



Clean Energy[®]

North America's leader in clean transportation

Natural Gas Emissions Benefits & Fueling Infrastructure

**Cheaper by the Gallon:
Natural Gas Fueling Fleet Transportation Needs**

AFVI Webinar September 16, 2008

Cleaner – Cheaper – Domestic Natural Gas

Challenges to the Trucking Industry

- Diesel Fuel
 - High Cost
 - Cost Uncertainty
 - Looming Shortages
- Climate Change & Carbon Emissions
- 2010 Engine Technology Changes (& Cost Increases)

If only there was
a cheaper fuel,
a cleaner fuel,
a fuel made in
America...

About Clean Energy

Emissions Benefits

Fueling Infrastructure

Largest Alternative Transportation Fuel Provider

250+
Fleet
Customers

14,000+
Natural Gas
Vehicles

170+
Natural Gas
Fueling Stations

Compressed Natural Gas (CNG)



Taxis



Government
Vehicles



Airport
Transit

Liquefied Natural Gas (LNG)



Regional
Trucking



Public
Transit



Refuse
Hauling

We Provide CNG & LNG Fuel to Fleets

We Deliver Value-Add Services to Drive Fuel Sales

- Vehicle OEM relations
- Fleet analysis
- Station design and build
- Station capital
- Station operations and maintenance
- Vehicle financing
- Grant assistance
 - \$100 Million + in Grant Awards





Clean Energy[®]

North America's leader in clean transportation

Emissions Benefits

What Problem?

Issues We Face with Diesel Emissions

- Diesel Exhaust Is Toxic –Classified as a Toxic Air Contaminant in California
- High Particulate Matter Emissions
- High NOx Emissions (Smog & Health Impacts)
- High Green House Gas Emissions
- Serious Public Health Issues
 - Asthma
 - Bronchitis
 - Heart Attacks
 - Reduced Birth Weight
 - Premature Birth
 - Early Death (Lung Cancer, Cardiopulmonary Complications, Infant Mortality)

