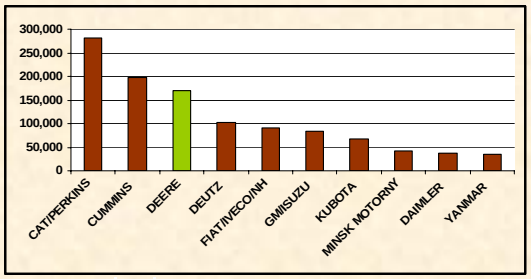
ENERGY 2003

12 August, 2003

AGENDA TOPICS

- **Deere CNG Background**
- **Technology - *today and tomorrow***
- **Applications**
- **Product Support**

2001 OFF-HIGHWAY DIESEL PRODUCTION (50-600 HP)



DEERE NATURAL GAS - ON-HIGHWAY

Production released in 1996

- **In response to industry need for reliable/high performance NG engine**
- **Initial product development began in 1994**
  - **Original design incorporated today's advanced technology**
  - **Generated 1.6 million test miles prior to production**
  - **Testing validated design and drove successful product launch**

DEERE NATURAL GAS - ON-HIGHWAY

6081 NG engine built off of Diesel Heritage

- **Diesel ratings up to 375 HP / 1007 Lb-Ft**
- **Leader in Agricultural market - 70% plus Load Factor**
- **Construction equipment (4WD Loaders / Excavators / Skidders)**
  - **Variability in speed and loading**
  - **Abusive environment**
- **Focused approach - transit style school bus only!!!**
  - **CNG - 250 HP @ 800 Lb-Ft (4 gr NOx)**

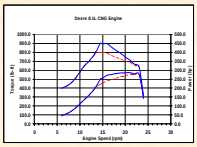
DEERE NATURAL GAS - ON-HIGHWAY

Outstanding customer acceptance drove release to other key applications

- **Medium Duty Truck market - 2000**
- **Refuse Truck market - 2001**
- **40' Transit Bus market - 2002**

ON-HIGHWAY CNG ENGINES

6081HFN
Truck
275 HP @ 800 Lb.Ft.
280 HP @ 900 Lb.Ft.



6081HFN
Bus
250 HP @ 800 Lb.Ft.
280 HP @ 900 Lb.Ft.

JOHN DEERE POWER SYSTEMS

AGENDA TOPICS

- Deere CNG Background
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JOHN DEERE POWER SYSTEMS

DEERE NATURAL GAS ENGINES

Customer Expectations of Deere CNG Engines

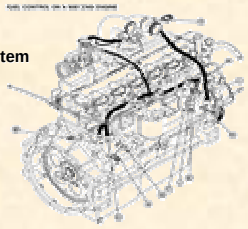
- Diesel-like:
  - Driveability
  - Reliability
  - Cost of Ownership
    - » Fuel Economy
    - » Maintenance
    - » Durability
  - Serviceability

JOHN DEERE POWER SYSTEMS

DEERE PRODUCT FEATURES

Advanced Technology!

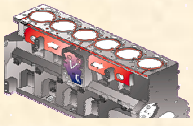
- 8.1L based on heavy-duty diesel engine platform
- Unique cylinder head
- Lean burn combustion
- Full authority electronic control system
  - Closed loop fuel control
  - Adaptive learn
  - Knock Detection
  - Humidity Sensor
  - Engine Protection



JOHN DEERE POWER SYSTEMS

HEAVY-DUTY DIESEL ENGINE PLATFORM

- 8.1 NG engine utilizes diesel bottom-end
  - Block
  - Crankshaft
  - Large bearing areas
  - Connecting Rods
  - Hardened Wet Liners
  - Low Mount Oil Pump



- Top Liner Cooling
  - Lowers upper-liner temperature significantly improving life of the power cylinder and head-to-block joint

JOHN DEERE POWER SYSTEMS

LEAN BURN COMBUSTION

Delivers diesel-like engine thermal efficiency

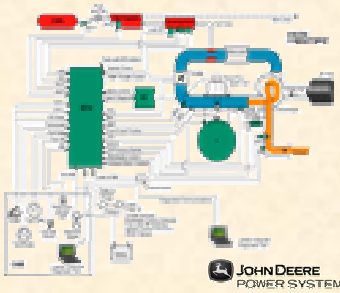
- Fuel Consumption (dge) basis
- Heat rejection similar to diesel
  - Less heat results in less thermal stress!
  - Lower under-hood temperatures
  - Cooling system package size and cost

