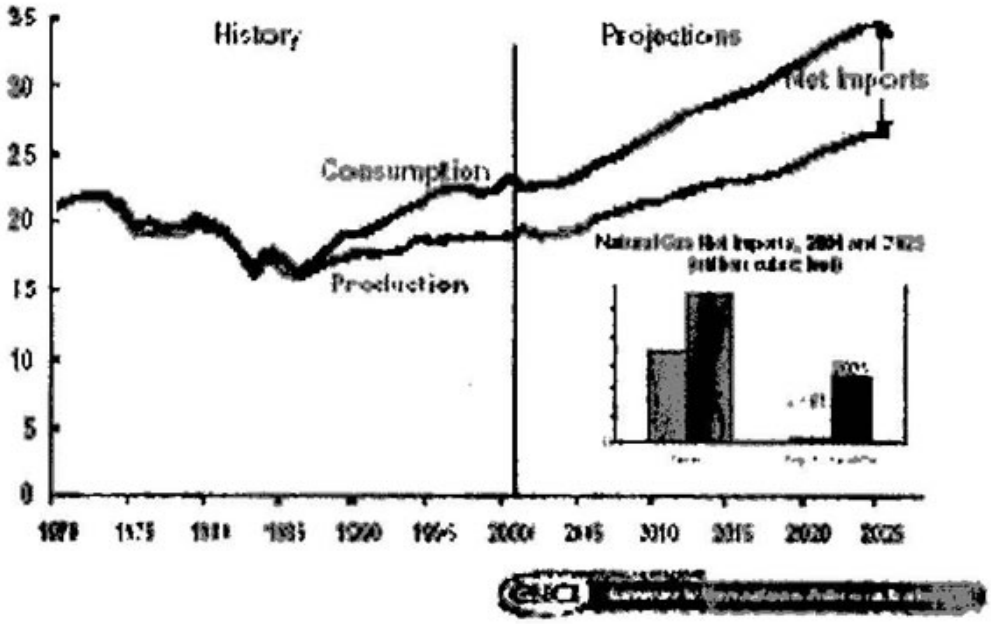
U.S. domestic natural gas production will rise considerably to meet demand growth projected at 1.8% per year by DOE - BHP Billiton concurs with DOE domestic production increase projection

1) James Kendell, DOE EIA, *Current Natural Gas and LNG Projections*, NARUC, July 29, 2003
2) BHP Billiton presentation, Southern California LNG Import Terminal Project – Cabrillo Port, June 2004 (PowerPoint)

Natural Gas Production, Consumption, and Imports, 1970 - 2025 (trillion cubic feet)



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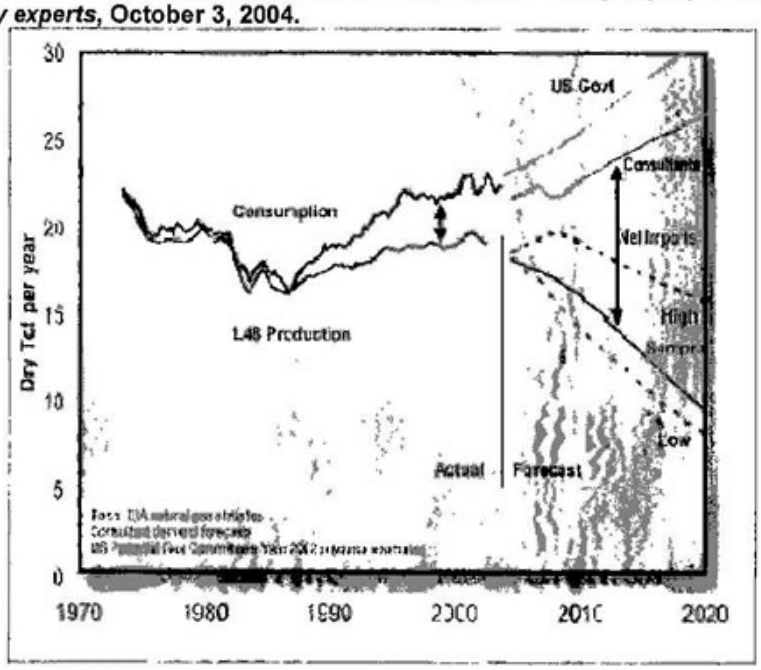
Sempra (SoCalGas/SDGE parent) "doomsday" scenario depicting crisis in domestic natural gas output – debunked in press when compared to independent industry projections

