

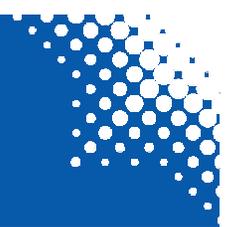
# Energy2006

August 8, 2006



## Intro Slide

# Disclaimer

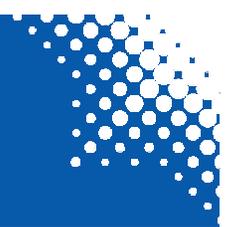


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# What is Natural Gas



Odorless

Colorless

Hard to Measure

Hard to Store

# Fundamentals

## Typical Composition of Natural Gas

Methane	CH <sub>4</sub>	70-90%
Ethane	C <sub>2</sub> H <sub>6</sub>	0-20%
Propane	C <sub>3</sub> H <sub>8</sub>	0-20%
Butane	C <sub>4</sub> H <sub>10</sub>	0-20%
Carbon Dioxide	CO <sub>2</sub>	0-8%
Oxygen	O <sub>2</sub>	0-0.2%
Nitrogen	N <sub>2</sub>	0-5%
Hydrogen sulphide	H <sub>2</sub> S	0-5%
Rare gases	A, He, Ne, Xe	trace

# Fundamentals

## How Gas Is Measured

- By volume -- cubic feet
  - \_ Btu content per cubic foot of gas varies
  - \_ “Typical” cubic foot of gas contains approx. 1027 Btu
  - \_ Volume typical for production and distribution companies
    - Thousands of cubic feet (Mcf)
    - Millions of cubic feet (MMcf)
    - Trillions of cubic feet (Tcf)
- By energy content – Btu
  - \_ Most typical for end-users, financial instruments
    - Therms and Dekatherms are common
      - \_ 1 Dekatherm = 1 million Btu

# Fundamentals

## Why Gas is Stored

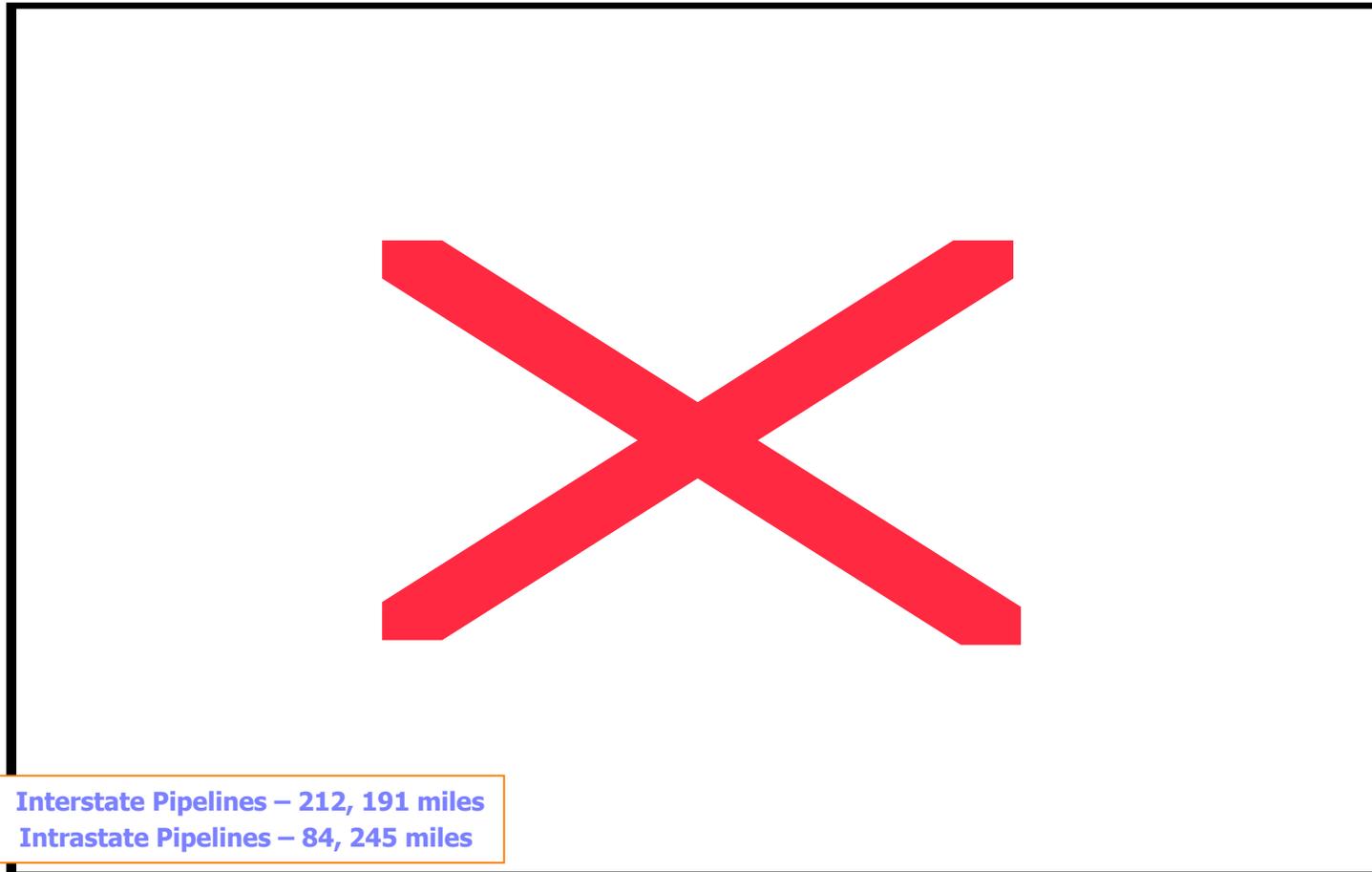
- Demand and pricing for gas varies over time (from hour to hour, day to day and season to season)
- It is more efficient and economical to produce and transport gas at a relatively constant level (“high load factor) than in accordance with specific demand at any given moment
- So that market area demand peaks can be met even when transportation capacity is inadequate to serve peak demands

