



## Benefits of Natural Gas Storage

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NARUC Annual Conference  
November 16, 2008

## **Sempra Pipelines & Storage**

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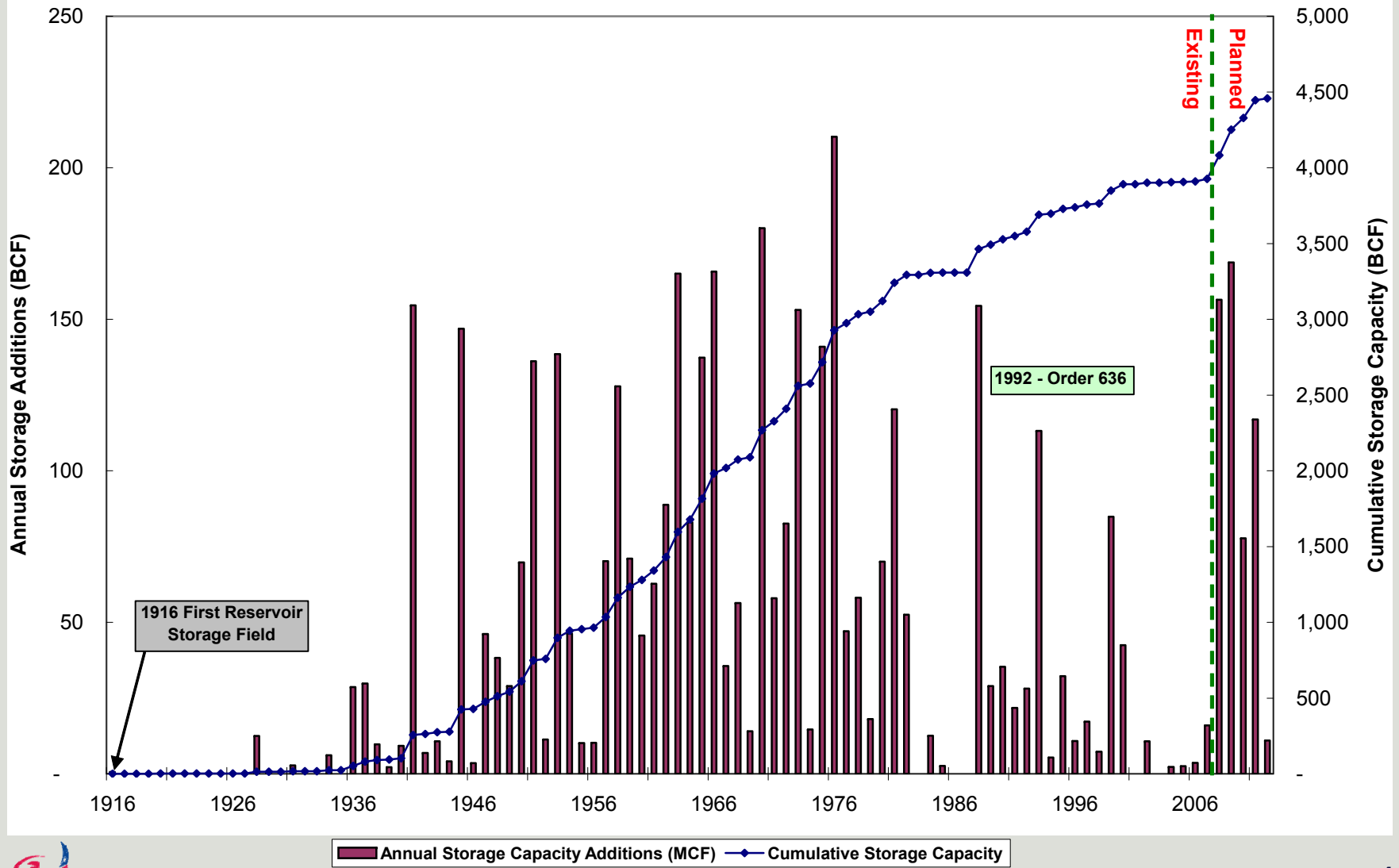
## Traditional View of Gas Storage

- ▶ **Reliable, flexible supply during peak demand periods**
  - Insurance against supply disruption
  - Mitigation of price spikes
  - Typically low cycle, seasonal utilization
- ▶ **Physical balancing tool to maintain system integrity against unpredictable demand load factors**
  - Avoid pipeline imbalance penalties
  - Capture buying opportunities during low demand periods