1) Greg Bartholomew, VP Gas Strategies, Sempra LNG, **CPUC/CEC natural gas 2006-2016 workshop, Dec. 10, 2003, SF.**
2) San Diego Union Tribune, *Sempra's dire forecast – company's prediction of a natural gas crisis is challenged by other energy experts*, October 3, 2004.

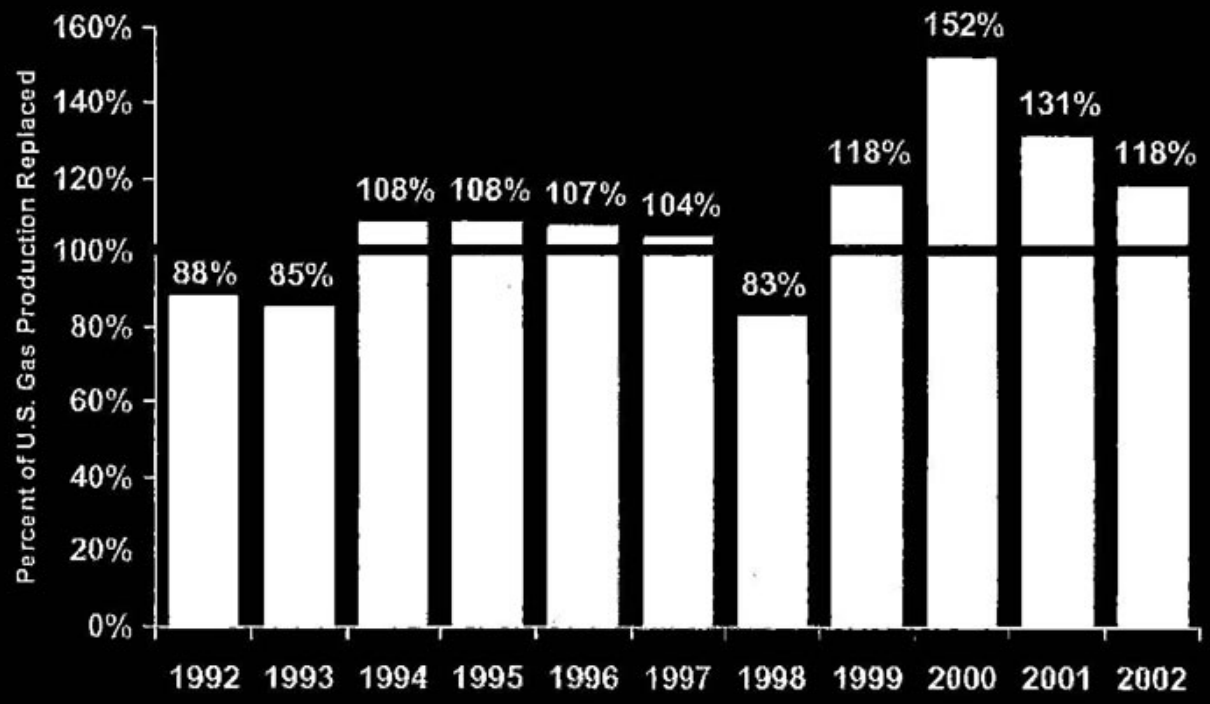


Sempra:

- **"California has little choice but to allow the development of LNG terminals"**
- **"The only decision is where and how"**