# Fundamentals

## How Gas is Transported

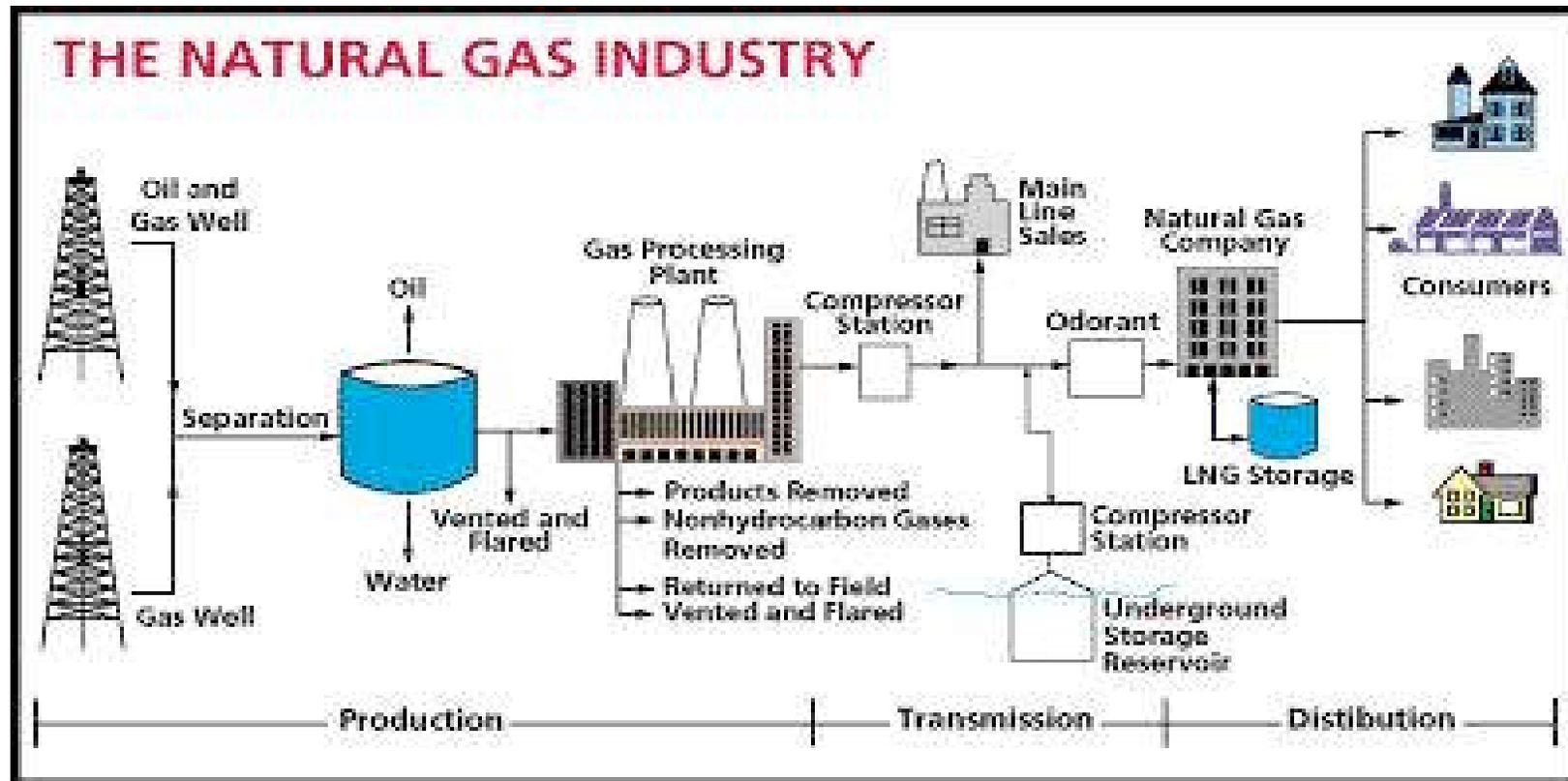


### U.S. Interstate and Selected Intrastate Natural Gas Pipeline Systems 2002



# Fundamentals

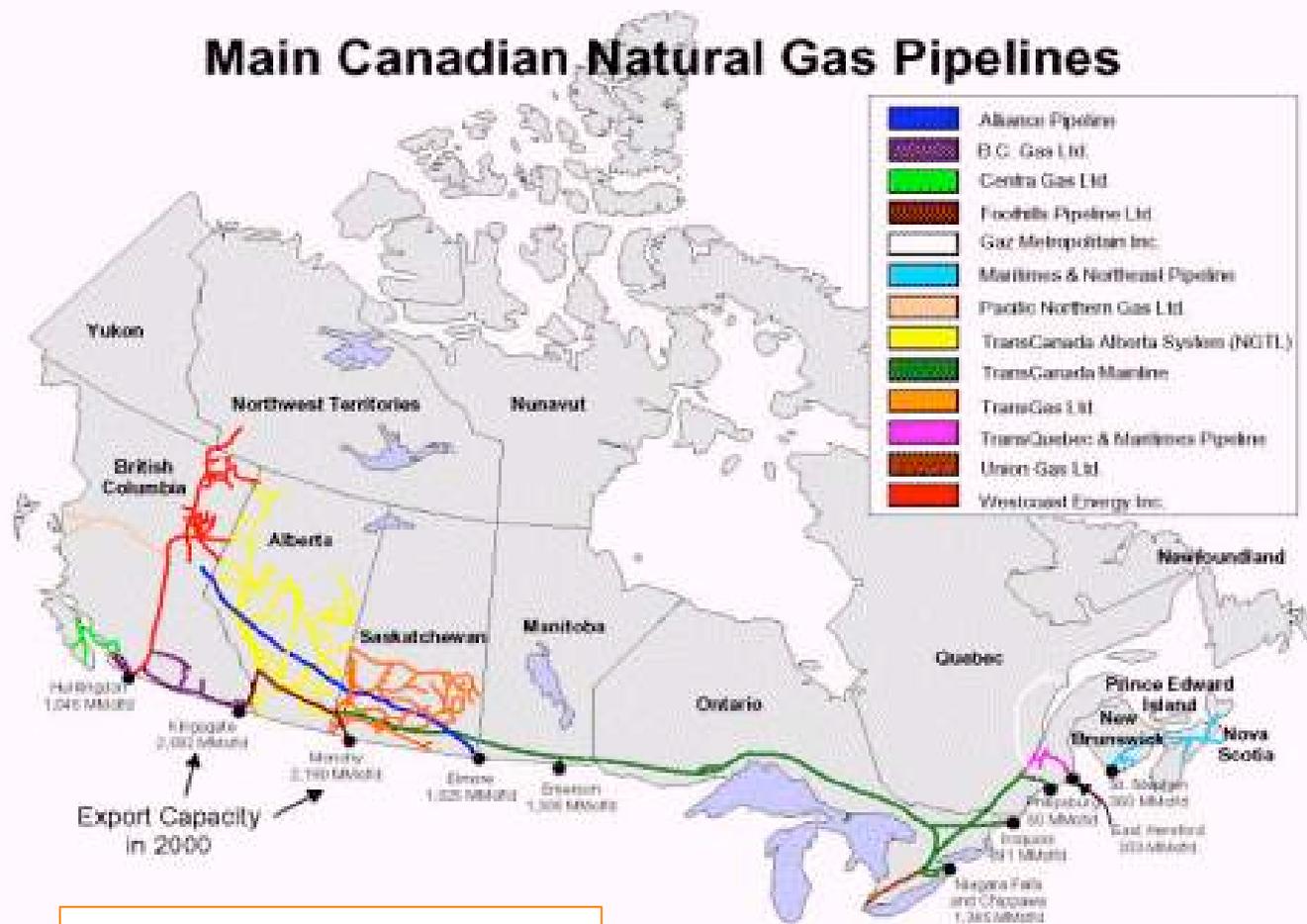
## How Gas is Distributed



# Fundamentals

## How Gas is Transported

### Canada Natural Gas Pipeline Systems



[See Simplified Map](#)