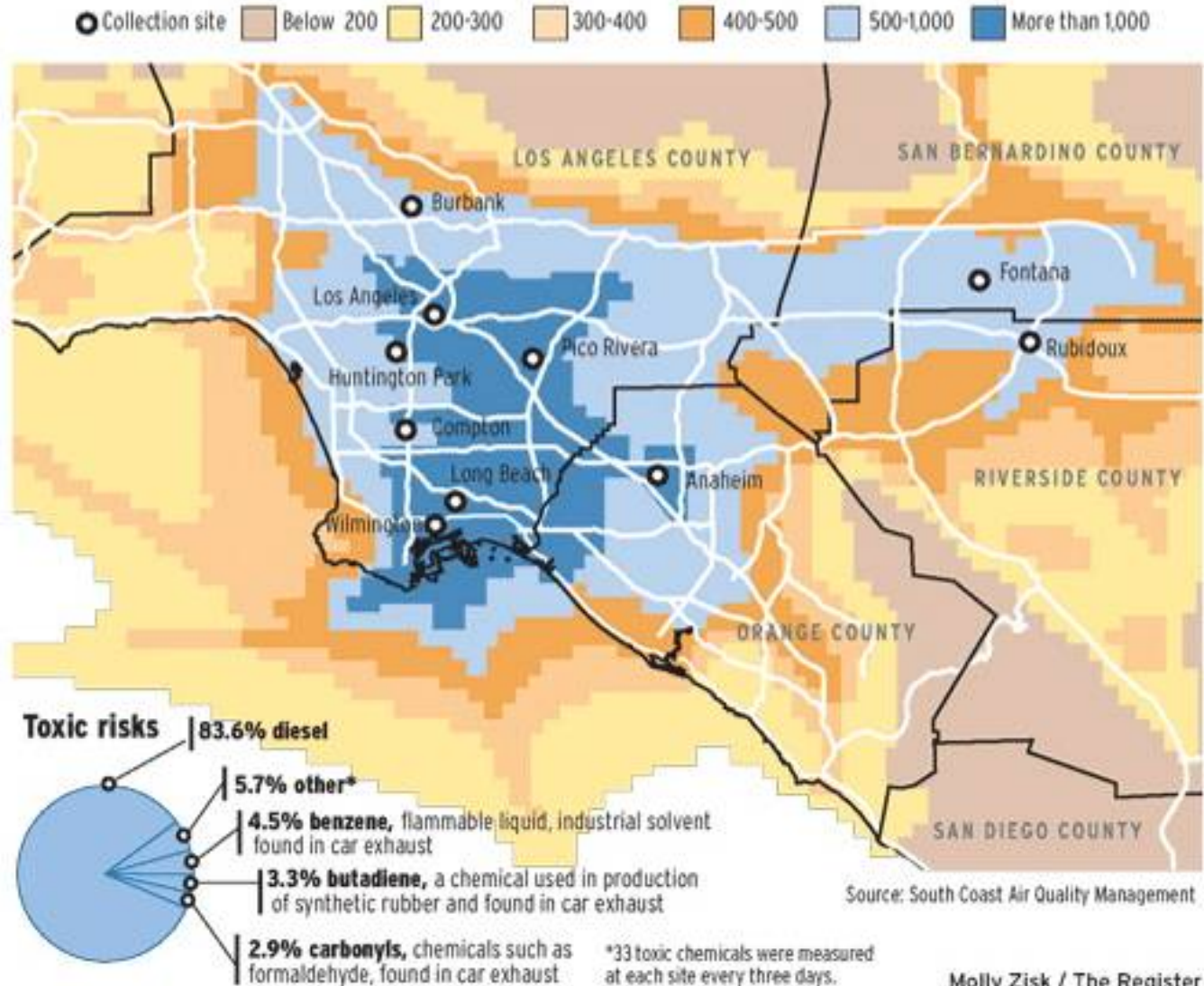


Unacceptable Cancer Risk from Diesel Exhaust

Diesel PM Causes 83.6% of Airborne Cancer Risk in Greater LA

The risk levels are "clearly too high, and unacceptable, relative to breathing air here in Southern California,"

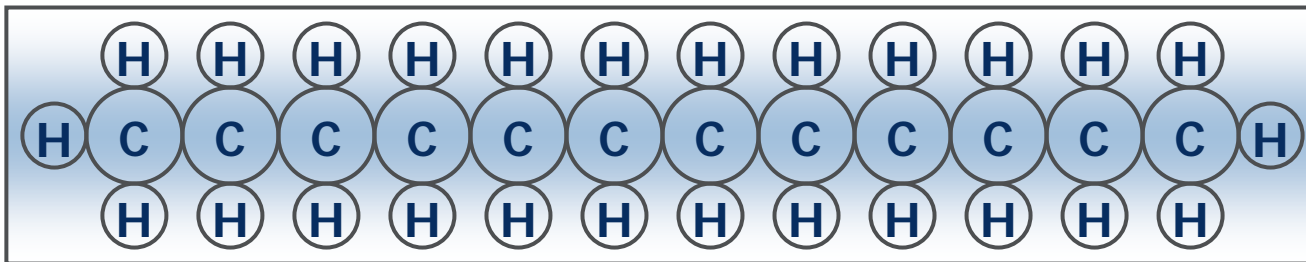
- Barry Wallerstein, South Coast Air Quality Management District



Natural Gas Is Simply a Clean Fuel

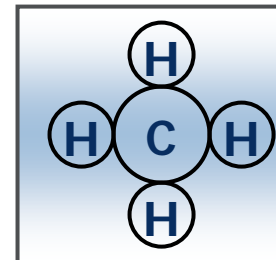
- Diesel Fuel

- Complex Molecule - Full of Carbon
- Inherently Burns Dirty
- The average chemical formula for common diesel fuel is $C_{12}H_{23}$, ranging from approx. $C_{10}H_{20}$ to $C_{15}H_{28}$
- $C_{12}H_{23}$ has 1 Carbon per 1.9 Hydrogen



