



# **Clean Energy**<sup>®</sup>

*North America's leader in clean transportation*



**Pennsylvania Public Utilities Commission  
NGV EV Forum**

# Company Profile

## Largest Alternative Transportation Fuel Provider

**500+**  
Fleet  
Customers

**25,680**  
Natural Gas  
Vehicles

**298**  
Natural Gas  
Fueling Stations

### Compressed Natural Gas (CNG)



Taxis



Refuse  
Vehicles



Airport  
Transit

### Liquefied Natural Gas (LNG)



Sea Ports



Public  
Transit

Heavy Duty  
Trucking



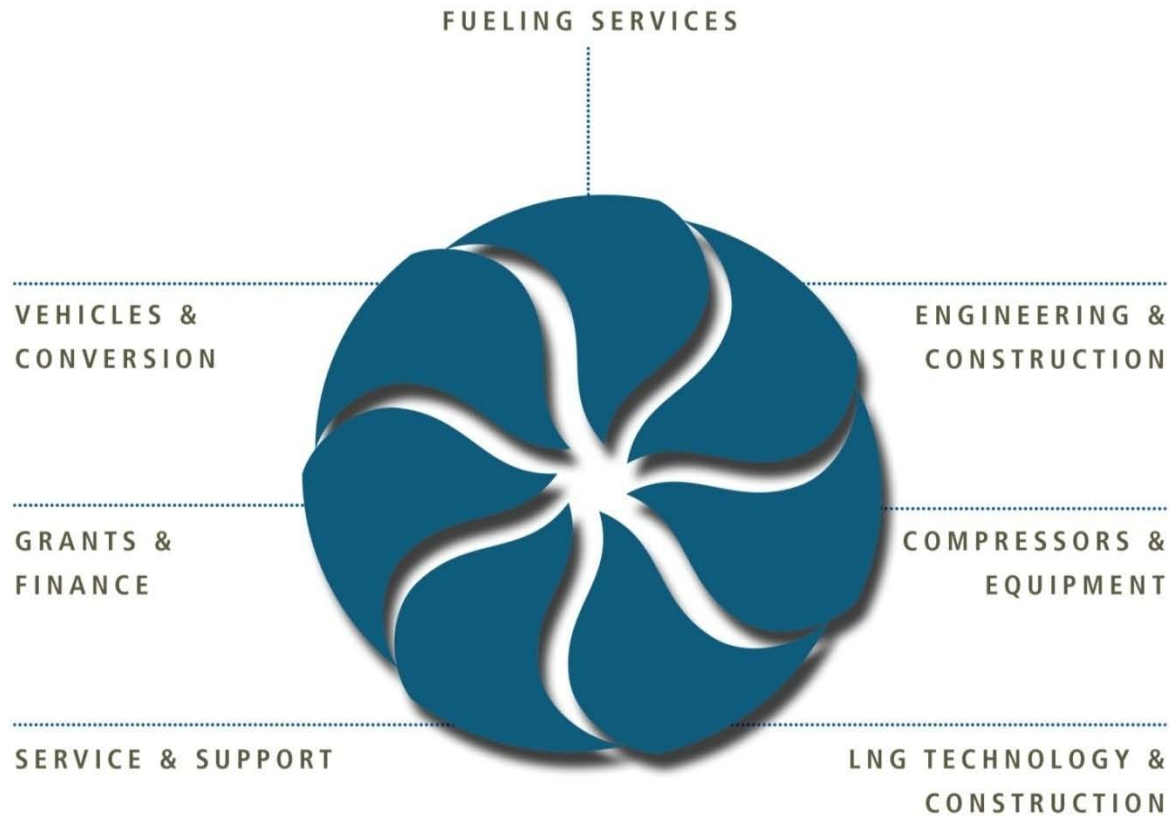
# Company Profile

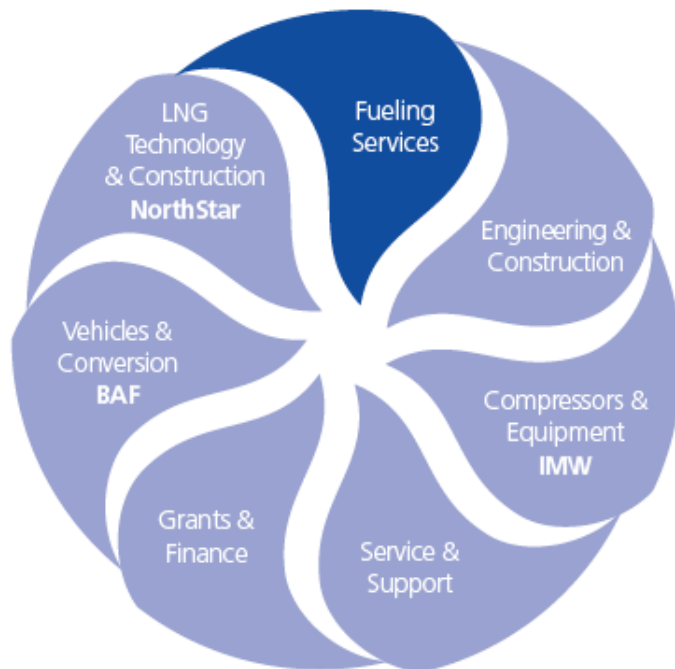


- Comprehensive offering for natural gas vehicle fueling
- 2011 Revenues of \$292.7 million
- 155.6 million gallons sold 2011
- 1100+ employees
- Presence across North America and 26 countries worldwide
- Creating the market and capitalizing on its future growth



# The Breadth of Clean Energy's Capabilities

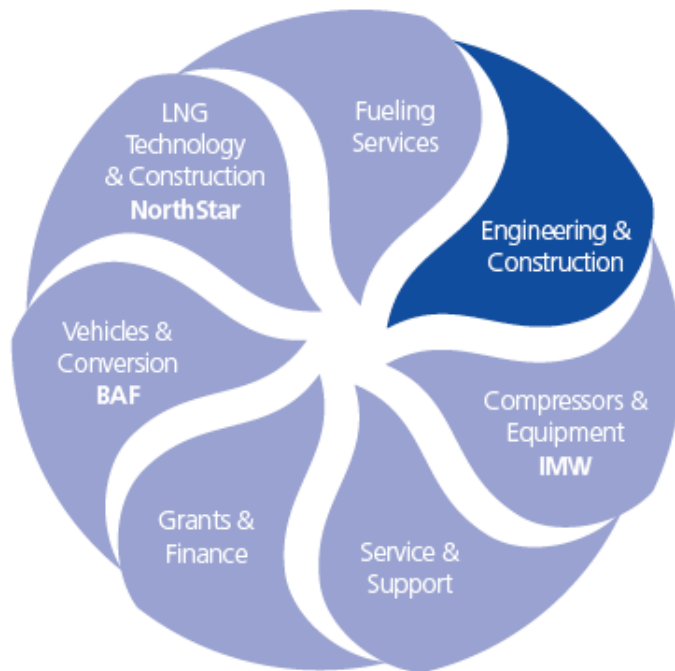




## Fueling Services

With more than 10 years' experience, Clean Energy offers a variety of options under short- or long-term fueling contracts.