Source: Natural Resources Canada

# Fundamentals

## How Gas is Transported

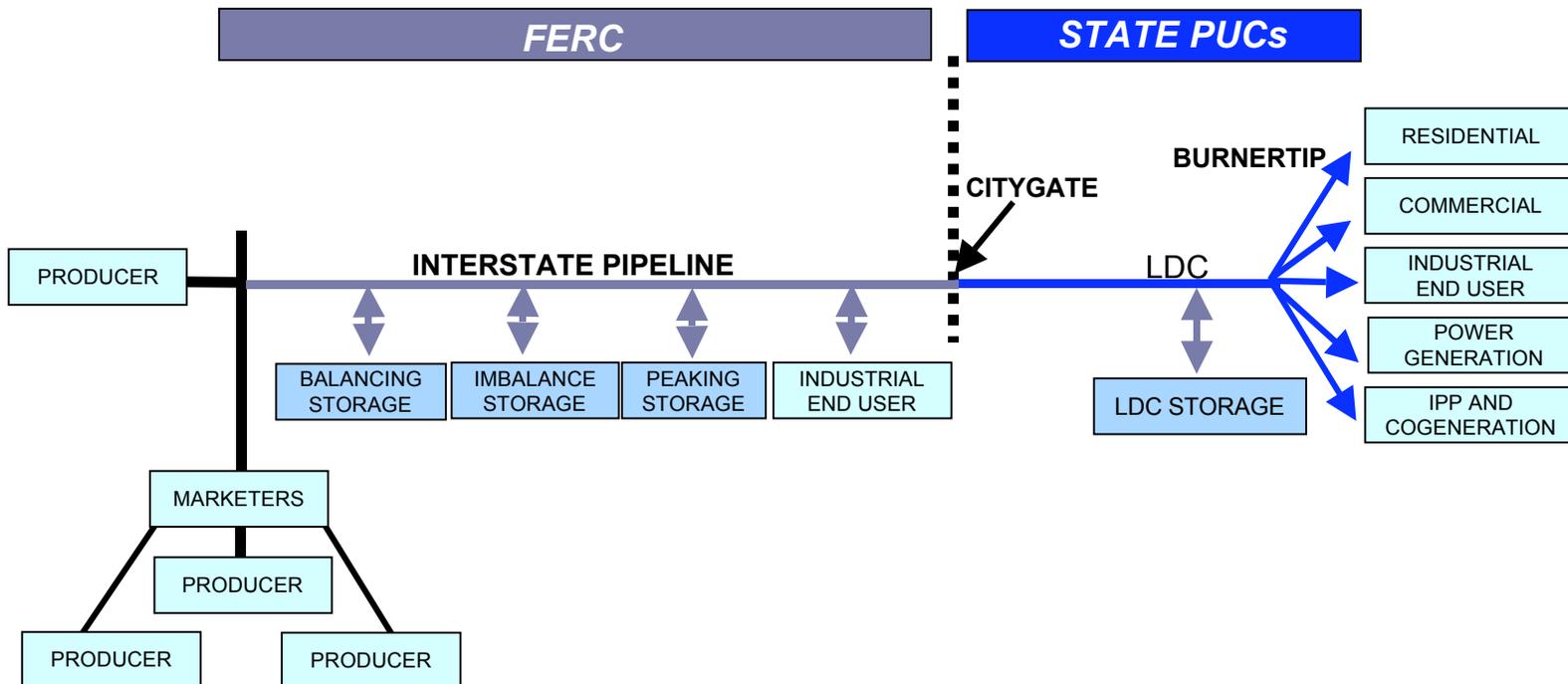


- Gathering
  - \_ Low pressure smaller diameter pipe
  - \_ Delivers gas from wellhead to processing
- Intra/Interstate Pipeline
  - \_ High pressure (500-750 psi)
  - \_ Large diameter pipe (25 to 34 inches)
- Compression
  - \_ 40 to 100 mile intervals
  - \_ Gas-fired turbine and reciprocating engines
    - Up to several thousand horse power
    - Additional filtration occurs
- Metering Stations
  - \_ Dispersed along the pipeline
    - Wireless remote reading
    - Supervisory Control and Data Acquisition of volume
    - Constant volume and pressure management by pipeline companies
- Local Distribution

# Governing Bodies

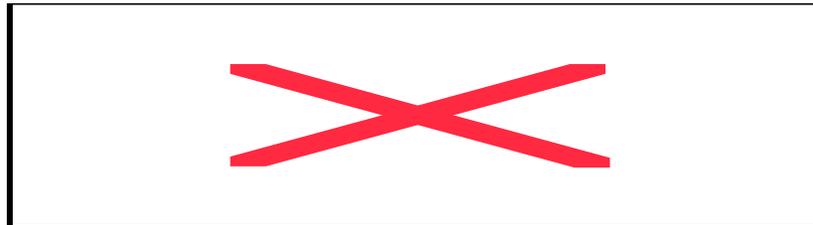
## U.S. Pipeline Regulation

### Most Common Scenario



# Governing Bodies

## U.S. Pipeline Regulation



State line

Inter-state Pipelines (1)

Intra-state Pipelines

- (1) FERC regulates all aspects of interstate pipeline operations and rates; can have "influence" on PUC's as regards to federal initiatives.
  - (2) Public Utility Commission (PUC) regulates all aspects of intrastate transmission pipeline and LDC operations, rates, safety and franchise areas.
  - (3) PUC only regulates the safety aspect of distribution system, if at all. All other aspects are self-regulated (I.e., via the City Council, Utility Board, etc.)
- \*\* Note: The Department of Transportation (DOT), through its Office of Pipeline Safety (OPS), maintains safety authority over virtually all pipelines



# Transportation & Distribution Costs – Types of Service

## Transportation Cost Components

There are three (3) components:

- 1) Demand Charge** – Monthly charge covering the fixed costs of a pipeline. Fixed costs are those that remain relatively constant and do not vary with throughput (e.g. capital expenditures, interest expense, depreciation, and taxes, etc.) Based on the daily contracted quantity, payable regardless of quantity transported.
- 2) Commodity Charge** – Throughput charge covering the variable costs of a pipeline (e.g. payroll, O&M, etc.)
- 3) Fuel/Line Loss** – Charge covering cost of fuel for compression and loss of gas.

# Transportation & Distribution Costs – Types of Service

## Transportation Capacity Types

### Pipeline Transportation Service – three capacity types

- **Primary Firm** - Force MAJEURE interruption only. Highest priority transportation available on pipeline
- **Secondary Firm** – Interruption at discretion of pipeline with specific notification requirements
- **Interruptible** – Interruption at option of capacity holder with little or no notification required

### Capacity Release - the buying and selling of interstate pipeline capacity priced according to availability, type and duration

- **Recallable** – Seller can take capacity back (i.e. recall the capacity)
- **Non-recallable** – Seller cannot take capacity back

# Transportation Decisions

## Pipeline

- Self transport
  - Buy delivered
  - FT or IT
  - Flavors of firm
- 
- Decision depends on how many pipes serve your LDC and the “vibrancy” of the capacity release market

## Utility

- FT
  - IT
  - Mix of FT & IT
  - Tariff rate choices
- 
- Decision depends on proximity to alternative pipeline, usage, alternate fuel choices and others

# Citygate Basis

**Basis** – The difference in price between two points. A “product” that helps buyers/sellers relate the cost of gas at any purchase point to NYMEX. Simplifies citygate pricing to:

$$\text{NYMEX} + \text{basis} = \text{total price}$$

## **Basis Includes:**

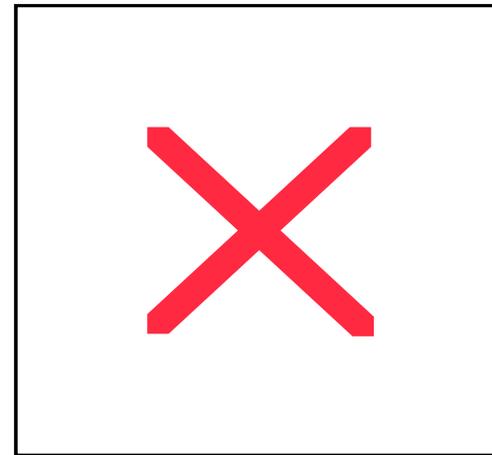
- **Interstate Transportation** - the cost a shipper pays the pipeline owner to move gas from a defined “point A” to a defined “point B”. Firm transport usually broken into two pieces:
  - reserved space in the pipeline
  - units actually flowed
- **Fuel** - cost incurred to buy extra units of gas at point A to get desired units at point B
- **Supplier Margin**

# Natural Gas Pricing Options

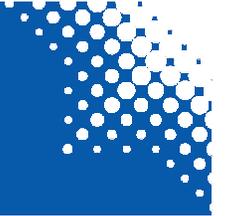
- Time
  - Spot
  - Baseload
  - Term
  
- Price
  - Cash
  - Index
  - NYMEX

# Understanding the Risks

- Physical Risk
- Financial Risk
- Contractual Risk
- Performance Risk
- Credit Risk



