Current Trends: Natural Gas Infrastructure

Staff Workshop

2011 Integrated Energy Policy Report

California Energy Commission

Hearing Room A

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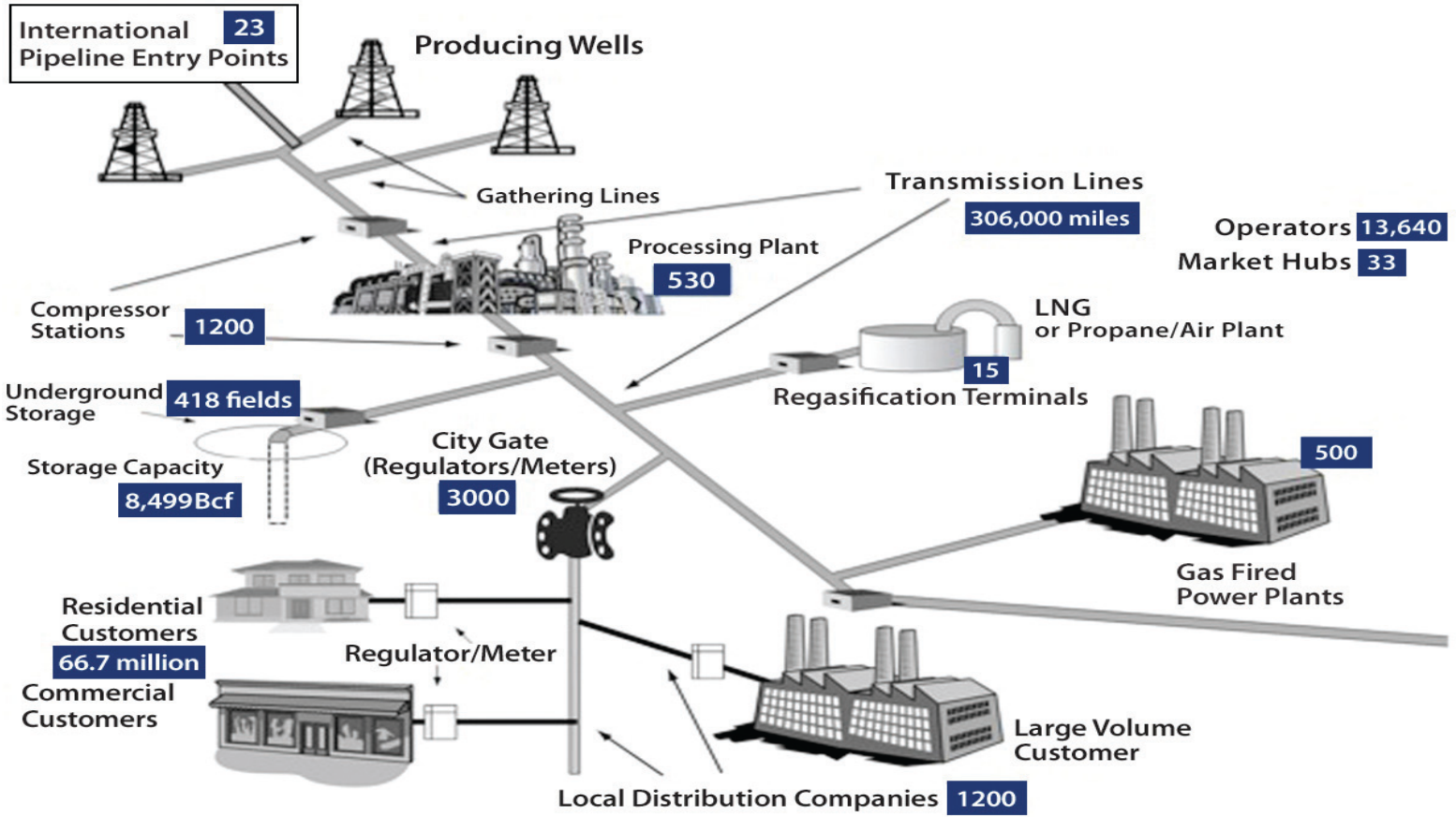
4 Topics

