

CNG: Natural Gas in the US Transportation Fuel Market

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Constellation



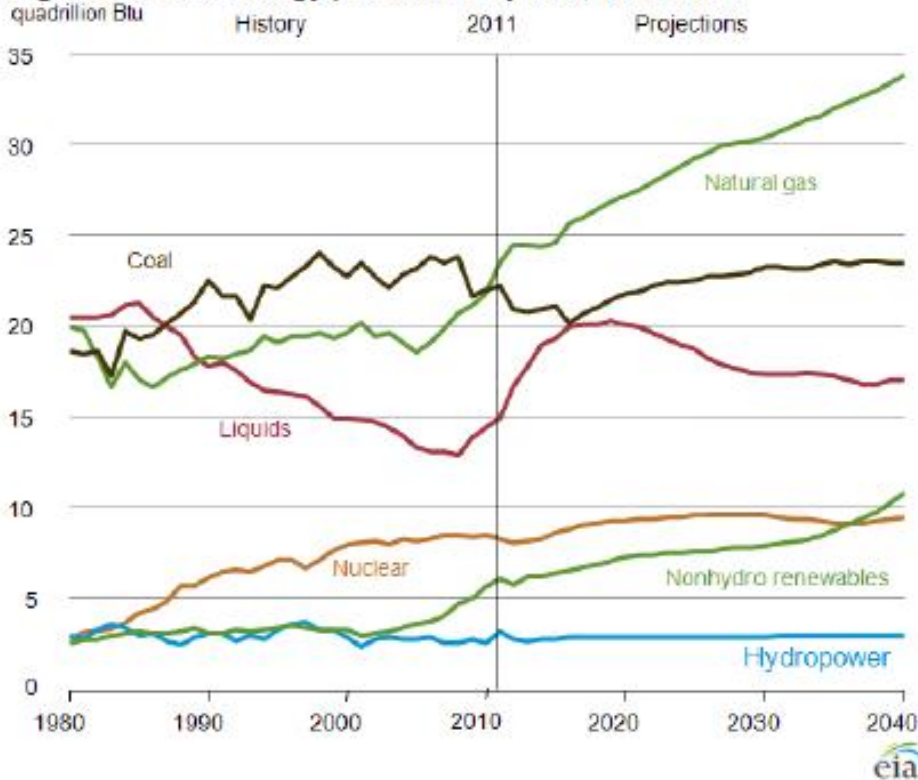
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U.S. Energy Production

Natural Gas Leadership

Figure 10. U.S. energy production by fuel, 1980-2040



Natural Gas has become the leading energy source produced in the US – quickly moving ahead of coal and 50% greater than domestic liquid fuel supplies.

U.S. Energy Production

Natural Gas – US Energy Market “Game Changer”

Bcf/Year	1990	2000	2012	2020
Consumer Use	17,305	21,527	23,157	24,485
Pipeline Use	633	625	711	712
Lease & Plant	1,236	1,016	1,436	1,570
Total Demand	19,174	23,168	25,304	26,767
U.S. Production	17,809	19,269	24,042	27,190
Net Imports	1,446	3,538	1,516	(90)
Total Supply	19,255	22,807	25,558	27,100
Import %	8%	16%	6%	0%

- Growth drivers:
 - > Power generation and CHP
 - > Rebounding Industrial Sector
 - > Transportation (high growth rates)
- Offsetting reliance on coal and oil



U.S. Energy Consumption

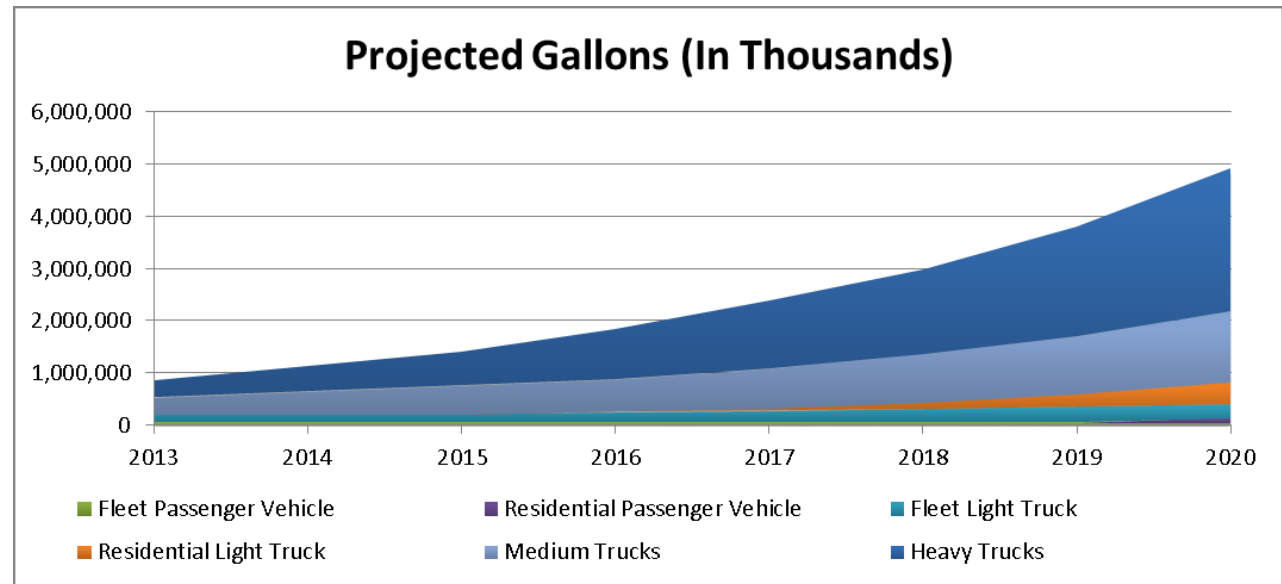
Natural Gas as a Transportation Fuel

Transportation market, by far, is the most concentrated energy sector in US

- Very high reliance and history with liquid fuels
- Of nearly 170 billion gallons of gasoline/diesel annual use in on-road transportation, less than 1% is natural gas (CNG/LNG)

Market factors point toward CNG growth opportunity

- Requires major capital investments and time for energy transition
 - CNG vehicles
 - CNG fueling infrastructure