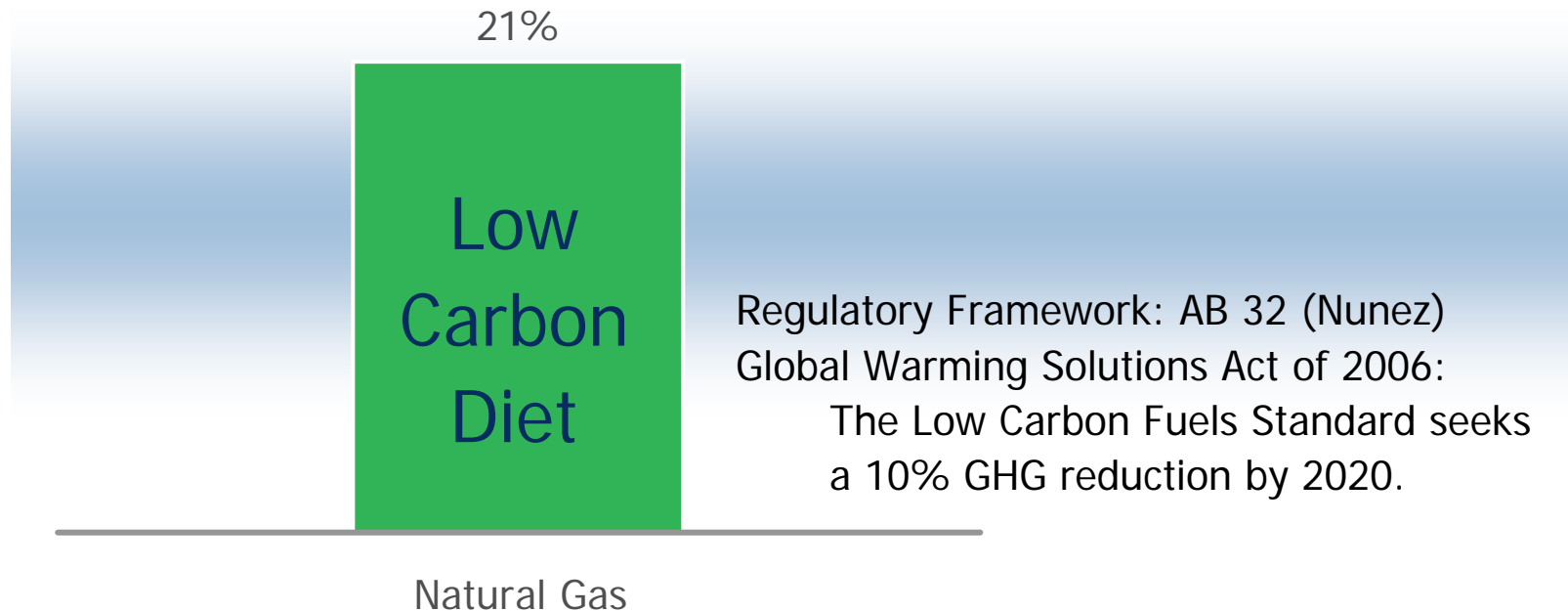
- Natural Gas (Methane)

- Simple, Low-Carbon Molecule
- Inherently Burns Clean
- CH_4 has 1 Carbon per 4 Hydrogen



Natural Gas Is The Low Carbon Option

Greenhouse Gas Emissions Reductions¹ (Compared to Heavy Duty Diesel Engines)