2004/G437

Reserve Additions Exceeded Production for 8 of the Last 9 Years

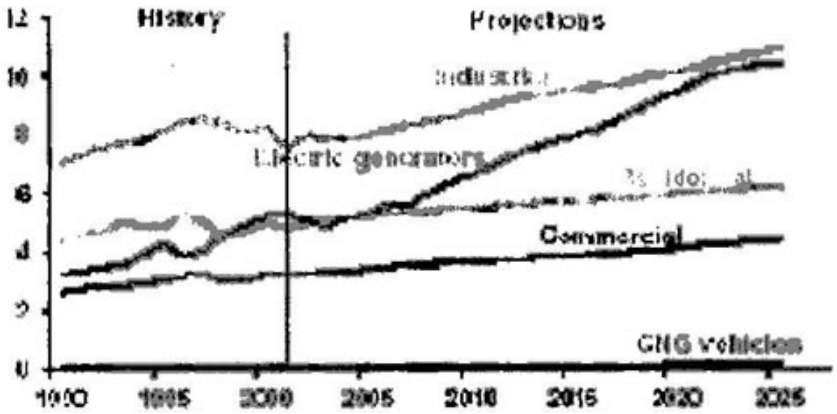


Source: Energy Information Administration, Advance Summary of U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves 2002 Annual Report

2004/G437

DOE natural gas demand increase assumes sustained increased in use of natural gas in power plants from 2008 onward – arguably a worst-case assumption

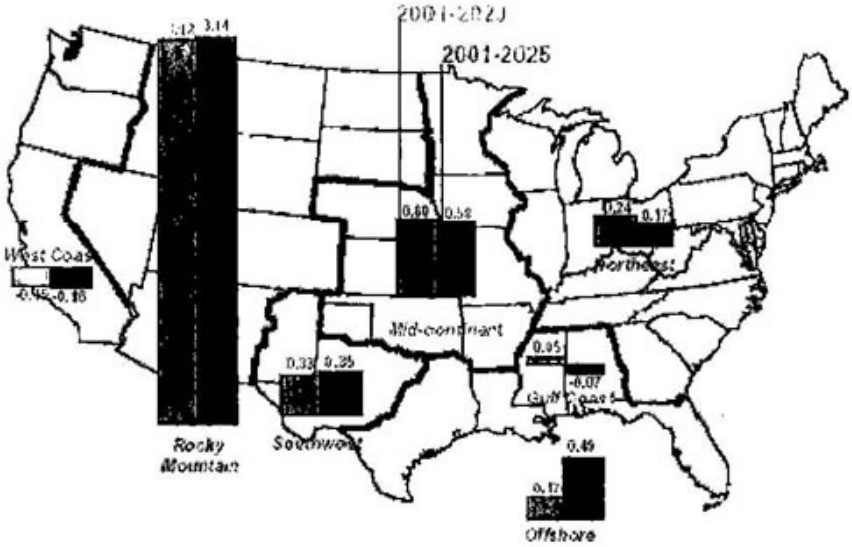
U.S. Natural Gas Consumption by Sector, 1990-2025
(trillion cubic feet)



2004/G437

Expected growth in U.S. domestic natural gas production, 2001 - 2025

Incremental Natural Gas Production by Region, 2001-2020 and 2001-2025 (trillion cubic feet)



2004/G437

Downgrading of Canadian import projection by DOE: Legitimate, political, or bit of both?