- CNG (compressed natural gas) fueling from pipeline natural gas or from LCNG supply
- LNG (liquefied natural gas) fueling delivered by tanker trailer for vehicle fueling or industrial use; plants in CA and TX, sourced nationwide
- RNG (renewable natural gas) derived from organic waste streams that can be delivered by pipeline for compression or liquefaction
- Variable- or fixed-rate pricing options

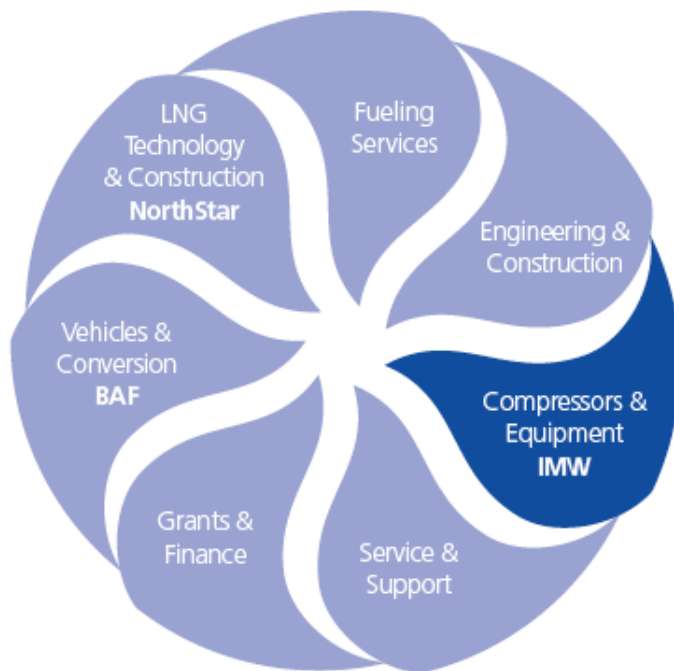


## Engineering & Construction

With hundreds of fueling stations built, Clean Energy provides best-practice approaches to each station project.

- Inhouse engineering
- Innovative, experienced CNG station design
- Licensed in 26 states
- Faster to open: standard designs, inhouse execution, factory-direct equipment sourcing

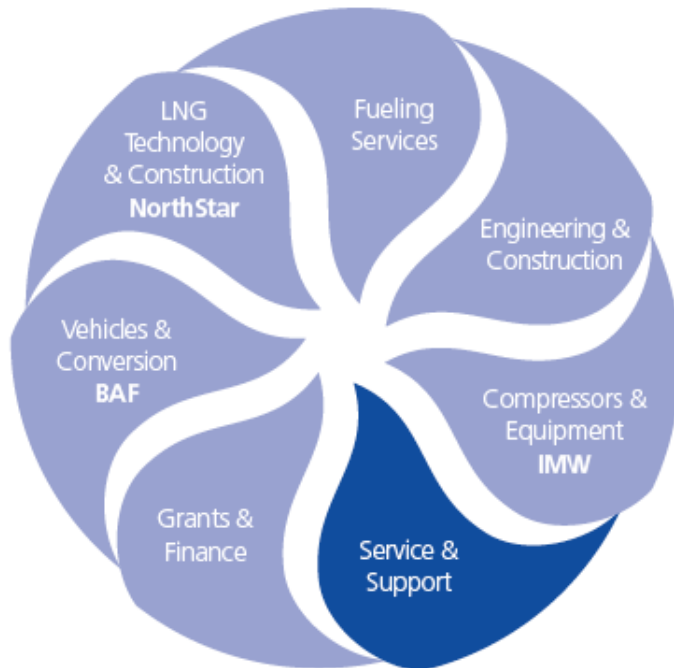
# Compression & Equipment – IMW Industries



## Compressors & Equipment — IMW Industries

With more than 1,200 units in 24 countries, IMW is a global leader in CNG compressor and equipment design, manufacturing and installation.

- “Oil Free” compression technology virtually eliminates fueling system and vehicle maintenance problems
- Manufacturing in North America and China
- Factory-direct sourcing provides seamless integration for station needs
- Custom configuration ensures optimum performance and reliability

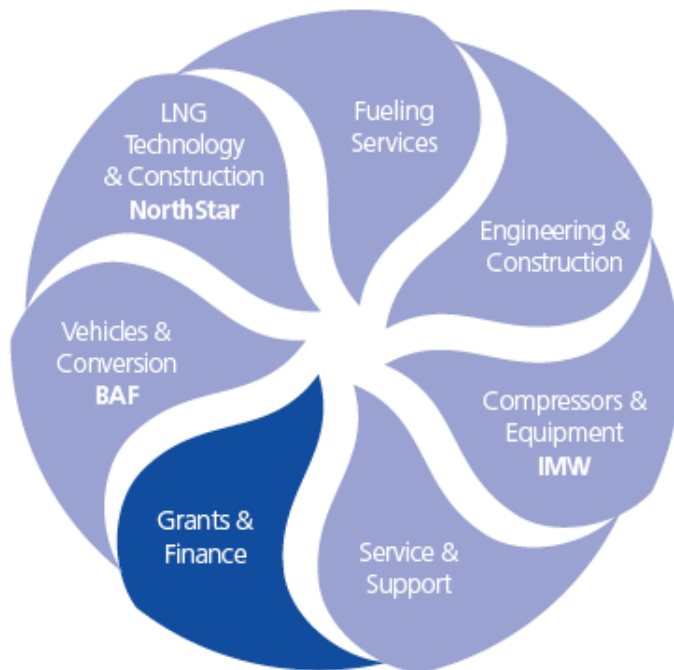


## Service & Support

With more than 200 fueling stations monitored nationwide, Clean Energy Sentinel™ Service provides 24/7 monitoring and response.

