Inflection Points: The Case For Natural Gas Demand Growth

AGA Financial Forum

May 15, 2011

BRIDGE STRATEGY GROUP LLC

1. Introduction

2. Demand Growth
   - Electricity Generation
   - Natural Gas-Fueled Transportation
   - Residential, Commercial, and Industrial Direct Use

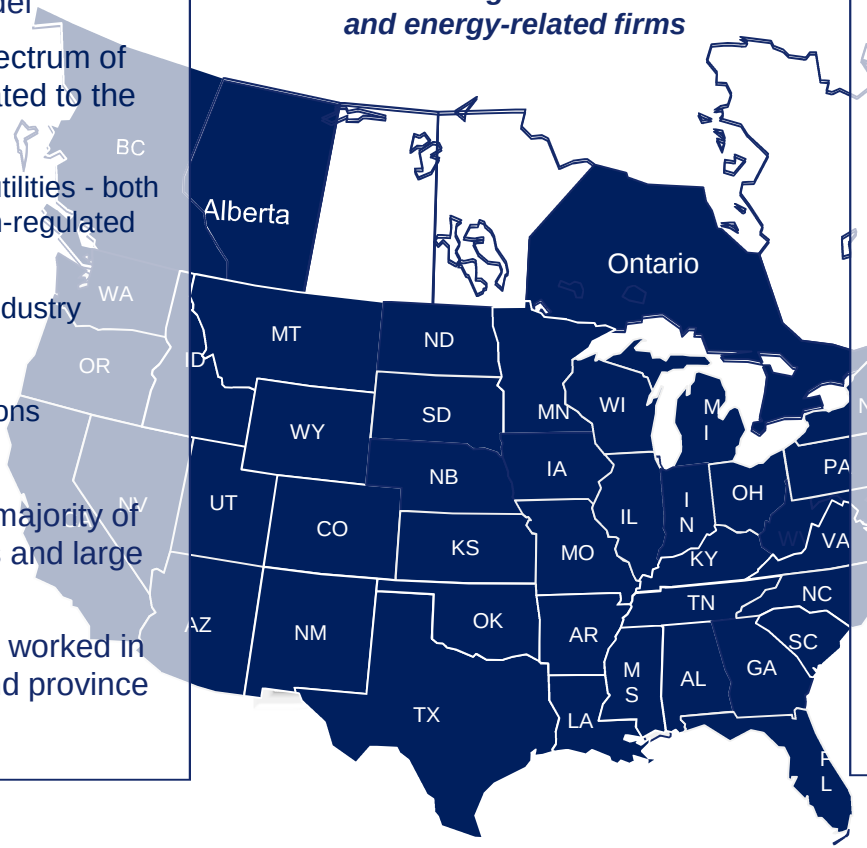
3. Earnings Growth Implications

This discussion is based on our experiences in the North American electric and gas sectors

Who We Are

- Management consulting firm with experienced practitioners in a hands-on delivery model
- We serve a broad spectrum of clients within and related to the energy industry
  - Gas and electric utilities - both regulated and non-regulated operations
  - Suppliers to the industry
  - Energy retailers
  - Industry associations
- We have served the majority of North American IOUs and large municipals
- Our consultants have worked in almost every state and province

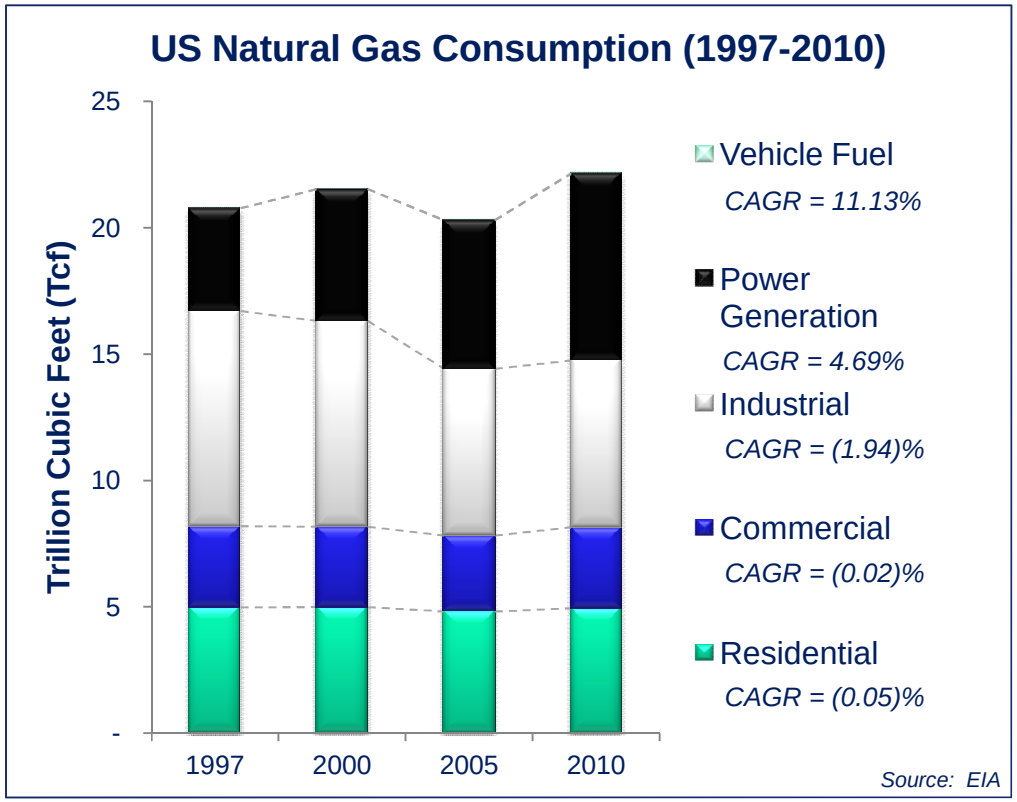
Bridge consultants have worked across North America with gas and electric utilities and energy-related firms



