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ENERGY

Market Overview for VXTM Cycle “Mobile LNGTM” Production Plants LNG, CNG & CCNGTM for Transportation Fuel

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Market Size & Growth

Global Market for Natural Gas Vehicles (NGVs) & Stations

	2003	2008	2010	2016 (est)
Global NGVs	2,800,000	8,600,000	12,600,000	19,900,000
Global NGV Stations	6,455	13,000	18,000	26,000

Source: Pike Research

- » 7.9% CAGR for NGVs (2010-2016)
 - By 2016, market will add 3.2 MM NGVs per year
- » 5.9% CAGR for NGV Stations (2010-2016)
- » Average of 685 vehicles per L/CNG fueling station

U.S. Market

	2010	2016 (est)
U.S. NGVs	110,000	177,400
U.S. NGV Stations	1,327	1,972

Sources: IANGV.org
Pike Research

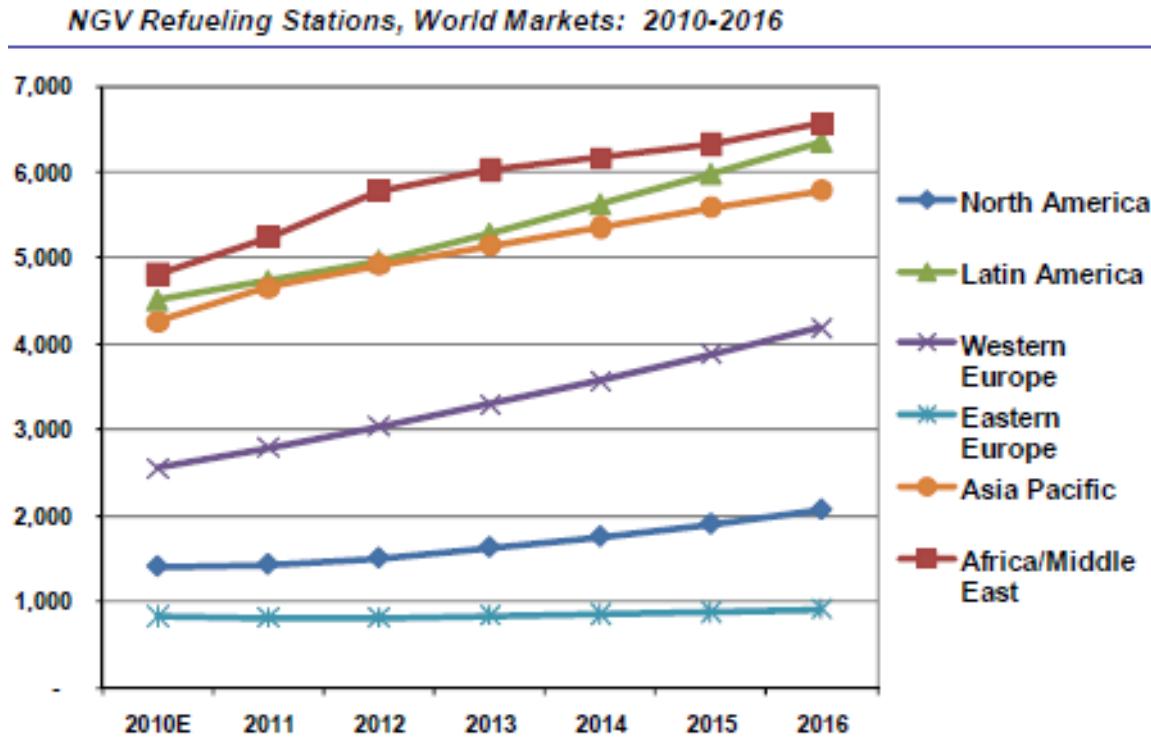
- » Average of 90 vehicles per L/CNG fueling station