Top: July 03 DOE EIA projection; Bottom: Jan 04 projection; DOE Sec. Abraham opening comments, LNG Summit, Dec 03

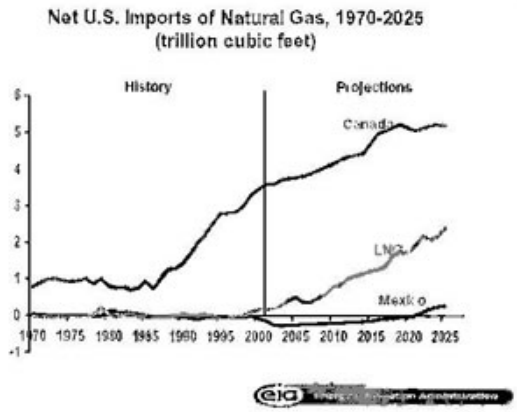
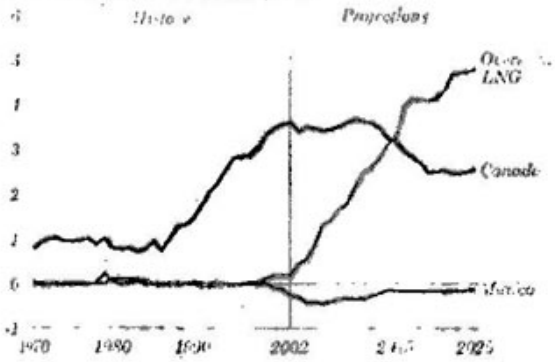


Figure 89. Net U.S. imports of natural gas, 1970-2025 (trillion cubic feet)



DOE Sec. Abraham, Dec 2003:

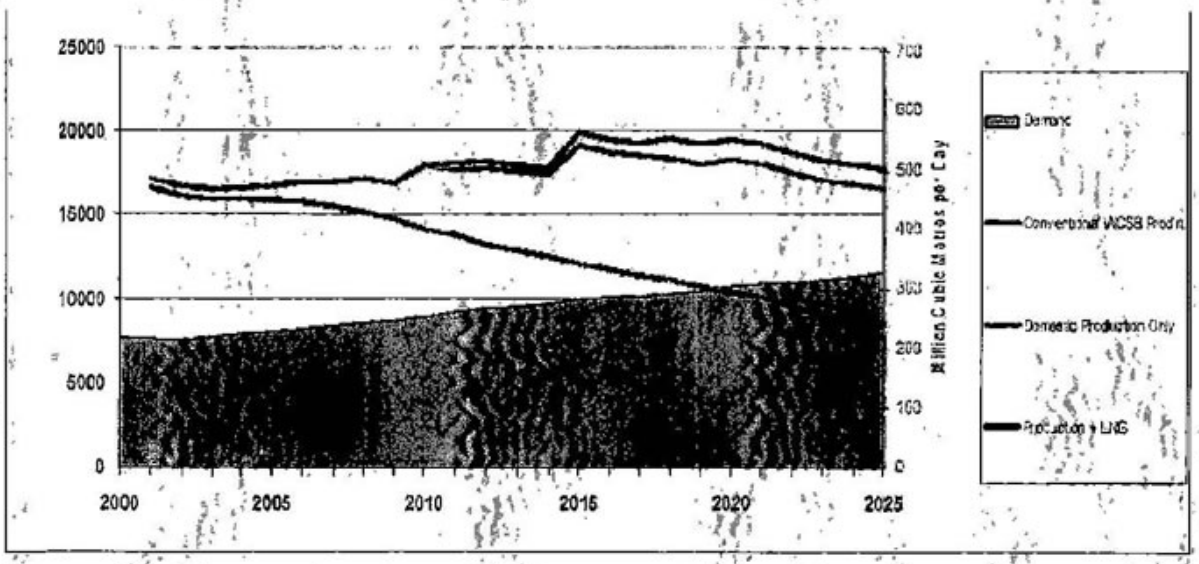
- We need the contribution of a large and growing market in imported Liquefied Natural Gas;
- We are here at this [LNG] Summit to discuss ways to make that market a reality;
- To meet our energy needs, the United States will have to become a much large importer of LNG than it is today;
- Imports could account for 15% of our natural gas supply in 2025 - that should give you some sense of how important a large and efficient global LNG market is to us.