- From time & materials to all-inclusive, fixed costs
- Over 150 factory-trained technicians, not outsourced labor
- Remote equipment/station monitoring through two high-tech operations centers
- Multi-million-dollar inventory of critical items
- Best value, flexible service-level options and terms



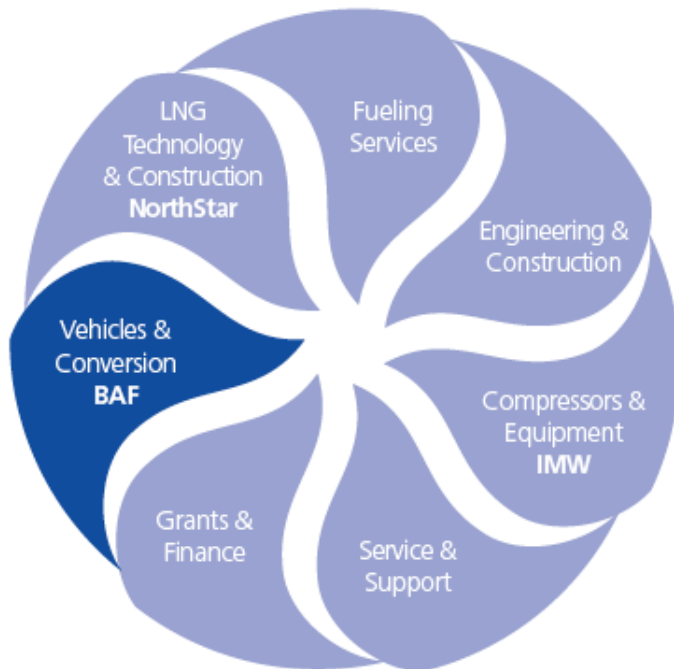


## Grants & Finance

With more than \$250 million secured, Clean Energy obtains valuable public/private financing for stations and fleets.

- Grant support at federal, state and local levels nationwide
- Funding for infrastructure construction and vehicle financing
- Clean Energy Leasing subsidiary provides fleet financing options
- Arranged financing for more than 4,500 vehicles

# Vehicles & Conversion - BAF

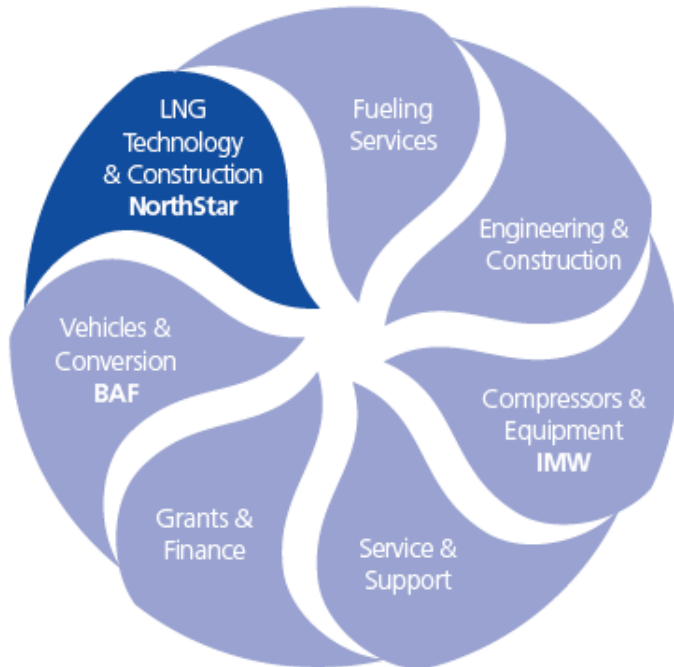


## Vehicles & Conversion — BAF

With more than 12,000 vehicles on the road, technology leader BAF provides best-practice, qualified and certified conversions in all states.

- Only QVM (Qualified Vehicle Modifier) certified by Ford with full factory warranty
- All engine families CARB- or EPA-approved
- Chosen by AT&T, Verizon for nationwide CNG van programs
- Service and support provided nationwide
- Only vehicle modifier conducting full crash tests on conversion vehicle types

# LNG Technology & Construction - Northstar



## LNG Technology & Construction — NorthStar

Having installed two-thirds of the LNG fueling stations in North America, NorthStar is the acknowledged leader in LNG/LCNG technology and construction.

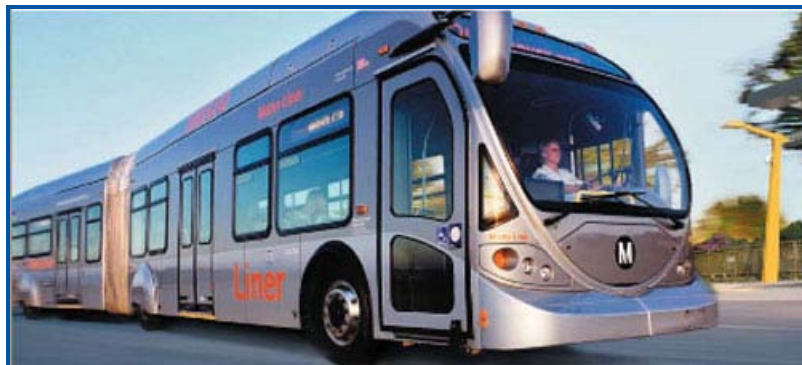
- Turnkey provider from design and permitting through construction and commissioning
- Factory-direct, proprietary equipment sourcing and manufacturing
- Low-cost, reliable station operation and maintenance

# Sample Customers



# NGV Markets

- **Early Successful Market**
  - CE fuels 6,000+ NG buses & Paratransit
  - 83,000 units nationwide
  - 1 billion gallons/year
- **30% of new Transit Orders are NG**
  - \$1.50/gallon savings
  - 1 year simple payback
- **Cummins ISLG NG Engine**
  - No DPF or Urea Injection



# Airports

- **CE at 32 Airports**
  - 8 in Design & Permitting phase
  - Predominately Retail
  - 2 billion gallons/year
- **Emission Mitigation a Driver**
  - NGVs generate substantial offsets for airside & landside vehicles
- **High Fuel Consuming Vehicles**
  - Taxi & Shared Ride Operators
  - Hotel/Parking Shuttles
  - Rental Car & Terminal Buses



- **Rapidly Growing Market**
  - We have 63 refuse customers
  - We fuel 3,000+ NG trucks
  - 200,000 truck addressable market
  - 2 billion gallons/year
- **Incremental truck cost has rapidly dropped**
  - Accelerating adoption
- **Model return-to-base fleet**
  - WM and Republic are partners
- **Time-fill stations**
  - Provides lowest cost station
  - Most efficient fueling (labor) solution
  - CE built the first for WM in 1998





# Heavy Duty Trucking

# Heavy Duty Trucking Market

- **Largest opportunity**
  - 8,000,000 trucks
  - 1,300+ NG trucks nationwide
    - CE fuels 90+%
  - 30 billion gallons/year (4.2 TCF)
- **Ports of LA & Long Beach drove the market in 2007**
  - CE helped shape the policy
  - Built several LNG stations
  - Built Boron, CA LNG plant
  - \$100+ million investment
- **Port proved to regional trucking firms that NG can meet rigorous trucking duty cycles**



