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Designing Retail LNG/LCNG stations

Kevin Markey
Director Natural Gas Fueling Solutions

kmarkey@gpstrategies.com
Phone 214-697-0391
(formally General Physics Corporation)



Retail Fuel Stations

Q: Why are we here?

A: Discuss how to integrate conventional fuels into existing retail fuel stations



Flux Capacitor photo courtesy for Dr. Emmett Brown



Steps for Station Design and Installation

1. Define Fleet and Its Fueling Requirements
2. Define Station Location and layout
3. Define Existing Site Conditions
4. Permitting
5. Installation Process

Define Fleet and Its Fueling Requirements

1. What is the size of the fleet(HD trucks, pickups, cars)
2. Desired type of fuel to be used(LNG, CNG, Diesel, propane)
3. Define daily fuel consumption and growth projections
4. Fueling behavior of the fleet(once a day, continuous, overnight)
5. Desired amount of fuel storage(reserve fuel)
6. Desired number of pumps(based on vehicles fueling at same time)
7. Desired amount of redundancy(electric, pumps)
8. Desired Fueling window

LNG dispensing:

Typical dispensing rates 30-50 LNG gpm

CNG dispensing:

Fast or slow fill

Typical rates 5-8 gge per minute

Define Station Location/Layout

1. New or existing location
2. Site convenient to fleet operations
3. Retail or behind the fence operation
4. Vehicle traffic flow, vehicle staging
5. Security gates/secure access
6. Software integrates with existing fuel mgmt software
7. LNG/CNG/LCNG footprint fits property
8. Dispenser options Island vs Wall mounted unit

Define Existing Site Conditions

1. Determine proper power supply to property(480v 3 phase for LNG)
2. Phone service- 3 lines required(alarm,fire, fuel management system)
3. Natural Gas pipeline needed for dedicated CNG(100 psi desired)
4. Concrete driveways for proper traffic flow
5. Some stations may conflict with local codes for height of LNG tanks and noise restriction codes

Permitting and construction

1. Planning Committee (Landscaping, height restrictions)
2. Local city/county ordinance
3. Authority having Jurisdiction (usually local fire department)
4. Seismic and soil evaluations are required
5. Construction of the station should take no more than 3 months if all permits and equipment is received in a timely manner

Governing Codes

- Local Building / Electrical / Plumbing / Mechanical Codes
- Local Fire Codes
- NFPA 52 (CNG/LNG)
- NFPA 30A (gasoline/diesel)

General Issues

- 480VAC power availability
- LNG storage setbacks and equipment footprint
- Gasoline/diesel dispenser vs. LNG/LCNG dispenser electrical classifications
- Traffic flow patterns
- Public barriers vs. safety for maintenance personnel
- Interface with existing point of sale system
- Capex vs. capacity
- Customer fleet requirements

Retail LNG/LCNG Fuel Stations

Kwik Trip Fuel Station

Kwik Trip Way, La Crosse, WI

Equipment

- Six fuel lanes with CNG, LNG, E85, B20, B5, DEF, propane, off-road diesel
- 15,000 gallon LNG tank
- Two submerged LNG pumps for redundancy
- 60 hp LCNG pump

General Issues

- Separations between fuels
- Cold Climate design: electric trim heater / snow melt system



LNG

- Mobile stations
- Pumpless station for small fleet
- Various storage sizes to meet needs
- Dispensers
 - Demand based cold-saturated fuel
 - Integrated card reader
 - Wall mounted dispenser
 - Dual hose
- Standard designs for most configurations
- Own-Operate-Maintain

LCNG Options

- LCNG pump capacity to meet CNG dispensing needs
 - Eliminate waiting between dispensing operations
 - Eliminate short fills when 2nd vehicle starts fill
- Cold climate options
- Dispensing
 - Low flow / high flow nozzles

Thank You

Kevin W. Markey, CPA/MBA

GP Strategies

1918 Don Lee Place

Escondido, CA 92029

(214) 697 0391

kmarkey@gpstrategies.com

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