DEERE NATURAL GAS - ON-HIGHWAY

COMMERCIAL APPLICATIONS

AGENDA TOPICS

- Product Profile
- Technology
- Commercial Applications
- Product Support
- Future Direction

DEERE NATURAL GAS ENGINES

Customer Expectations of Deere CNG Engines

- **Dedicated Natural Gas**
- **Reduced Emissions (NOx & PM):**
- **Lowest Cost of Operation**
  - **Fuel Economy**
  - **Maintenance**
- **Diesel Like:**
  - **Driveability**
  - **Reliability**
  - **Serviceability**

TECHNOLOGY

Dedicated Natural Gas Engine

- **Lean Burn Combustion**
- **Full Authority Electronic Control System**
  - Closed loop fuel control
  - Adaptive learn
  - Knock Detection
  - Humidity Sensor
  - Engine Protection
- **Unique Cylinder Head**

FULL AUTHORITY ELECTRONIC CONTROL

- **Adapts to variant ambient conditions**
- **Continually monitors engine and parameters to prevent against over-fueling**
  - Closed loop fuel control utilizes a wide range oxygen sensor to maintain a consistent air-to-fuel ratio
  - Adaptive learn learns, then adjusts the engine to changing ambient conditions, fuel quality, and driving conditions
  - Knock detection sensor provides engine protection with poor fuel quality excursions (low octane)
  - Humidity sensor adjusts the engine to changing ambient conditions eliminating misfire
  - Engine protection system de-rates the engine for high coolant temperature and low oil pressure

ON-HIGHWAY CNG ENGINES

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

6081HFN
Bus
250 HP @ 735 Lb.Ft.
250 HP @ 800 Lb.Ft.
280 HP @ 900 Lb.Ft.

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 Warranty Available!

COMMERCIAL APPLICATIONS

Transit Style School Bus

Commercial Bus

40' Transit Bus

Class 6 / 7 / 8 Trucks

Refuse Trucks

SCHOOL BUS APPLICATIONS

BlueBird

Thomas

- **Type D Transit style school bus was first on-highway market for Deere CNG engine**
  - Production released in 1996
  - **8.1 250 HP @ 800 Lb-Ft (Optional 2.5 g NOx)**
  - Overwhelming customer acceptance
    - » Deere 8.1 has built a strong reputation for delivering diesel-like cost of ownership
    - » Deere currently enjoys ~100% share