**Reliably Optimize System Operations**

# Historical U.S. Natural Gas Storage Capacity

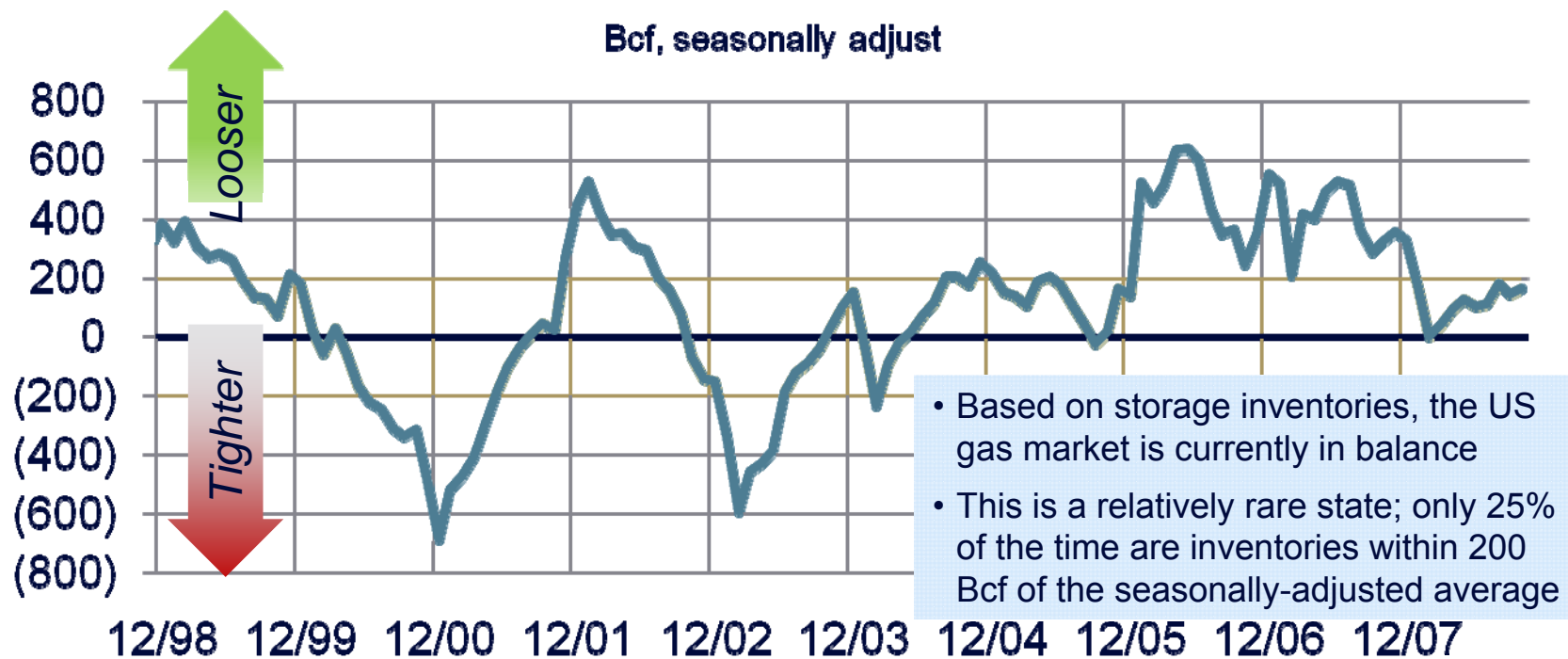
Historical Natural Gas Storage Capacity and Additions