1. Interstate Pipeline Status
2. LNG
3. Storage
4. Infrastructure Disruptions

U.S. Fully Interconnected Natural Gas Infrastructure

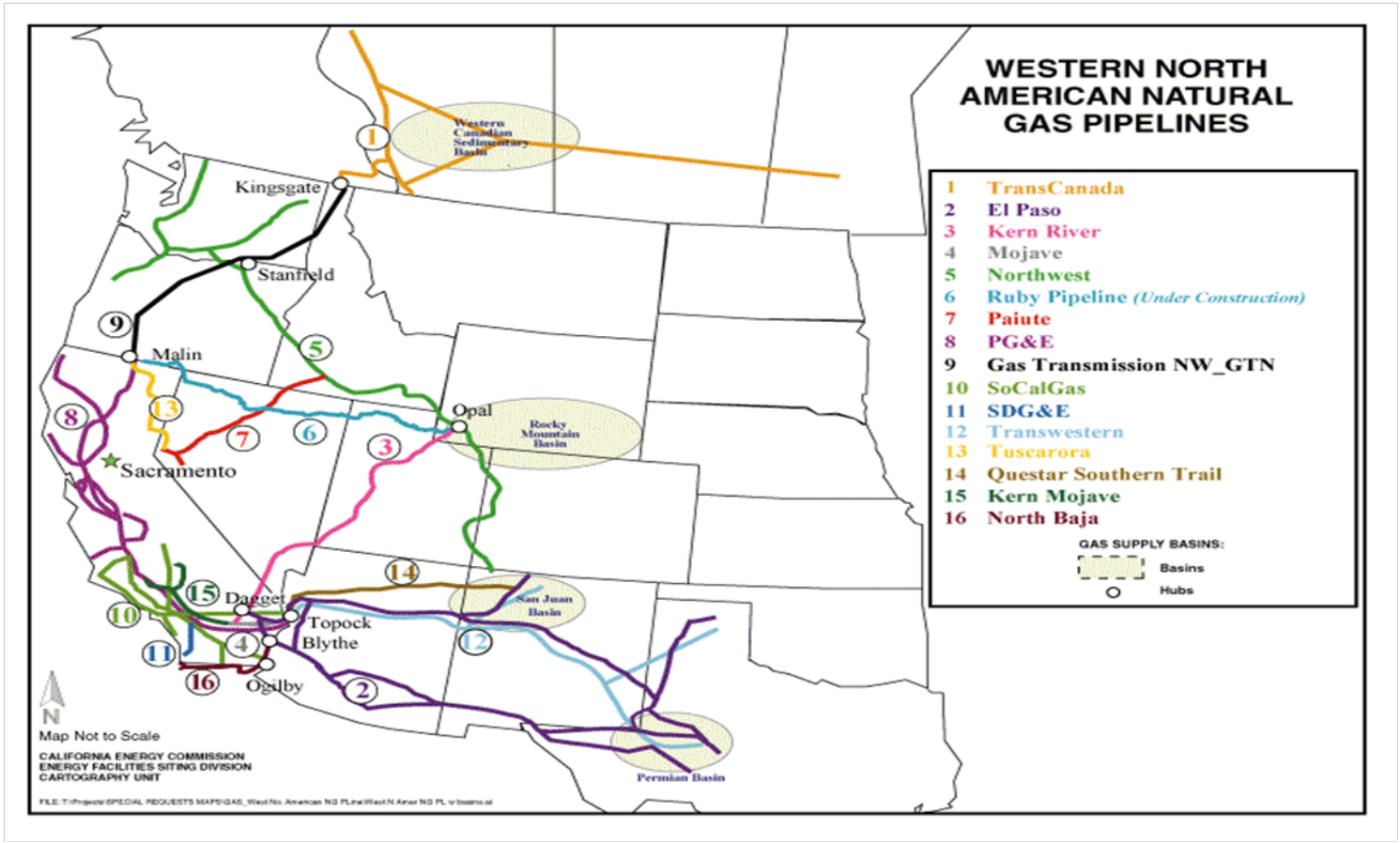


Source: The Future of Natural Gas, MIT, p. Modified by MIT from CHK.

