



CNG Fueling Options for Light Duty NGVs

A presentation describing the available options for refueling light duty NGVs:
from public stations to home refueling.

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Who We Are - Mansfield Gas Equipment Systems

- Founded March 2011 via acquisition of Gas Equipment Systems, Inc. (GESI)
- Mansfield Subsidiary Company
- All Key Staff and Employees of GESI were retained
- Headquarters Located in Ontario, CA
- Designed and/or constructed over 190 CNG fueling station projects
- <http://www.mansfieldgasequipment.com>





1

Initial Customer Consultation

Needs Qualifications



2

Project Design

Site Specific Parameters
Equipment Recommendations
System Design and Consultation



3

Project Proposal

Specifications
Terms and Conditions
Execution



4

Project Implementation

Equipment Order
Engineering and Permitting
Equipment Packaging and Assembly



5

On site Construction

Utility Coordination
Site Preparation
Equipment Installation



6

System Startup and Training

Initial System Testing
Customer Training
System Startup



7

Operation and Maintenance

Ongoing Support
Maintenance and Service

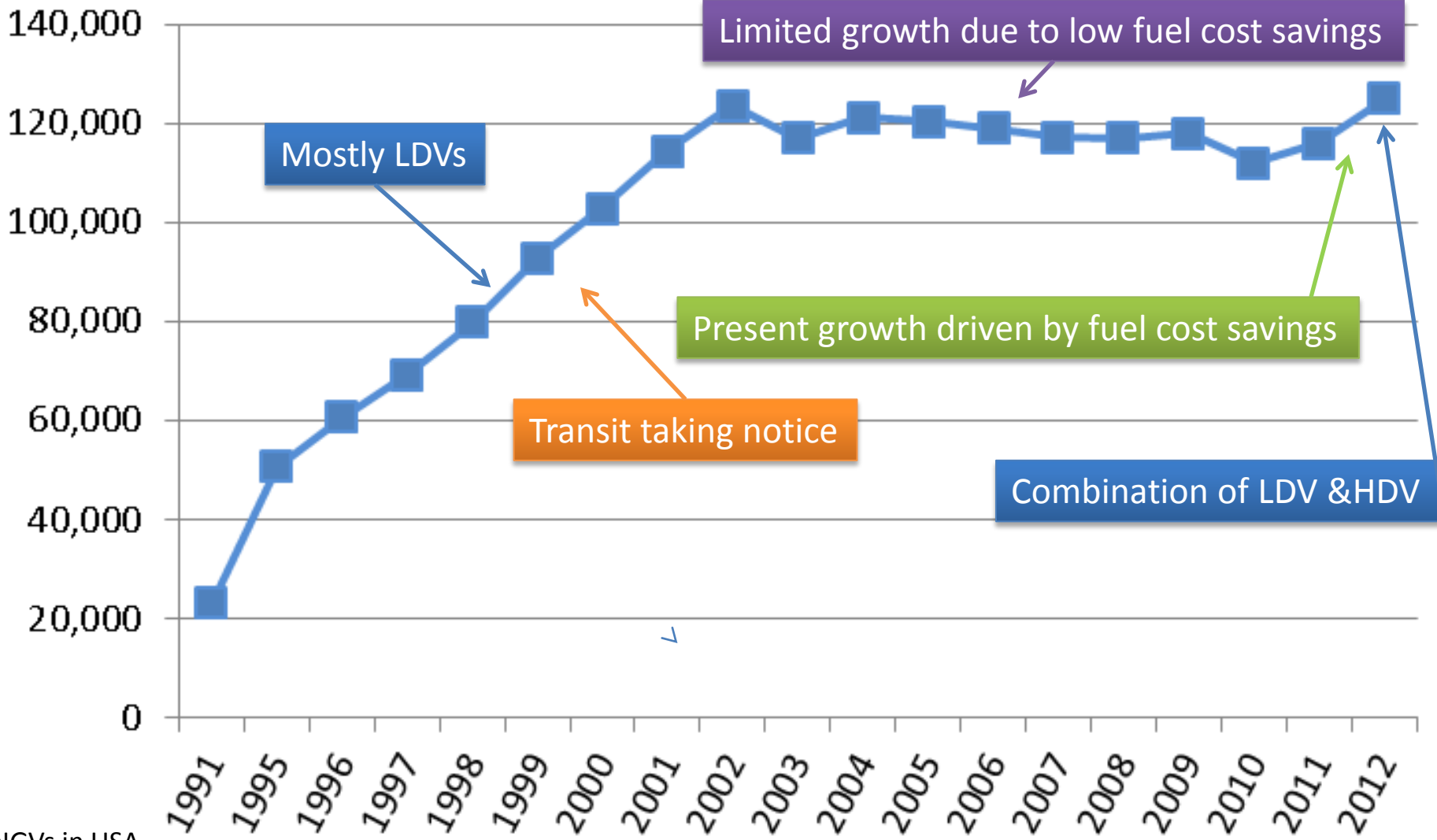
Recent Project History Summary (Excluding 2012)