Issue Focus

- We address a wide range of issues leveraging our deep industry and consulting experience
  - Growth strategies
  - Integrated planning
  - M&A
  - Operational improvement
  - Customer experience
  - Smart grid and energy efficiency
  - Alternative fuel vehicles
  - Renewables and integration
  - Retail strategy
  - Organizational restructuring
- With a collaborative approach to client work, we help 'bridge the gap' from strategy through implementation

Now that we have proven the supply side for gas, where can we look for demand?



- Historical trends show stable to declining demand in all three customer segments
- Power generation and a nascent vehicle fuel segment have provided the growth story
- Could some recent and powerful trends reshape the demand profile for gas?
  - Supply windfall from unconventional/ shale drives lower and more stable pricing
  - Weak dollar and global growth leads to better competitive position vs oil
  - Political consensus for greater 'energy independence' and job creation favors domestic energy sources
  - Policy incentives from favorable environmental positioning vs. other fossil fuels and role as an essential partner for growth of wind and solar
  - Awareness of end use efficiency (e.g. LEED certification), and smart grids enabling time of use pricing, improve the business case for consumer direct use and distributed gen

Growth Opportunities for North American Natural Gas

1. Introduction

2. Demand Growth

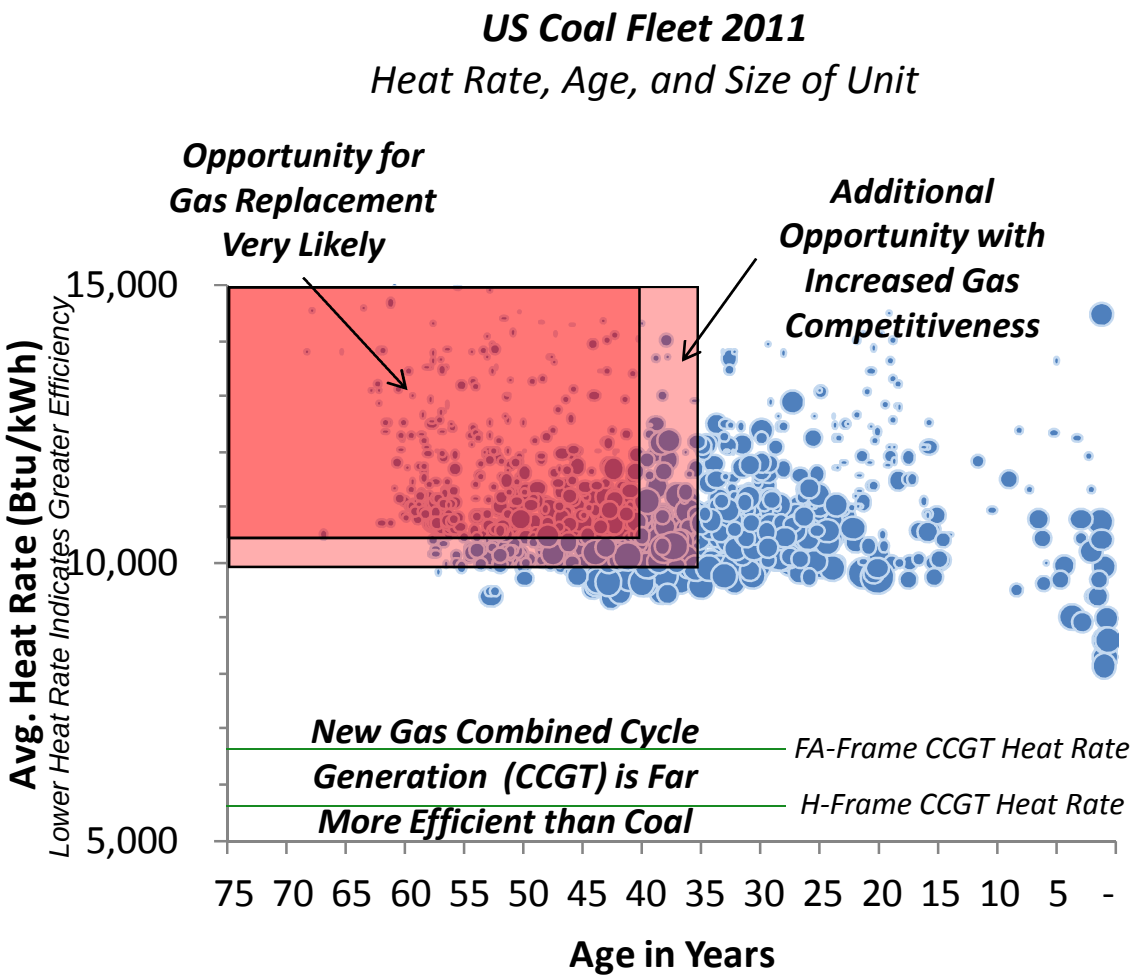
    - Electricity Generation
        - Coal Replacement/Displacement
        - Support of Intermittent Renewables
        - Distributed Generation