# NG Trucking Market Drivers - Engines

- Engines Available Today
  - Westport (Cummins ISX) 15-liter
  - Cummins-Westport ISLG 9-liter
  - Navistar ESI 9-liter
  - Navistar DT (ESI) 7.6-liter
  - Ford BAF 6.7-liter
  - GM 6-liter
- Publicly Announced
  - Cummins 15-liter (~2014)
  - Cummins-Westport 12-liter (Q1 2013)
  - Volvo 13-liter (Early 2013)
  - Navistar 13-liter (Early 2013)
- OEM's
  - International, Freightliner, Kenworth, Peterbilt, Mack, Ford, GM, Autocar, Capacity, Ottawa, and Volvo



**2010 Compliant with  
simple, maintenance-  
free catalyst  
No DPF  
No SCR**

# NG Trucking Market Drivers - Economics

## Assumptions

Annual Fuel usage/truck: 15,000 DGEs (=17,500 GGEs)

Fuel Savings/DGE:	<u>\$0.50</u>	<u>\$0.75</u>	<u>\$1.00</u>	<u>\$1.25</u>	<u>\$1.50</u>
Monthly Savings	\$625	\$937	\$1,250	\$1,562	\$1,875
Savings over 5 years	\$37,500	\$50,000	\$62,500	\$75,000	\$112,800
Savings over 7 years	\$52,500	\$70,000	\$87,500	\$105,000	\$157,500

7 year ROI %

Incremental Cost:

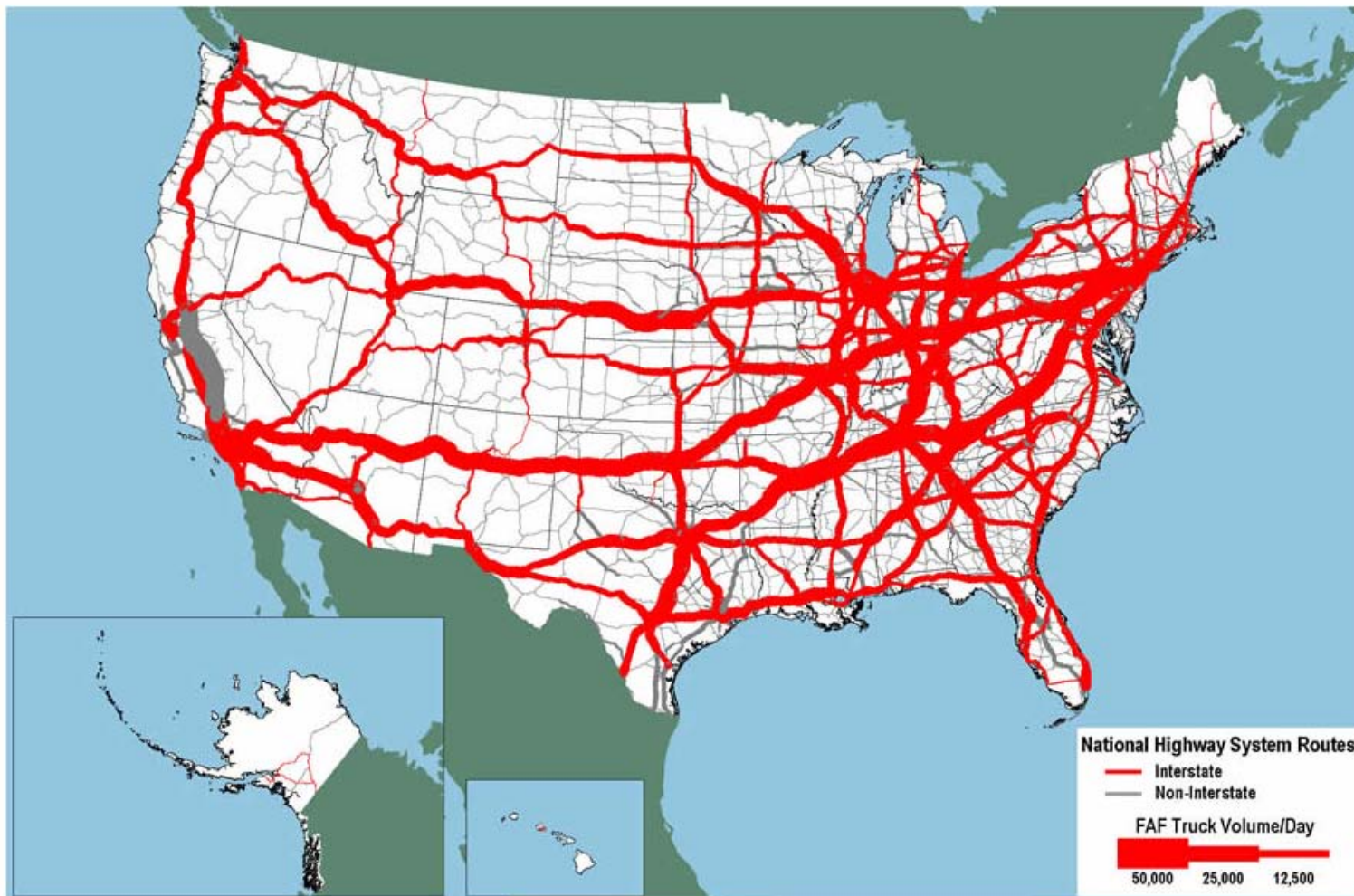
<u>\$30,000</u>	17.6%	33.8%	48.1%	61.5%	74.5%
<u>\$40,000</u>	8.07%	22.0%	33.8%	44.6%	54.9%