Source: Annual Energy Outlook (2013); EIA www.EIA.gov



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CNG as THE Transportation Fuel Alternative



Domestic Fuel Supply

- US nat gas production has reached levels equal to/greater than annual demand



Reliable

- Well-established transmission and distribution network across US



Cost Advantage and Stability

- Lower cost per mile
- Disconnected from the traditional volatility of world energy markets



Reduced Vehicle Emissions

- NGVs produce fewer GHG emissions than traditional fuels



Integrated Energy Management

Facility and Transportation energy management can benefit from an integrated, proactive approach

Capitalize on the benefits and availability

Focus on strategy rather than the procurement process to drive the desired results

CNG Industry Development Challenges

Core Costs Remain High:

- OEM vehicle offerings limited with cost-premiums consistently above 40% of base vehicle cost
- Aftermarket conversion costs have risen due to EPA certification requirements
- Fueling station costs are significant, and industry standardization needs to be more coordinated
- Station operating costs can be high for new stations where capacity utilization has not yet reached planned levels



Emissions

- Lessening of CNG advantages due to improvements in conventional fuels and exhaust after-treatment and hybrids

Incentives

- Uncertainty of the availability of vehicle and station incentives
- State-by-state differences in incentives and focus on particular alternative transportation fuels

Lane Logistics

- Range of vehicles (greater range = greater cost) makes the coordination of logistics and refueling critical
- Commitment of lanes and vehicles need to be coordinated with commitments of new and existing CNG fueling stations
- Multi-point lanes require coordination of shippers, haulers and CNG refuelers

Constellation – A National Energy Services Leader



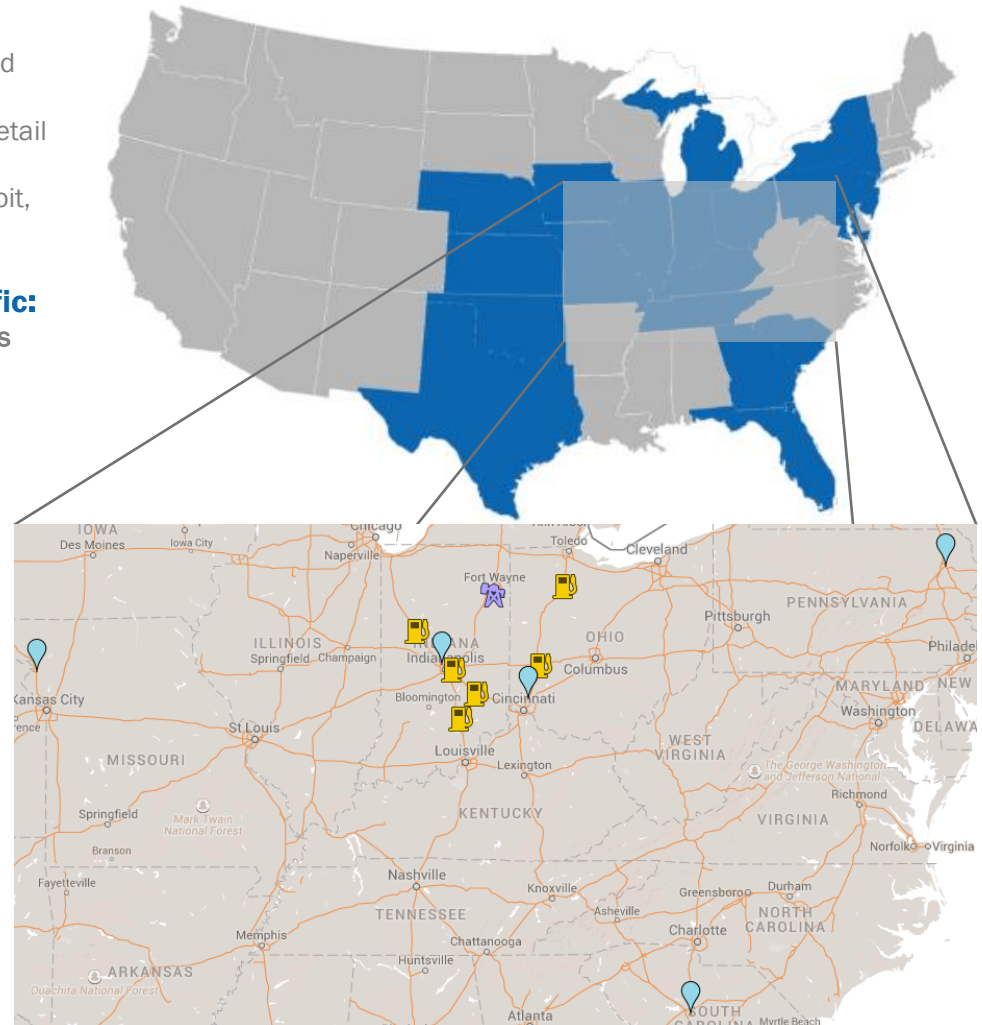
Constellation's planned 100 CNG stations by 2018 would represent 5% of refueling infrastructure

Constellation's CNG Station Network Location:

Strategic public sites within the Great Lakes – Ohio River Valley regions' interstate highway travel corridor

- One of the largest volume regions for interstate trucking and freight traffic
- Located near the highest concentration of Constellation's retail natural gas and power supply customers
- Promotes private CNG station development (example: Detroit, MI to Kokomo, IN fleet route)

Constellation Active CNG Markets (in Blue)



Large Market for Local Interstate Anchor Fleets & Traffic:

> 554 million GGE/yr of fuel demand within 25 miles of the sites

- Potential fuel contracts of 3MM GGE/yr

Additional Stations Under Development:

- Columbia SC
- Scranton PA
- Ft. Wayne IN
- Cumberland County NJ
- Cincinnati OH

Constellation's CNG Locations:

- Indianapolis, IN
- Lafayette, IN
- Greensburg, IN
- Dayton, OH
- Findlay, OH
- Seymour, IN