Largest Global NGV Markets

Rank	Country	NG Vehicles	L/CNG Fueling Stations
1	Pakistan	2,300,000	3,068
2	Argentina	1,807,186	1,851
3	Iran	1,665,602	1,021
4	Brazil	1,632,101	1,704
5	India	935,000	560
6	Italy	628,624	730
7	China	450,000	870
8	Colombia	300,000	460
9	Ukraine	200,000	285
10	Bangladesh	177,555	500
11	Thailand	162,023	391
12	Bolivia	121,908	128
13	Egypt	119,679	119
14	USA	110,000	1,300
15	Armenia	101,352	214
16	Russia	100,000	244
17	Germany	85,000	860
18	Peru	81,024	94
19	Bulgaria	60,270	77
20	Uzbekistan	47,000	43

Source: Pike Research

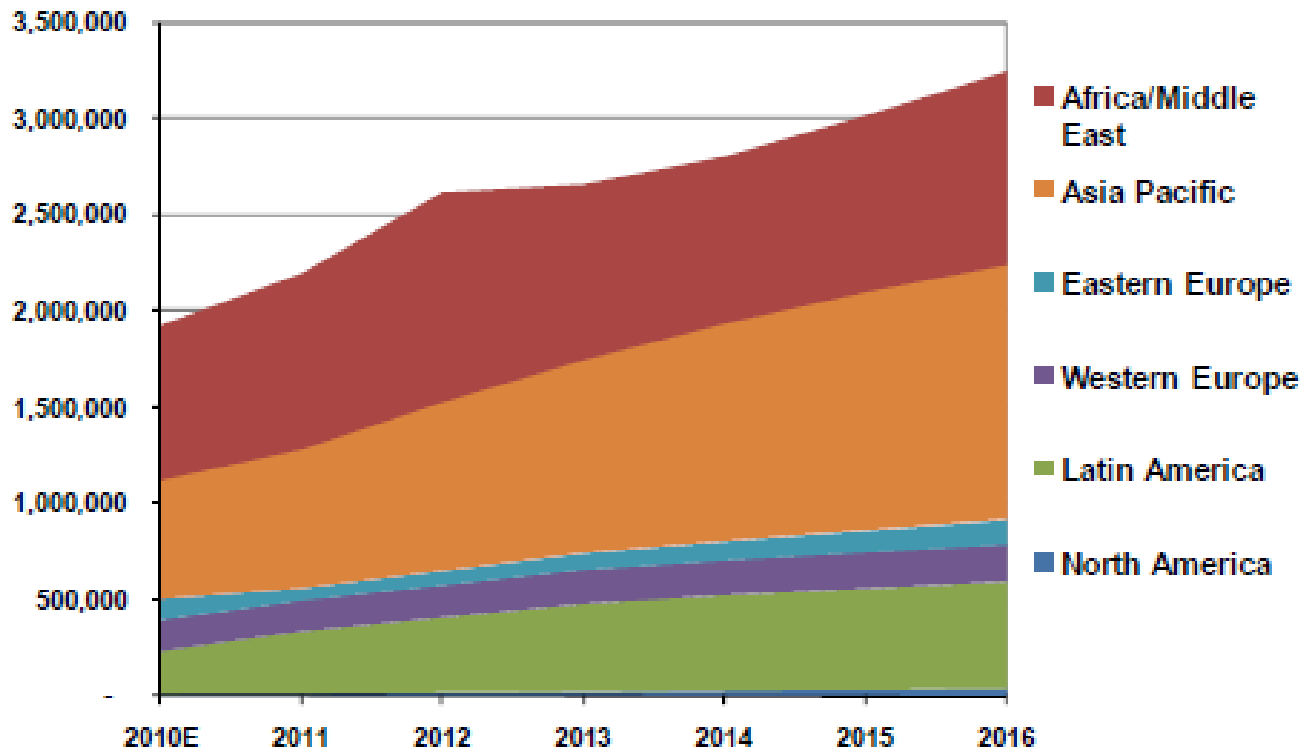
Market Size & Growth – L/CNG Fueling Stations



