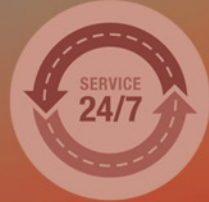
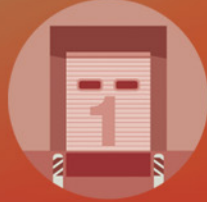




Logistics Management



Dedicated Contract Carriage



Warehouse Management



Bulk Transportation



Custom-Built Transportation



Carrier Management



Kitting and Subassembly



Brokerage Services

RUAN

Renewable Fuels Implementation

FHWA Talking Freight Webinar

4/18/18

Ruan Transportation
VP of Fleet Services
James Cade

Ruan Introduction

- + Founded 1932 (John Ruan) HQ Des Moines, IA
- + Dedicated Contract Transportation & Supply Chain Solutions
- + National footprint with 270+ Operating Centers
- + Primary industries: Retail, Grocery, Industrial Gases, Dairy, Manufacturing, Food Processing, Chemicals & Metals
- + 3,700+ Class 8 tractors / 8,000+ trailers / 5,100 employees
- + # 40 2017 Industry ranking by Transport Topics “Top 100”
- + Sustainability
 - 3x Excellence Award recipient – EPA Smartway Partner
 - Member of DOE National Clean Fleets Partnership
 - Heavy Duty Trucking “Top 50 Green Fleets” award winner
 - Named annually to Food Logistics’ “Top Green Provider” list
 - Named annually to Inbound Logistics’ “Green Supply Chain Partner” list
 - Designated Carbon Disclosure Project (CDP) “Manager Level” in 2017
 - Member of CA SB1383 Subgroup #2 (Fostering Markets for Digester Projects)



Ruan CNG Fit

- + Ruan business model is Dedicated Contract Transportation (in addition to non-asset based Supply Chain Solutions business)
 - Multi-year contracts – very ratable gallons
 - Very predictable routes and/or routes under 250 miles one-way
 - Much of our volume is not weight sensitive (i.e. not at 80,000 lbs.)
 - Annual miles generally around 100K or more per tractor

- + Note that these are all attractive attributes for CNG equipment.

- + The inverse (erratic, heavy, long routes with unknown future demand or very small total miles per year) pose significant challenges for CNG deployment.

Compressed Natural Gas Fleet (CNG and RNG)

- + Over 90 million miles run on CNG equipment to date
- + Fleet at a glance
 - 84 CNG 12L tractors (Includes 17 Texas NGV “TERP” Program)
 - 40 RNG 12L tractors (Fair Oaks Farms)
- + Fleet domiciles: IA, IN, MN, TX, WI



Renewable CNG (RNG) – Fair Oaks Farms

- + Anaerobic digestion – 32,000 dairy cows
 - ampCNG produces 2 million DGE/yr of RCNG from dairy cow manure
- + Light-weight specs optimize bulk payloads (51,890 lbs. per load)
- + Operation consists of 140 drivers, 40 tractors, & 85 tankers
- + 333,000 gallons of milk moved daily; 122 million gallons of milk per year
- + Approx. 60 million miles since 2011
- + RNG fueling displaces well over 1 million gallons of diesel annually
- + Fuel economy and vehicle uptime meeting expectations
- + Fleet life extended with engine work and cab refresh
- + Catalyst for CNG fleet growth with other Customers (addition of another 85 CNG trucks)



Fair Oaks, IN – CNG/RNG Vehicle Refurbishment

- + Original plan (500K – 600K LTD miles) modified due to soft used truck market
- + Scope of refurbishment
 - Engine overhaul
 - Transmission
 - Other major or minor components repaired/replaced as needed
 - Driver comfort
 - Seats
 - Cab components
 - Body / paint / trim
- + Benefits
 - Improved vehicle performance
 - Improved driver satisfaction with refurbished vs. non-refurbished vehicles
 - Spreading relatively high CNG capital costs over longer duty cycle
 - Expected to reach over 1.5M miles each on average

RUAN

AHEAD OF THE CURVE

**RUAN TRANSPORTATION
MANAGEMENT SYSTEMS HITS
MILESTONE OF 1 MILLION MILES ON
A CNG-POWERED CLASS 8 TRACTOR.**



RUAN TRANSPORTATION MANAGEMENT SYSTEMS CNG/RNG FACT SHEET

OVERVIEW

A 2014 Kenworth T660 compressed natural gas (CNG) powered class 8 tractor operated by Ruan has reached the milestone of 1 million miles in service. The vehicle has experienced no major maintenance issues over its operating life. The vehicle is part of a fleet of 40 tractors domiciled in Fair Oaks, IN. Most vehicles in this fleet of CNG-powered equipment have more than 800,000 life-to-date miles. These vehicles pull 80,000 GWW loads of milk primarily from Fair Oaks, IN, to southern Indiana. The fuel for this operation is primarily renewable natural gas (RNG) sourced from anaerobically digested cattle manure. This allows a waste product to be used to transport customers' for-profit product.