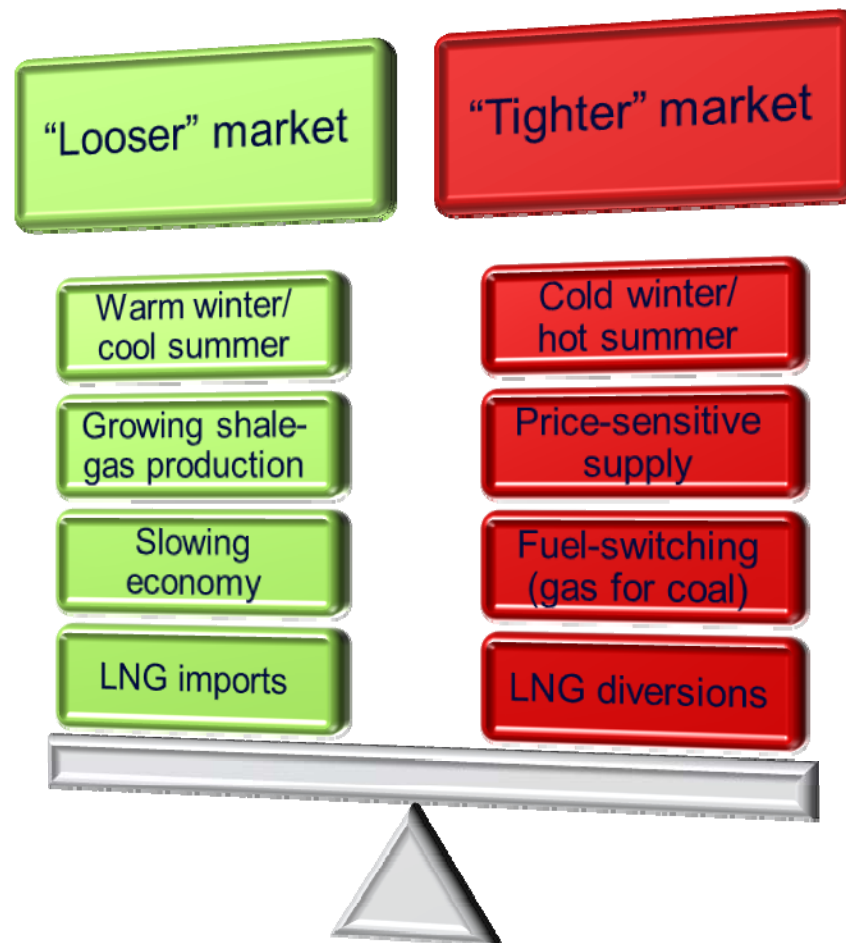
Sources: FERC / PACE

# For North American gas demand, the only certainty... ...is uncertainty

## US storage inventory surplus/(deficit)



# Current Market Balance Could be Upset Many Factors

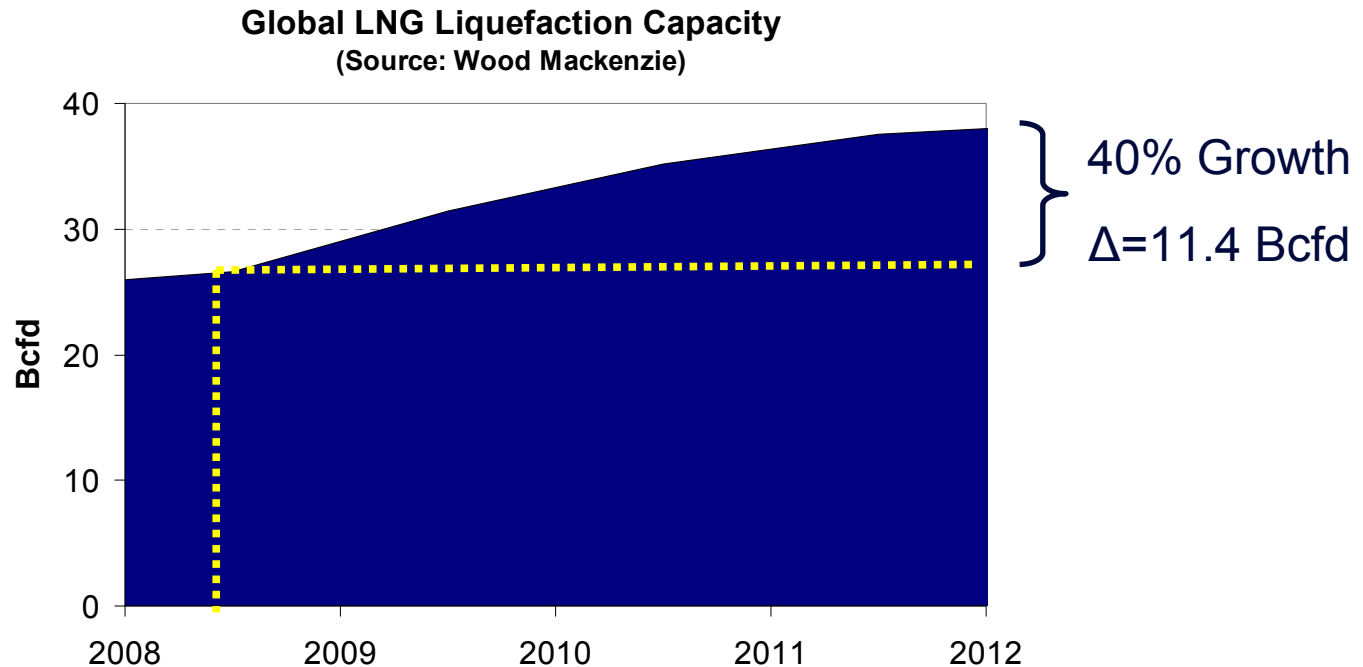


## Gas Market Environment 2009 - 2012

- ▶ **Current global & North American gas demand forecasts are below earlier forecasts through 2012**
- ▶ **Conventional North American gas supply is declining, and being replaced with fractured shale & tight sands gas (higher finding cost)**
- ▶ **Growth in global LNG supplies and weakening global gas demand could result in increased deliveries of LNG to North America in the summers of 2009 & 2010**
- ▶ **Lower gas prices and/or environmental policy pressures could increase gas demand in the electric generation sector**