Total SCFM 15 – 100 SCFM	16
Total SCFM >100 SCFM	29
Total GGE per day < 400 GGE	17
Total GGE per day > 400 GGE	28
HP rating up to 100 Hp	30
HP rating 100 Hp and above	15
Duplex Configuration	32
Single Configuration	13
Time-Fill Only	18
Fast-Fill Only	8
Time-Fill / Fast-Fill	19

2012 YTD Station Wins

2012 Wins	Number of Compressors	Total SCFM	GGEs per Hour	System Type	Customer Type	Types of Vehicles	
AL-A	2	110	55	TF-FF	Gas Utility	LD/HD	Private
AL-B	2	110	55	TF-FF	Gas Utility	LD/HD	Private
AL-O	2	110	55	TF-FF	Gas Utility	LD/HD	Private
AV-D	1	495	245	TF-FF	Gas Utility	LD/HD	Private/Public
AV-M	2	404	200	TF-FF	Gas Utility	LD/HD	Private
BW-M 1	1	58	29	TF-FF	Transit	LD/HD	Private/Public
BW-M 2	1	58	29	TF-FF	Transit	LD/HD	Private/Public
BW-M 3	1	58	29	TF-FF	Transit	LD/HD	Private/Public
CO-O	4	3452	1712	TF-FF	Transit	HD	Private
CR-1	2	116	58	TF	Auto Manuf.	LD	Private
CR-2	2	116	58	TF	Auto Manuf.	LD	Private
CR-3	2	116	58	TF	Auto Manuf.	LD	Private
ED-C	1	400	198	TF	Waste	HD	Private
MB-C	1	75	37	TF-FF	Transit	HD	Private/Public
RVT-PA	2	16	8	TF	Transit	HD	Private
SW	1	8	4	TF	Gas Utility	LD	Private
ST-C 1	2	8	4	TF	State Gov.	LD/HD	Private
ST-C 2	2	8	4	TF	State Gov.	LD/HD	Private
SA-C	2	116	58	TF	Military	LD	Private
WI-N	2	800	397	TF	Waste	HD	Private
WM-F	2	1000	496	TF	Waste	HD	Private
Total	37	7234	3587				