(Source: Pike Research)

Market Size & Growth – NGV Sales

*Annual Natural Gas Vehicle Sales (Including Conversions), World Markets:
2010-2016*



(Source: Pike Research)

NGV OEMs (sample)**Heavy Duty Trucks & Buses**

Freightliner	Cummins Westport	Mack
Navistar/International	Volvo	New Flyer Bus


Light Duty / Passenger Vehicles

Honda	Ford	Fiat	Volkswagen
Toyota	GM/Opel	Hyundai	Renault
Mercedes-Benz	Citroen	Peugeot	Mitsubishi
Nissan	Volvo	Isuzu	Tata

Market Segments

- » Light & Medium Duty Vehicles
 - Corporate and Government light/medium duty trucks & vans
 - Corporate and Government passenger vehicles
 - Consumer passenger vehicles
- » Heavy Duty Vehicles & Fleets
 - Long-Haul Trucks
 - Short-Range Delivery & Refuse Trucks
 - Bus Fleets
- » Off-Road Vehicles (a new fast-growing category)
 - Port vehicles (driven by EPA and state clean air standards near coastlines)
 - On-base Military vehicles
 - Airports
 - Rail Yards
 - Mining vehicles
- » Inland Marine & Ocean-Bound Marine
 - Major initiatives are underway to create a global fleet & infrastructure for LNG ship fueling (“bunkering”)
 - New N. American environmental regulations are pushing inland vessel operators (barges, etc.) to convert to LNG fueling

Market Drivers

- » Economics (paybacks due to savings vs. diesel, etc.)
- » Environmental advantages (lower GHGs, NOX and particulate matter)
- » Energy independence / energy security (NG primarily sourced domestically)
- » Availability  L/CNG Fueling Infrastructure is a key hurdle
 - Market will grow far faster if widespread L/CNG fueling infrastructure is developed
 - Ability to refuel w/ LNG (vs. CNG) is critical for long-haul Heavy Duty truck market
 - Today, only ~ 60 of 1,300 US NG fueling stations are LNG. Hundreds more are needed.

VX™ Cycle “Mobile LNG™” production plants are the solution! The “missing link.”

- Skid- or trailer-mounted “Mobile LNG™” technology that can be used on any low (or high) pressure NG pipeline or local NG distribution system
- Would allow a nationwide / global network of L/CNG fueling stations to be developed and operated cost-effectively

U.S. Market Growth

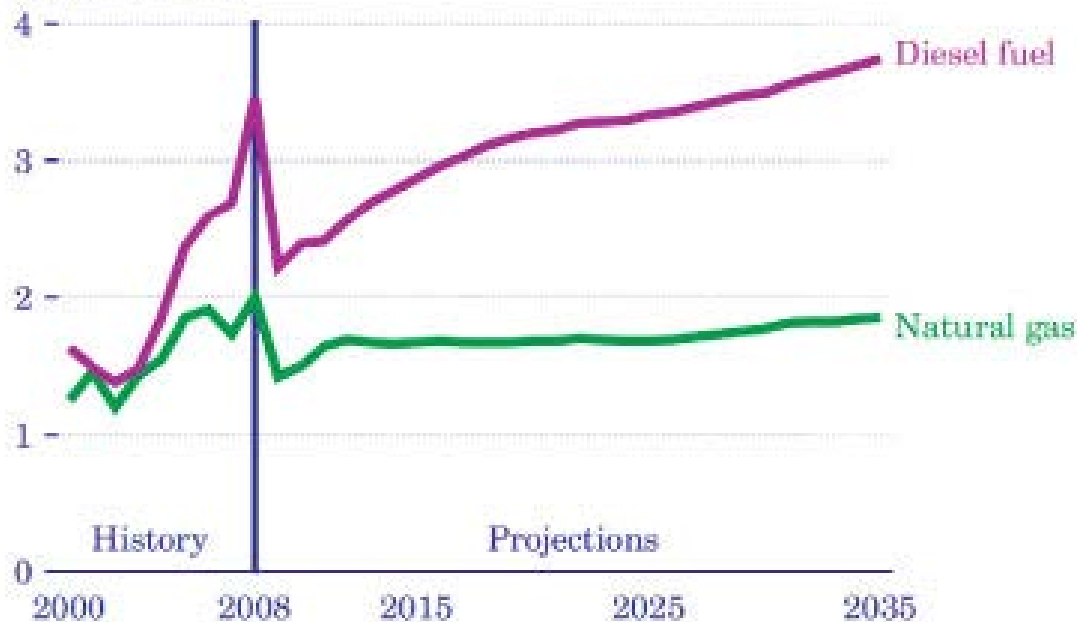
- » U.S. market will be the fastest-growing in the world from 2011-2016
 - 25.4% CAGR from 2011-2016 (*Source: Pike Research*)