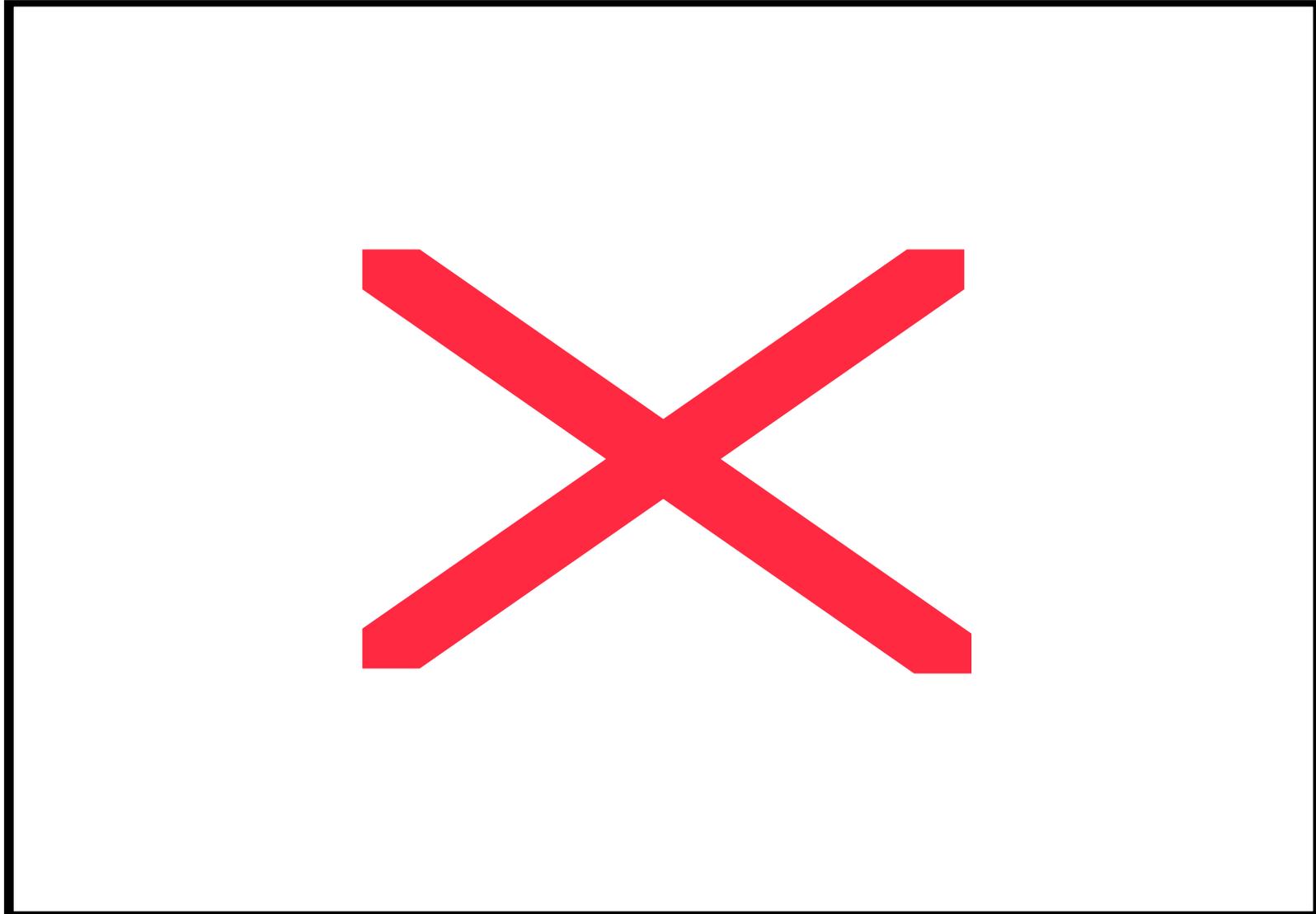
# Summary





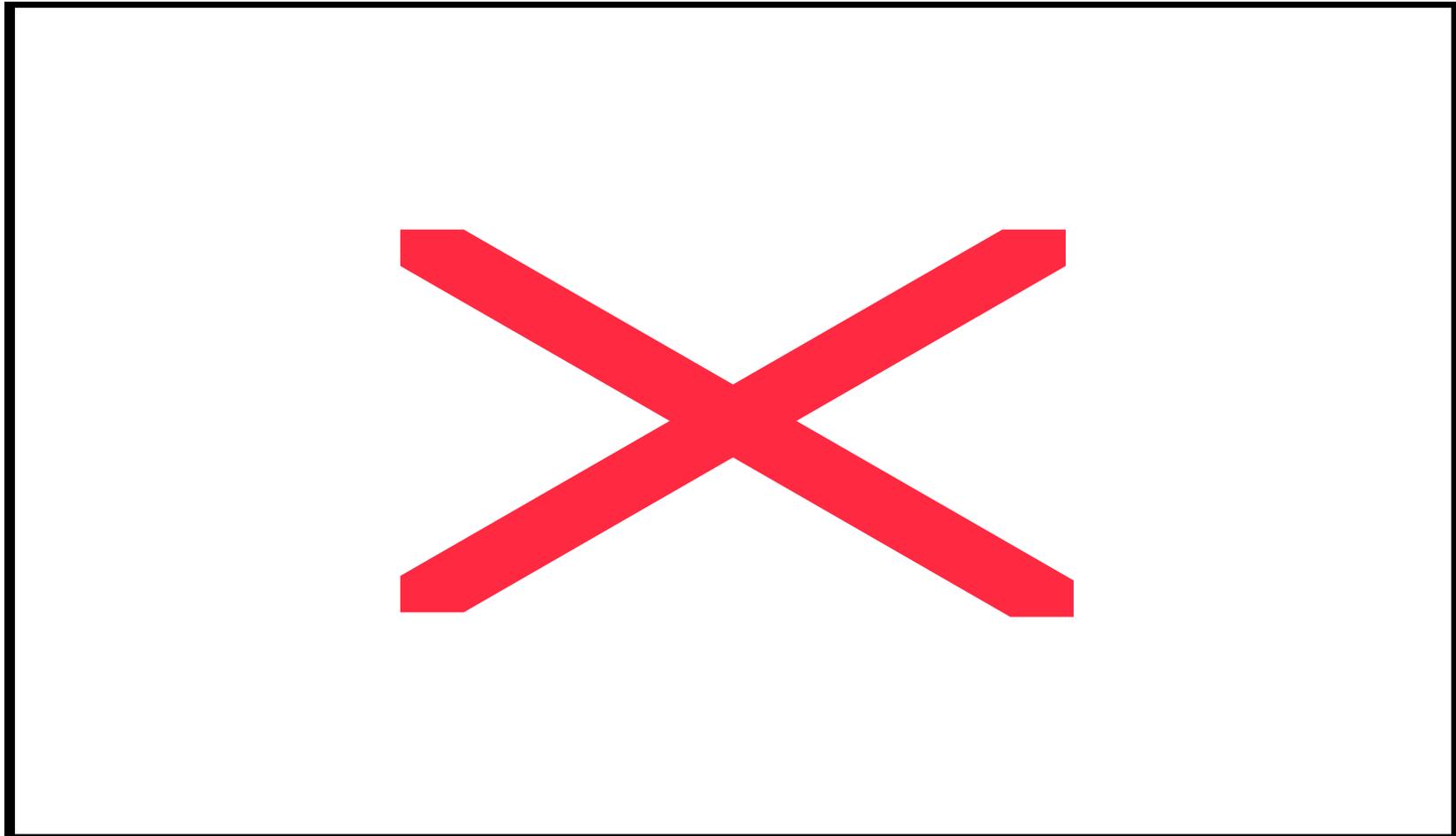
# Natural Gas Market Overview

# Natural Gas Market Overview



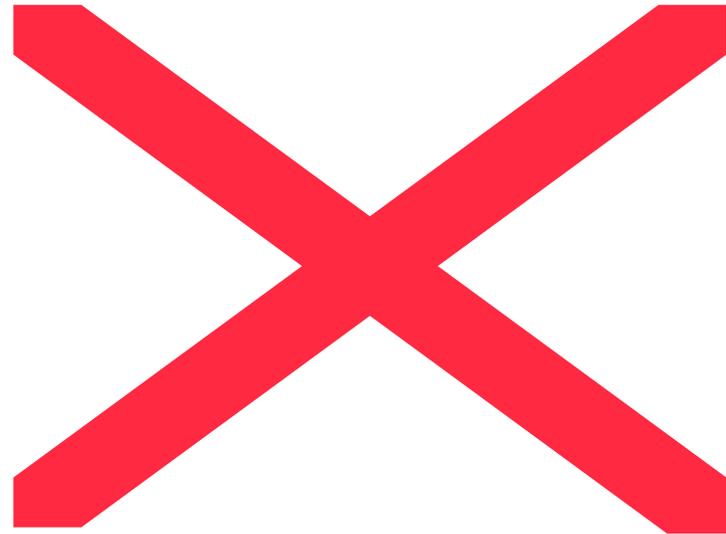
# Natural Gas Market Overview and Outlook