JOHN DEERE POWER SYSTEMS

FULL AUTHORITY ELECTRONIC CONTROL SYSTEM

- **Adapts to variant ambient conditions – monitors engine and parameters to maximize engine efficiency**

- Closed Loop Fuel Control
- Adaptive Learn
- Knock Detection
- Humidity Sensor
- Electronic Features



JOHN DEERE POWER SYSTEMS

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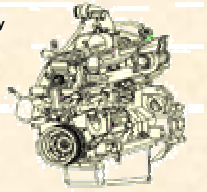
DEERE PRODUCT FEATURES

HFN04 – Next Generation Technology!

- **Deere proprietary controller**
  - **Processing speed – calibration flexibility**
  - **Electronic features demanded by on-highway applications**
- **Combustion design improvements**
  - **Piston**
  - **Air management**
- **Incorporates new high volume/reliable engine components**
- **Engine performance enhancements**
- **LNG / CNG Capable**
- **Platform for emission reduction**



JOHN DEERE POWER SYSTEMS

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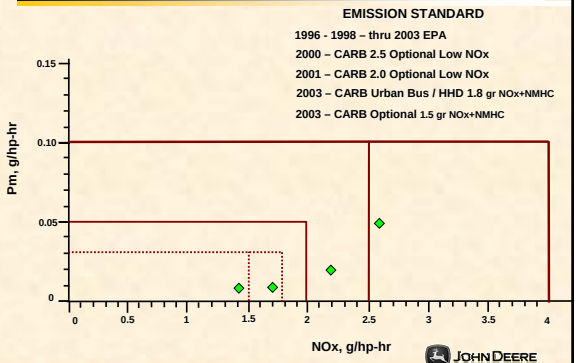
DEERE EMISSION REDUCTION



JOHN DEERE POWER SYSTEMS

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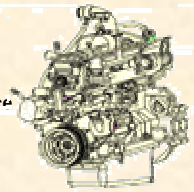
TECHNOLOGY CONCLUSIONS

- **Deere NG engines utilize comparable sized diesel engine installation accessory components**
  - Heat rejection comparable to diesel
  - Intake and exhaust flows comparable to diesel
- **When properly geared, Deere CNG engines provide outstanding performance**
- **Deere NG engines have demonstrated diesel-like operating economics**
  - Reliability
  - Fuel economy
  - Maintenance costs



JOHN DEERE POWER SYSTEMS

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JOHN DEERE POWER SYSTEMS

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COMMERCIAL APPLICATIONS

Transit Style School Bus

Commercial Bus

40' Transit Bus

Class 6 / 7 / 8 Trucks

Refuse Trucks

JOHN DEERE POWER SYSTEMS

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SCHOOL BUS APPLICATIONS

BlueBird

Thomas

. Type D Transit style school bus was first on-highway market for Deere CNG engines

- Production released in 1996
- 8.1 250 HP @ 800 Lb-Ft **(Optional 1.5 gr NOx+NMHC)**
- Overwhelming customer acceptance
  - » Deere CNG engines have built a strong reputation for delivering diesel-like fuel economy and cost of ownership
  - » Deere currently enjoys ~100% NG share of this market

COMMERCIAL BUS

Blue Bird Q-Bus
29' and 35' Configurations

Thomas Bus - Transit Liner

- **8.1 (250 HP @ 735 Lb-Ft)** **Optional 1.5 gr NOx+NMHC / 1.8 gr NOx+NMHC Urban Bus standard**

HEAVY-DUTY TRANSIT BUS

250 HP @ 735 Lb-Ft // 280 HP @ 900 Lb-Ft **1.8 gr NOx+NMHC Urban Bus standard**

MetroLink – Rock Island

Atlanta Metro Transit

Washington Metro Transit

CLASS 7 / 8 TRUCKS

Freightliner FL 70

- Utility, Dump, P & D Applications
  - **8.1 (250 HP @ 800 Lb-Ft)** **Optional 1.5 gr NOx+NMHC July 2003**

REFUSE TRUCKS

Crane Carrier LCF & LET2

- Front Loader / Side Loader / Rear Loader applications
  - 275 HP @ 800 LB-FT Allison MD **Optional low 1.8 gr NOx+NMHC**
  - 280 HP @ 900 LB-FT Allison HD **Optional low 1.8 gr NOx+NMHC**
- **CNG and LNG Capable!!**