Active CNG Network



Public Constellation CNG station network

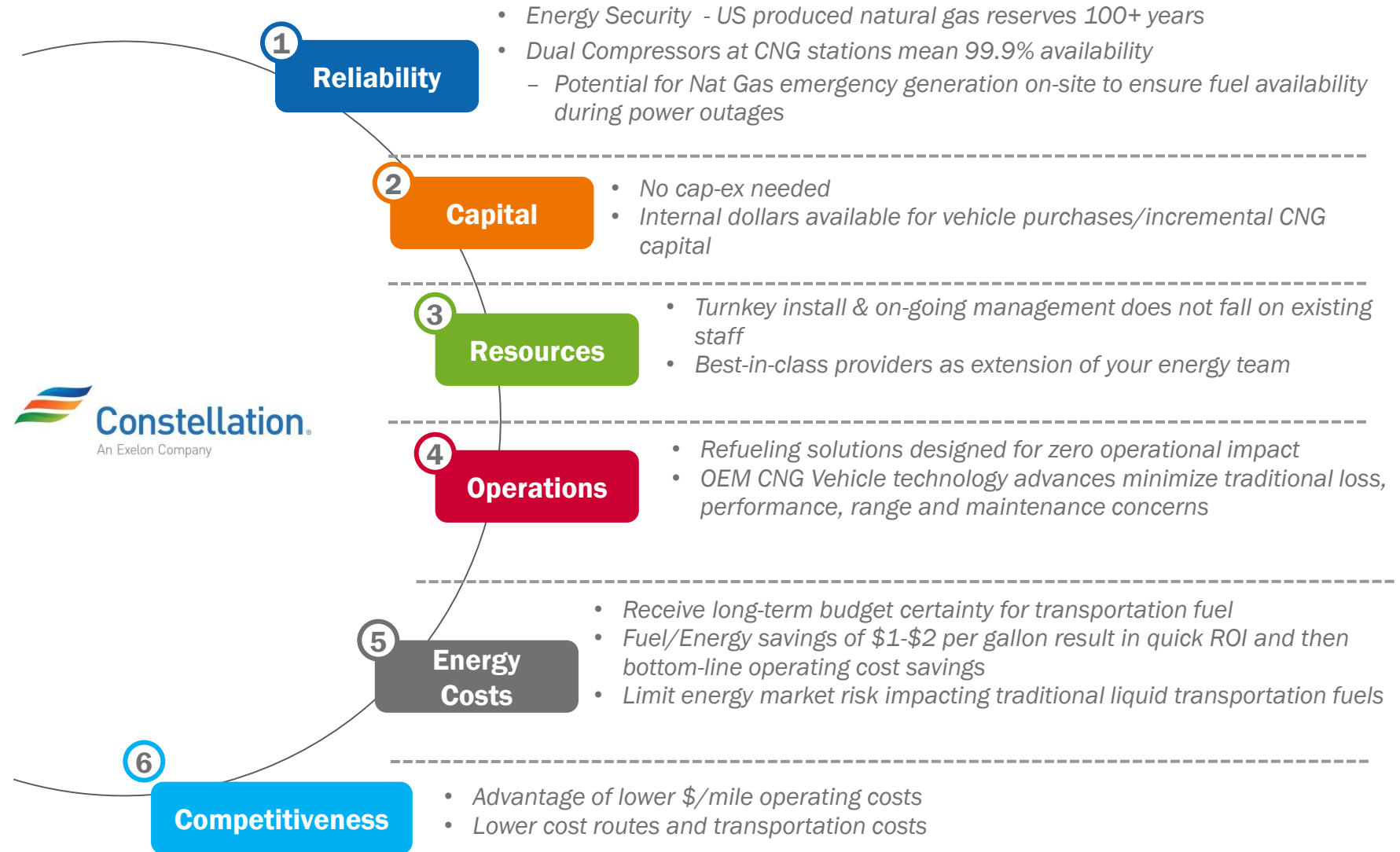


Public sites in construction



Potential sites in development

Fleet Owner Benefits of CNG



Fleet CNG Decision Factors

Benefits

- \$1-\$1.50/gal fuel savings
- Lower portion of fuel price related to commodity volatility (30% for CNG vs 70% for diesel & gasoline)
- Domestic energy source
- Boost the U.S. economy
- Cleaner burning fuel with less emissions

Tradeoffs

- Incremental vehicle conversion cost
- Decreased payload from CNG equipment
- Horsepower can decrease 5-10% with heavy duty applications
- Different maintenance schedules vs petrol
- Garage/facility retrofits

Conversion Costs

- \$10,000 to \$15,000 for light duty
- \$20,000 to \$70,000 for heavy duty

Vehicle Incentives

- State-specific programs offer grants up to offset up to 50% of incremental vehicle cost



Local Maintenance Light-Duty:
Annual Gallons (per vehicle): 2k
Fleet Investment (per vehicle): \$10k
Payback Period: 48 months



Regional Distributer Semi Truck:
Annual Gallons (per vehicle): 20k
Fleet Investment (per vehicle): \$60k
Payback Period: 24-36 months



Refuse & Waste Hauler Truck:
Annual Gallons (per vehicle): 10k
Fleet Investment (per vehicle): \$20k
Payback Period: 24 months

Sample ROI – The CNG Price Advantage for Fleets

INPUT



Fleet Type:

Fleet Fuel: ☒ Diesel
☐ Gasoline

Select Alternative Fuel:

Fleet Size: Trucks

Total Fuel Tank Capacity Per Truck: gallons

Average Miles Per Year Per Truck: miles

Average Diesel Fuel Economy: MPG

Diesel Price: \$ per gallon







CNG Price: \$ per GGE



Incremental CNG Truck Cost: \$ per truck

Government Incentives: \$ per truck

Consider Fueling Options: ☐

OUTPUT

Diesel	Compressed Natural Gas
 <input type="text" value="50532"/> gallons used per year	 <input type="text" value="56949"/> gallons equivalent used per year
 <input type="text" value="1758"/> miles on a full tank	 <input type="text" value="1560"/> miles on a full tank
<input type="button" value="Find Local CNG Stations"/>	
 <input type="text" value="\$159174.45"/> total annual fuel cost	 <input type="text" value="\$91688.02"/> total annual fuel cost

Results	
	Payback on Incremental Truck Cost: <input type="text" value="1.33"/> Years
	Annual Fuel Savings: <input type="text" value="\$67486.43"/>

<http://www.ep-act.org/alternative-fuel-calculator>

Exelon Corporation: A National Energy Leader

Operations & Business Activities in 48 states,
Washington D.C. & Canada

Revenues: \$27.4 billion | **Assets:** \$86.8 billion

Employees: 29,000

Competitive Load Served:

- 180 TWH (electric)
- 650 BCF (natural gas)

Energy Generation: Exelon Generation

- Generating Capacity: 32,500 MW

Competitive Energy Sales: Constellation

- 175,000 business & public sector customers
- More than 2 million residential customers
- Wholesale sales, dispatch, and delivery from Exelon's 33 GW power generation portfolio

Transmission & Distribution: BGE, ComEd, PECO

- 6.6 million electric customers
- 1.2 million natural gas customers

NYSE Ticker Symbol: EXC

Headquarters: Chicago, IL



One of the nation's leading competitive power generators, with approximately \$27.4 billion in annual revenues. The Exelon family of companies participates in every stage of the energy business, from generation to competitive energy sales to transmission to delivery.