    - Natural Gas-Fueled Transportation

    - Residential, Commercial and Industrial Direct Use

3. Earnings Growth Implications

New EPA rules and regulations on coal plants, combined with low natural gas prices, are creating a significant opportunity for gas generation

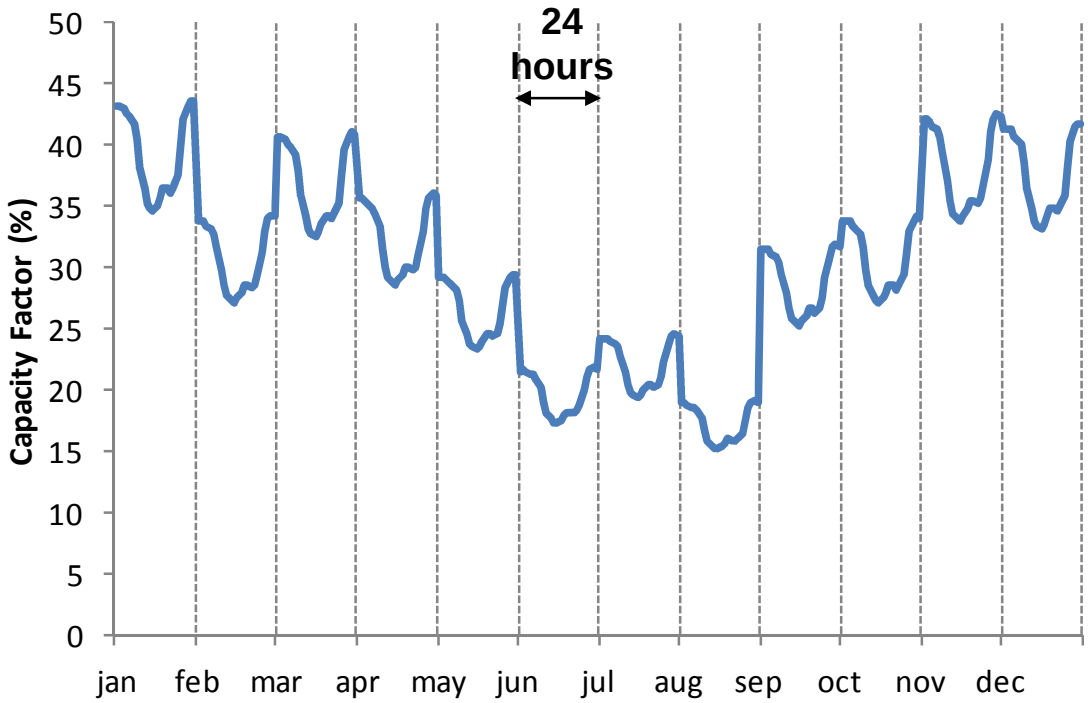


Source: Bridge Strategy Group Analysis, SNL Energy data

- Natural gas generation is an electric utility's logical choice for meeting near-term load growth
  - "Bridge Fuel" status or better
- The EPA is promulgating rules that will lead to retirement of a sizeable portion of the US coal fleet.
  - Air Rules: Clean Air Transport Rule (CATR), Hazardous Air Pollutants (HAP), and National Ambient Air Quality Standards
  - Water Rules: 316 (a) & (b)
  - Ash Handling Rules: Coal Combustion Residue Rule (CCRR)
- EEI estimates 30-80 GW may be retired depending on the final rules
  - At current gas prices, advanced CCGT (H-Frame) will beat all Central Appalachian fired coal plants and many inefficient PRB
- Even without the new rules, many of these units are sub-scale, fully depreciated, and reaching end of design life

Natural gas is the fuel of choice to support an electric grid with an increasing amount of intermittent renewables – wind and solar

Annual Typical Day Wind Capacity Factor Profile



Note: Class 3 wind regime with a 33% average annual capacity factor

Source: NOAA, Bridge Strategy Analysis

- Wind resource is intermittent in nature
- Wind profile traits are directly opposite of when load peaks in most regions of the country
  - Generally, winds are stronger and wind energy is more abundant in the winter than in the summer
  - Winds are also generally stronger and wind energy is more abundant at night
- Solar (PV) is more aligned with peak requirements, but faces intermittency from weather and stops generating before the end of peak demand on a typical day
- Natural gas is very well suited to provide both backup (firming) as well as load following support for these renewable resources