## Average Natural Gas and Forward Prices



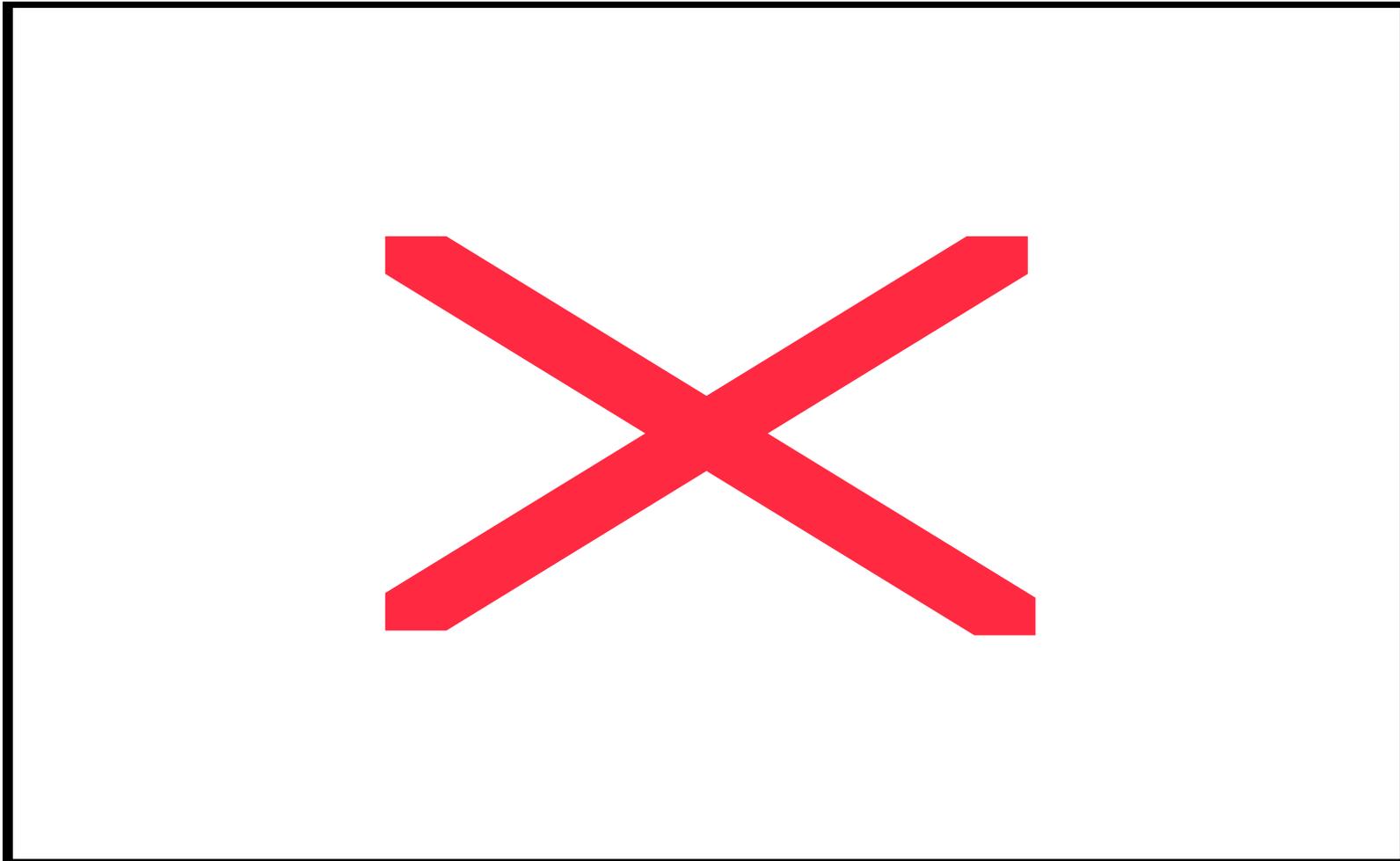
# Natural Gas Market Overview

Daily NYMEX Crude Oil Futures Price History



# Natural Gas Market Overview and Outlook

## Daily Avg. Crude Oil and Forward Prices



# Natural Gas Market Overview

## U.S. Gas Production vs. Demand

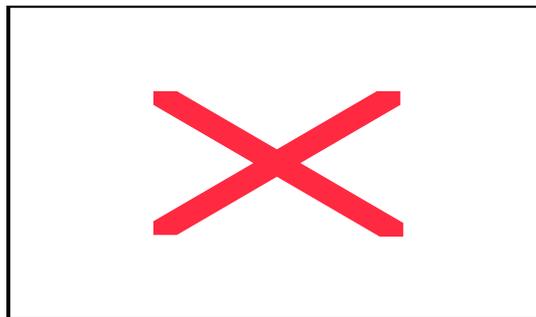
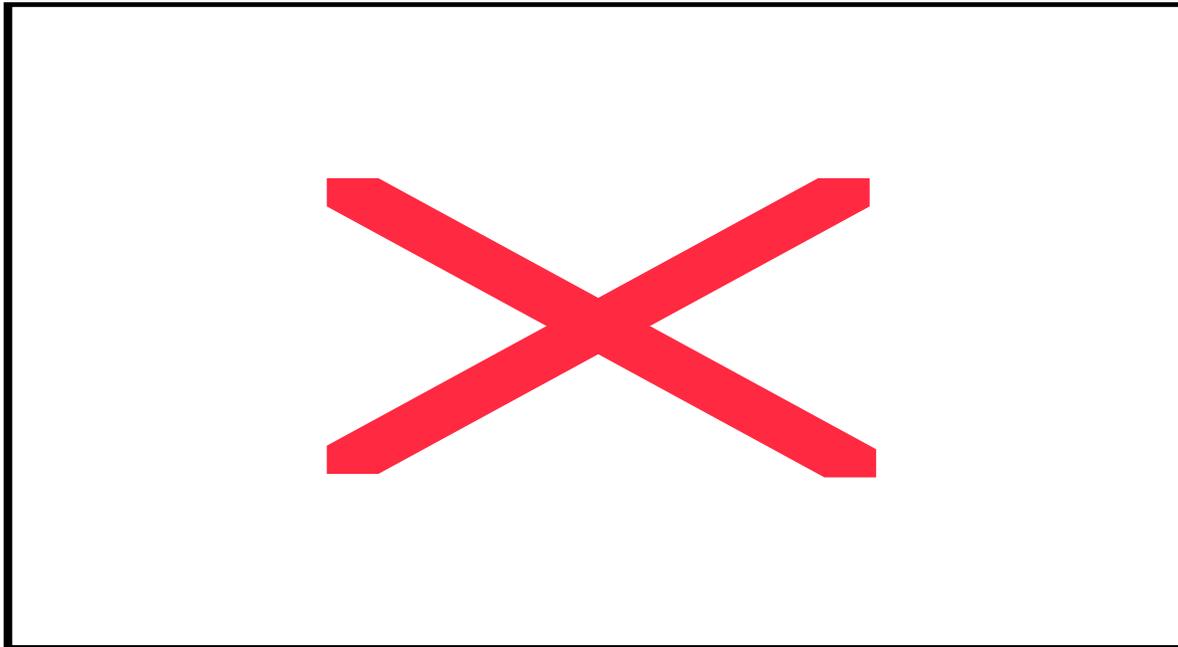


ports  
nada  
&  
.NG

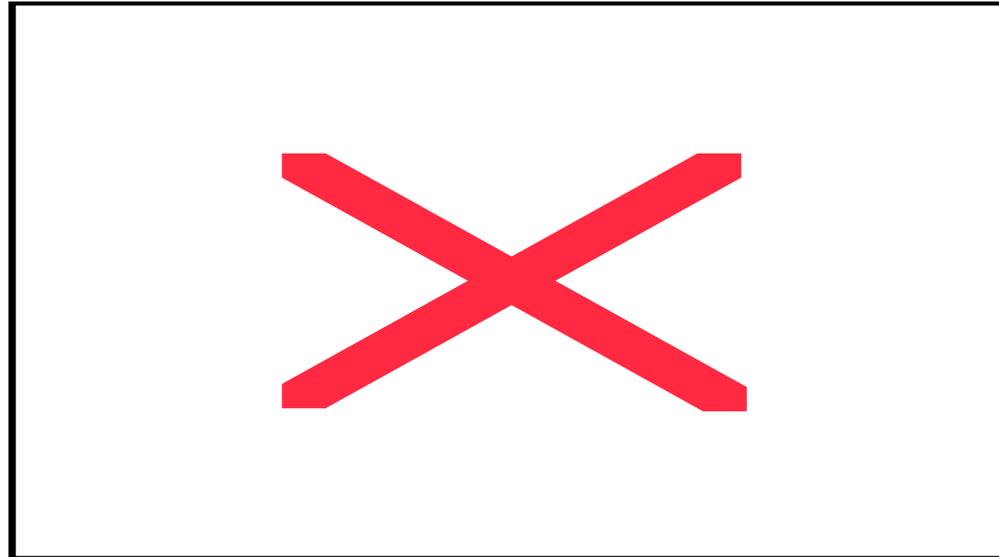


# Natural Gas Market Outlook

# Weather – Warmer Than Normal Weather



# Natural Gas Storage Projections - 2006



2005 Storage Floor = 1,239 Bcf  
2005 Storage Injection Ceiling = 3,282 Bcf  
2006 Storage Floor = 1,695 Bcf  
2006 Current Stocks = 2,775 Bcf