California Interstate Pipelines

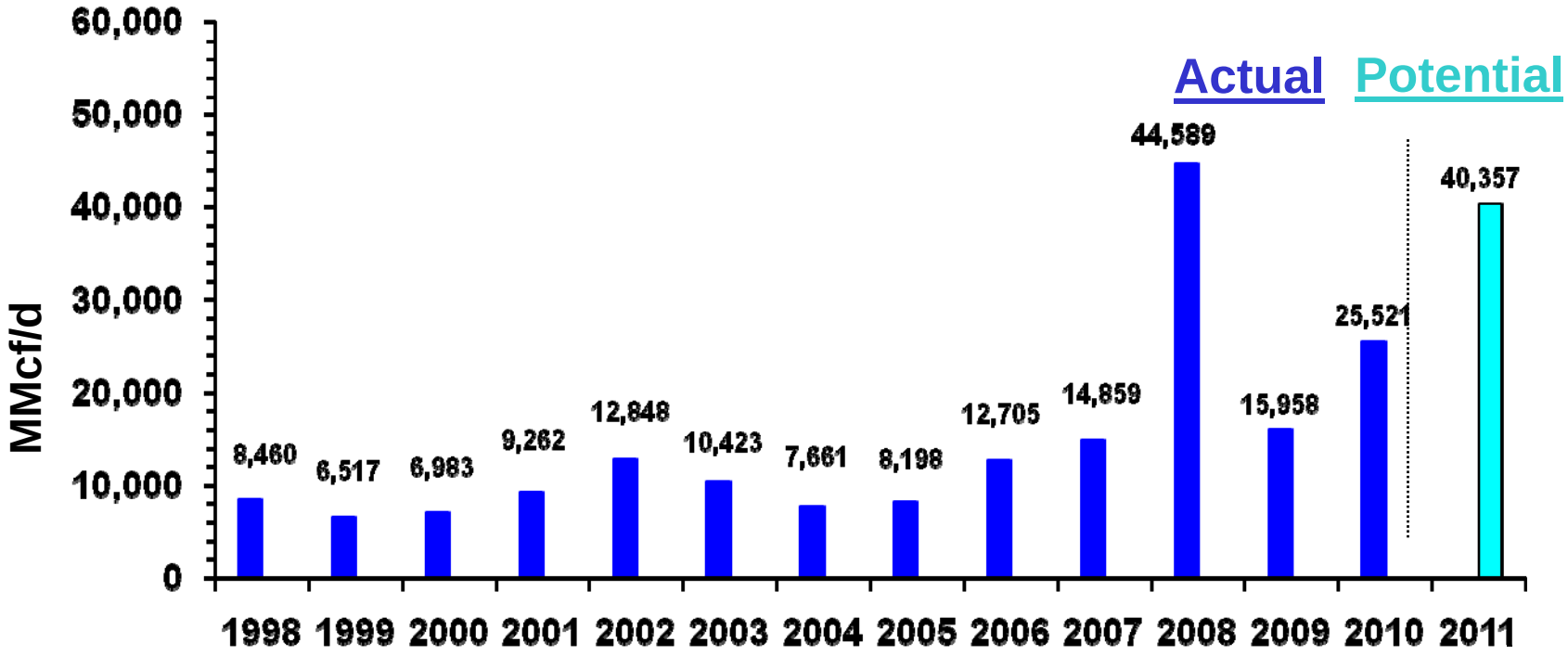
- Interstate Pipelines Serving California
  - Six major pipelines with aggregate delivery capacity of 9.3 Bcf/d
  - Take-away capacity into CA = 8.2 Bcf/d
- Two Capacity Additions: Ruby and Apex
  - Ruby will deliver 1.5 Bcf/d Rockies gas to Malin beginning July 2011 (not met with matching downstream capacity)
  - Kern River added 266 MMcf/d November 2010 to serve Apex power station at Las Vegas