2004/G437

What do the Canadians think? Somewhere in between the DOE '03 and '04 projections.

From: Joe Lemée - Supply Specialist, National Energy Board, *Canadian Gas Supply 1980 – 2025*, NEMS/AEO Conference, March 23, 2004. "Techno-Vert" means technology advances rapidly w/ preference for clean burning fuels.

Canadian Gas Supply vs. Domestic Demand Techno-Vert (MMcf/d)



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Will the arrival of LNG reduce the price of natural gas? No.

- What the Department of Energy says:
  - Natural gas price will drop considerably over next two years, then slowly rise to $3.50/MMBtu in 2015 timeframe, and continue to $3.95/MMBtu (wellhead price adjusted to 2001) by 2025;
  - Cost to get LNG to California is well over $4/MMBtu;
  - Cost to get LNG to Baja California is $3.40/MMBtu;
  - DOE projection assumes no LNG on West Coast until 2020.
- What some LNG developers say:
  - Natural gas price is high and will go much higher without LNG to stabilize regional market
- No consensus among government and industry analysts whether LNG will have any impact on price – core problem appears to non-competitive natural gas trading practices leading to tremendous price volatility and high prices despite adequate domestic natural gas supply.

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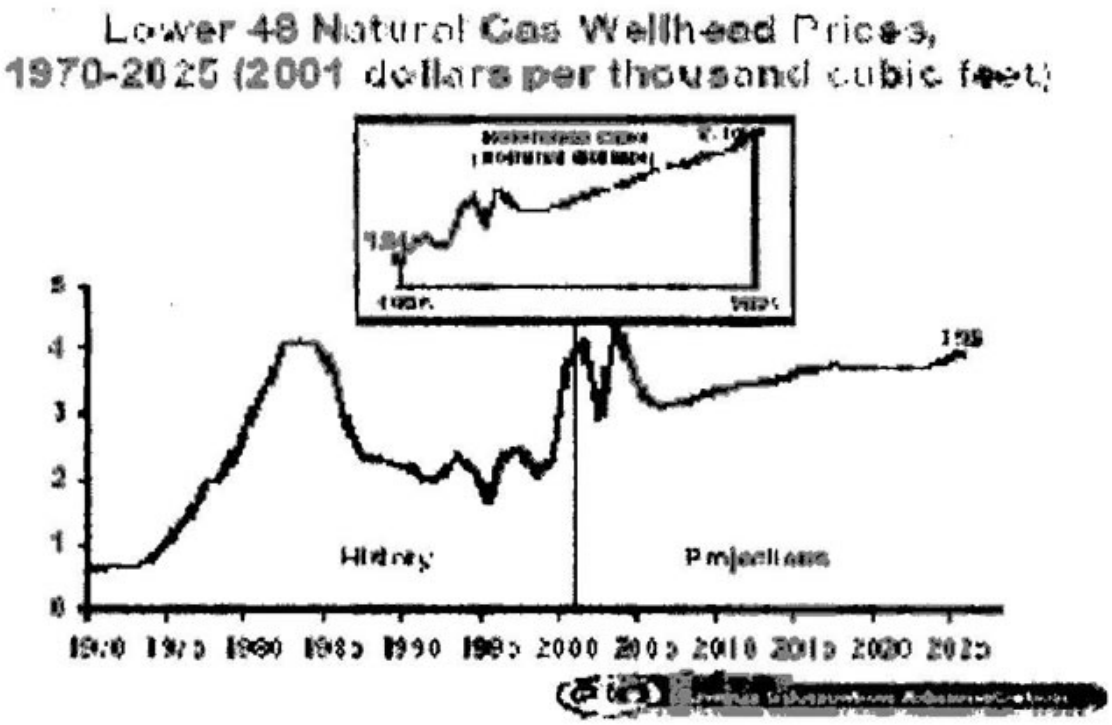
July 2003 DOE projection: Current high natural gas prices seen as spike, dropping to ~ $3/MMBtu wellhead price by 2006