5-year average storage ceiling = 3,168 Bcf

Estimated 2006 U.S. physical storage maximum = 3,450 Bcf

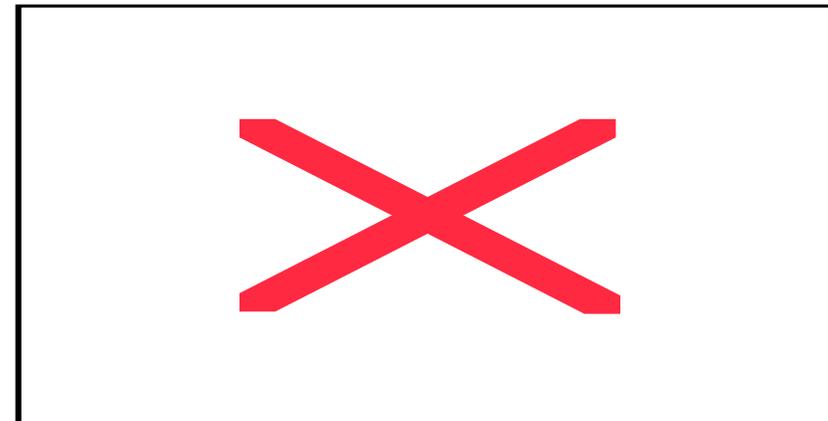
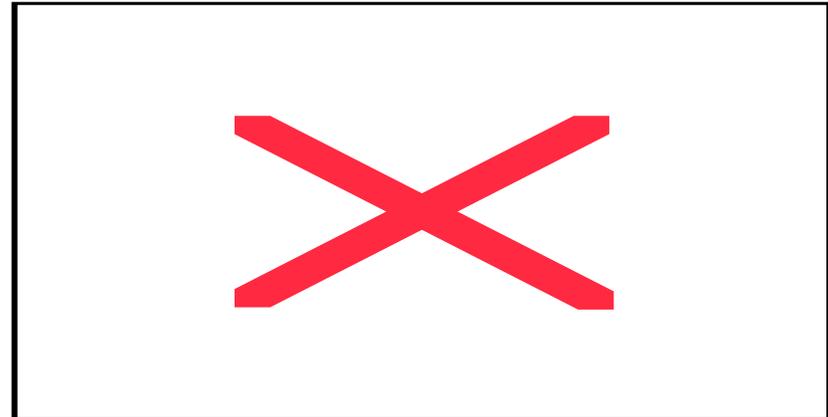
If injections are in line with the 5-year average, stocks will reach 3,168 Bcf by September 8, 2006 and reach 3,450 Bcf by October 6, 2006.

If injections are in line with the 5-year maximums, stocks will reach 3,168 Bcf by September 1, 2006 and reach 3,450 Bcf by September 22, 2006.

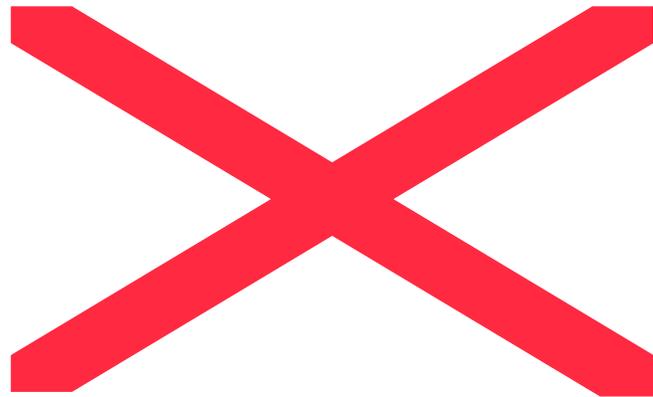
If injections are in line with the 5-year minimums, stocks will reach 3,168 Bcf by September 22, 2006.

# Weather – YOY Sea Surface Temperatures

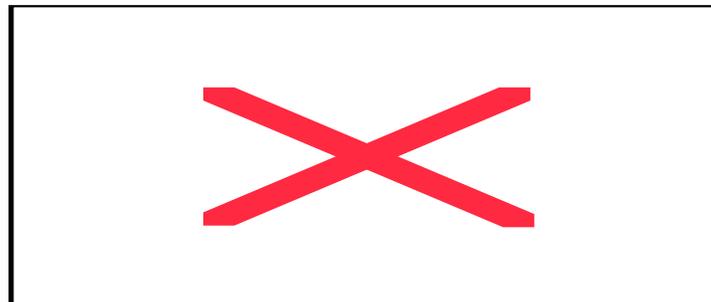
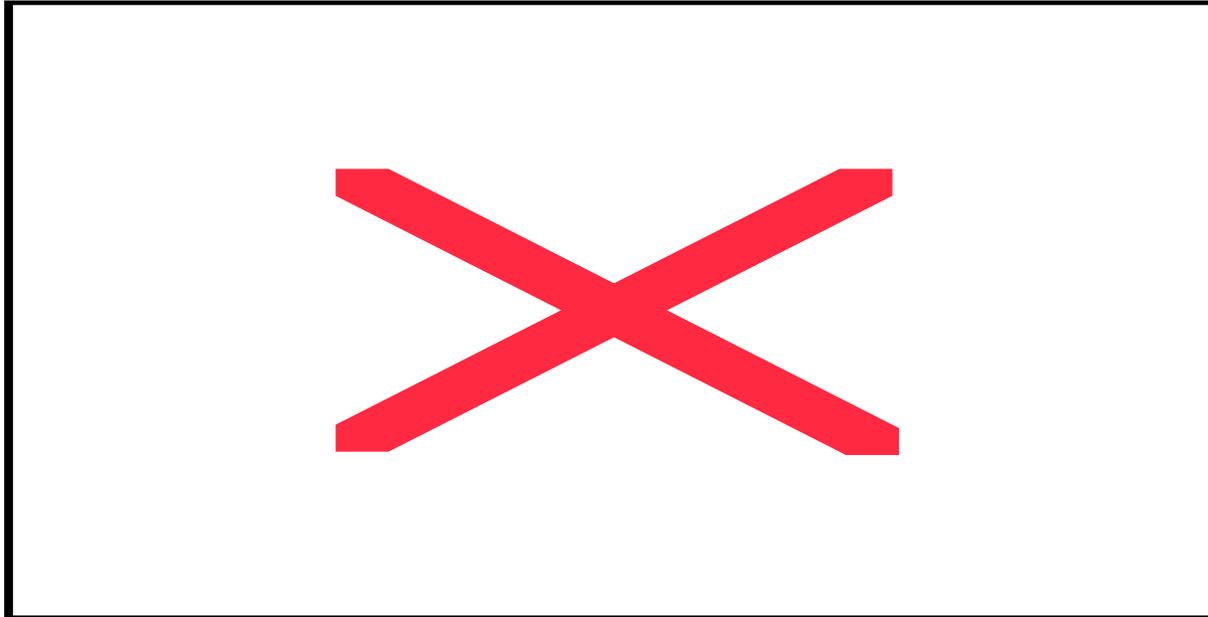
- Tropical Atlantic SSTs normal for this time of year
- Cooler than 2005
- La Nina has gone neutral
- El Nino looking more apparent
- Active tropical season still called for