**U.S. = global LNG “physical put” market**

## Impact of LNG on Domestic Natural Gas Storage



- ▶ Global liquefaction capacity projected to grow 40% in 2009-11. If global gas demand stagnates or contracts, this surplus LNG will seek largest liquid market → United States
- ▶ U.S. storage infrastructure is best equipped to absorb excess LNG capacity
- ▶ Spot LNG deliveries would increase use of high-deliverability storage facilities

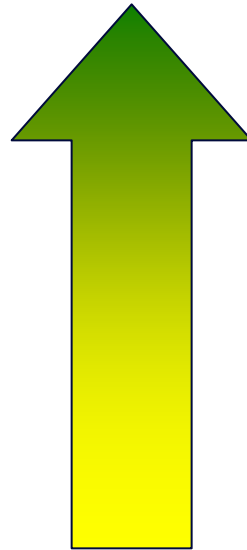
**Once Built, Liquefaction Facilities Will Run at Very High Load Factor**

# Components of Domestic Supply & Demand

## Demand Drivers

- ▶ *Electric Generation*
- ▶ Residential
- ▶ Commercial
- ▶ Industrial

**Higher Growth**



**Lower Growth  
(or Decline)**

## Sources of Supply

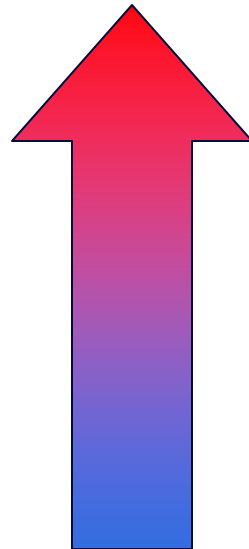
- ▶ *LNG Imports*
- ▶ Unconventional Production
- ▶ Pipeline Imports
- ▶ Conventional Production