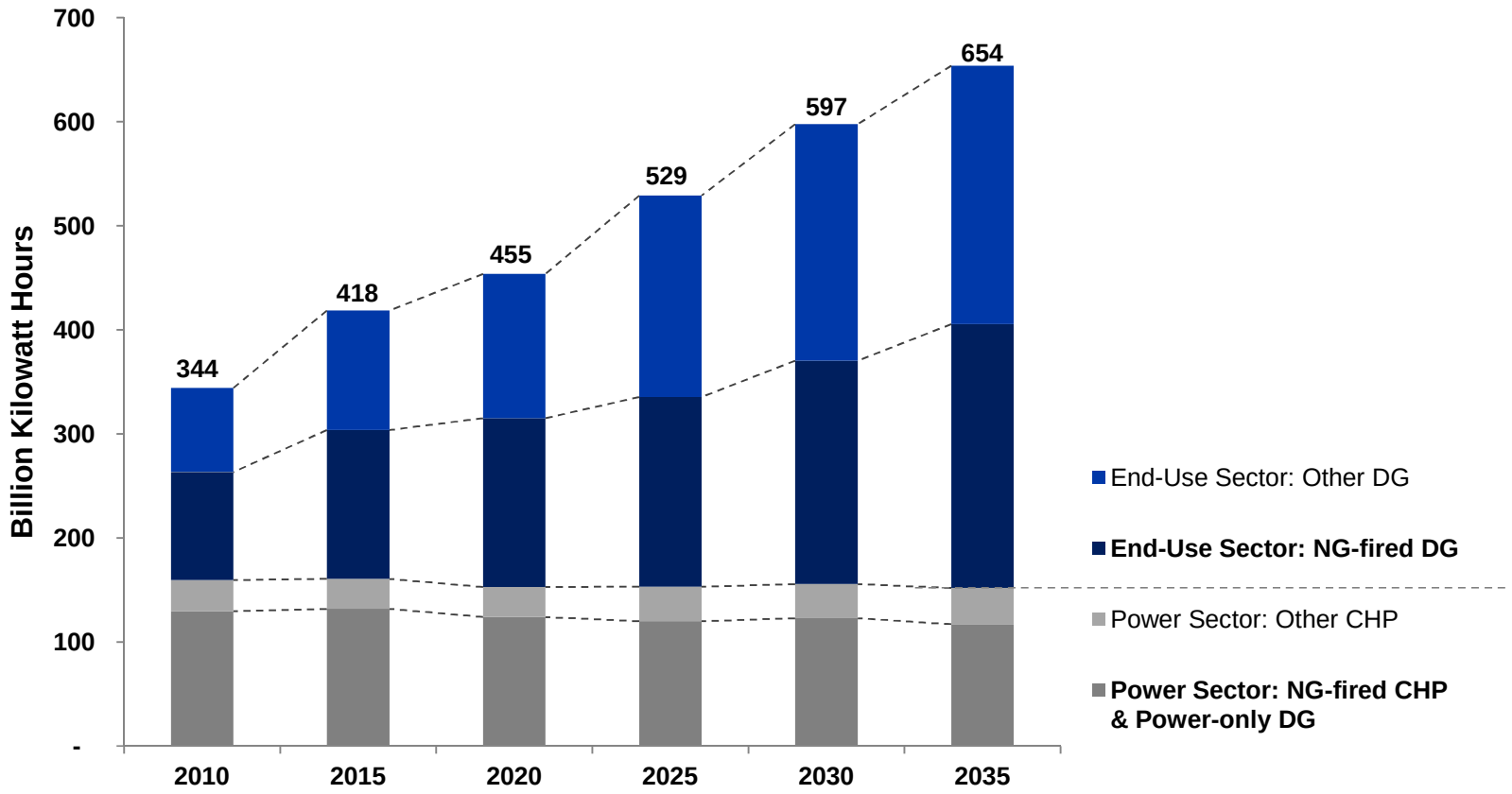
Distributed generation has frequently been seen as ‘the next big thing’ - are the right factors finally aligned for widespread market adoption?

Drivers that Affect Growth of DG (Green indicates positive environment for DG)	**1986**	**1996**	**2001**	**2006**	**2011**
Natural gas price					
Long term gas supply/ perceived volatility					
First cost - DG equipment and installation					
GHG concerns					
Utility preference for large-scale new build					
Merchant appetite for new build					
Capital availability					
Cost of capital					
Customer perceptions –use of gas vs other fuels					
Utility ‘grid parity’ and time of use pricing					
Political support of ‘energy independence’					
Technology evolution (DG technology risk)					
Regulatory support					
Legislative support (RPS/CES, tax incentives)					

Source: Bridge Strategy Group

The EIA estimates that electricity from distributed generation will almost double over the next 25 years, driven by customer-sited solutions

Distributed Generation Growth Projections



% of Net Generation	**8%**	**10%**	**10%**	**11%**	**12%**	**13%**

Source: Energy Information Administration, Annual Energy Outlook 2011

Gas-Fired Distributed Generation: Moving from "Potential" to Reality

Potential

- Can eliminate or defer need for large energy infrastructure investments (plants, T&D) – lowering pressure on rates
- Natural gas delivery infrastructure already in place in many areas
- Natural gas has significant advantages vs. other distributed generation sources
  - Lower overall cost and significantly cleaner than other fossil fuels
  - Lower overall cost and no intermittency issues compared to renewables
  - Potentially lower community and regulatory risk than central generation
  - Proven technology and processes
  - Lower costs to build and operate
  - Can be linked to renewable natural gas sources
- Oil to gas replacement presents a major opportunity to accelerate customer sited DG