# Hurricanes Impact Gas Market



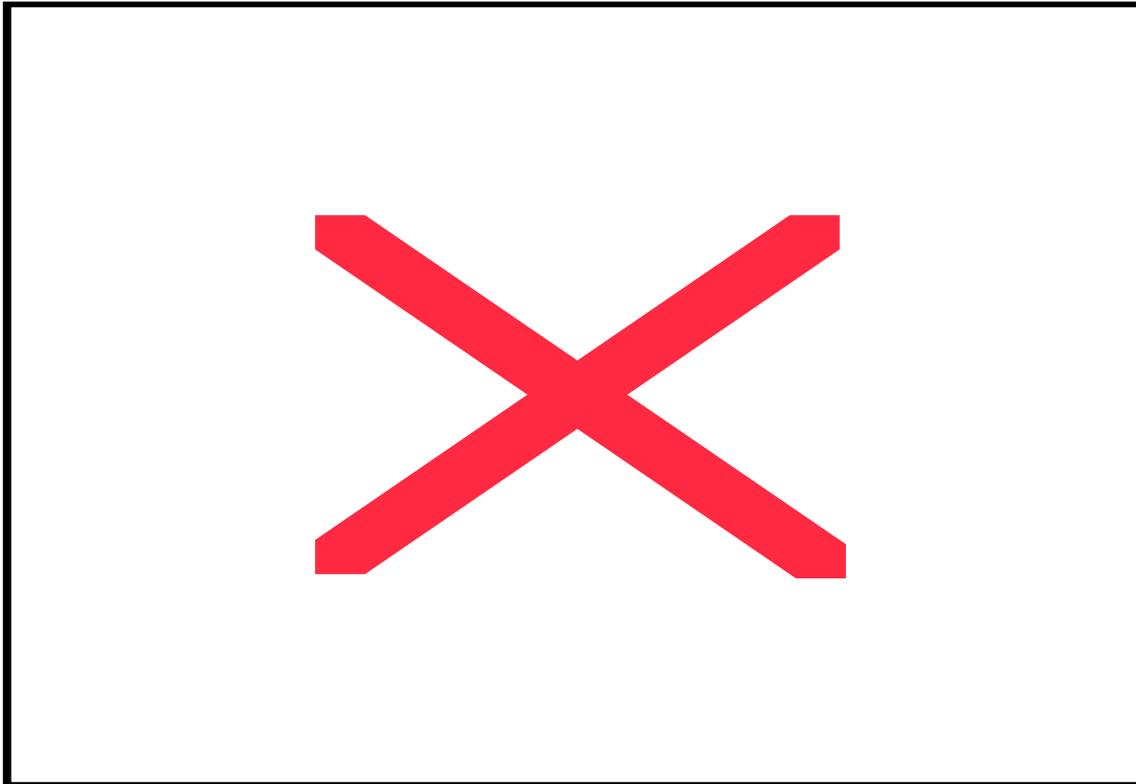
# Weather – Hurricane Activity by Month



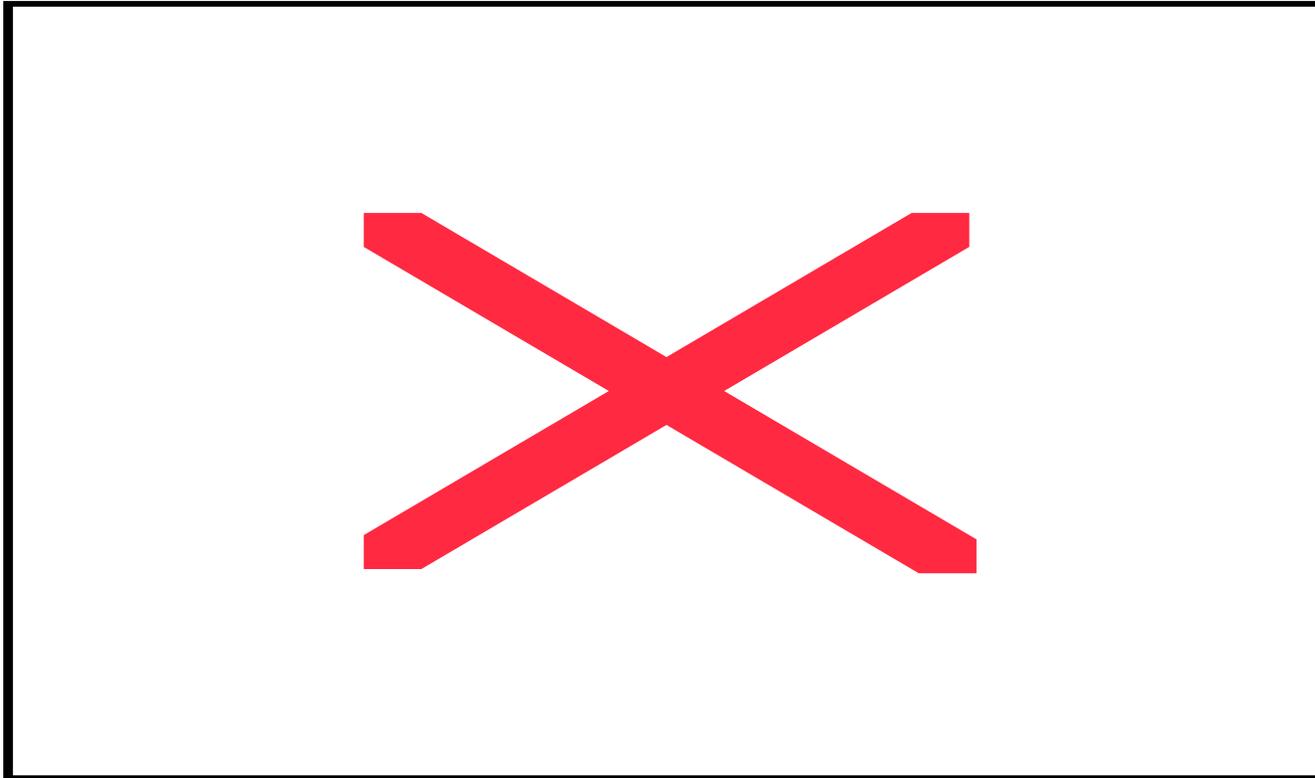
# Rita – Katrina Assessment

## Highlights

- As of 6/21/06 shut-in gas production is 0.935 BCFPD. This shut-in gas production is equivalent to 9.357% of the daily gas production in the GOM, which is currently approximately 10 BCFPD.
- The cumulative shut-in gas production 8/26/05-6/19/06 is 803.604 BCF, which is equivalent to 22.017 % of the yearly production of gas in the GOM (approximately 3.65 TCF).



# U.S. LNG Imports Are on the Rise



# LNG Summary Update

## Current Import Terminals

- U.S. LNG Import terminals (4) constructed 1970s
- 3 of 4 LNG terminals inactive until 2002/2003
- Everett, MA only LNG terminal in continuous operation since construction
- 2005 was significant year in U.S. LNG terminal construction