# Price Sensitivity of Domestic Supply & Demand

## Demand Drivers

- ▶ *Electric Generation*
- ▶ Residential
- ▶ Commercial
- ▶ Industrial

**Price Volatility**



**Price Stability**

## Sources of Supply

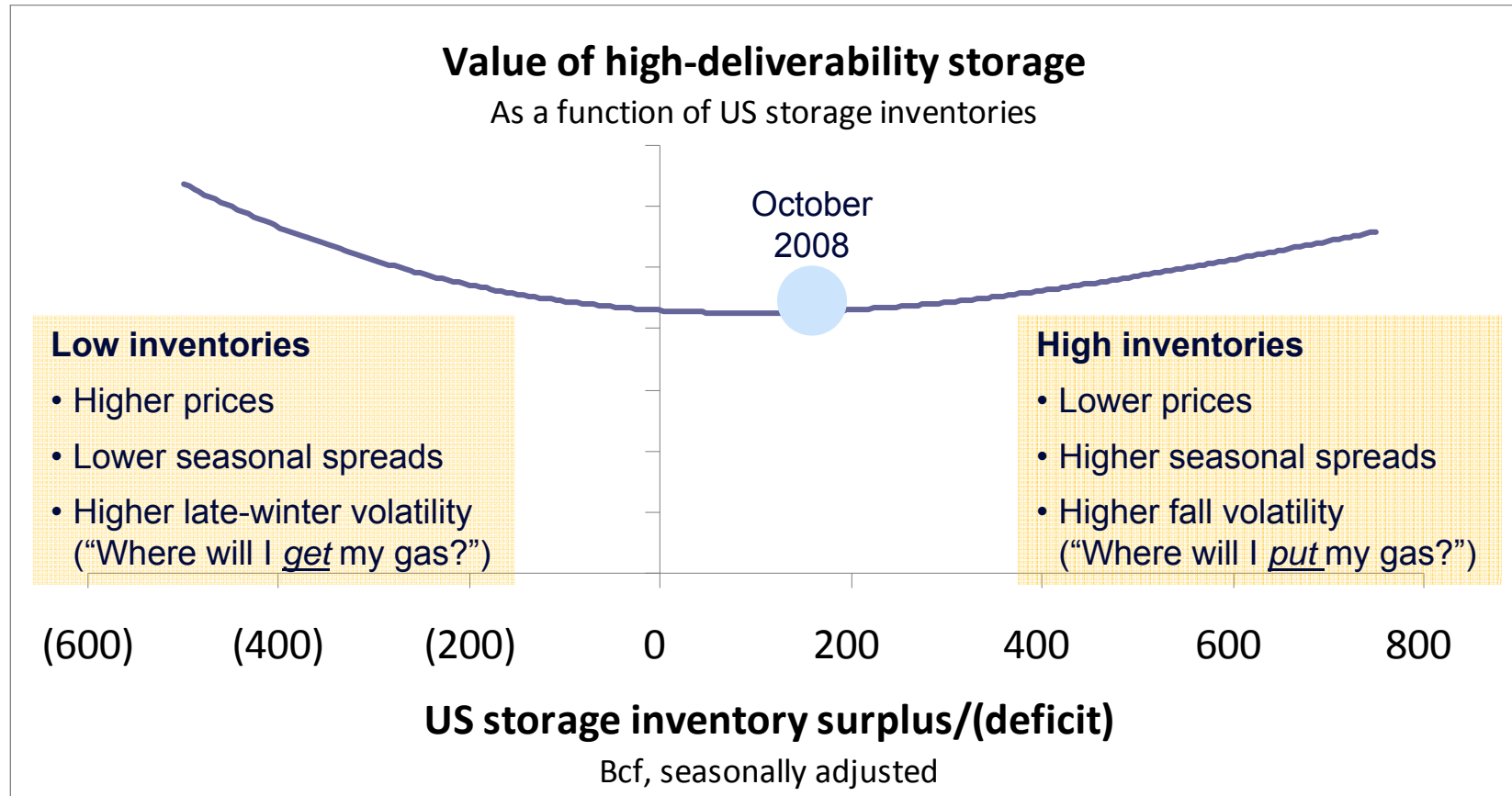
- ▶ *LNG Imports*
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## Impact of Changes to Gas Market

- ▶ **Competition between North American production and increasing LNG deliveries will impact commodity pricing**
- ▶ **Tremendous need for asset infrastructure to provide physical balancing of the gas grid as periods of high supply do not match up with periods of high demand**
- ▶ **Premium on reliable, flexible, & affordable supply sources at strategic locations as pipeline flow patterns & capacity constraints shift**
- ▶ **Storage use should evolve from traditional seasonal use to shorter term balancing tool as customer mix changes**

**Supply-side Balancing as well as Demand Peak Shaving**

# Storage Value Increases as the Market Moves Out of Balance



# Cost Comparison of Gas Storage

Example 1 assumes 1 Bcf of capacity from each type storage

<u>Capacity</u>	<u>Storage Type</u>	<u>Annual Turns</u>	<u>Injection</u>	<u>Withdrawal</u>	<u>Monthly Demand Fee</u>	<u>Annual Storage Cost</u>	\$ 7.000 8.50% <u>Annual Carry Cost</u>	<u>Total Annual Cost</u>	<u>Cost Per Unit Deliverability</u>
1,000,000	Salt	12	50,000	100,000	\$ 0.250	\$ 3,000,000	\$ 416,500	\$ 3,486,625	\$ 34.87
1,000,000	Reservoir	3	16,667	16,667	\$ 0.150	\$ 1,800,000	\$ 416,500	\$ 2,286,625	\$ 137.20
1,000,000	LNG Tank	4	12,500	100,000	\$ 1.500	\$ 18,000,000	\$ 416,500	\$ 18,486,625	\$ 184.87

1,000,000	Salt	12	50,000	100,000	\$ 0.250	\$ 3,000,000	\$ 416,500	\$ 3,486,625	\$ 34.87
6,000,000	Reservoir	3	100,000	100,000	\$ 0.150	\$ 10,800,000	\$ 2,499,000	\$ 13,719,750	\$ 137.20
1,000,000	LNG Tank	4	12,500	100,000	\$ 1.500	\$ 18,000,000	\$ 416,500	\$ 18,486,625	\$ 184.87

Example 2 assumes 100,000 Dth/d of deliverability from each type of storage

**All Storage is Not Equal, No “One Size Fits All” Solution**