# American Natural Gas Highway

# Long Haul Freight Truck Traffic Corridors

## Corridor Planning

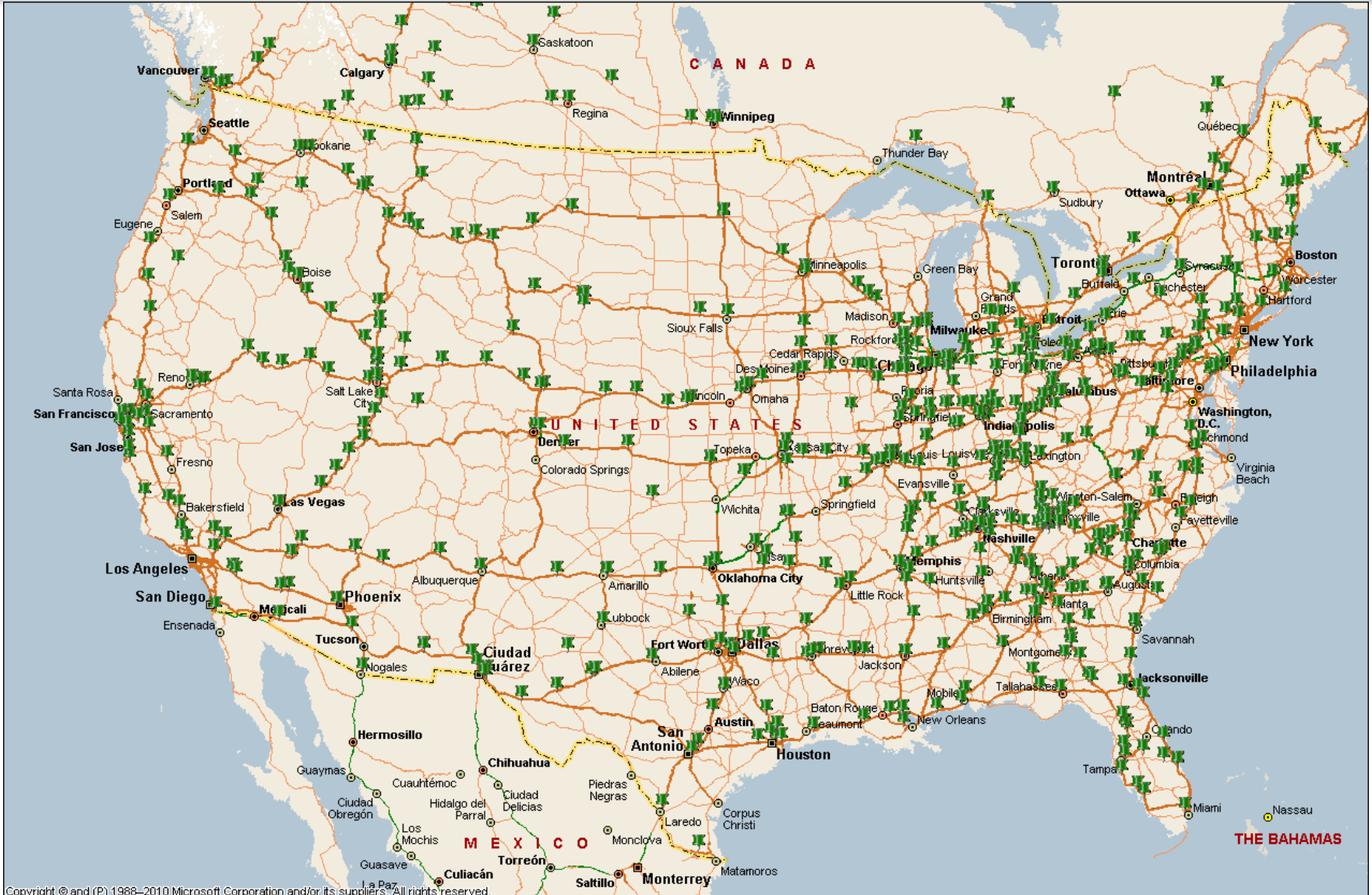
Average Daily Long-Haul Freight Truck Traffic on the National Highway System: 2040



Note: Long-haul freight trucks typically serve locations at least 50 miles apart, excluding trucks that are used in movements by multiple modes and mail.  
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010.

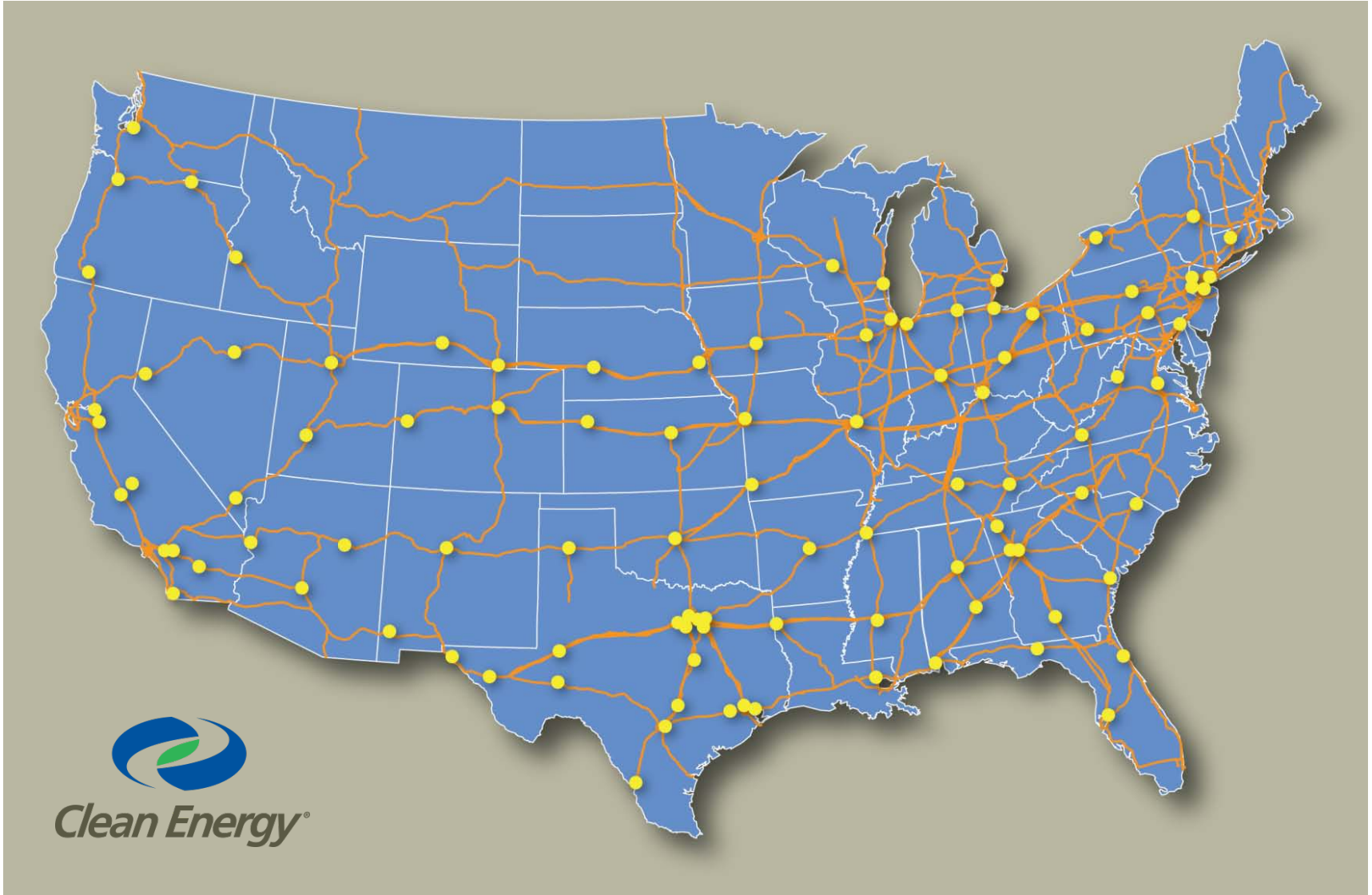
# Pilot-Flying J

490 Interstate Locations Coast-to-Coast, 7 Billion Gallons per Year



# America's Natural Gas Highway

*Coast-to-Coast & Border-to-Border on LNG*





# Pilot Locations In Pennsylvania



## CLNE Locations to be opened this year

- Bristol, PA
- Bucks County, PA
- Carlisle, PA (ANGH)
- Mill Hall, PA (ANGH)
- Smithton, PA (ANGH)
- Philadelphia, PA
- Washington, PA
- York, PA