Exelon Family of Companies

Generation

Competitive
Energy Sales

Transmission
& Delivery

 Exelon Generation.

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BGE

ComEd.

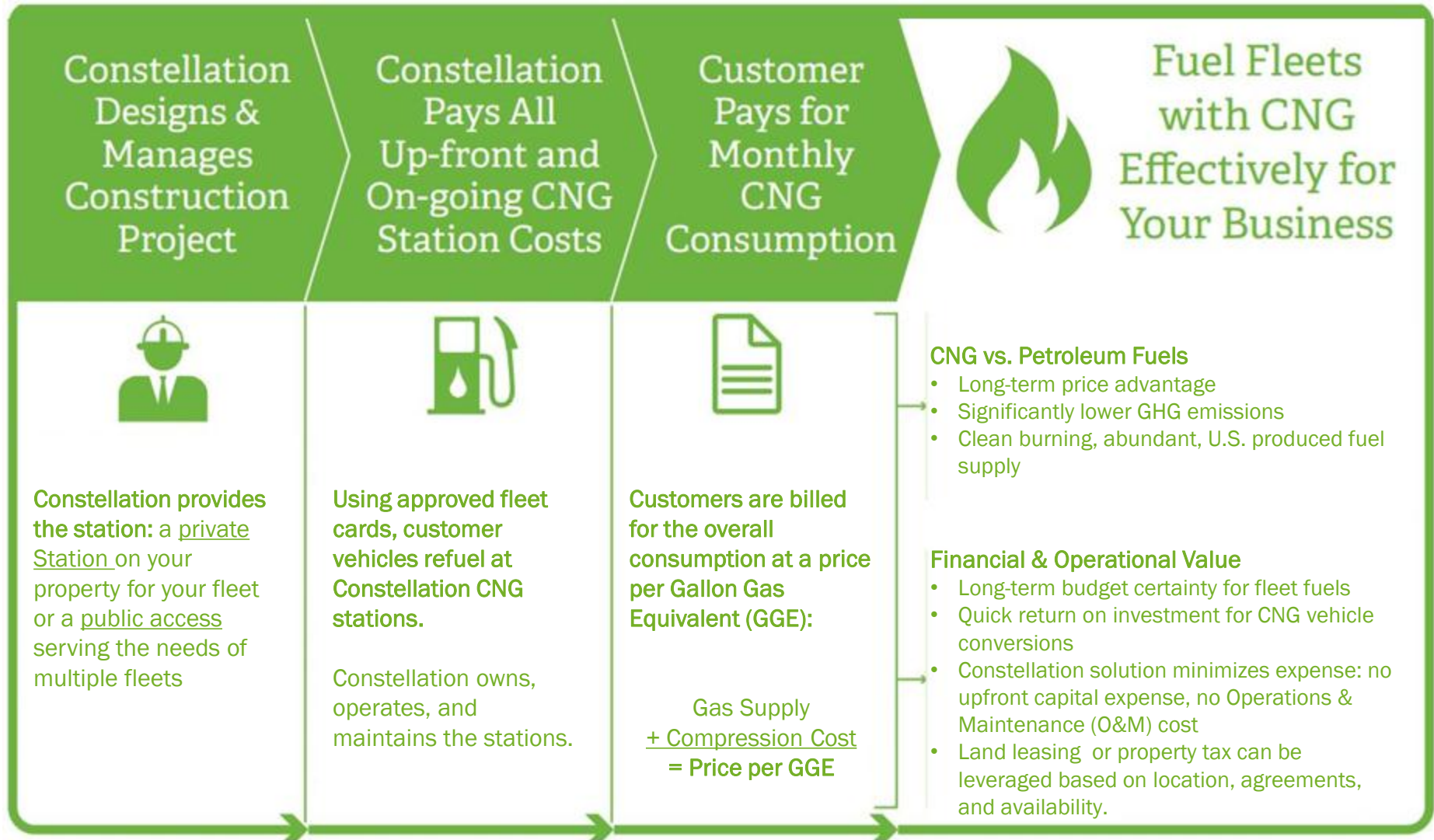
 PECO.