Western Pipelines



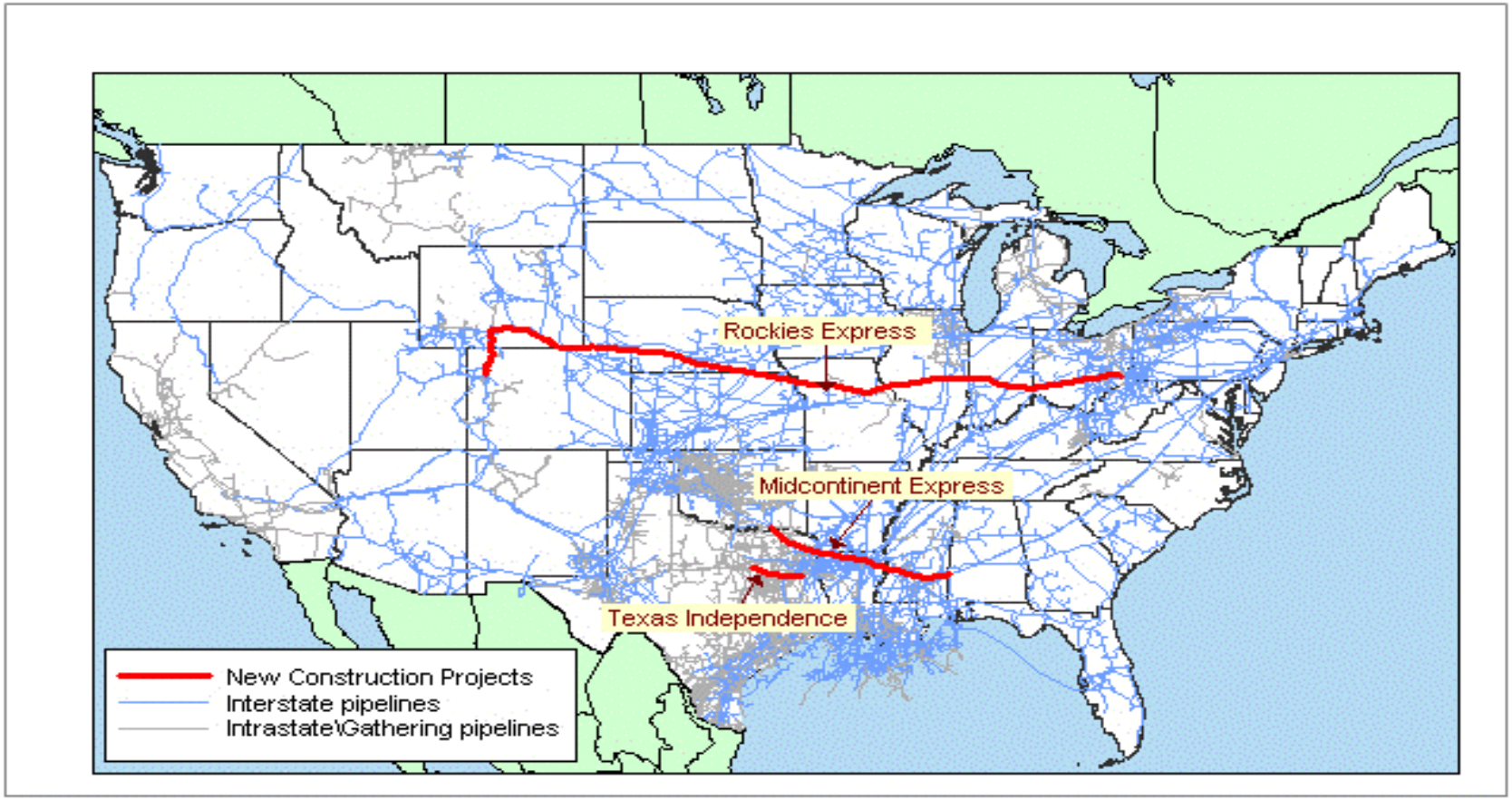
Source: California Energy Commission

U.S. Natural Gas Pipeline Capacity Additions



Source: Energy Information Administration, GasTran Natural Gas Transportation Information System, Natural Gas Pipeline Projects Database.

Pipeline Expansions Across the U.S.



Source: EIA Natural Gas Year in Review 2009

Liquefied Natural Gas: World Trends

- LNG priced based on fuels in market it competes with
  - Biggest exporters: Qatar, Indonesia, Malaysia
  - Biggest importers: Japan, South Korea, Spain
  - World liquefaction capacity = 13.3 Tcf/yr (CEDIGAZ)
  - World regasification capacity = 30.3 Tcf/yr (CEDIGAZ)
  - U.S. regasification capacity = 6.3 Tcf/yr (FERC)