# Fleet Targets for Natural Gas Trucking



# Air Quality Benefits

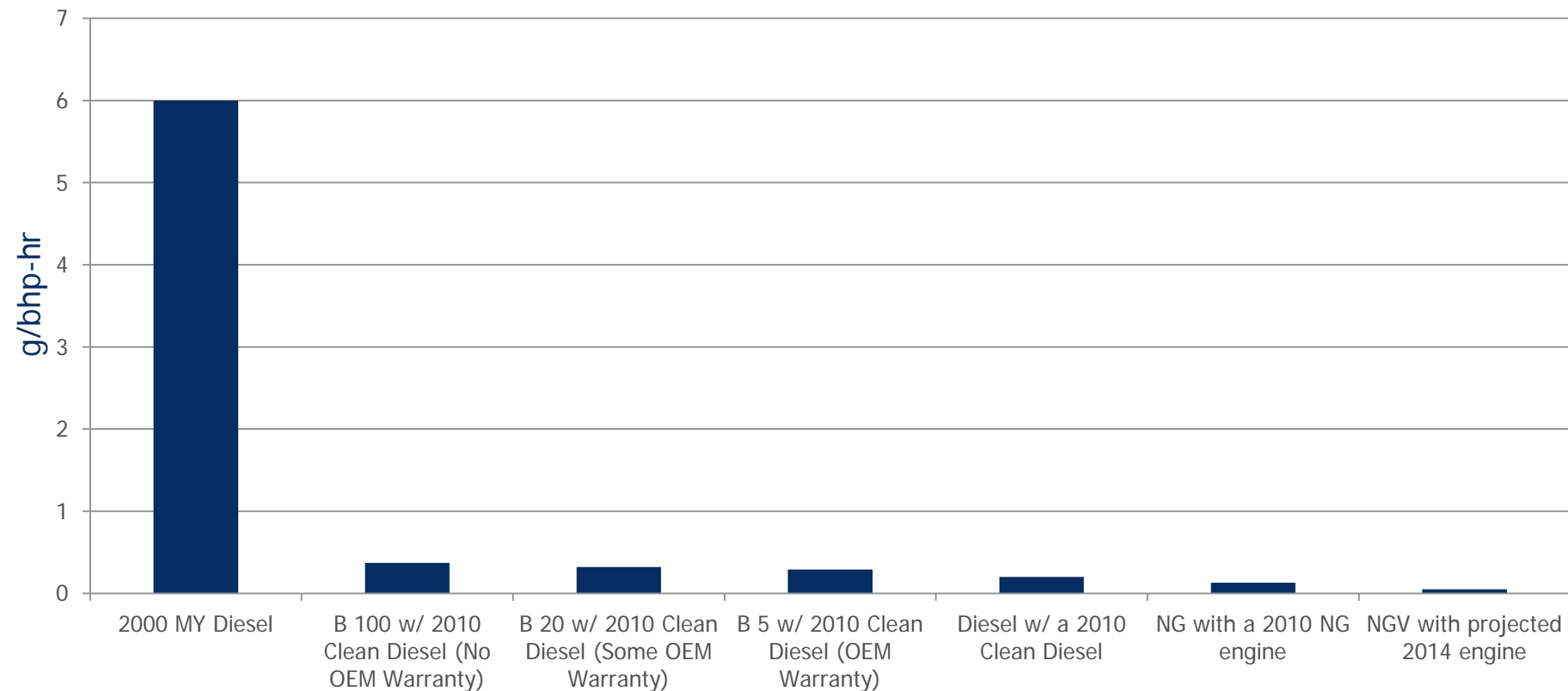
## Clean Air Initially Paved the way for NGVs

- South Coast AQMD Fleet Rules
- First to meet EPA's 2010 Heavy-Duty Truck Rules
- Honda Civic GX received the top green car of the year award for 8 consecutive years running topping EVs and PHEVs
  - Remember, lifecycle emissions (coal v. natural gas)
  - 2012 UCS study showing EV emissions benefits varying by region
- Cummins-Westport Q4 announcement to reduce NOx emissions to “nearer zero” levels at 0.05 g/bhp-hr by 2014-15.
- NGV particulate not a listed Toxic Air Contaminant
- CARB analysis shows HD NGVs with up to a 23% GHG reduction, LD NGVs up to a 29% GHG reduction.