Barriers

- Some risk averse and cost-focused electric utilities not yet pushing a distributed model for generation
  - Incremental O&M cost of supporting new business models like DG, and some interconnection costs
  - Regulatory risk of customer-specific assets added to rate base
  - Some markets with insufficient load growth to support any new generation
- Economic downturn slows consumer adoption
  - Significant up-front investments
  - Conservative capital markets
  - Slowdown in new construction & building renovations
- No coherent legislative action to support gas fired distributed resources – 'cleaner' vs 'renewable'
- Existing natural gas infrastructure has to be enhanced in some cases, requiring regulatory support for incremental, targeted capex

Growth Opportunities for North American Natural Gas

1. Introduction

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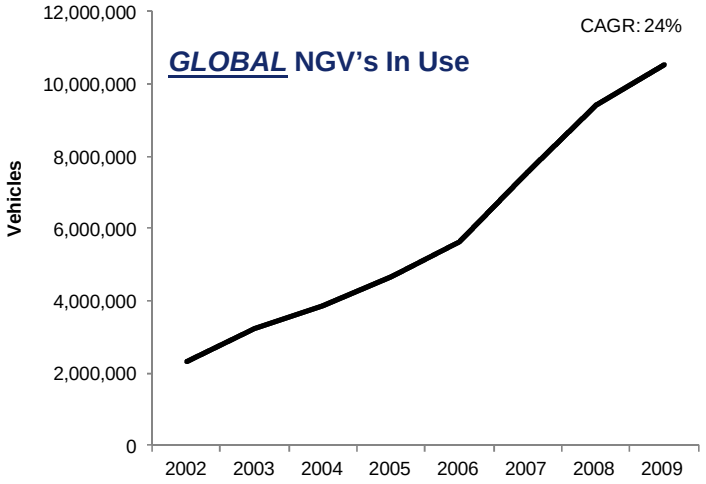
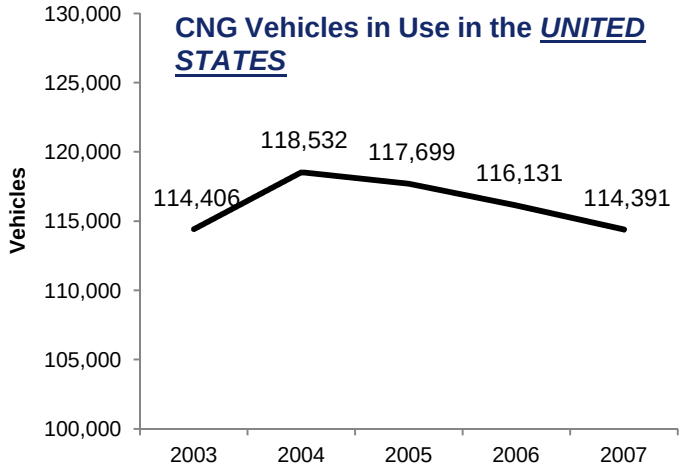
3. Earnings Growth Implications

Opportunity for U.S. NGV industry to learn from established global NGV infrastructure and business models





Global Growth Drivers

- Consumer benefits - fuel prices and availability
  - Relative cost vs. oil
  - Operating and maintenance costs
  - Ease of use once infrastructure is in place
- Consumer financial and non-cash incentives
  - Cash rebates for conversion, exemptions from congestion charges, tax benefits (road, income, fuel)
  - Free parking and preferential access
- Energy Security and Economic Policy
  - Reduction of dependency on oil exports from unstable parts of the world and resulting trade and currency imbalances
  - For oil exporters, using natural gas domestically is part of a strategy to increase oil exports
- Environmental benefits
  - National incentives to meet GHG protocols
  - Regional air quality compliance goals
- Government mandates
  - Venezuela: 40,000 NGVs
  - India: Diesel buses, 8 regions and more to expand

