





ACSIM 25 Year Natural Gas Study

Executed Fall 2007



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Background/ Study Objective

The OACSIM's role is one of long-term strategy and budget planning for Army Installations, including energy sourcing and life cycle planning.

Problem Statement

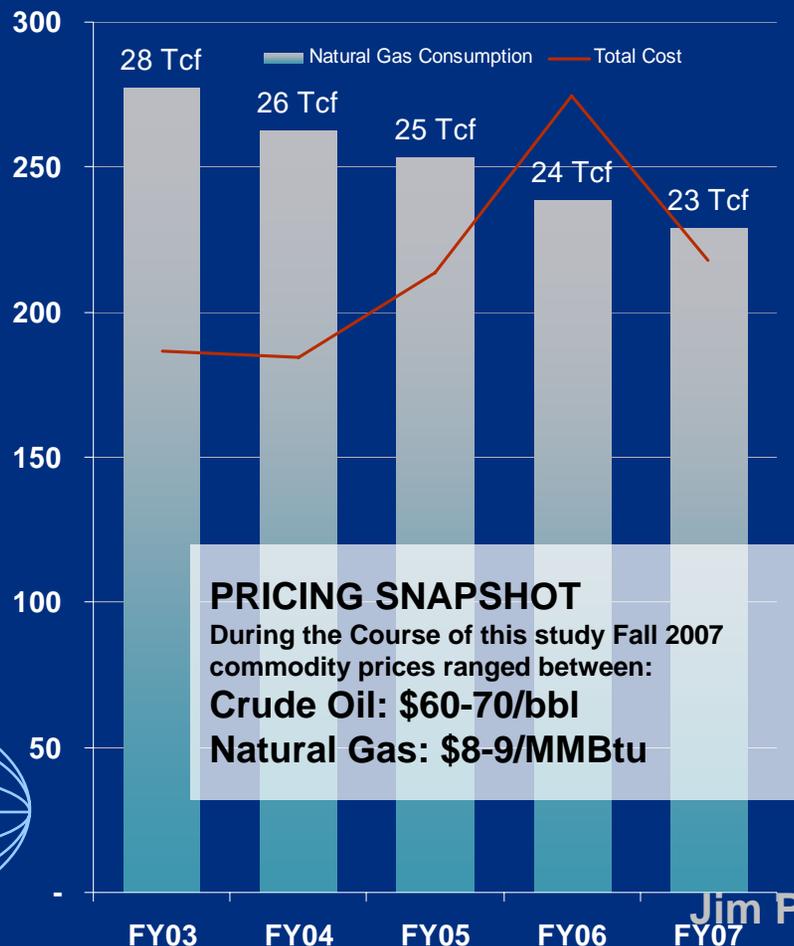
- The Army has transitioned away from using fuel oil for installation needs for domestically available, cleaner, natural gas.
- Army installation energy costs have increased 30% over 3 years despite successful measures to reduce energy consumption

Objective

- 25-year strategic outlook for natural gas availability in the United States to assess the sustainability of continued use of natural gas as the primary energy source for Army installations.

The impact upon the Army's ability to execute its mission through its installations was critically important to the study

Historical U.S. Army Natural Gas Spend Million \$



PRICING SNAPSHOT

During the Course of this study Fall 2007 commodity prices ranged between:
Crude Oil: \$60-70/bbl
Natural Gas: \$8-9/MMBtu

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Methodology

Multi-phase Technical Approach

Baseline Army Natural Gas Usage

- ▶ Gather natural gas usage information from AEWRS
- ▶ Leverage our own current Army natural gas information
- ▶ Interview Army leadership & the installations to document expected natural gas use for next 25 years

Literature Research

- ▶ Document and Analyze complex variables influencing NG market
- ▶ Provide foundation for view of natural gas viability over next 25 years
- ▶ Develop templates for natural gas expert interviews
- ▶ Prepare scenarios for input into NEMS

Natural Gas Expert Interviews

- ▶ Leverage relationships with natural gas experts for perspectives of natural gas market over next 25 years
- ▶ Collects insights and best practices that will become future strategies
- ▶ Develop strategies & Identify technologies

Model runs were designed to assess the impact on Installations based on variable market trends



1. Reference Case

Is projected based on the current state of the natural gas market, absent of any major regulatory changes

2. Climate Concerned

Assumes aggressive carbon legislation where carbon intensity (the ratio of carbon per person) decreases by 4 percent annually and carbon credits are sold in an open market with no price cap

3. Technology Investment

Assumes an increased level of investment to provide reduced costs of developing domestic supplies, energy efficiency gains, lower capital costs for generation technologies, and greater opportunities for renewable resources