# Cleanest Criteria Air Emissions for Heavy-Duty Combustion Engines

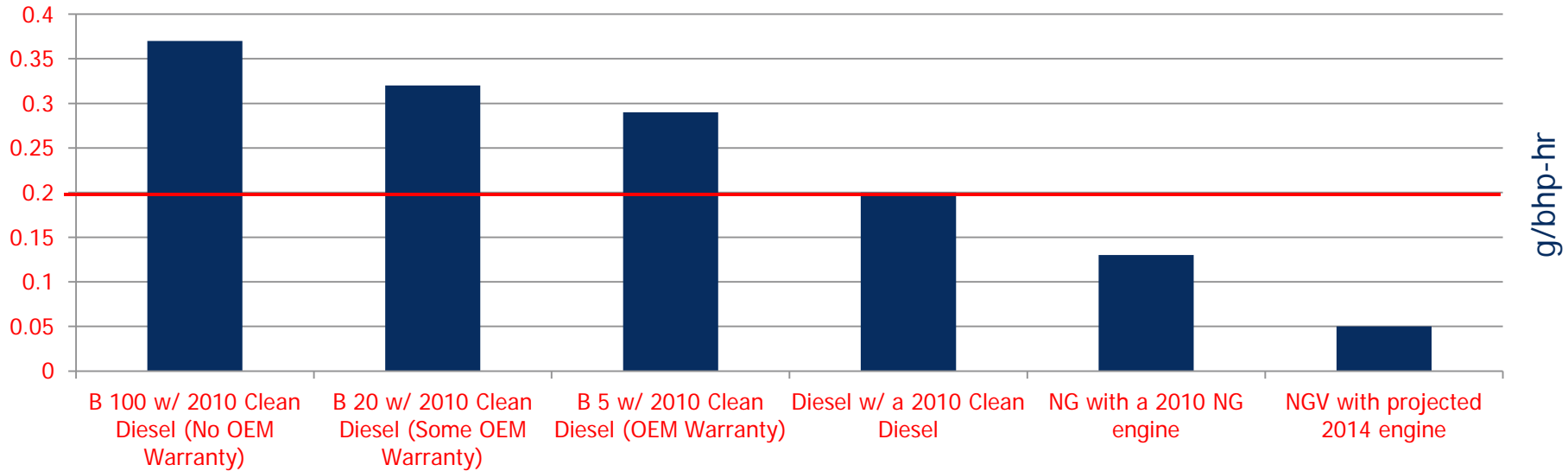


## NOx Emissions Comparison



# Cleaner Criteria Emissions than 2010 Diesel

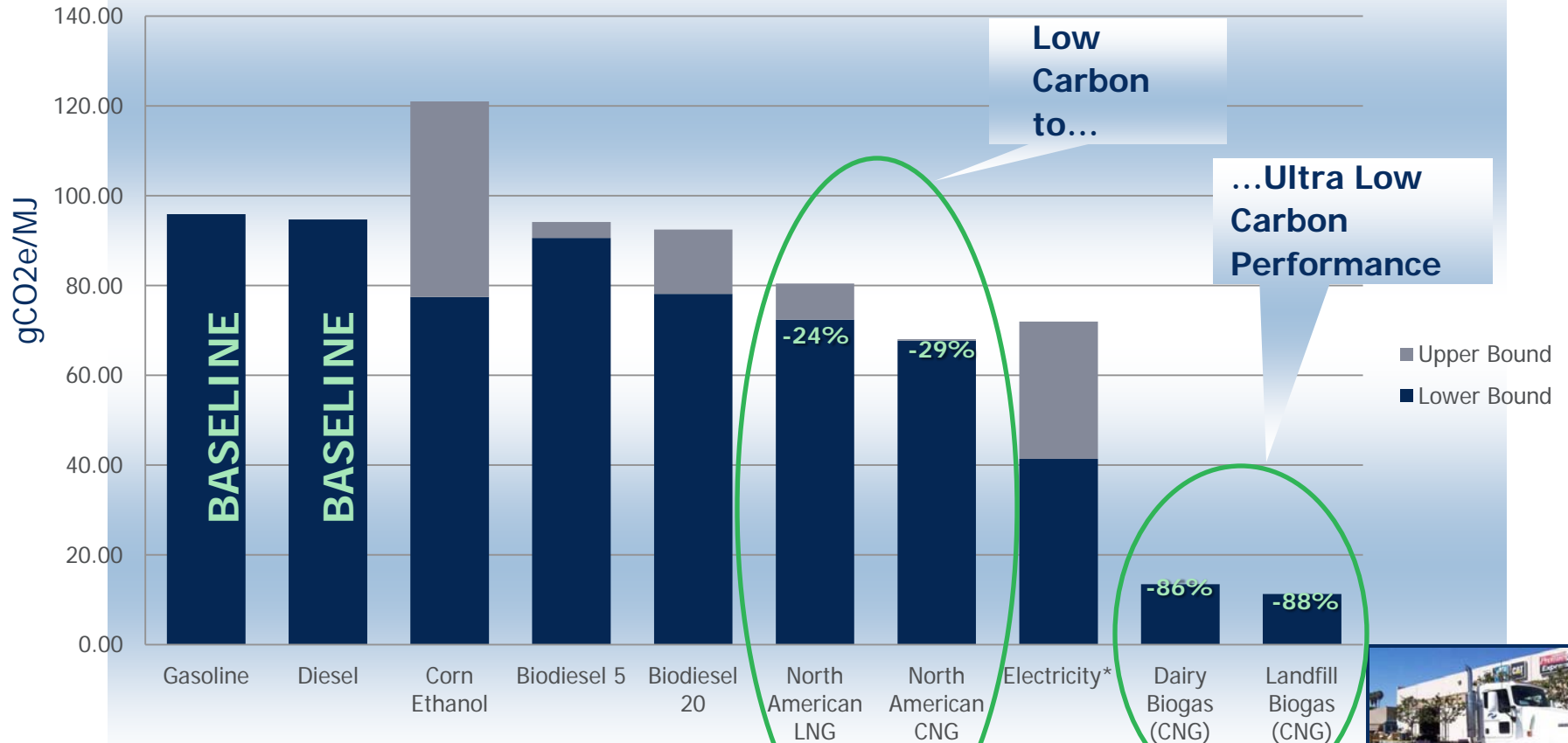
## NOx Emissions Comparison



- CNG/LNG continues to provide superior NOx benefits, **35% better** emissions over 2010 Standard with **75% better** emissions potential by 2014.
- Lower NOx emissions translates into lower secondary PM emissions.
- CNG/LNG PM emissions almost “non-detectable” at **0.002 g/bhp-hr** using a three-way catalyst, not a DPF, making it more reliable.
- CNG/LNG particulate matter, unlike diesel, is not identified by Cal EPA as a Toxic Air Contaminant which can cause cancer or reproductive harm

# Natural Gas is a low to ultra low carbon fuel

## Carbon Intensity by Fuel Type



Sources: California Air Resources Board, Low Carbon Fuel Standard, Table 6. Carbon Intensity Lookup Table. 2010

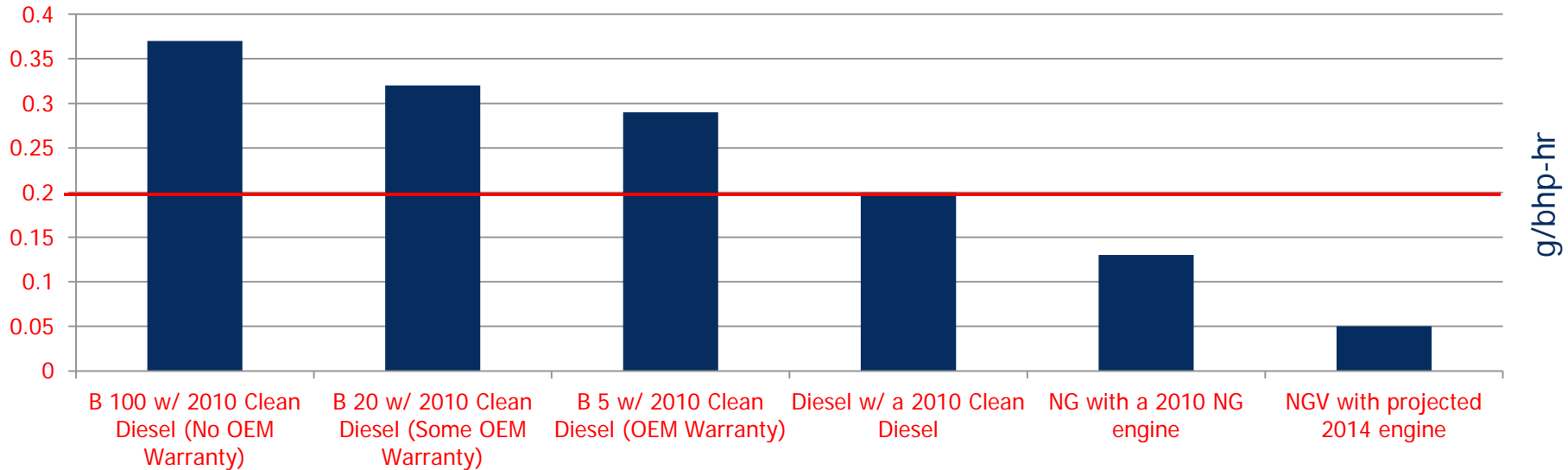
\*Lower bound estimate for electricity reflects CARB number and upper bound estimate reflects UC Davis' correction of CARB's figure by reflecting marginal power generation of California grid.