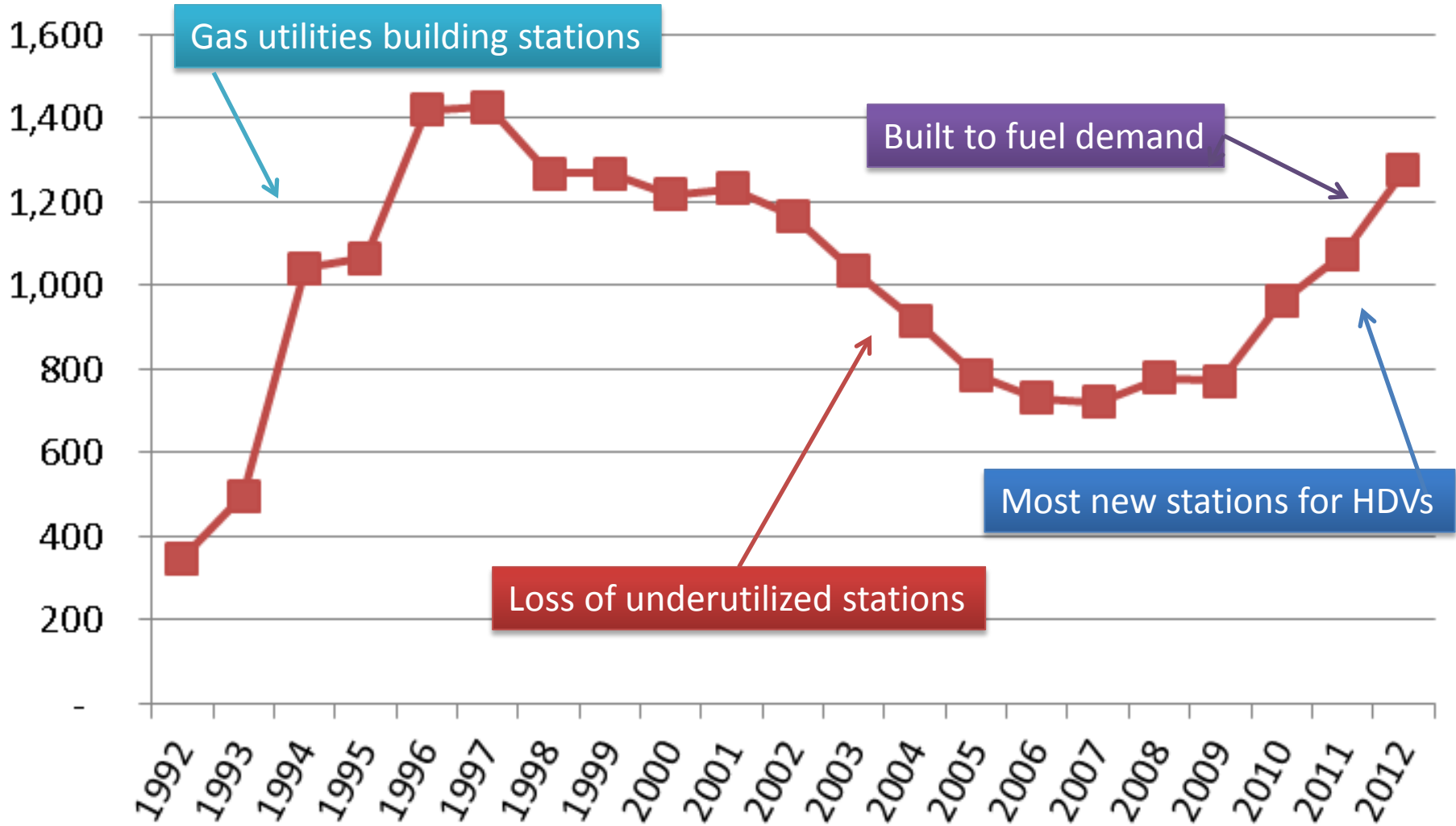
USA NGV Growth



NGVs in USA

Data from GVR, NGV Global & NGVAmerica

USA CNG Station Growth



CNG Stations - Existing & Planned

Data from AFDC

Selection of Correct Equipment for Market Segment is Crucial



Trucks, Buses, Cars



Fleet



Passenger Vehicles



Large Public & Private Stations

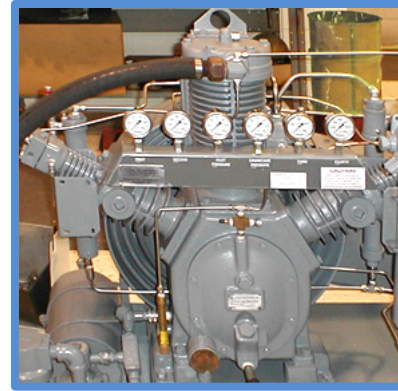
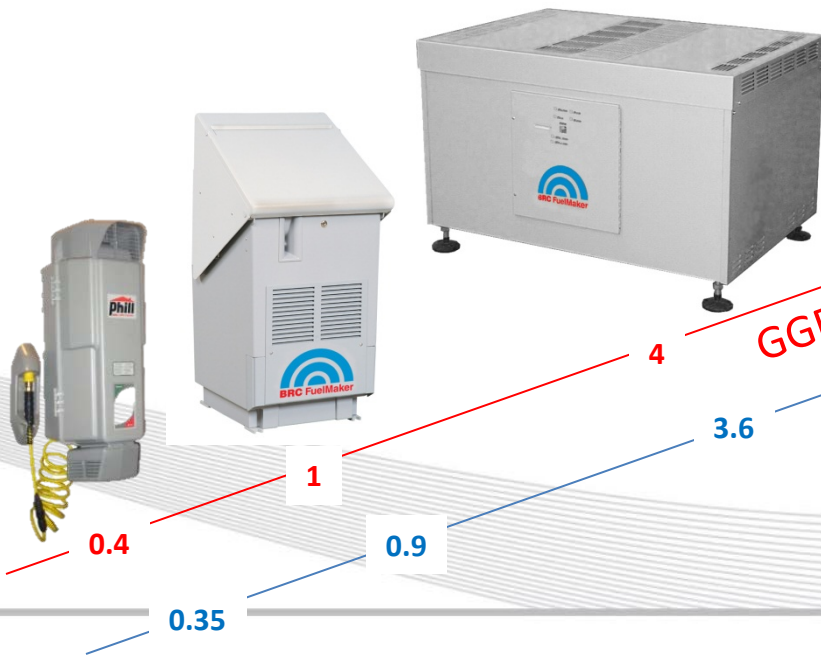


Small to Medium Public & Private Stations



Home Refueling

Compressors of All Capacities are Available



0.4

0.35

1

0.9

4

3.6

14 - 60

70 - 1000+

63 - 910+

GGEs per Hour

DGEs per Hour

12.5 - 54

High Capacity Public Station

- Works well with anchor fleet
- Requires large number of NGVs
- Large equipment footprint
- High capital cost



Assumption operating 12 hours a day

Station Size	Annual GGE Capacity	Max Hourly Vehicles Filled	Back to Back Vehicle Fills (6 gallons in 4 minutes)	Installed Cost
Typical Large Public	1,800,000	70	15	\$1,500,000+