COMMERCIAL BUS

Blue Bird Q-Bus

29’ and 35’ Configurations

ElDorado E-Z Rider

Low Floor 30 - 35’ Configurations

- **8.1 250 HP @ 735 Lb-Ft**
- **Optional 2.5 g NOx**

HEAVY DUTY TRANSIT BUS

Orion Bus Operated by Queens Surface Transit

New Flyer Bus Operated by Atlanta Metro Transit

Los Angeles Metro Authority

- 280 HP @ 900 Lb-Ft
- Optional 2.0 g NOx Certificate

MEDIUM DUTY TRUCKS

Freightliner FL 70

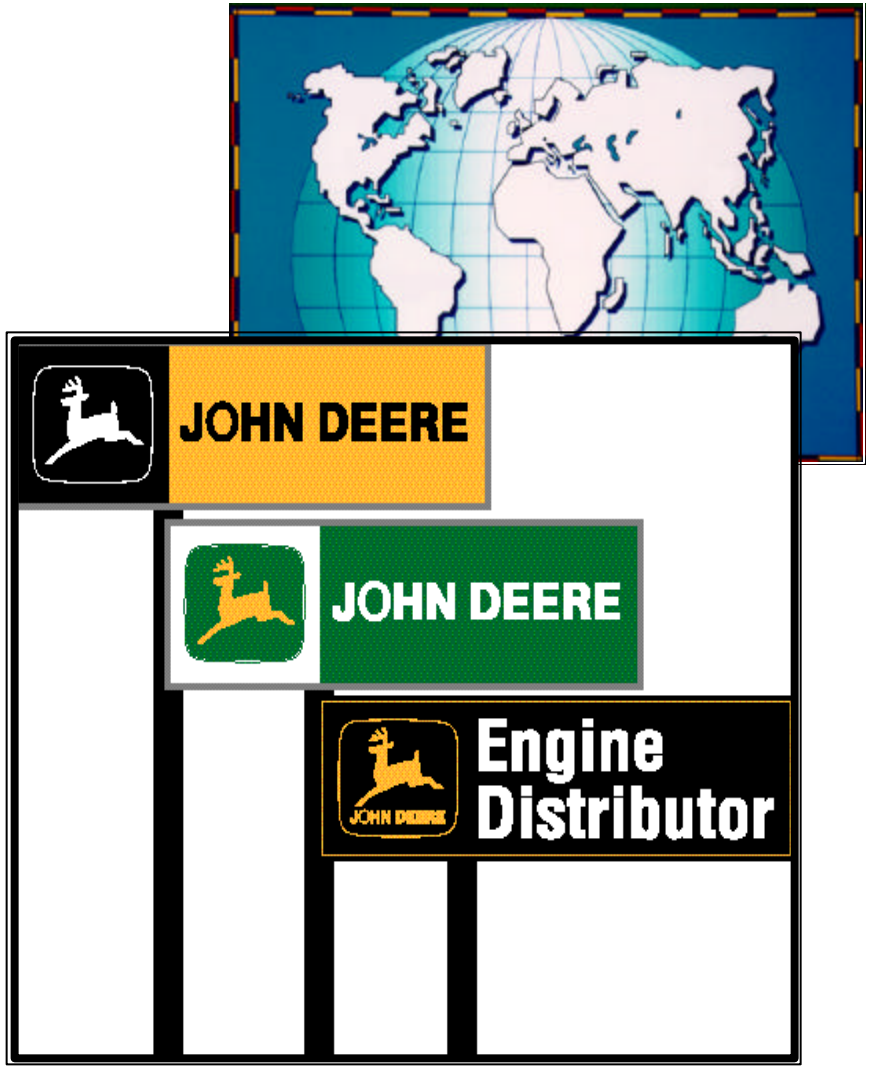
- **Limited production released Q1, 2002**
  - Utility, Dump, Beverage, and P & D Applications
  - **8.1 250 HP @ 800 Lb-Ft**
  - **Optional 2.5 g NOx**

REFUSE TRUCKS

Crane Carrier LCF & LET2

- Front Loader / Side Loader / Rear Loader applications
  - **275 HP @ 800 LB-FT Allison MD**
  - **280 HP @ 900 LB-FT Allison HD**
  - **Optional 2.0 g NOx**