4. Geopolitical Instability

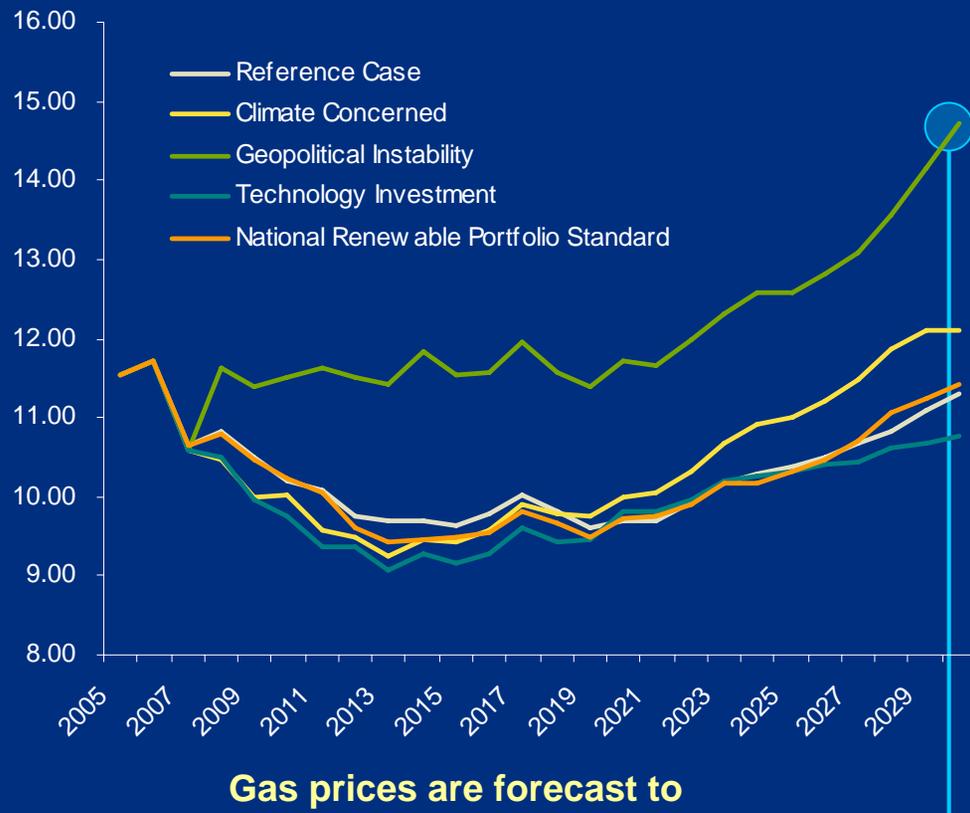
Represents an unfavorable geopolitical environment coupled with modest carbon legislation that requires an annual carbon reduction of 3 percent. The scenario uses forecasted high oil prices to model geopolitical instability

5. National Renewable Portfolio Standard

Includes a Federal Renewable Portfolio Standard, which requires that the percentage of electricity sales produced from renewable sources, excluding existing hydroelectric generation, must reach 25 percent by 2025

Projected Natural Gas Prices

2005\$/Mcf



Gas prices are forecast to rise above \$15 (constant 2005 dollars) by 2030

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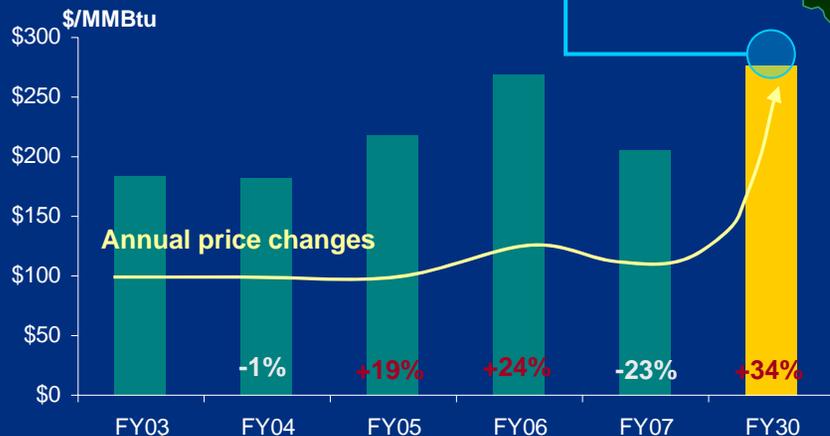
The Study Confirms Supply Availability but it will come at a cost that will effect the Army's budget