The fleet is being refurbished currently, and projections are for the fleet to reach upwards of 1.5 million miles per vehicle before retirement. The refurbishment consists of the following broad categories: Inframe engine overhaul, transmission, body polish and in-cab items such as A/C, radio and drivers' seats.

EQUIPMENT

Year	2014
Make	Kenworth
Model	T660
CNG	112 Diesel Gallon Equivalent (DGE) back-of-cab tanks

CNG vs. Diesel Decision Making Process

- + Generic assumptions (# of trucks, miles/yr, contract term)
- + Fuel Assumptions
 - MPG (Must factor in trends of increasing diesel MPG)
 - Price per gallon (Retail CNG currently around \$1.00 below retail diesel)
 - Factor in negotiated discounts for both CNG and diesel
 - DEF usage rate and cost (diesel only)
 - Fuel credits (LCFS, RIN, VETC, State IFTA discounts)
- + Equipment
 - Costs
 - Grants (if applicable)
 - Residual assumptions (calculate depreciation)
 - Interest
 - Maintenance costs per mile
- + Other
 - Personal property tax
 - Customer benefits from stable fuel prices?
 - Weight impacts (note 2,000 lb. exemptions for Federal and 25 States)
- + Calculation of total cost of ownership and resulting cost per mile

CNG/RNG Station Considerations – Fleet

- + Ensure station specs are adequate for fleet operations
 - Class 8 accessible
 - Accessible location (controlled intersections, road type/condition, proximity to major interstates)
 - Fleet cards accepted (i.e. Comdata)
 - Alphanumeric keypad (similar to National truck stop chains)
 - Redundant compressors and dryers
 - Fill rates (should be ~8 to 14 GGE per minute)
 - Balance of site storage vs. compression
 - Card lock vs full service truck stop
 - Customer service phones available for drivers
 - Public vs. “behind the fence”
 - Multiple pumps/lanes

CNG – Ruan Experience

+ Equipment

- Work with traditional dealership network
- Vehicle cost
 - Significant upcharge vs. diesel
 - Largest contributor is tank selection
- Don't over-spec, but need to be comfortable with operating range/weight
- **FUTURE:** All CNG class-8 tractors will have ultra-low (0.02) NOx engines starting ~mid-2018

+ Maintenance

- More maintenance intensive than diesel
- Fair Oaks, IN vehicles have an average of 900K+ miles, with several over 1M miles
- Shorter maintenance intervals (oil changes)
- Spark plugs
- Tank inspections every 36,000 miles
- Generally assume two cents/mile above diesel (including inspection costs)

Other Renewable Fuels – Ruan Experience

+ Biodiesel

- Simple drop-in substitute for diesel in blends up to 20% (B20)
- Similar performance behavior in vehicle
 - Suggest reducing blend percentages in cold weather (B10, B5 or even 0% in periods of extreme cold)
- Tax benefits

+ Renewable Hydrocarbon Diesel (RHD)

- RHD can be blended with biodiesel or petroleum diesel
- Recommended blend of 80% RHD with 20% biodiesel
 - Blends can be used in any diesel engine without modifications.
 - Blending provides benefits of lubricity, low sulfur content and better cloud point vs biodiesel
- It will not affect MPG or horsepower and it has been approved by engine manufacturers
- Renewable feedstocks with significantly reduced emissions
- Tax benefits and other incentives are available

Other Renewable Fuels – Ruan Experience

+ Electrification

- Yard trucks – for in-yard trailer shuttling
 - Vehicles are available, and demand seems strong
 - Grants are available
- Future: On-board electrification – elimination of parasitic load to significantly reduce diesel consumption – 48 volt systems
 - Electrification of all gear and belt driven accessories (alternators, power steering, AC systems)
- Future: Electric powertrains in class-8 vehicles
- Ruan has Five Tesla class-8 electric semis on order
 - *“Ruan has always been a leader in efficient transport and logistics, so it makes perfect sense to explore what these trucks could do for us and our customers,”* James Cade, Vice President of Fleet Services

Other Renewable Fuels – Ruan Experience

+ Electrification Concerns

- Infrastructure
 - How long and where do I recharge my batteries?
 - What is the cost of a charging station?
 - What are the impacts of fast charge versus slow charge?
- Costs
 - How do the acquisition costs compare to diesel?
 - Are there operational savings to offset higher acquisition costs?
 - What is the cost of the electricity to recharge my batteries?
 - How long do batteries last?
- Range
 - How far can I go on a battery charge?
 - What impact does driver behavior have on range?
- Weight
 - Will battery weight impact my payload capacity?
 - Will weight distribution be affected?