LNG Landed Prices

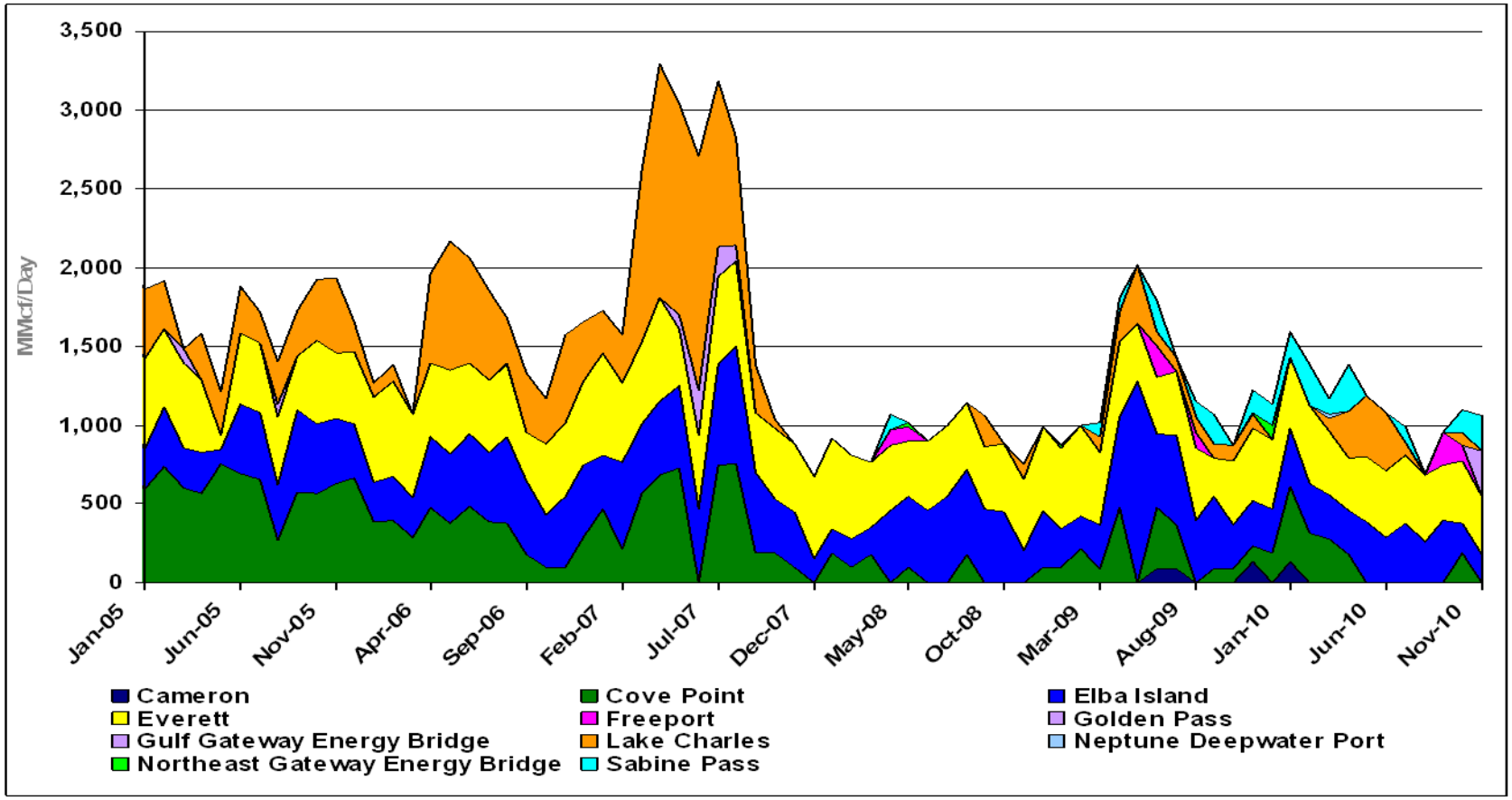
($US/MMBtu) March 2011

Source: Federal Energy Regulatory Commission

U.S. LNG Trends

- Little coming to U.S.
  - LNG from other world markets cannot compete with low price of U.S. domestic natural gas
- Kenai export terminal license extended
  - But with provision that exports must stop when Alaska Railbelt needs gas
- Talk of shale gas allowing U.S. export
  - But must still obtain DOE permit showing U.S. does not need the gas
  - Permits to Gulf Coast terminals only allow export of LNG imports

U.S. LNG Imports 2005 – 2010



Source: California Energy Commission

LNG options for California

Source: California Energy Commission

California Existing and New Storage Projects

NORTHERN CALIFORNIA	Maximum Working Capacity Bcf
Existing	
Subtotal	180.6
Proposed	
Wild Goose	21
Sacramento	8
Central Valley	5.5
Subtotal	34.5
No Calif Total	215.1

SOUTHERN CALIFORNIA	Maximum Working Capacity Bcf
Existing	
SoCalGas	133.1
Proposed	
SoCalGas	7
Tricor Ten Section	22.4
Subtotal	29.4
So Calif Total	162.5

GRAND TOTAL EXISTING AND PROPOSED NO. AND SO. CALIFORNIA: **378**

Source: California Energy Commission

Natural Gas Infrastructure Disruption

- Extreme cold in Southwest Feb 2 – 4
  - 6 coal-fired generating units in ERCOT out overnight, inducing rolling electricity outages that affected gas processing and pipeline compressors
  - Ice plugs in gas gathering lines/some well freezes
- Gas demand surged in Texas, N.M. and AZ at same time less gas getting to system
- 100,000 gas customers curtailed in north Texas, N.M., AZ and 88 in SDG&E

Natural Gas Infrastructure Disruption (cont.)

- SDG&E bought 1400 MW of electricity to replace gas-fired generation
- Daily natural gas spot prices increased 40 to 75% in the Southwest
- Better recognize use of electricity to fire gas pipeline compressors and processing stations
- U.S. Senate Energy Committee held hearings February 21; NERC and FERC both reviewing

Summary

- Large Investments in U.S. Natural Gas Infrastructure
- Imports of LNG to the U.S. is low, option to export LNG being explored
- Storage is plentiful and proposed projects will help to dampen natural gas price spikes
- Recent events have increased awareness of the vulnerability of California gas supplies and markets to infrastructure disruptions

Questions or Comments?

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