New Holland’s Biodiesel Experience
The Strategic Importance of Biofuels

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Topics

- New Holland position and importance of biofuels
- Our experiences
- The future
Part of the circle of life ...

Sun, Soil, Seed  ➔  NH Products  ➔  New Holland products are used to produce biofuels

Crops ➔  Biofuels  ➔  New Holland products and customers use biofuels
Biofuels support agriculture

Input cost to our customer with limited return
- Non-renewable
- Outgoing expense
- No return

Investment in our customers’ future
New Holland’s position on biofuels

Milestones

- **May 06** – “NH Leads the Biodiesel Revolution” – first manufacturer to fully approve B20
- **May 06** – TM tractor endurance trial with B100 (France)
- **June 06** – Penn State begins operating NH tractors with B100
- **January 07** – B100 approved for NH engines with mechanical fuel systems tractors
- **March 07** – NH biodiesel SIMA
- **April 07** – NH is selected as preferred equipment supplier of Eden Project thanks to environmentally friendly brand image and biodiesel commitment
- **October 07** – B100 approved for NH engines with high-pressure, common rail fuel systems. Detailed service and marketing buleting distributed to dealers with biodiesel usage guidelines.
New Holland’s future: B100 ready

When quality and availability of B100 is acceptable and consistent, New Holland engines will be ready!
Biodiesel evaluation program

Significant concerns

- Fuel filter plugging
- Upper cylinder wear, high piston temperatures
- Open or plugged injectors
- Oil dilution
- Fuel system material incompatibility
- Unstable fuel storage
- Affects on engine power, torque and fuel consumption
- Cold weather starting, run-up, smoke
- Commercial fuel quality
- Fuel handling and storage practices
Biodiesel evaluation program

Evaluation process

- Lab analysis & endurance testing
- In-vehicle field testing
- Material compatibility evaluation
- Analysis of fuel system materials
- Biodiesel storage evaluation
- Evaluation of injection system components
- Customer evaluations
Biodiesel evaluation program

40,000+ hours with a fleet of 70 tractors running on B100 biofuel

- Fuel quality
- Care handling biodiesel
- Storage precautions
- Perform regularly scheduled maintenance
  - Engine fuel filter
  - Precautions
  - Reduced oil, oil filter, and fuel filter change intervals
Reduction in power & torque:

- B5 = Negligible
- B20 = ~3%
- B100 = ~10%
Lyman Dellinger, NH Regional Service Manager
“Walks the walk”

Uses blends of up to B100 in his New Holland tractors and 1982 Mercedes diesel auto
“I am elated that New Holland has taken this step to show support for biodiesel, a farmer-grown fuel. Their customers asked for it and they listened.”

Ed Hegland
Soybean grower & biodiesel supporter
Appleton, Minn.
**Biofuels outlook**

*Major policies*

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**Energy security**

- Reduce dependency on petroleum-based energy sources
- Diversify energy sources

**Environmental policies**

- Reduce criteria emissions at local, urban, metropolitan, and national levels
- Reduce greenhouse gas emissions

**Agricultural policies**

- Create new markets for agricultural crops
- Reduce subsidies

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Source: 2007 Global Insight Energy & Biofuels Outlook
Biofuels strategy

Strategy so far is based on oilseed biodiesel

- Oilseed-based biodiesel has some unanswered questions
  - Long term economic viability
  - Competition with food production
  - Energy conversion rates

- Next generation trend towards non-edible oil crops

- Other biofuel possibilities are emerging. It is likely several alternative solutions will be implemented in different areas around the globe.
New Holland biomass harvesting & handling
New Holland biomass harvesting
Corn stover

- **Multi-pass process**: more jobs during harvest

- **Densification**: current balers can only provide about 50% of potential GVW

- **Cleanliness**: soil in material is negative

- **Moisture content**: difficult to dry material in fall

- **How much residue should remain on the field?**
New Holland biomass harvesting

*Dedicated energy crops*

**Short-rotation woody crops**
SUNY research: using forage harvester for co-fire chips directly feeds a power plant

**Switchgrass**: “pelletizing” eventual use for ethanol

**Miscanthus**: similar to switchgrass with potentially higher yields

*Miscanthus*  
*Switchgrass*  

*Short-rotation woody crops*
New Holland biomass harvesting

**Cellulosic crops**

**High-tonnage sorghum**
- Long canopy duration
- Drought tolerant
- High biomass accumulation (expect >15-20 tons/acre)

**Energy canes**
- Sub-tropical production
- High water demand
- High biomass accumulation (20+ tons/acre)

**Grasses**
- Drought tolerant
- Marginal lands
- Medium biomass accumulation (5-10 tons/acre)
New Holland : Leading the biodiesel revolution

- For nearly two decades, we have recognized the benefits of biodiesel
- We are proud of the relationships
- New Holland is ready for B100
- No intention to stop with the work done to date; exploring the next generation fuels
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