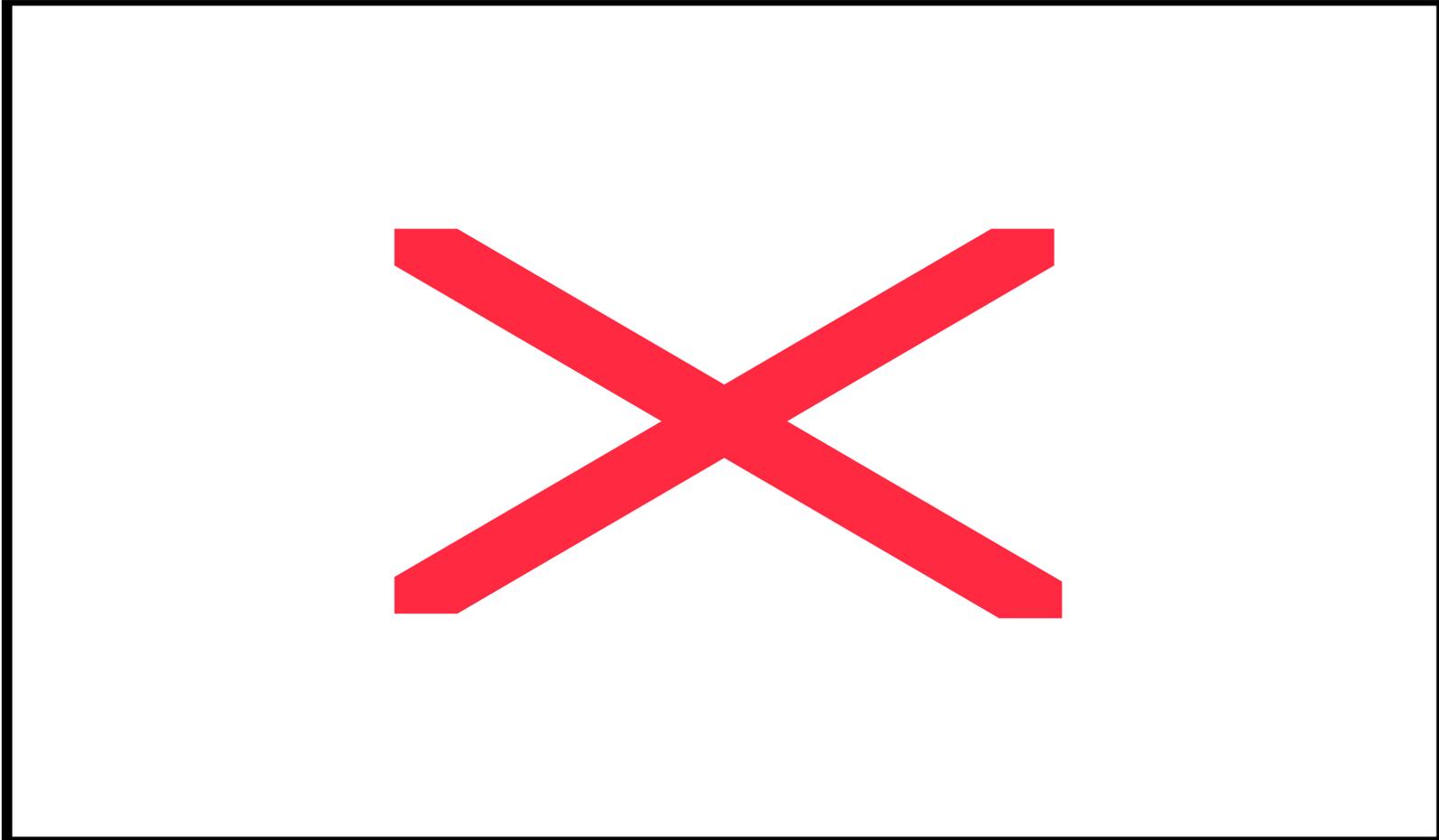
# LNG North American Regasification

67 Regasification Terminals Proposed, Not All Will Be Built

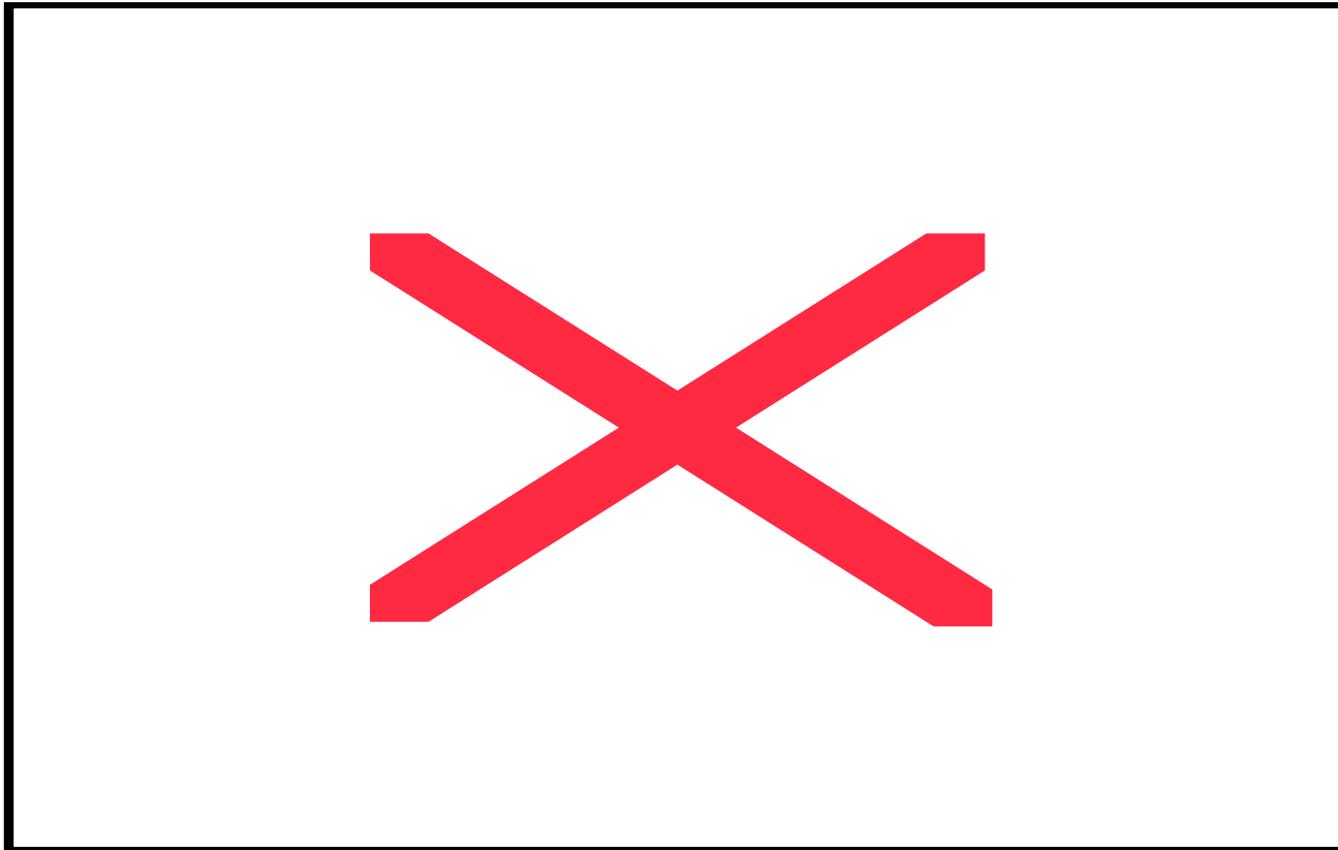
- Large Balance Sheet and Upstream Supply Are Paramount

Project	Location	Max Capacity	Supply	Status	Est. Completion Date
Alta Mira	Alta Mira, MX	1.3 Bcf/D	Shell -Total	Under Construction	2006
Cheniere Freeport	Freeport, TX	1.5 Bcf/D	ConocoPhillips	Under Construction	2007
Cheniere Sabine Pass	Sabine Pass, LA	2.6 Bcf/D	-----	Under Construction	2008
Sempra Cameron LNG	Hackberry, LA	1.5 Bcf/D	Suez - Sonatrach	Under Construction	2008
Sempra Costa Azul	Baja Norte, MX	1.3 Bcf/D	Shell	Under Construction	2008
Irving Canaport	New Brunswick, Canada	1.0 Bcf/D	Irving Repsol	Under Construction	2008-2009
Exxon Golden Pass	Port Arthur, TX	1.0 Bcf/D	Exxon-Qatar Petroleum	FERC Approved	2008
Chevron Casotte Landing	Pascagoula, MS	1.3 Bcf/D	Chevron West Africa	FERC Application Submitted	2009-2010
Jordan Cove LNG	Coos Bay, OR	0.3 Bcf/D	-----	FERC Application Submitted	2009

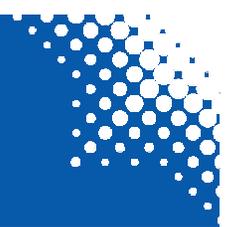
# U.S. LNG Imports



# U.S. LNG Regasification Capacity



# LNG Summary Update



Global LNG market developing rapidly

Focus on supply, not capacity

Global prices will determine where supply goes

U.S. – based ROI (e.g. \$3.50/MMBtu) – Irrelevant

China, India, Pacific-Rim, Europe hungry for LNG

Not a panacea for North American market

Will act to “rebalance” supply/demand in U.S.

# Summary