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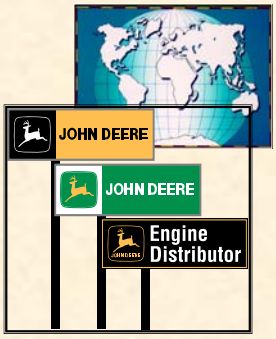
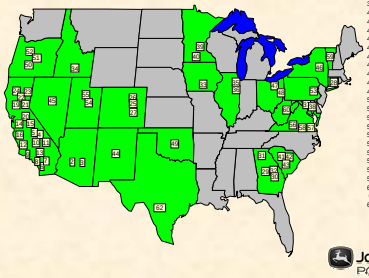
"Providing Value to Customers Through Product Support"



- Over 4000 Dealers Worldwide
- Parts Communication System Providing Delivery Within 24 Hours in the U.S.
- Dealer Technical Assistance Centers Provide 24 Hour Assistance (DTAC)
- Training Facilities and Materials
- Extended Warranties For Guaranteed Reliability

NATURAL GAS SERVICING DEALERS

1.) RDO Eqp
2.) Auto Safety House
3.) Empire Eqp.
4.) California Bus Sales
5.) Coastline Eqp.
6.) RDO Eqp.
7.) A-Z Bus
8.) Western Engine Dist.
9.) Coastline Dist.
10.) South Kern Machinery
11.) Western Engine Dist.
12.) Coastline Eqp. Co.
13.) Coastline Eqp. Co.
14.) Nortrax West
15.) Nortrax West
16.) Nortrax West
17.) Nortrax West
18.) Nortrax West
19.) CN Power Systems
20.) A-Z Bus Sales Inc.
21.) Nortrax West
22.) Nortrax West
23.) Mid Valley Tractor Co.
24.) Nortrax West
25.) Honnan Eqp. Co.
26.) Colorado Machinery
27.) Colorado Machinery
28.) Bell Power Systems Inc.
29) Blue Bird Co.
30.) Blue Bird Co.
31.) Metrac Inc.
32) Metrac Inc.
33.) Northstar Power
34.) Idaho Bus Sales
35.) Westside Tractor Sales



36.) Midwest Transit Eqp. Inc.
37.) Atlantic Trans. Eqp. LTd.
38.) Standard Eqp. Co.
39.) Grande Amercian
40.) RDO Eqp. Co.
41.) North American Engine. Co.
42.) R.W. Moore Eqp. Co.
43.) R.W. Moore Eqp. Co.
44.) Tom Growney Eqp.
45.) Empire Eqp.
46.) Five Star Eqp.
47.) Mahnen Machinery Inc.
48.) Mahen Machinery Inc.
49.) Hanley Power
50.) Hessel Tractor & Eqp. Co.
51.) Western Bus Sales
52.) Hessel Tractor & Eqp. Co.
53.) Plasterer Eqp. Co. Inc.
54.) Bryson Sales & Service
55.) Scott Machinery Co.
56.) James River Eqp.
57.) Coastal Eqp. Corp.
58) Coastal Eqp. Corp.
59.) Grappone Industrial Inc.
60.) Matheny Motor Truck Co.
61) NGVEcotrans
62) RDO – San Antonio

NATURAL GAS TRAINING

- 1250+ students trained!!
- 3 trainers on staff at JDPS
  - On-site with property/ fleet vehicle
  - Waterloo (factory)
  - Third party facility with mobile stand for hands-on training

DEERE NATURAL GAS ENGINE

Service Intervals

Oil/ Filter change:	12 months / 25,000 miles (Low sulfated ash oil 0.5 to 1.0%)
Clean & Gap Plugs	12 months / 25,000 miles
New Spark Plugs:	24 months / 50,000 miles
Adjust Valve Lash:	24 months / 50,000 miles
Water Filter	Not Required

Diagnostics

Computer Aided:	Trouble-shooting simplified

Warranty

School Bus - 5 years / 100,000 miles
Transit Bus - 2 years / unlimited miles
Trucks - 2 years / 150,000 miles
Extended Warranties Available!

Our Commitment to Natural Gas Technology Advancement, Customer Satisfaction, and a Cleaner Environment

Genuine Value