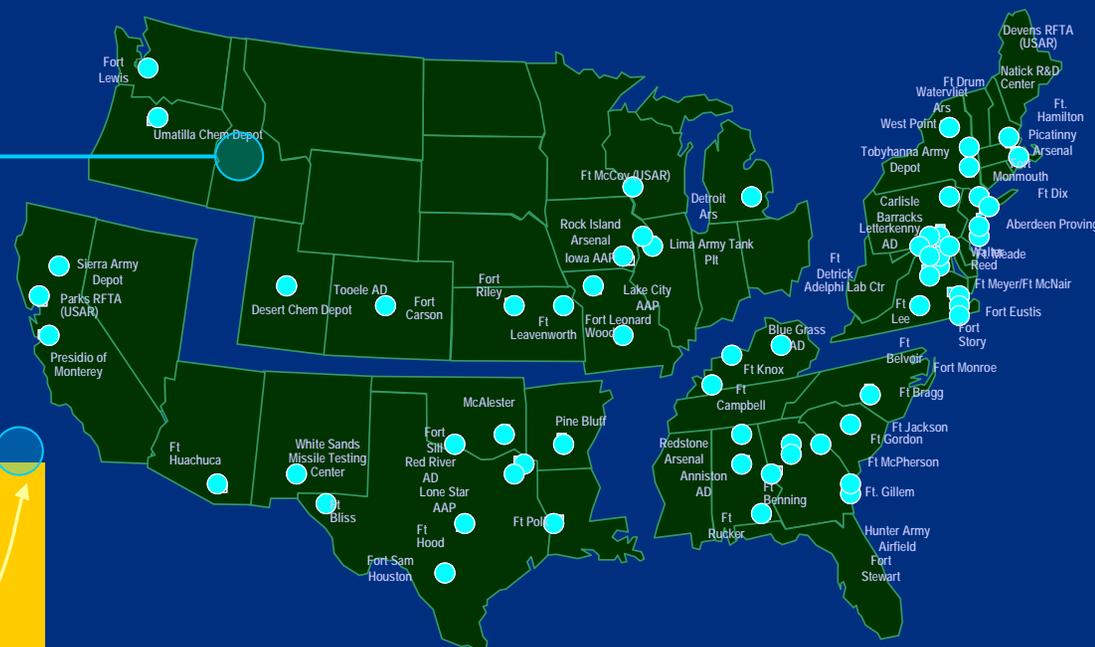
Installations throughout the country depend on natural gas for a portion of their energy requirements

To keep pace with FY07 consumption levels, funding will need to increase by 28%, from \$217 million, to \$277 million in 2030

Installation Budget Impact



Installations Consuming Natural Gas



Rising natural gas prices left unchecked could effect quality of life for the soldiers!

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Key Metrics to Monitor

Supply Portfolio Transformation

- Increased reliance and vulnerability to LNG market
- Decline in stable imports from Canada

Global Oil Prices

- World oil prices create an artificial floor price for natural gas
- Extreme changes in oil prices push natural gas prices higher

Regulatory Changes

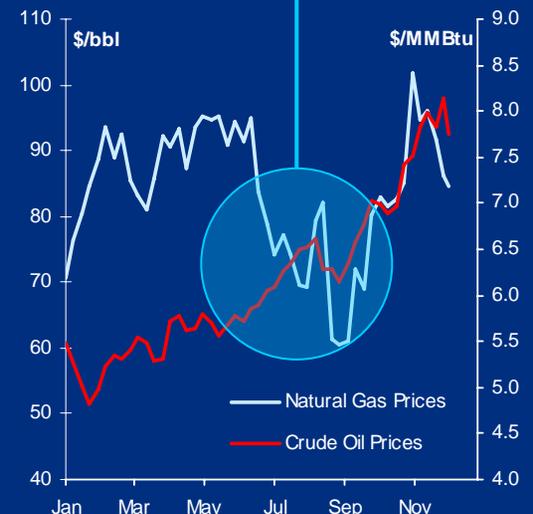
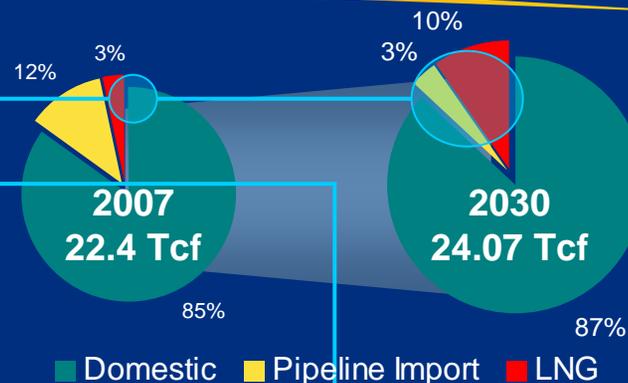
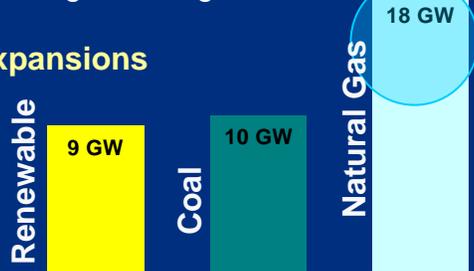
- Carbon costs imposed on utilities promote the consumption of "clean" natural gas
- Renewable energy requirements need natural gas for complementary power