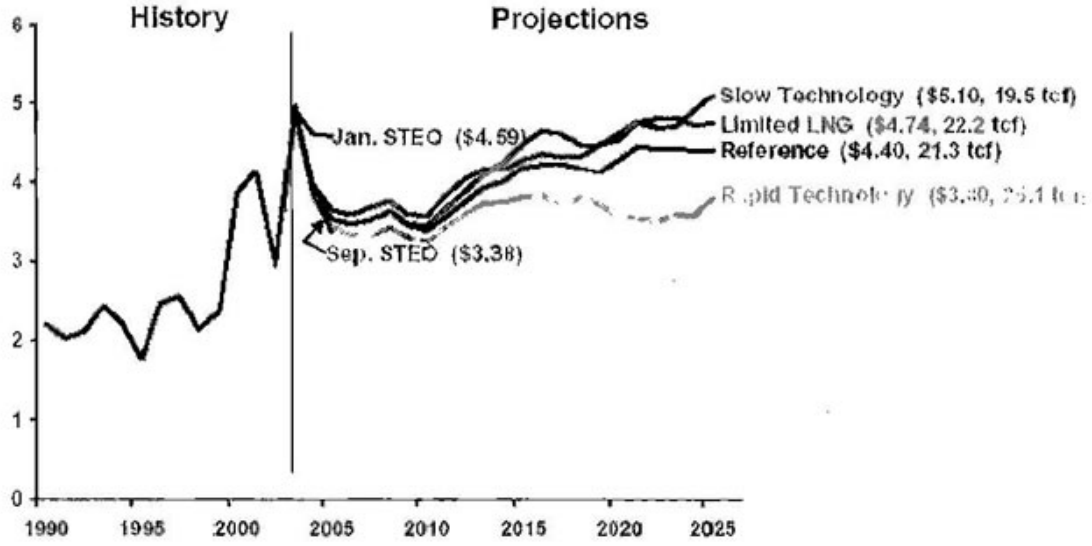


2004/G437

March 2004 DOE projection: Natural gas price beyond 2013 influenced by pace of technology

From: Dana Van Wagoner, DOE EIA, *Domestic Natural Gas Supply: A Large Resource Base Does Not Guarantee Low Long-Term Prices*, NEMS/AEO Conference, March 23, 2004

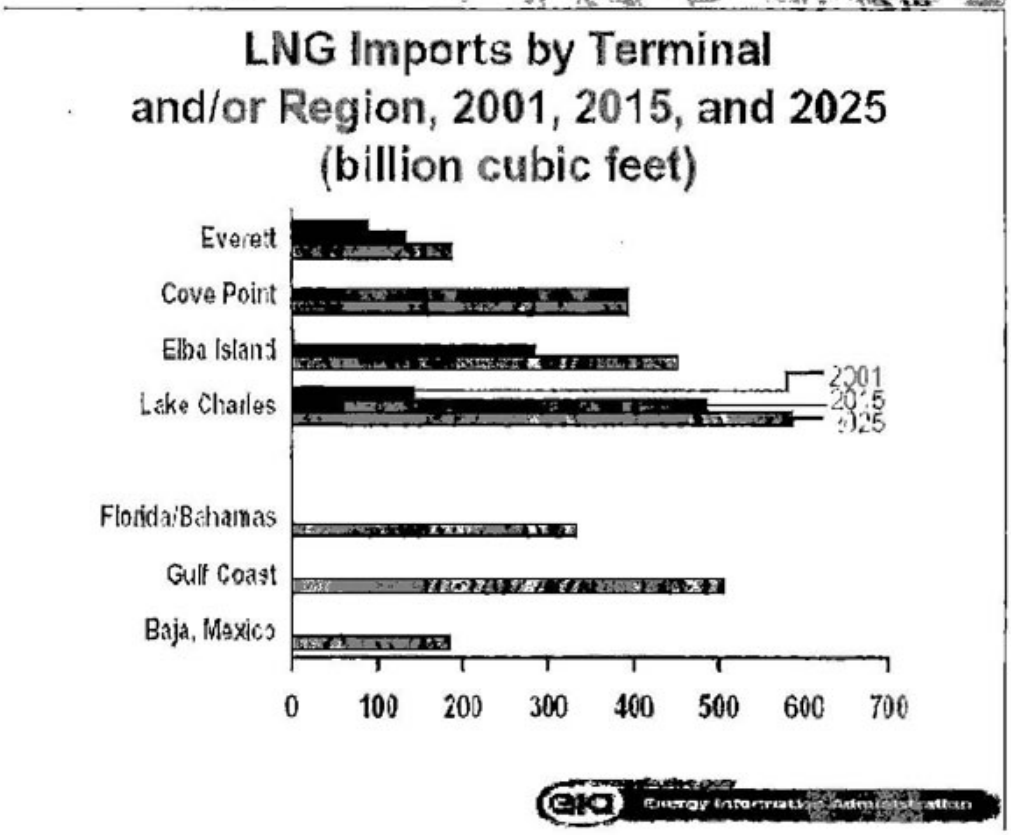
Natural Gas Wellhead Prices
(2002 dollars per thousand cubic feet)