U.S. Market Drivers

- » Attractive economics
 - Recent rapid expansion of U.S. shale gas production has led to a very large increase in recoverable domestic gas reserves + a low, stable price
 - Nearly 100 years of domestic supply
 - L/CNG fuel price is quite low vs. diesel fuel (even on a BTU-adjusted basis)
- » Regional/state government incentives for NGVs and L/CNG fueling stations
- » Potential for federal government incentives, etc. for NGVs and L/CNG fueling stations (e.g., NAT GAS Act)
- » Environmental advantages

L/CNG Prices vs. Diesel-Equivalent Prices – 2000 to 2035

Figure 21. Delivered energy prices for diesel and natural gas transportation fuels in the Reference case, 2000-2035 (2008 dollars per gallon of diesel equivalent)



Source: U.S. Energy Information Administration (DOE); Annual Energy Outlook 2010

U.S. Market Potential – L/CNG Station Infrastructure

Source: Clean Energy

Heavy Duty Trucks Segment

- » Primarily LNG for Class 7/8 trucks
- » Network of 2,000 to 5,000 stations nationwide
 - For reference, there are 9,000 truck stops in U.S. today
- » \$14-20 billion for station infrastructure
- » \$20-30 billion for (centralized) LNG production facilities **(not necessary w/ VX™!)**

Light Duty Vehicles Segment

- » Primarily CNG
- » Network of 20,000 to 45,000 stations nationwide
 - For reference, there are 170,000 retail gasoline stations in U.S. today
- » \$40-70 billion for station infrastructure

Competition – L/CNG Fueling Infrastructure & Equipment

- » The field of suppliers of L/CNG fueling stations is quite fragmented
- » No company currently holds a significant % share of the total global market
- » The suppliers of L/CNG fueling stations are primarily small companies that are regionally focused
- » **This provides an attractive opportunity for a large global company(s) to become the dominant competitor(s) in this industry.**
 - **Particularly if they have a differentiated, proprietary and cost-effective technology like the VX™ Cycle for “Mobile LNG™” production**

Other Markets the VX™ Cycle “Mobile LNG™” Technology Can Serve

- » Stranded gas fields/wells
 - Liquefaction via VX™ Cycle “Mobile LNG™” production plants allows natural gas from isolated gas fields to be extracted and cost-effectively brought to market (without the need for a pipeline near the wells)
- » Recovery & monetization of associated gas at oil wells
 - An alternative to wasteful flaring of “associated gas” from oil wells
 - Liquefaction via VX™ Cycle “Mobile LNG™” production plants allows associated gas to be captured, converted to LNG, and then trucked to market or used as LNG fuel for vehicles and drilling rigs operating nearby
 - ~ \$40 Billion of associated gas is flared globally each year! (Source: World Bank)
- » Inland LNG storage terminals
 - For peak-shaving, supply security, etc.

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