*2014 data

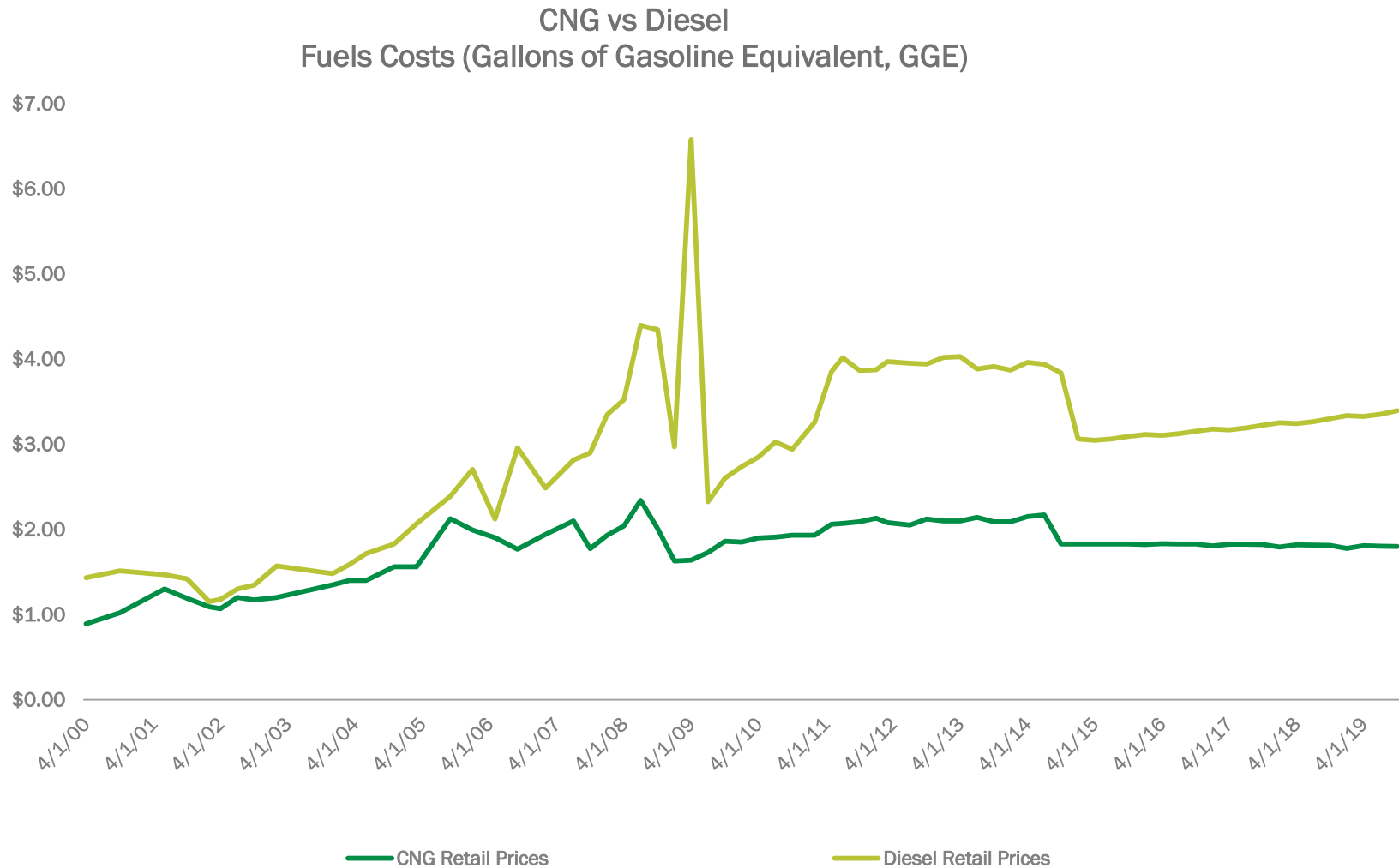
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Constellation's CNG Value Proposition – How It Works



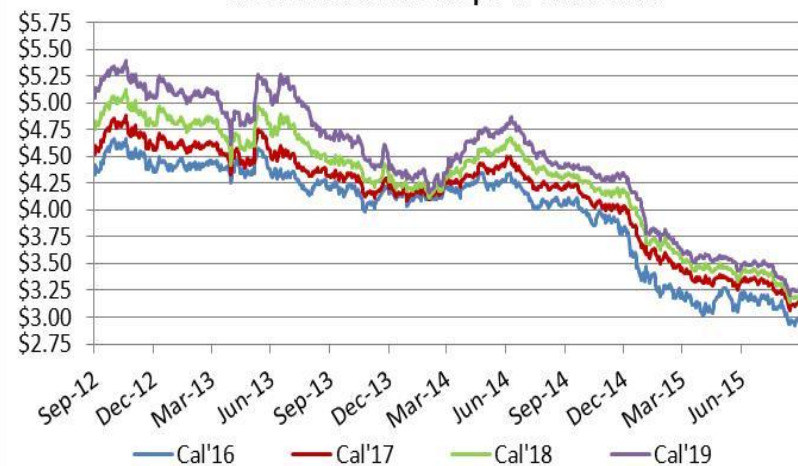
Lower CNG price advantage dictates the target fleets



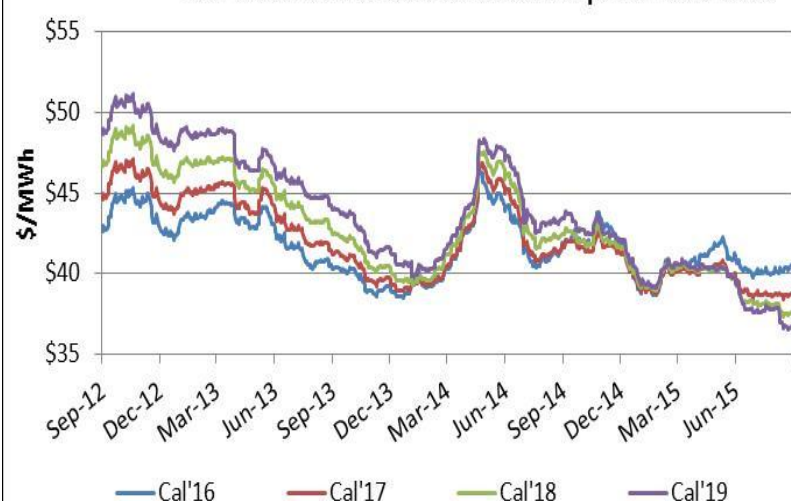
Focus on private fleets, fleet mileage, fuel consumption and operational areas providing specific targets for CNG pipeline, at varying values of CNG to Diesel price spread

What Is Impacting Current Energy Price Trends?

NYMEX Calendar Strips - 3 Years Back



PJM WestHub Forward Calendar Strips - 3 Years Back



Weather – Neutral

- 6-10 day: Warm outlook expected for the Plains, Midwest, and Texas whereas heat for California. Normal temperature outlook for the East.
- 11-15 day: Forecast trends warmer for the Midwest, Interior West, and South-west. Variability in the East but less persistent warmth than the Midwest.

Economy – Neutral

- Good news: Jobless claims are steady at rock bottom lows (264k for wk 09/12), continued optimism in housing (housing market index at 10 year highs), and solid growth in retail sales.
- Bad news: Reversal in auto production pulled down Industrial Production (falling 0.4% vs. anticipated 0.2%) and weak CPI for August due to soft consumer prices.