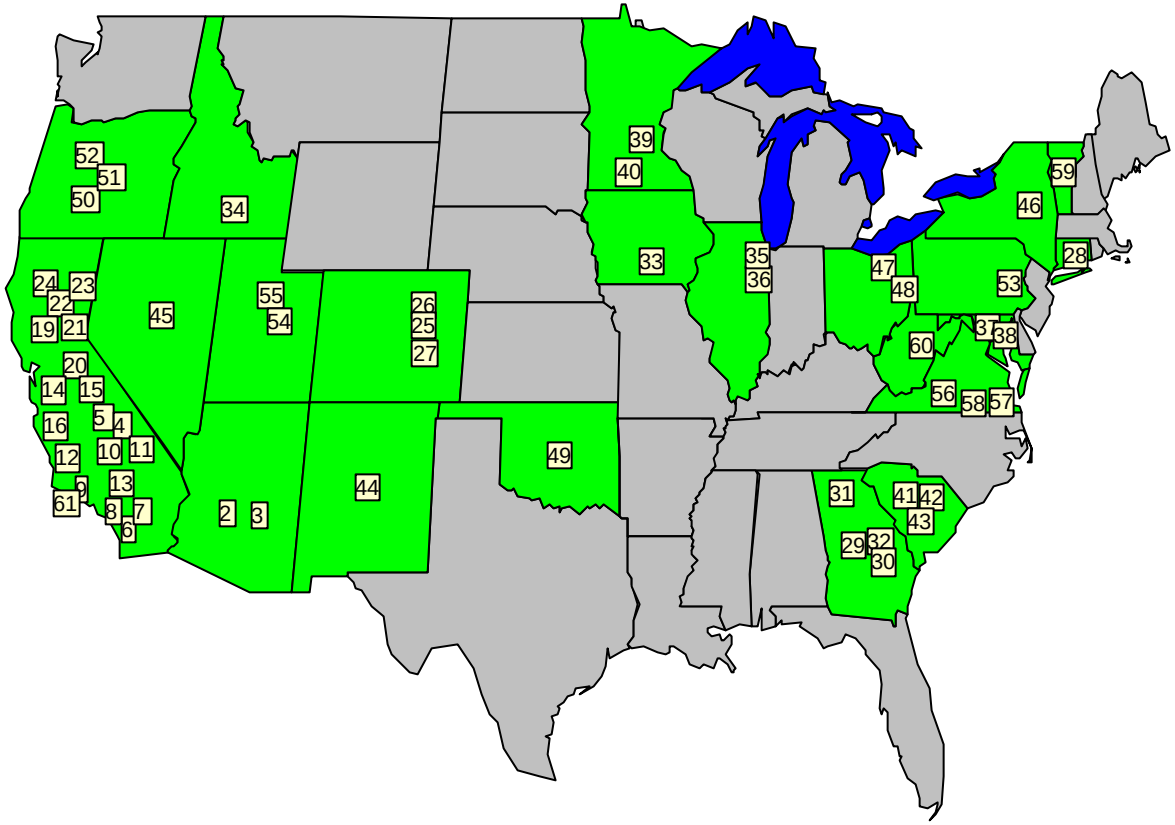
“PROVIDING VALUE TO CUSTOMERS THROUGH PRODUCT SUPPORT”