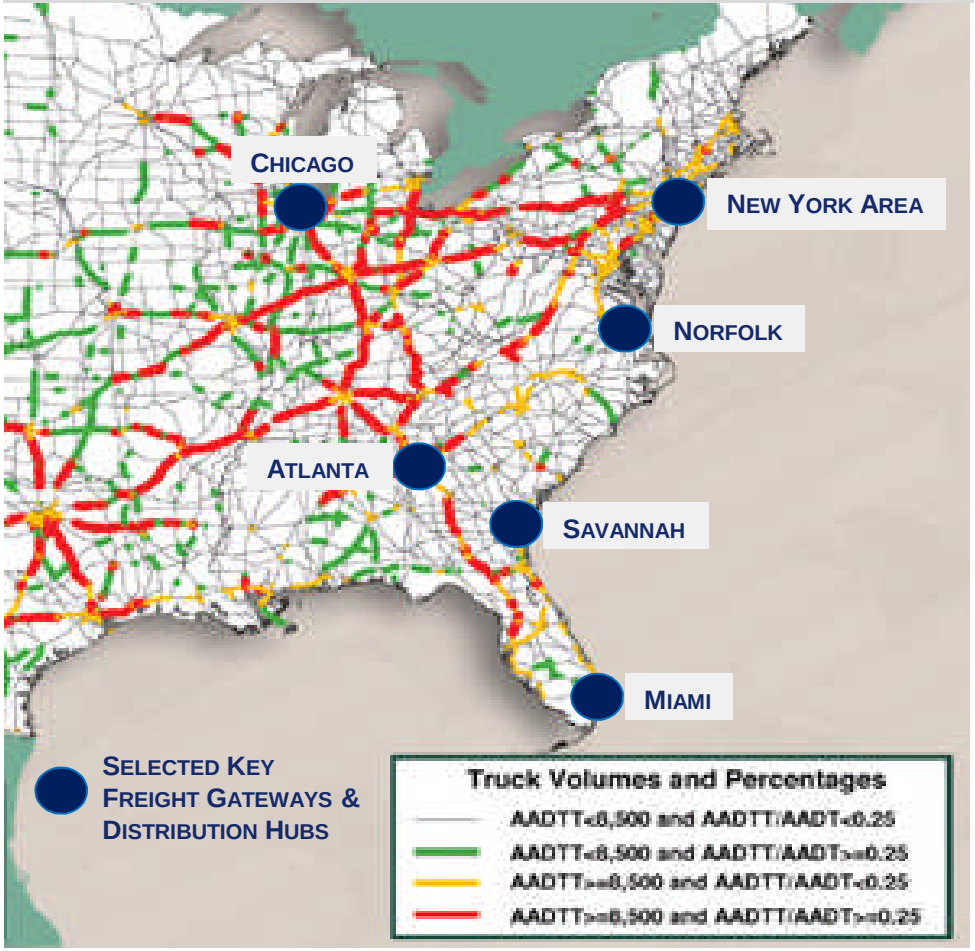
Source: NGVAmerica – Annual NGV Conference Summit, 09/21/09; The Gas Vehicle Report – September 2009

The most attractive NGV applications are currently in medium to heavy trucks, but new developments may revive interest in passenger vehicles

	 Light Duty / Passenger – Class 1-2		 Medium Duty – Class 3-5 (Mostly Commercial)	 Heavy Duty – Class 6-8 (All Commercial)
	Consumer	**Commercial**		
Examples	• Passenger cars • Pick up trucks • SUV's	• Taxi fleets • Company auto fleets	• School buses and shuttles • Delivery trucks (e.g., UPS/FedEx) • Heavy duty pick up trucks	• Large (e.g., 54') Semi-trucks • Garbage and Cement trucks • Transit buses
Electric Vehicles	• Primary AFV • Strong support & marketing across stakeholders – government, OEMs, suppliers	• Making significant inroads with light duty fleet buyers considering EVs • Hybrids winning significant share (eg taxis) eventual move to PHEV/EV	• Medium duty hybrids in place • Several OEMs currently offer or developing models (e.g., Navistar, Smith, Japanese & Chinese mfrs.) • Fleet owners placing test order quantities for medium duty Evs • Supported by RTO incentives and wholesale pricing/ retailers	• No EV offering today, other than transit • Potential for EVs to grow off medium duty base • Similar to light and medium duty, may start with hybrids
Natural Gas Vehicles	• **Strongest competition from EVs** • Improved NGV conversion and fueling economics and political support may accelerate market adoption	• Over 60% of NGVs in use are fleet light duty vehicles	• Strong NGV market with significant potential • ~30% of NGVs in use	• High potential NGV market • ~3% of NGVs in use, but largest fuel consuming sector
	Potential Competition Among NGVs and EVs for Commercial Vehicles • EV 'buzz' has extended into commercial vehicles, with some class 2/3 EVs now in service • EVs are positioned as fuel agnostic with a nationwide network • Commercial EV tax subsidies are closing the gap with NGVs, and massive subsidies have been given to battery and vehicle manufacturers			

Medium-heavy trucks consume oil/diesel equivalent of 5+ TCF natural gas

MAJOR TRUCK ROUTES ON THE NATIONAL HIGHWAY SYSTEM: 2007 (EAST AND MIDWEST)



- Many trucking fleet segments can benefit from conversion to NGVs
  - Central-fueled fleets (including transit buses, delivery trucks etc)
  - Long-haul trucking
  - Short-haul trucking
- Predictability of fleet vehicle routes and control over scheduling makes them good initial candidates for supporting infrastructure build-out
- A significant amount of the long haul trucking market can be captured on a relatively small number of routes
  - I-75 (Detroit-Toledo-Atlanta-Tampa)
  - I-80/90 (Chicago-Boston/NYC)

Notes: AADTT is average annual daily truck traffic and includes all freight-hauling and other trucks with six or more tires. AADT is average annual daily traffic and includes all motor vehicles.

Source: Bridge Strategy Group, U.S. Dept of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010; US Dept of Transportation, Research & Innovative Technology Administration, America's Freight Transportation Gateways, Nov 2009

Natural Gas Vehicles: Ready for Adoption in the U.S.?