Commodity Fundamentals – Neutral

- NYMEX prompt month gas (\$2.60) was lower w-w, although volatile during the week with expectations of warmer temperatures.
- For the week ending Sep 11, EIA reported storage injection of 73 Bcf, in line with expectations.
- WestHub calendar strips w-w were slightly lower but the front of curve remains stronger than the back.

Constellation's Core Business – Energy Supply

This page contains informal talking points about the market intelligence Constellation provides its customers. Our intent is to distill the vast amount of market data we receive into concise bullets which you can use to educate, entertain or bore anyone who'll listen to tears. We welcome your [feedback](#).

Weather

- Following a period of cooler than normal conditions seen in the mid-Continent since the Ides of August, forecasts now feature a pattern change that will bring some of the hottest conditions of the season to parts of the Midwest. The first week of Sept is looking to be hot as a pistol from the Midwest to the Northeast, with major pop centers likely to reach 90° or better, including Chicago where only seven days this year have reached 90°. The first third of this month is tracking towards record heat based on pop-weighted CDDs.
- Similar to the Donald's steady trend of ticking higher at the polls, the strong El Niño in the Pacific continues to make gains as its own polls are now at the highest temp departures since 1997. As we know, this setup causes the weather types to favor above-normal temps across the US northern tier and way above-normal precip. Why? Because the El Niño shifts the subtropical jet stream that normally pours rain over the jungles of southern Mexico and Central America toward California and the southern US. One needs to take the good with the bad however; yes, this would alleviate the drought that has plagued California since the days Occupy Wall Street was all the rage, but when this occurred in 1997-98 storms brought LA nearly 25 inches of rain, more than twice normal... cue the flooding and mudslides.

Natural Gas & Oil

- Weekend and Monday deliveries at the Algonquin Citygate clocked in at \$2.57. That price could seem like a blue-light special if planned capacity restrictions at one of the Algonquin compressor stations collides head on with forecasts for warmer temps and light pre-holiday weekend trading. Restrictions for maintenance on flows into New England are slated to be in place for another two weeks. With big expectations for heat and demand this week the restriction could place upward pressure on Algonquin basis.
- *The prompt October contract fell 1.8 cents to \$2.715 on an 8.4 cent range last week. Natural gas trading was a sea of tranquility compared to the wild gyrations emanating from Wall Street and other markets. Recall, the Dow opened the week with a 1,000 point plunge and ended with a loss of 588 points; the prompt Nymex gas contract moved 2.6 cents that day. The incredibly small price range continues to suggest the possibility of establishing both a new high and low in coming weeks. Made even more likely as the net managed money short position surged to over 78,000 contracts last week and is the largest since July 7, while open interest fell to 917,000 and is the lowest since November 4, 2014. The most renowned trade in gas is called the ["widow maker"](#); a rush to the exits in a spurt of short-covering amid late summer illiquidity spells price spikes.*
- Crude skyrocketed nearly \$4/bbl Monday after a bullish supply report from the EIA and increasing chatter among the OPEC members that an emergency meeting is warranted to address low prices. In the past three trading days, crude has gained more than 25% to just over \$49/bbl. That the EIA cut production volumes for June in its wrap-up report and a number of cartel members are willing to link arms and "face the oil industry's challenges together" has clearly put a bid under prices, it may be short-lived. Unless Saudi Arabia, the only country capable of leading an effort to restrain production, participates, any emergency meeting is likely to be ineffective. Additionally, the \$49/bbl level was a price magnet for traders looking to play around Mexico's recent monster option purchase to [hedge](#) half of its 2016 exports.