# Cleaner Criteria Emissions than 2010 Diesel

## NOx Emissions Comparison



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Utilities should be “enablers”,  
not “competitors”

- There are private firms who desire to invest private capital in the fueling infrastructure side of both EV and NGV markets.

- A Better Place
- Ecotality
- NRG EV Services

## Los Angeles Times, 5-26-12



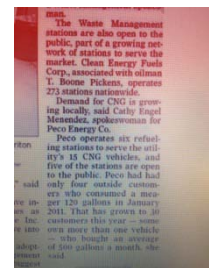
# Private Firms risking shareholder dollars

- **Air and Gas Technologies**  
*CNG and LNG Station Provider*
- **Allsup**  
*CNG Station; Owner/Operator*
- **ALT**  
*LNG Plant Owner; LNG Fuel Provider*
- **American CNG**  
*CNG and LNG Station Owner/Provider*
- **American Natural Gas**  
*LNG Station Owner*
- **Atlas Copco-Greenfield Compression**  
*Equipment Provider*
- **AVSG LP**  
*CNG Station Network; Owner/Operator*
- **CH-4**  
*LNG Station; Owner/Operator*
- **Chart Industries**  
*LNG Equipment Provider; Station Installer*
- **Chesapeake Energy**  
*CNG Station Owner/Operator*
- **Clean Energy Fuels**  
*CNG, LNG Fuel Provider; Station Network Owner/Operator*
- **CN Gas Group Corp.**  
*CNG Equipment & Stations/US Agira Representative*
- **Encana**  
*CNG & LNG; Station Owner*
- **Engineered Energy Solutions**  
*Engineering and Design Firm, CNG Station Owner/Operator*
- **Enviro Express Natural Gas LLC**  
*LNG Station; Owner/Truck Operator*
- **Integrlys**
  - **Pinnacle Gas Systems LLC;**  
*CNG; Fuel Station Owner/Operator*
  - **Trillium USA**  
*CNG; Fuel Station Owner/Operator*
- **General Electric**  
*CNG and LNG Equipment Provider*
- **General Physics**  
*LNG Equipment Provider; Station Installer, Operator*
- **Go Natural Gas**  
*CNG Station; Owner/Operator*
- **Gulf Oil**  
*CNG Station Owner*
- **Kwik Trip Inc.**  
*CNG Station; Owner/Operator*
- **Lehigh Gas**  
*CNG Station; Owner/Operator*
- **Linde**  
*LNG Fuel Provider; Equipment Supplier*
- **Love's**  
*CNG Station Owner*
- **Mansfield Gas Equipment System, Inc.**  
*CNG Station; Supplier/Owner/Operator*
- **Peake Fuel Solutions**  
*CNG and LNG Station Equipment Supplier for Stations and Home Refueling*
- **Questar Corporation**  
*Questar Fueling; Owner/Operator*
- **Nopetro**  
*CNG and LNG Fueling Systems*
- **OnCue Express**  
*CNG Network; Owner/Operator*
- **Petrocard Systems**  
*CNG Station; Owner/Operator*  
*Producer/Kentucky*
- **Prometheus Energy Company**  
*LNG Fuel Provider; LNG Supply*
- **Republic Industries**  
*CNG Station; Owner/Operator*
- **Shell**  
*LNG Fuel Provider*
- **Speedy Fuels**  
*LNG Station; Owner/Operator*
- **US Air – CNG Systems**  
*CNG Equipment & Stations*
- **Vocational Energy**  
*CNG Station Provider; Refuse*
- **Waste Management, Inc.**  
*Public Access; Station Owner*
- **Wisegas, Inc.**  
*CNG Station; Owner/Operator*
- **Zeit Energy**  
*CNG Station; Owner/Operator*

# Utility Participation Confuses the Market, Leads to Unfair Competition



- Captured rate base (v. shareholder dollars)
- Low Cost of Capital (based on captured rate base)
- Name Branding (household name)
- Cross-subsidized marketing and service
  - (i.e., BDMs, envelope stuffers, cost of service)
- Guaranteed rate of return on capital regardless of project success
- Failure to include full cost allocation of service
- Discourages private capital investments for needed infrastructure
- Limited to service territory
- Not core business of the utility
  - Leads to delay in market adoption of NGVs and utility program failure



# Failed Utility Programs

Several utility programs failed over the past 15 years, most of which led to an opportunity for Clean Energy to take over, upgrade and rebrand:

- SoCalGas
- SDG&E
- Long Beach Gas
- Public Service Company of New Mexico
- Public Service Company of Colorado (Denver)
- Puget Sound Energy (Seattle) – all of the public stations closed because the utility was not allowed to charge a compression fee.
- Lone Star Energy (Dallas)
- CenterPoint Energy (Houston) –shut down all but 2 stations and intended to close those if CE did not purchase them (deal closed in 2008 for \$100,000)
- Regional Transportation Commission of Nevada (Las Vegas)
- National Grid
- Terasen

# Ways Utilities Can “Enable” the NGV market

- **Home refueling**
  - Offer to finance home refueling appliances to commercial and residential customers in order to help develop the market for a limited period of time.
  
- **Customer Information and Outreach**
  - Participate in national and state NGV organizations (e.g., NGV America, state NGV Coalition).
  - Provide information and advertising to customers – advertising (e.g., cost-saving, environmental and energy security benefits).
  - Sponsor fueling station map books.
  
- **Demonstration and Deployment**
  - Purchase and offer demo NGVs for limited time fleet customer evaluation.
  
- **Utility Fleet Purchases**
  - Work through AGA/NGV America to aggregate orders for utility fleet vehicles in order to create an incentive for OEMs and QVMs to produce vehicles.
  - Maximize alternative fuel vehicle fleet purchases (e.g., EV or NGV).
  - Include alternative fuel MD and HD utility vehicles.
  
- **Infrastructure on Utility Bases**
  - Where cost-effective, construct natural gas fleet fueling facilities at utility bases and provide public access.
  - Encourage utilities to develop a cost based dedicated transportation rate for service to NGV refueling stations.
  
- **Utility Incentives**
  - Design a utility incentive that would grow NGV system throughput and provide timely service establishment to NGV customers on the utility side of the meter.

# Thank you

Todd R. Campbell

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Clean Energy

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