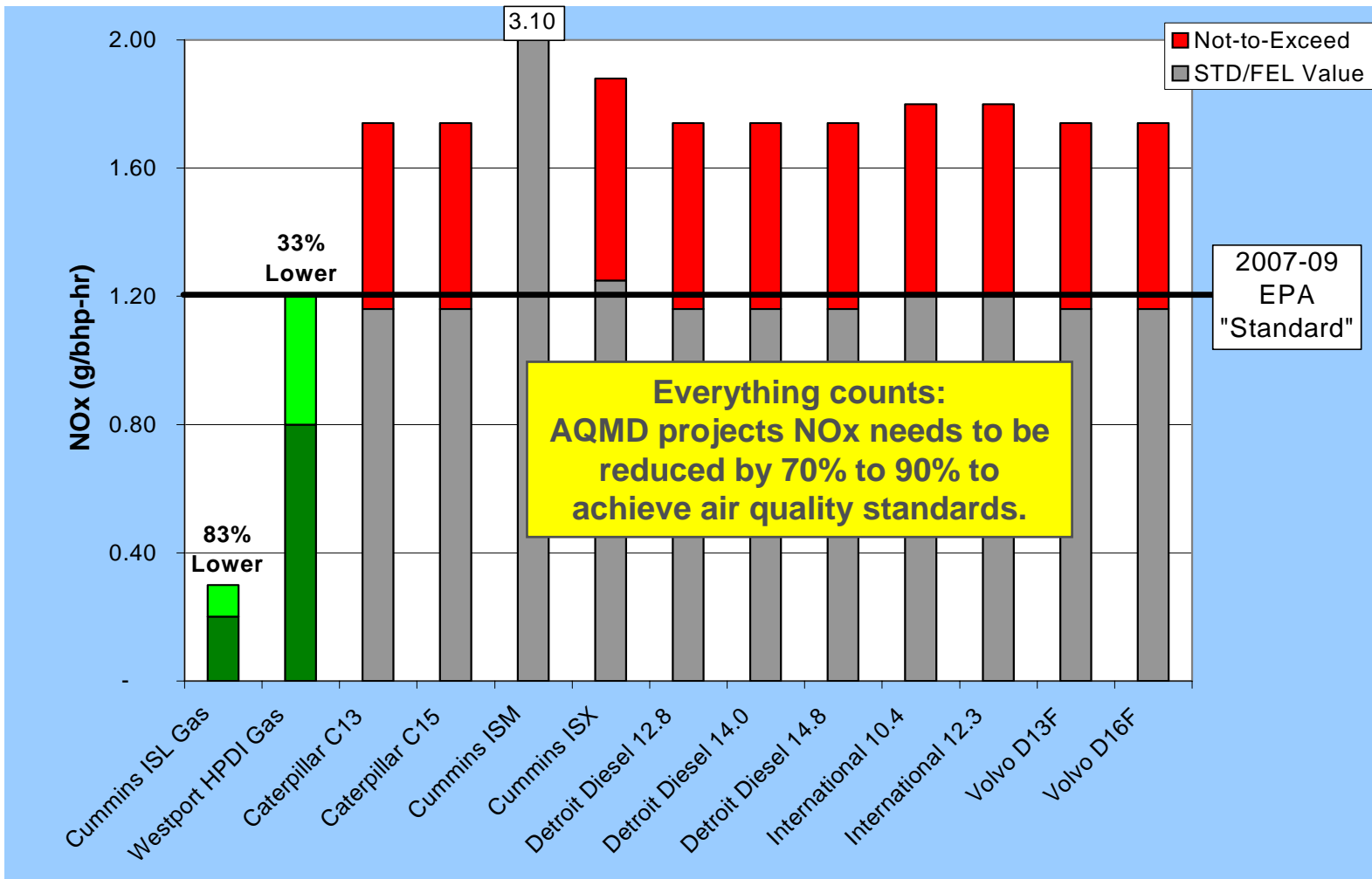


Note:

1 "Well to Wheels" evaluation

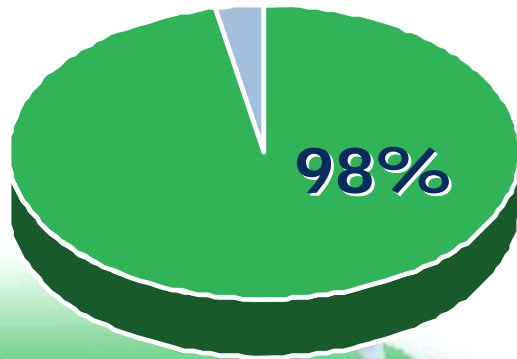
Natural Gas NOx Emissions Are Much Lower than Diesel


Comparison of NOx Emissions from 2008 HD Trucks



2008 CARB Executive Orders

Natural Gas



- 
- Supplied From US and Canada
 - Imported

- 80+ Years of Domestic Reserves (Some estimates are as high as 120 years)
- World NG Reserves Estimated at 3x that of Oil
- Why Import Oil When We Have Our Own Energy?