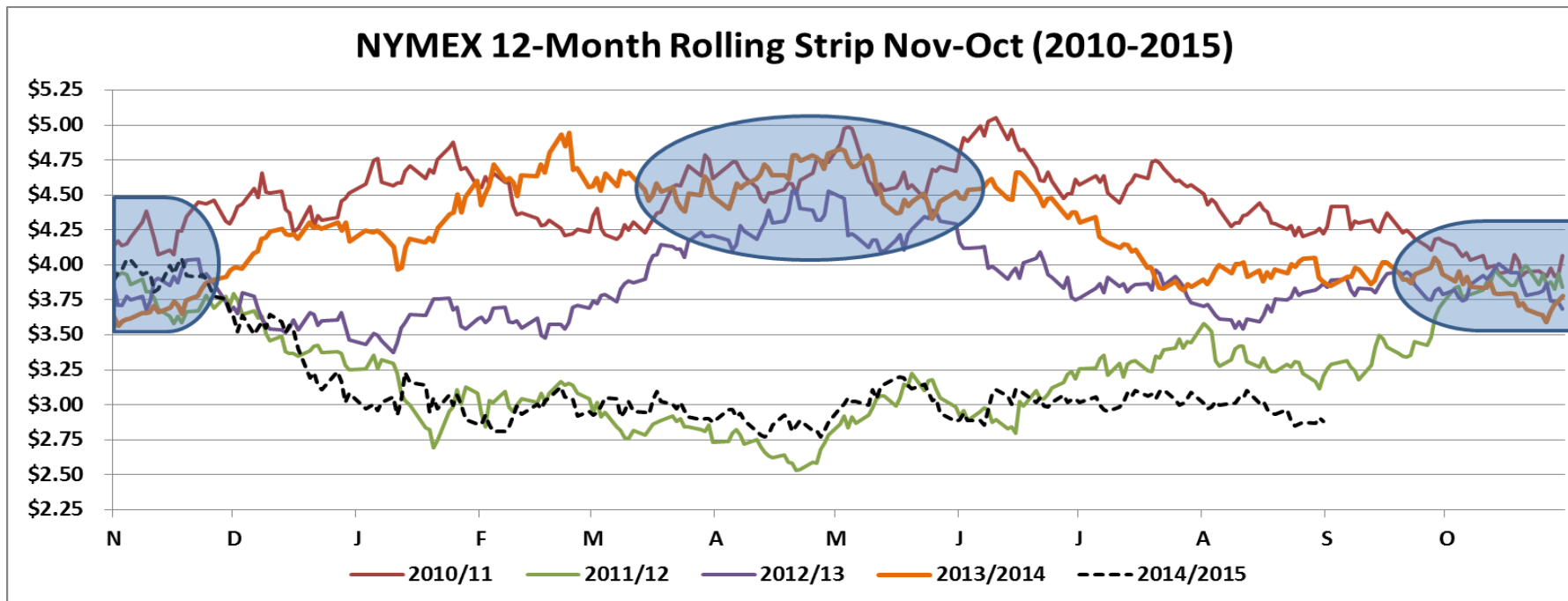
Power

- Flaunting the same near-boundless energy the [Aerobic](#) fad brought to workouts everywhere, ERCOT broke its own peak demand record multiple times last month. On Aug 5th, ERCOT broke its standing four-year peak hourly demand. On Aug 6th, it broke the newly-set peak another two times. Power demand in the cowboy state then crushed all previous records on Aug 10th when demand hit 69,000 for the first time topping out at 69,783 MW. Prices were wildly different across the days as the ORDC price adder was in effect during the several peak periods. On Aug 5th, the price adder drove most prices system-wide to over \$600/MWh but was much less present on later days as prices were often in the \$80 range. The Operating Reserve Demand Curve began in 2014 to more accurately price reserve shortage and scarcity pricing scenarios.

Risk Management

- Bullish? Read this: Near term forecasts favoring heat will be downsizing storage injections beyond this week's EIA release. A sizable upswing into the 85+ Bcf zone has likely been priced in for this week, and any extension of hot temps toward mid-Sept or storm activity into the GOM could easily force nearby futures up into the \$2.80s. Yawn.
- Bearish? Read this: How much more downside are you looking for? The short side of the trade is already overcrowded. Not enough specs want to bet these low prices can reach even lower. When the market flushed down below \$2.75, a lot of traders came in to short the market, but when we hit \$2.65 interest dried up.

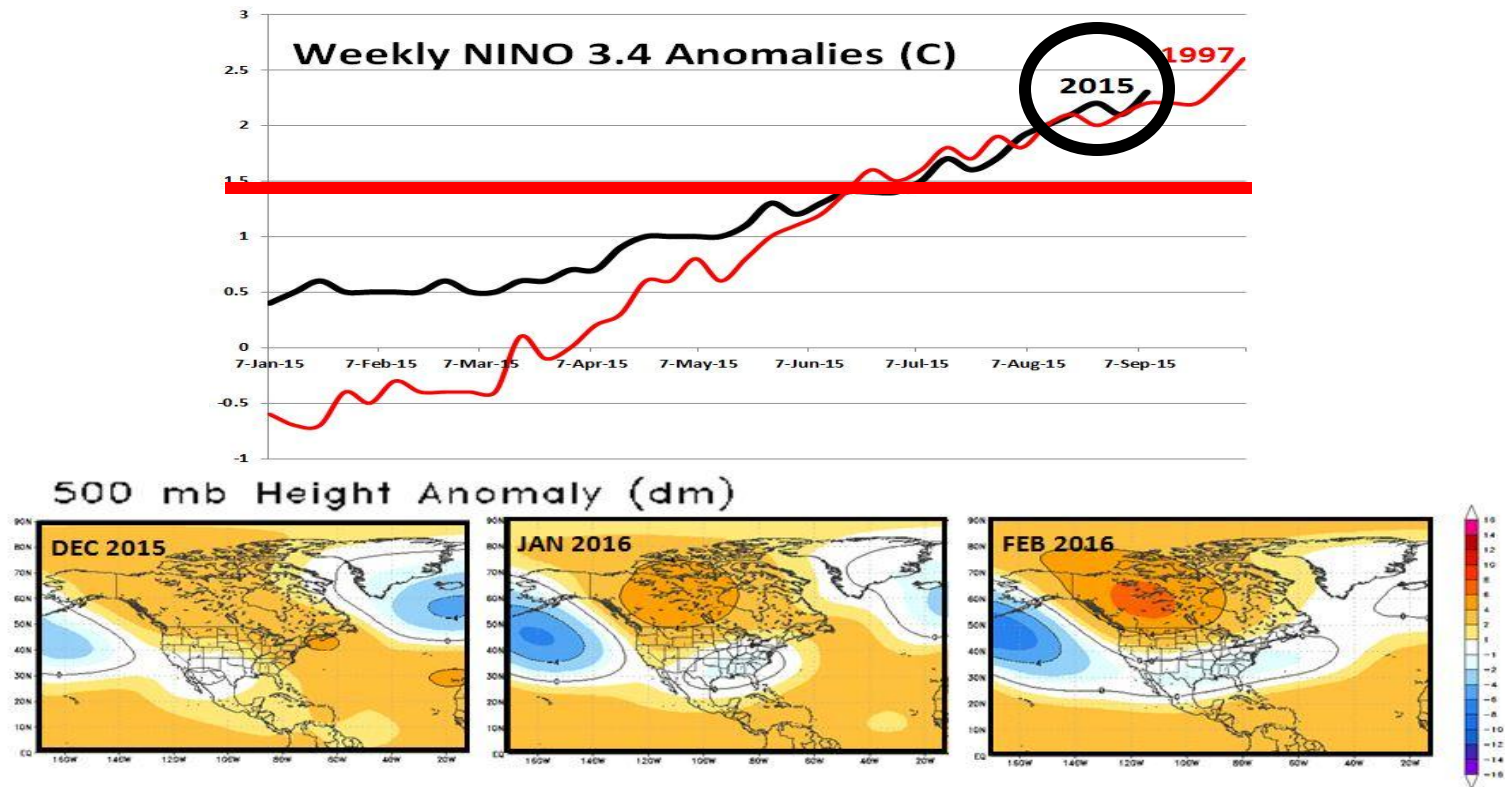
NYMEX 12 Mo. Strip Remains Below \$3/MMBtu



- The NYMEX 12 mo Strips is trading \$2.85-\$2.90/MMBtu the last week as heat in the beginning of September supports prices to the downside and flat production is holding prices from running up.
- Winter weather forecasts will begin to firm up in October so look for opportunities between now and September to layer in forward purchases.

Customer Takeaway: The NYMEX 12 mo strip is range bound by lack of fundamental demand to drive above \$3.25/MMBtu while end of October storage less than 4 Tcf will support prices from moving too much lower in the short run.