Typical Lower Capacity Public Station

- Adequate for locations with few NGVs
- Large equipment footprint
- Cannot handle many HD NGVs
- Lower capital cost, but still expensive



Assumption operating 12 hours a day

Station Size	Annual GGE Capacity	Max Hourly Vehicles Filled	Back to Back Vehicle Fills (6 gallons in 4 minutes)	Installed Cost
Typical Small Public	250,000	9	5	\$500,000+

All-in-One Lower Capacity Public Station

A Low Cost Alternative

- Adequate for locations with few NGVs
- Small equipment footprint
- Cannot handle many HD NGVs
- Includes:
 - 50GGEh compressor
 - Storage
 - Gas dryer
 - Two hose dispenser
 - Remote POS



Assumption operating 12 hours a day

Station Size	Annual GGE Capacity	Max Hourly Vehicles Filled	Back to Back Vehicle Fills (6 gallons in 4 minutes)	Installed Cost
CNG Express™ All-in-One	230,000	9	2	\$325,000

Public/Private Station Mix

- Many commercial and government entities are building private stations with a public access component
- Efficient way to grow public infrastructure for LDVs
- Helps offset some of the stations costs
- Some incentives specify a public access element



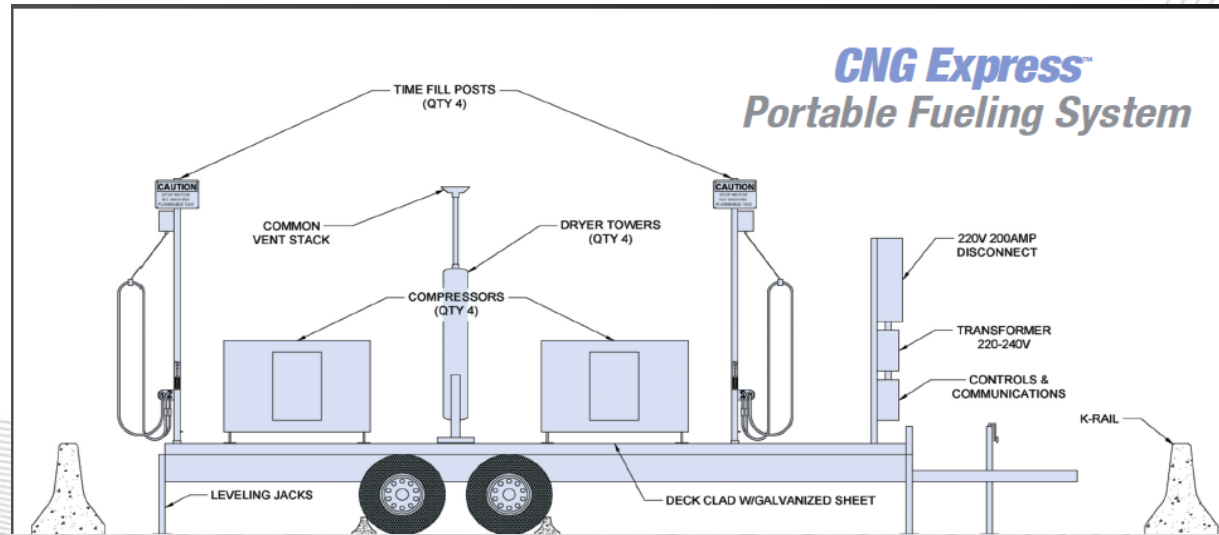
Private Stations

- Private stations for fleet LD NGVs should be designed for specific fuel requirements
- Costs can vary greatly
- Time-Fill is the most economical option
- Equipment is available allowing refueling anywhere there is gas



Portable Refueling

- **CNG Express™ - Portable-Time-Fill (PTF)**
 - Designed for fleets wanting to test CNG or have only a few vehicles
 - Time-Fill 16GGEs per hour
 - Fuel up to 4 vehicles simultaneously
 - Easy installation
 - Rent or purchase



Lowest Cost Commercial CNG Fueling on the Market

- **Vehicle Refueling Appliance (VRA)**
 - Appliance delivering 1 GGE per hour
 - Low install and operating cost
 - Fully compliant and widely used
 - 12,000 units installed worldwide
 - Suggested retail \$7,275 + installation



Home Fueling Option

- Home fueling: one vehicle - one station



- New \$2000 per unit SCAQMD incentive soon to be available

Home Fueling Can Bridge Infrastructure Gap

- When the initial cost of public infrastructure is too high, Home Fueling can be used during the early stages of market development to help bridge the gap



Conclusion

- Cost effective equipment is available allowing NGV refueling anywhere there is gas
- For best economics station needs to be right sized
 - Match equipment to present fuel requirements
 - Time-Fill substantially more economical than Fast-Fill
- More cost effective LDV models are required

Thank You

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