Emission Reductions from 100 LNG Trucks Compared to 2008 Diesel

DPM Reduced, up to	NOx Reduced, up to	GHG Reduction, up to	Diesel Displaced, up to
589 pounds/year	123,000 pounds/year	11,266,000 pounds/year	1,800,000 gallons/year

DPM & NOx: Based on CARB Carl Moyer emissions calculation methodology assuming 100,000 miles/year
GHG: Based on Well-to-Wheels Report prepared for the California Energy Commission
Diesel Displaced: Assumes average fuel economy of 5.5 mpg



Clean Energy[®]

North America's leader in clean transportation

Fueling Infrastructure

Compressed Natural Gas (CNG) Basics

- Light duty and medium duty vehicles
- Same fuel that heats homes & used for cooking
- Pipeline gas compressed at the station
- Dispensed similar to gasoline
- Stored in cylinders onboard vehicle
- Not propane! (NG has higher BTU content)



CNG Fueling – From Home to Fleet



Home Fueling



Fleet Fueling



Retail Station Fueling



Liquid Natural Gas (LNG) Basics

- Heavy duty and medium duty vehicles
- Pipeline gas cooled to -260F
- Produced at LNG plants
- Delivered by truck to fuel stations
- More onboard fuel storage than CNG – Greater range at lower weight
- Premium priced vs. CNG



LNG Sources: Field Production LNG Plants

- Large Scale Plants
 - ExxonMobil (Wyoming)
 - Williams (Colorado)
 - BP (Wyoming)
 - Pioneer (Kansas)
- Plants condition Natural Gas from the Well to Pipeline Quality
 - Natural gas is liquefied and then turned back to gas
- Some amounts are sold from plants for transportation fuel
- 500-1,000 miles from market



LNG Sources: Pipeline LNG Production Plants

- Plants Take Pipeline Gas and Convert to Liquid (LNG)
- Produce LNG for 2 Purposes
 - Storage for later use (utilities)
 - Transportation fuel
- Located Near Consumption
 - Pickens Plant, near Houston, Texas
 - Topock, AZ
 - Boron, CA
 - Ehrenberg, AZ
- 100-300 miles from market