- 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

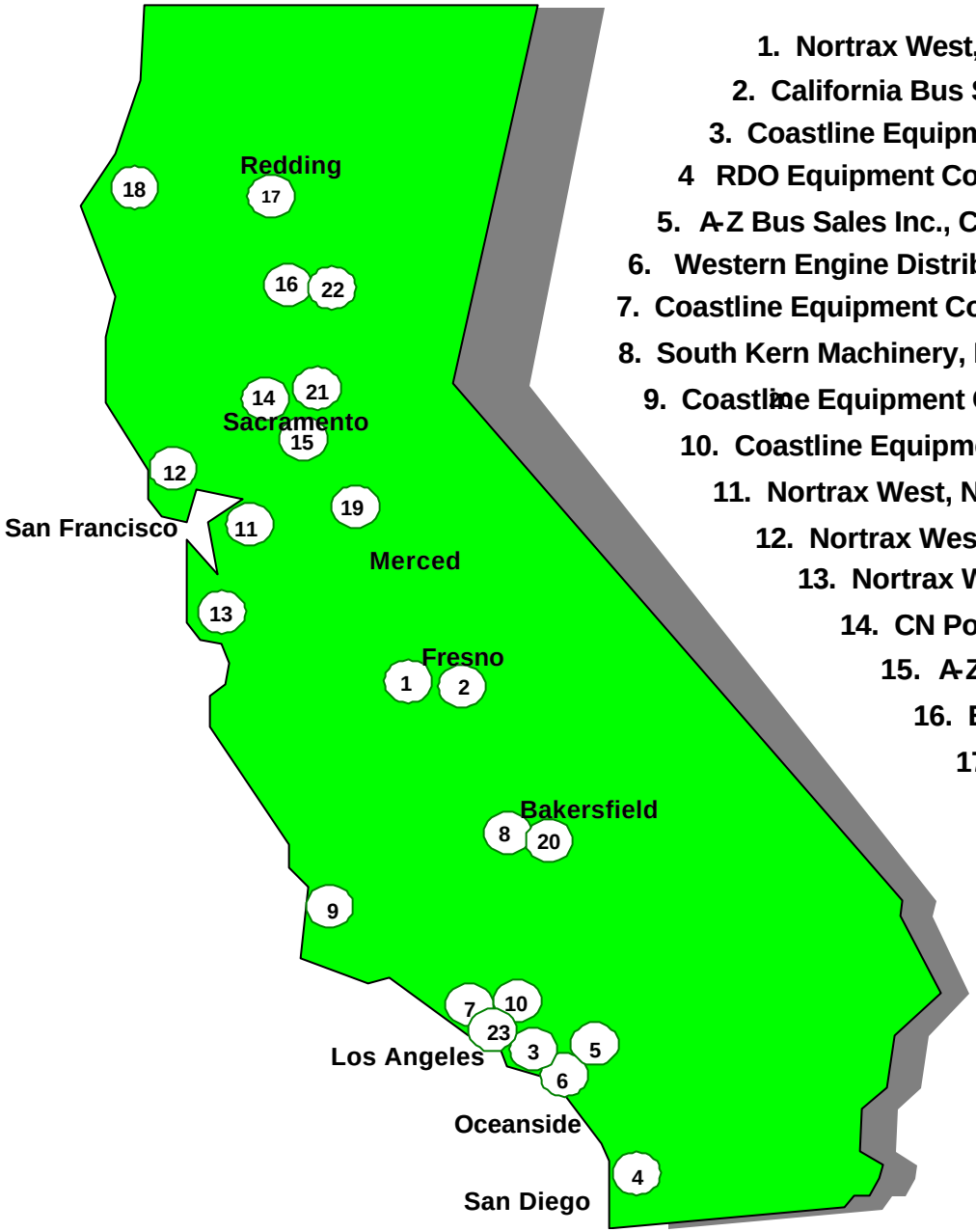
1.) RDO Eqp
2.) Auto Safety House
3.) Empire Eqp.
4.) California Bus Sales
5.) Coastline Eqp.
6.) RDO Eqp.
7.) A-Z Bus
8.) Western Engine Dist.
9.) Coastline Dist.
10.) South Kern Machinery
11.) Western Engine Dist.
12.) Coastline Eqp. Co.
13.) Coastline Eqp. Co.
14.) Nortrax West
15.) Nortrax West
16.) 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.) Honnen 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 Engfine. 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.) Harley 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) Ecotrans

NATURAL GAS SERVICING DEALERS

CALIFORNIA



1. Nortrax West, Fowler
2. California Bus Sales, Fresno
3. Coastline Equipment Co., Long Beach
4. RDO Equipment Co., Poway
5. A-Z Bus Sales Inc., Colton
6. Western Engine Distributors, Huntington Beach
7. Coastline Equipment Co., Oxnard
8. South Kern Machinery, Inc., Bakersfield
9. Coastline Equipment Co., Santa Maria
10. Coastline Equipment Co., Lancaster
11. Nortrax West, Newark
12. Nortrax West, Rohnert Park
13. Nortrax West, Gilroy
14. CN Power System, Woodland
15. A-Z Bus Sales, Inc. Sacramento
16. Empire Equipment., Chico
17. Nortrax West, Anderson
18. Nortrax West, Fernbridge
19. Nortrax West, French Camp
20. Western E.D., Bakersfield
21. Empire Equipment., Sacramento
22. Mid-Valley Tractor Co., Chico
23. Ecotrans, Los Angeles

PRODUCT SUPPORT MANUALS

NATURAL GAS TRAINING

- 900+ students trained
- 3 trainers on staff at JDPS
- Mobile stand for hands on training

FUTURE DIRECTION

Further emission reductions

- **CARB Urban Bus ‘HHD’ Cert (1.8 g NOx + NMHC)**
- **MHD (1.8 g NOx + NMHC)**

LNG Capable

Expand hardware and electronic features for optimum vehicle integration

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

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