Values in parenthesis = (average lower 48 wellhead price, lower 48 production)

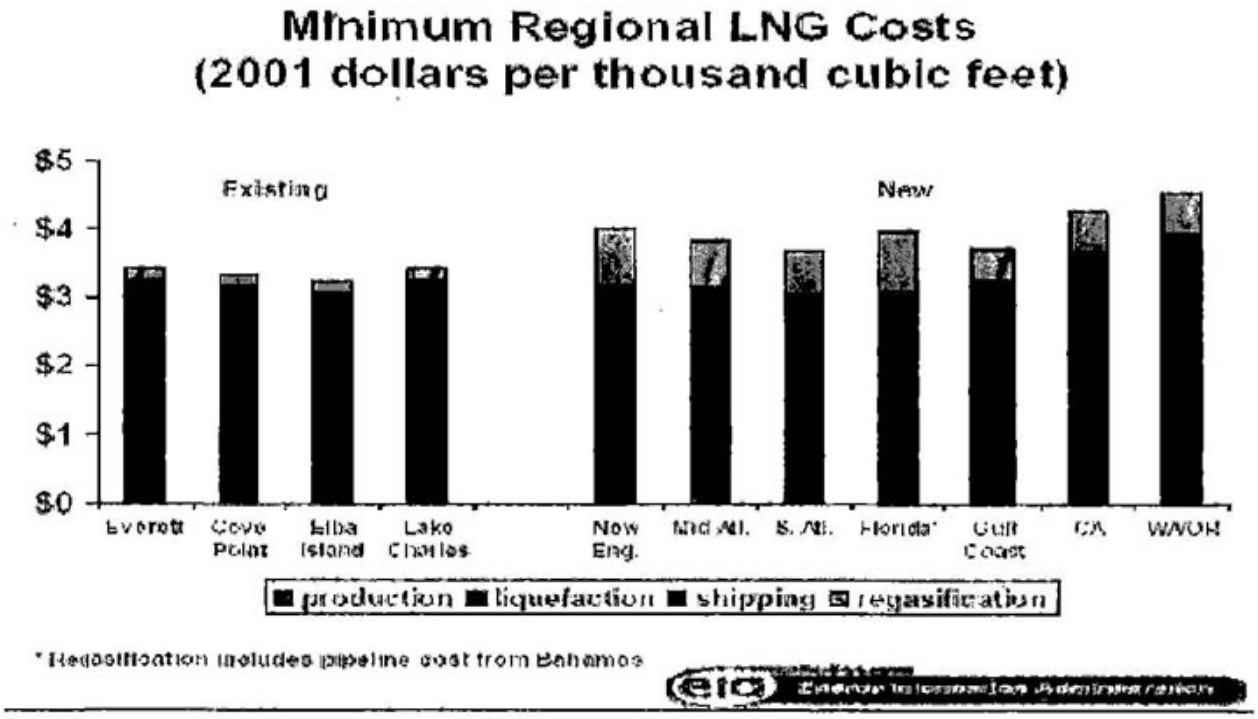
2004/G437

DOE projects one LNG terminal on West Coast, in Baja California around 2020, in business-as-usual gas usage scenario



2004/G437

Reason for no West Coast LNG is high cost relative to domestic gas, only Baja LNG becomes competitive around 2015-2020



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Effect on California Natural Gas Demand

September 2, 2004 CPUC Decision on Long-Term Natural Gas Procurement

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September 2, 2004 CPUC long-term natural gas procurement decision

- Authorizes Southern California Gas Company to terminate 1,400 mmcfd of firm natural gas capacity rights, the equivalent throughput of two LNG terminals, on domestic pipelines serving California operated by Transwestern and El Paso;
- March 2004 comments to CPUC by Transwestern and El Paso to this plan to terminate domestic natural gas firm (contractually guaranteed) natural gas supply capacity;
  - El Paso: *"If utilities decline to hold EPNG capacity now, it may be unavailable to California in the future. Given the Commission's overarching goal of promising price stability and supply diversity/security, the Commission should consider requiring the utilities to continue to hold this capacity as a prudent hedge against an uncertain future."*
  - Transwestern: *"Important that utilities not sacrifice long-term supply reliability in the pursuit of supply diversity."*

2004/G437

SoCalGas voluntary termination of existing domestic gas contracts creates artificial need for new gas capacity in form of LNG

- The CPUC has authorized a course of action that will require SoCalGas to acquire new capacity rights to the equivalent of two LNG terminals; This CPUC action is clearly directed at creating a need for gas capacity where none previously existed to provide access to LNG supplies, as future access to domestic gas capacity via Transwestern and El Paso may be lost due to termination of existing capacity contracts.