El Nino Status – Stronger



- The latest water temperature anomaly for the key El Nino region ticked up to +2.3 degrees C.
- This places the current El Nino well into the strong category and slightly ahead of the super strong El Nino of 1997-98.
- The strength of El Nino will be key for the winter.
 - There will be warmer winter risks if the El Nino slowly declines during the late autumn.
 - There will be colder winter risks if the El Nino starts to rapidly collapse through the autumn
 - The Euro monthly forecasts show mostly mild winter temperatures, however storminess could lead to more heating demand across the southern tier.

CNG Has Price Stability and Remains Cheaper

Benefits:

Fuel Savings - CNG is cheaper than petroleum fuels

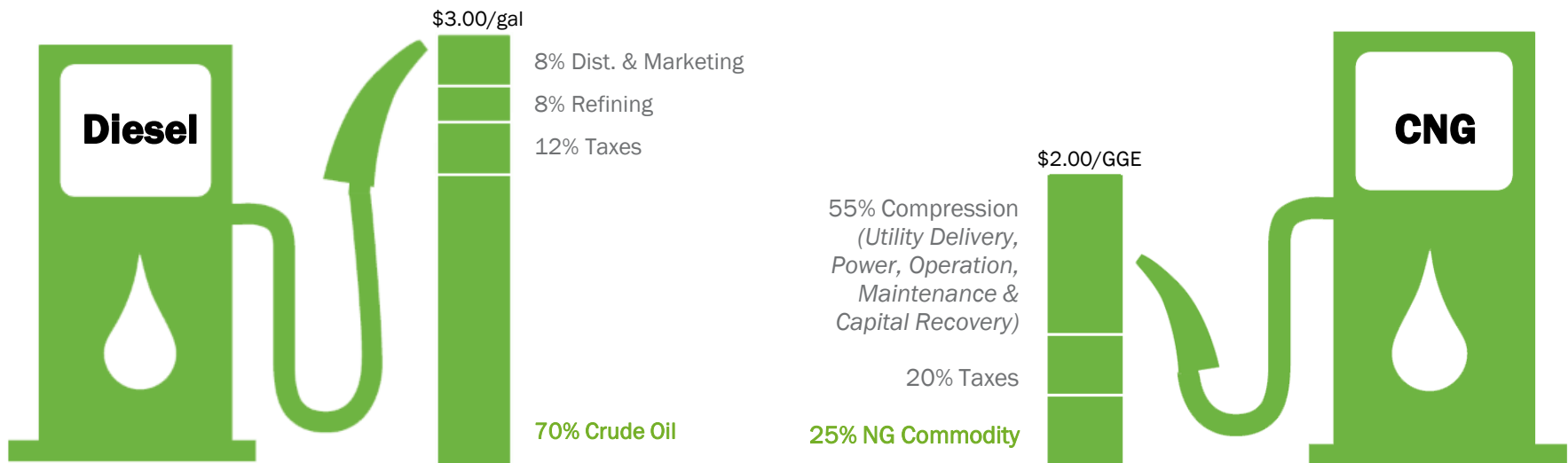
More stable fuel price - A GGE of CNG has a lower portion related to commodity volatility (~25% for CNG vs ~70% for diesel & gasoline), so the price at the dispenser is less volatile.

In Other Words:

CNG is both cheaper and, for a given change in the commodity price, the price at the dispenser for CNG fluctuates less:

<i>Δ in CNG commodity cost per Dth:</i>	+\$0.50	+\$1.00	+\$1.50	+\$2.00
<i>÷8 to get GGE</i>	+\$0.063	+\$0.125	+\$0.188	+\$0.250
<i>Δ in CNG cost at the pump:</i>	+\$0.016	+\$0.031	+\$0.047	+\$0.063

Sample Breakdown of CNG cost at the Pump*



*Prices & taxes vary by state

Constellation Retail by the Numbers

What We Serve

Natural Gas: More than **650 Bcf**
load in C&I markets^

Retail Power: More than **110 TWh**
C&I load under contract^

Energy Efficiency: **34,000 MWh**
conserved by customers

Distributed Energy: **300 MW**
customer sited, completed or under construction

Who We Serve

More than **2.5 million** customers

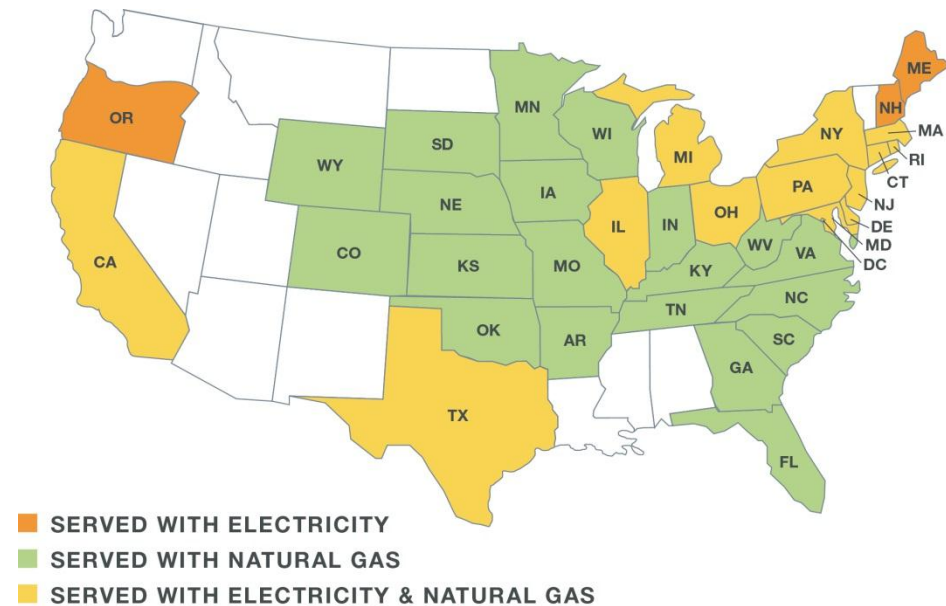
Serving **2/3 of the Fortune 100**

More than **185,000**
business & public sector customers

More than **two million**
residential customers

Where We Serve

RETAIL ELECTRICITY & NATURAL GAS SERVICE



Constellation is headquartered in Baltimore, MD
and is a unit of Exelon Corporation

*2014 data, ^annualized load

Constellation's CNG Program

Constellation

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