	Why US Market Stalled	Recent Positive Developments
Commodity Uncertainties	❑ Volatile natural gas prices ❑ Fears of natural gas shortages	❑ Domestic natural gas reserves are abundant allaying fears of shortages, high prices and volatility ❑ Petroleum price levels and volatility have increased, improving economic benefit of NGVs
Vehicle Costs	❑ Long payback for consumers - cost of retrofit did not offset fuel savings	❑ OEM cooperation with conversion system suppliers and component investments ❑ Streamlining of EPA emissions certification process to lower conversion system costs
Fueling Infrastructure	❑ Inadequate or inconsistent coverage ❑ Some opposition from regulators for rate-base treatment of fueling infrastructure	❑ Fueling station performance and reliability have improved through “lessons learned” and technology improvements ❑ Some PUCs are showing interest in more supportive regulation
Consumer Attitudes	❑ Lackluster demand inhibited OEM investment ❑ Lack of new models and OEM support limited consumer interest	❑ Carbon reduction, oil price, and environmental impact are top policy issues ❑ Consumer sentiment on reducing oil dependence ❑ Effective public awareness campaigns ❑ Broad deployment of NGVs in Europe and Asia have confirmed safety and reliability

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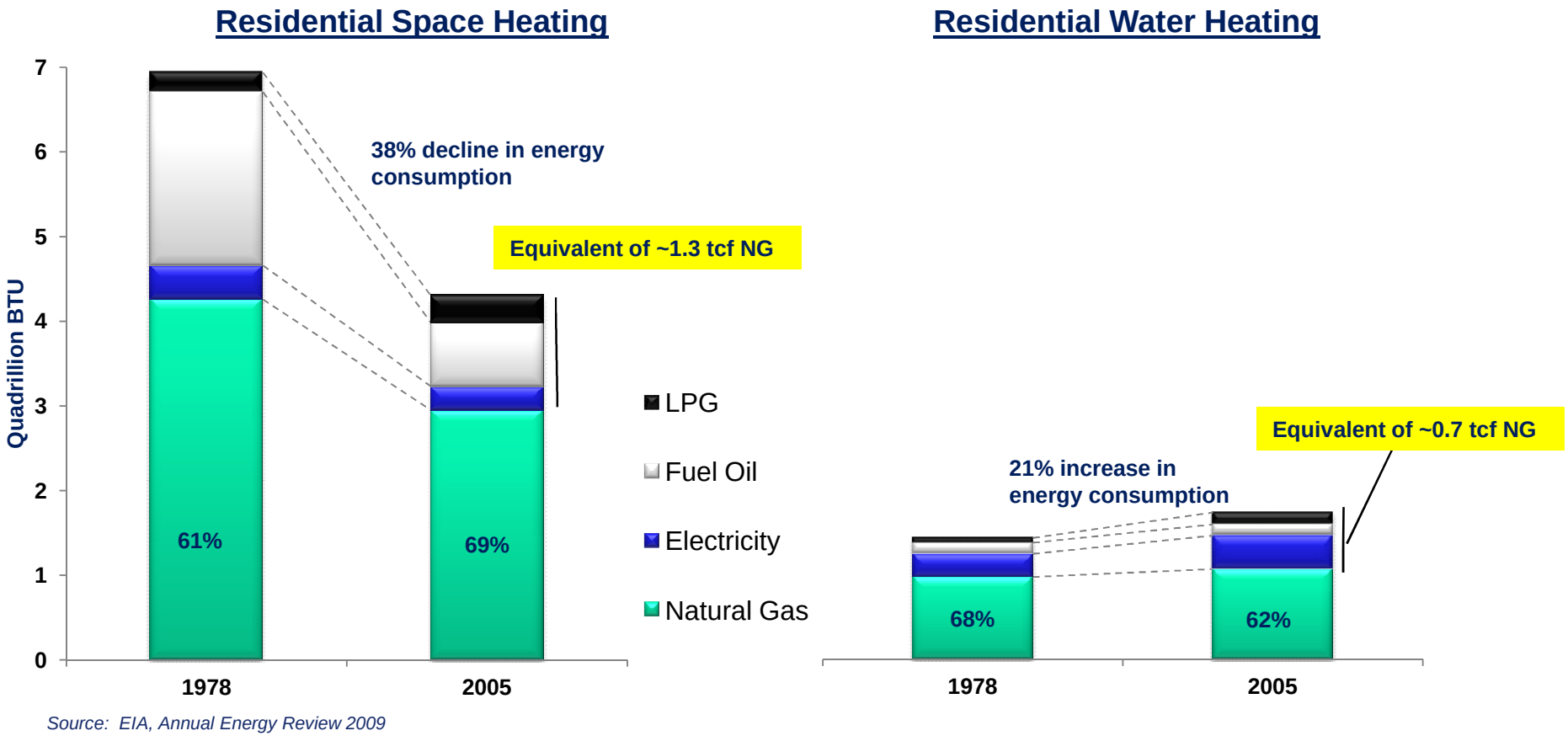
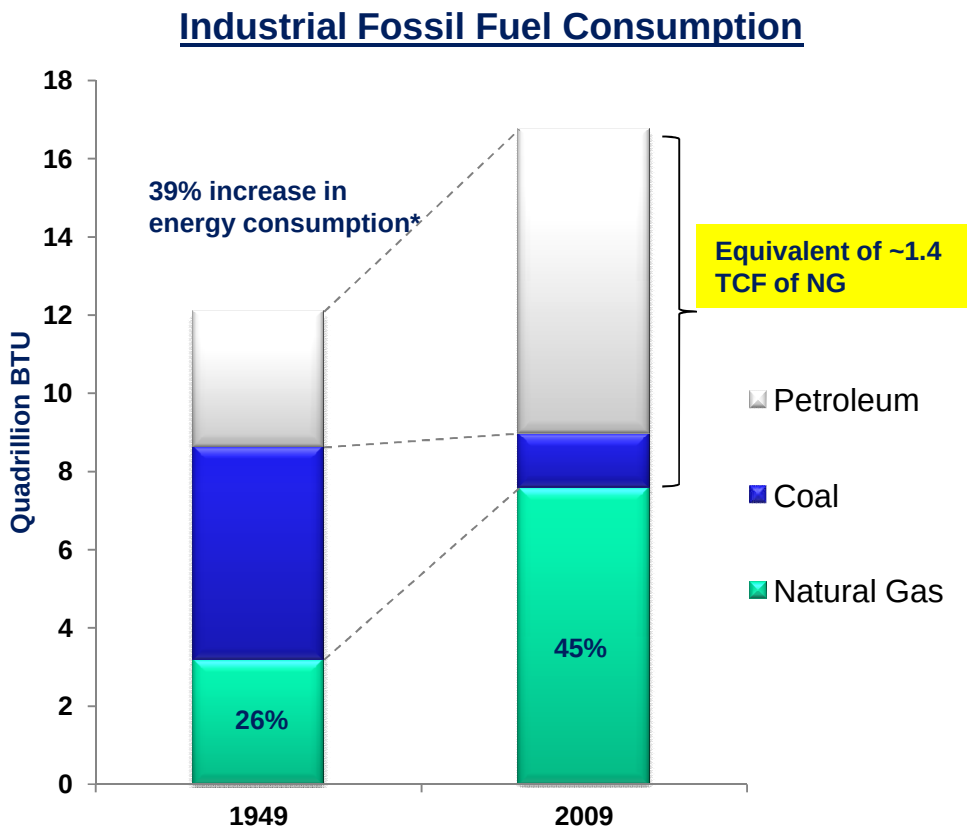
        - Water and space heating (especially oil to gas conversions)
        - Industrial processes
3. Earnings Growth Implications