LNG Production Plants Make the Fuel

Clean Energy's
Newest LNG
Plant in Boron,
California

Opens 2008

\$70 Million
Investment

160,000 gal/day

Expanding to
240,000 gal/day
at end of 2009

1.5 Million
Gallons Storage



Fuel Delivered to Stations in Trailers



Above-Ground Stations Dispense the Fuel

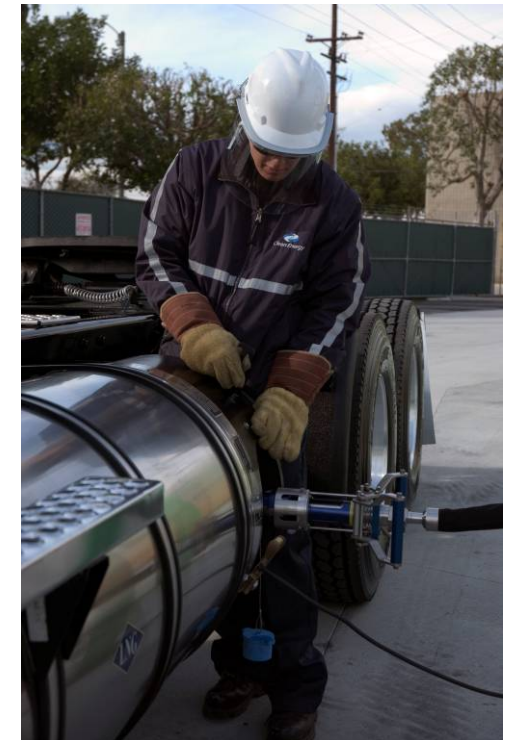


**Carson Truck Station
Grand Opening Dec-07**

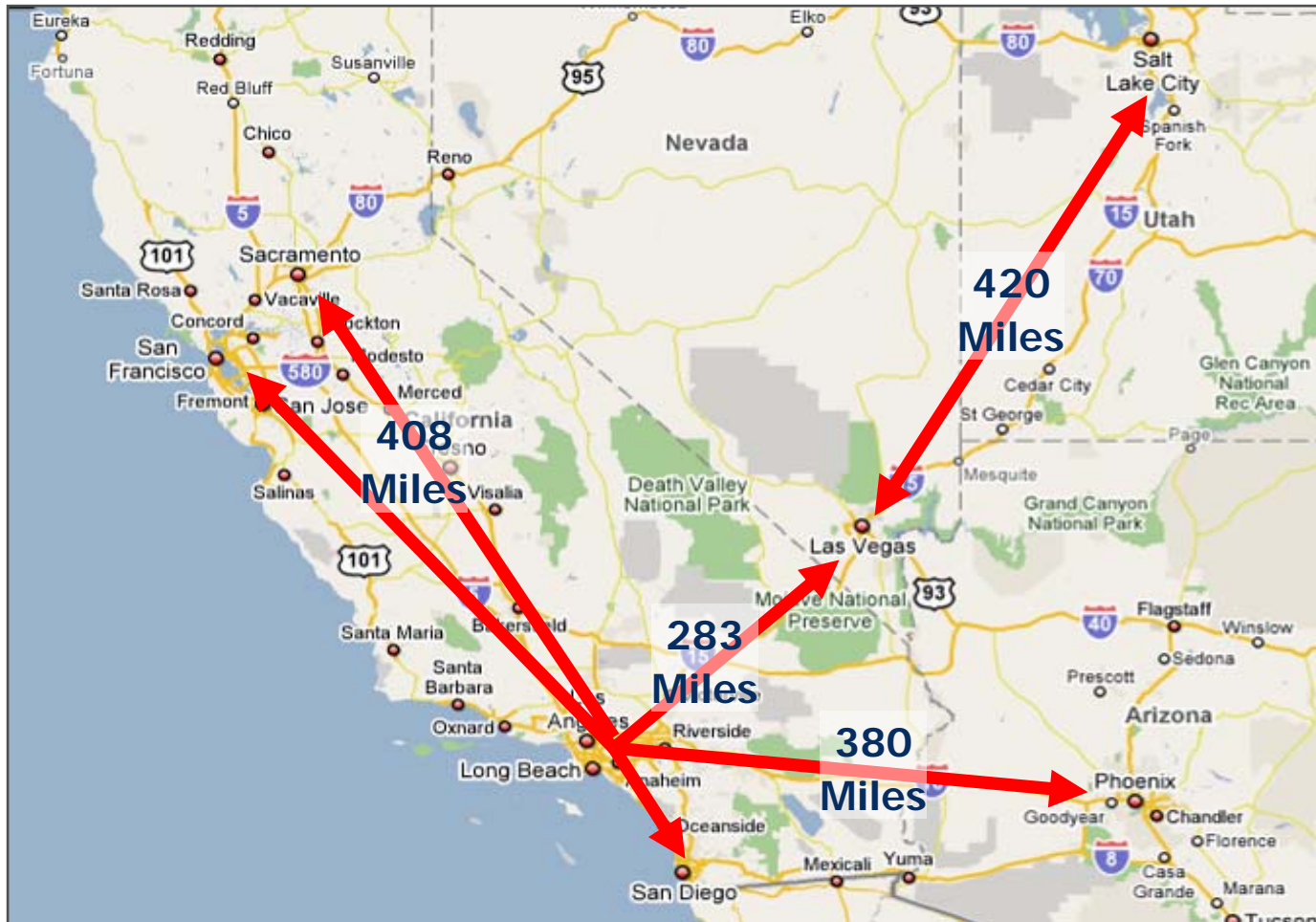


LNG Truck Fueling

- Fuel dispensed at 20 to 40 gallons per minute
 - Tank fills in a few minutes
- Sealed Dispensing System



Fueling Network Can Easily Span Regions



Let's Go – Cure Oil Addiction Today!

- Natural Gas Fuel Is:
 - Cheaper
 - Cleaner
 - Lower Carbon
 - Made in America
 - Abundant
- Trucks Are Available

Thank You for Attending
Greg Roche

(562) 493 – 2804

groche@cleanenergyfuels.com

