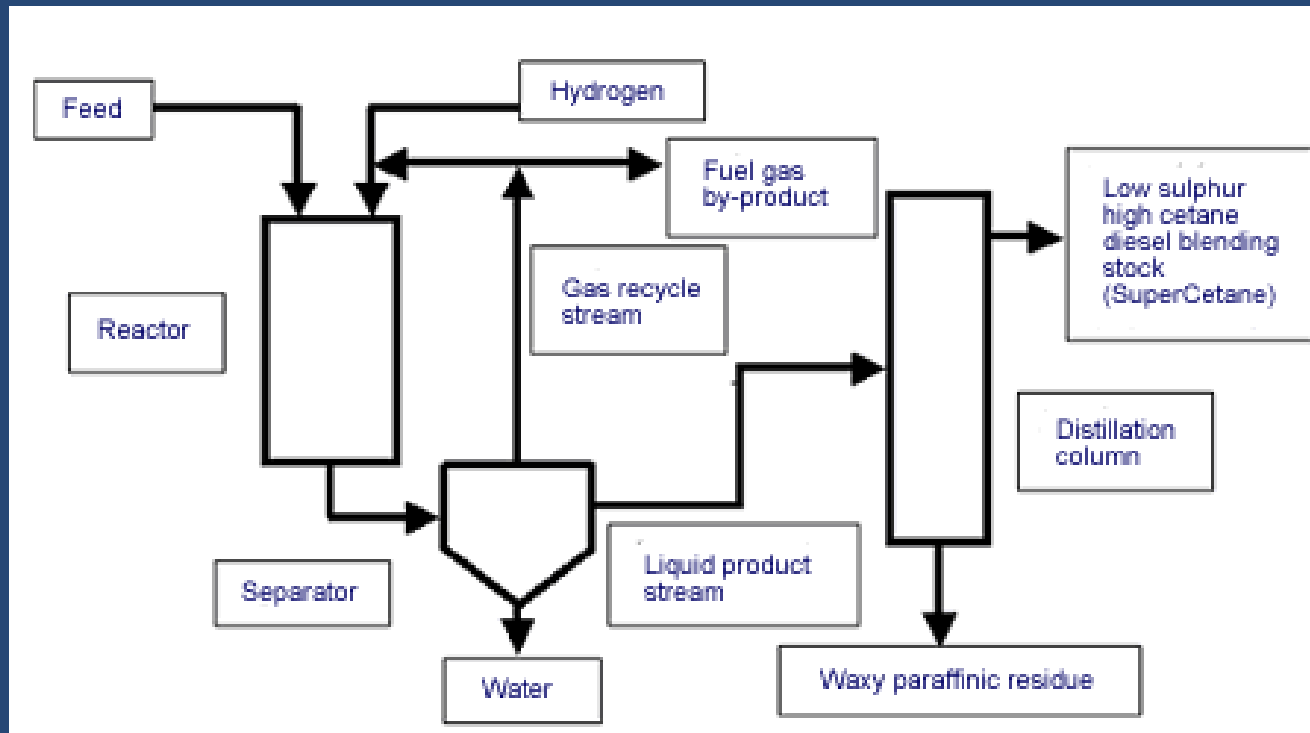
# THANK-YOU

Melanie Nadeau  
[Menadeau@nrcan.gc.ca](mailto:Menadeau@nrcan.gc.ca)  
(613) 947-2370

Ed Hogan  
[Ehogan@nrcan.gc.ca](mailto:Ehogan@nrcan.gc.ca)  
(613) 996-6226



# CETC Super Cetane Technology



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