Technology Developments

- Reduces cost to find and produce domestic resources
- Increases efficiency of new gas-fired generation

Planned Generation Expansions

EPA 2005 Requires the installment of 9 GW of Nuclear Power by 2025; however, the regulatory environment is slowing the progress





Conclusion



In support of the Army's Energy and Water Campaign for Installations, the following are recommended:

	Recommendation	Army Energy and Water Campaign for Installation tie-in
★ 1	Implement capability to track key energy market drivers and develop corresponding mitigation strategies. Routinely revisit natural gas outlook	1.1 Develop national/regional/installation energy mgt plans 1.2 Provide a full-time, trained, and certified staff to lead the energy and water management program and its initiatives
★ 2	Complete business case analysis of using Dual Fuel Capabilities as a hedge against gas prices	5.3 Implement energy security plans and continuously improve the Army Energy Security Program
★ 3	Minimize potential mission vulnerability related to interruption of natural gas fired power by implementing alternative forms of distributed generation at the installations	2.7 Establish Army utility source evaluation program to select a cost effective and secure energy source that includes alternative sources 3.2 Develop cost-effective on-site renewable power generation consistent with mission requirements
★ 4	Maximize impact of current Natural Gas Risk Management Program by expanding across CONUS installations	2.6 Minimize impact of fuel cost and availability at installations 1.9 Establish effective utilities procurement strategies
★ 5	Integrate installation response plans in the event of supply disruptions (ref. COOP)	5.1 Institute energy security concepts and methodologies in Army installation management operations
★ 6	Improve information management to include a platform to share energy information across all branches of the Department of Defense	1.5 Develop and implement information and knowledge management systems

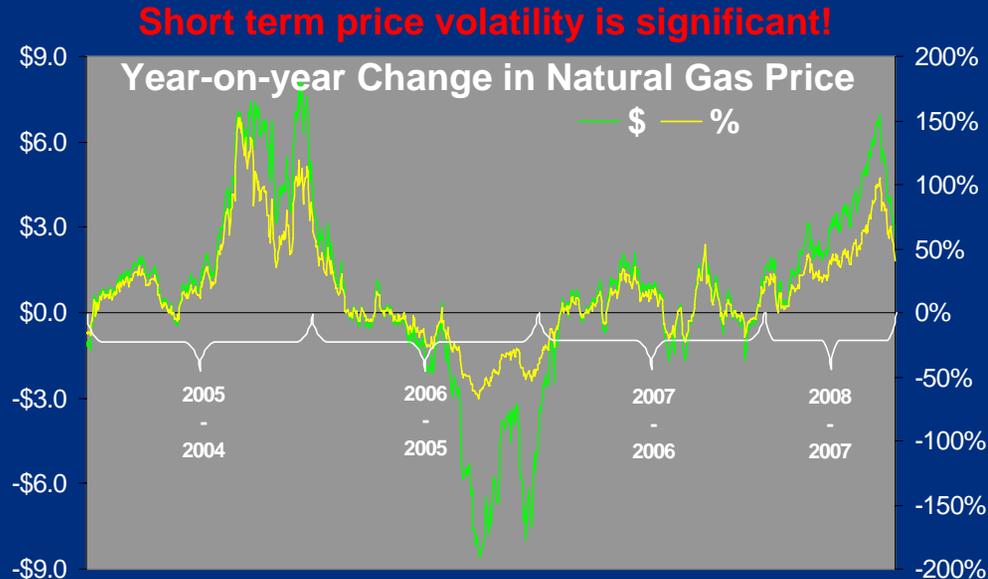
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Where are we now?

The natural gas market has moved unfavorably over the past six months since the study was completed. Prices in the short-term could surpass those forecasted in the global instability case!

- Natural Gas prices have risen as high as 150% compared to last year
- The LNG market has been unexpectedly dominated by Spain, Japan, and South Korea placing a price premium for LNG supplies to the US.
- Hurricane activity for the summer of 2008 is forecast to be very active.
- Natural gas storage levels are 20% lower entering into injection season compared to this time last year
- Crude oil prices are over \$140//bbl, up 70% compared to last year



Prices continue to swing as much as 150%, no sign of prices reaching a relative equilibrium!

The short-term volatility will be discussed in greater detail in the upcoming short-term natural gas outlook

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QUESTIONS?

For more information and a copy of the 25 year outlook,
please visit the following website:

<http://army-energy.hqda.pentagon.mil>

<https://www.us.army.mil/suite/doc/11448247>



For More Information

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Don't forget to fill out and drop off your session evaluations!