Oil to gas conversion is a >1TCF opportunity in residential space heating, and .7 TCF potential for gas to replace electric water heating



Source: EIA, Annual Energy Review 2009

Oil to gas conversion is also a major opportunity among industrial customers



Source: Bridge Strategy Group, EIA, Annual Energy Review 2009 (excludes renewable energy and electricity consumption)
** Peaks in 1970s and 1990s at >20 Quadrillion BTUs most years – 1973 peak of 23.5 and 1997 peak of 21.7 quadrillion BTUs respectively*

Direct Use: Realizing the Potential

Potential

- Natural gas is the best fuel for heating in many situations
  - Source to site efficiency over electric
  - Environmental advantages over oil
- Major regional opportunities for residential and commercial use
  - Oil-to-gas conversions in the northeast, mid-Atlantic and some parts of the midwest should be economically and environmentally compelling with proper policy support
  - Ensuring natural gas as a heating fuel in new builds in southeast and southwest
  - Ensuring use of natural gas for water heating on a national basis
- Abundant, low-cost fuel, combined with weaker US currency could encourage repatriation and growth of industries that can use natural-gas for heating or feedstock

Barriers

- Increasing energy efficiency of gas appliances has resulted in declining consumption per consumer
- First costs/ conversion costs remain an issue for many consumers
- “Last mile” challenge for marketing natural gas to new construction industry
- Subsidies and incentives may not create a level playing field for direct use of natural gas compared to electrotechnologies
- Slowdown in electric smart grid implementation also slows adoption of electric time-of-use pricing and net metering, which would support many gas direct use applications

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Translating consumption into earnings growth for regulated utilities depends primarily on asset growth and incremental customers

- Demand growth will support traditional drivers of earnings growth
  - Customer growth remains important, ensuring gas is installed at a customer site due to superior efficiency and quality of direct use, and with new sites for NGV fueling
  - Infrastructure replacement to ensure deliverability, especially with anticipated tightening of pipeline and distribution integrity
  - Ideally, replacement activities can be coordinated with upgrades to support/ enable new gas applications

- But the nature of new demand will also challenge the traditional practices and models of regulated utilities
  - Revisit firm vs. interruptible customer strategies for power generators
  - Develop innovative business models and strategies to integrate non-traditional assets such as customer-based distributed generation and NGV fueling infrastructure
  - Quantify and try to capture the environmental and efficiency benefits of natural gas
  - Design, collaboratively with state regulators, new and creative rate recovery mechanisms that balance the needs of the community, the customer, and the utility
  - Pursue regulatory and legislative actions to level the playing field for natural gas in all end-use sectors

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