- California state government approves and supports the CPUC action to artificially create a demand for LNG - California Resource Agency Asst. Secretary for Energy, Joe Desmond, stated just prior to the CPUC Sept. 2, 2004 decision that California has the need for two LNG terminals[a];
- Kinder Morgan Pipeline Company called for the CPUC to hold evidentiary hearings on LNG in August 2004, given the decision (ultimately adopted without such hearings) is unfavorable to Kinder Morgan's proposal to build a 750 mmcfd pipeline (Silver Canyon Pipeline) from the Rockies to California.
- Two rehearing applications have been filed over the September 2 decision. These rehearing petitions will be heard in January 2005; If the rehearing application(s)s are denied, a lawsuit is the likely next step.

a) Japan Times, *LNG Can Lighten California's Energy Load*, August 7, 2004.

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Non-competitive natural gas trading is issue, not shortage of domestic supply

- The wellhead price for U.S. natural gas in 1998 averaged $2/MMBtu[a];
- The wellhead price in 2002 was under $3/MMBtu[a];
- U.S. gas consumption has remained essentially static in the 1998-2004 timeframe (Slide 8);
- In 2004 production is strong relative to consumption and gas storage is at historic high;
- The marginal cost of production for domestic natural gas is well under $3/MMBtu;
- DOE estimates the cost to import LNG to California at over $4/MMBtu (Slide 19);
- LNG supplies will not put downward pressure on natural gas prices in a competitive market;
- Current high natural gas prices appear to be the result of a "badly broken" natural gas trading system[b];
- Substituting higher cost LNG supplies for domestic gas in a non-competitive natural gas market will have no modulating impact on high natual gas prices.

a) DOE EIA U.S. Natural Gas Wellhead Prices ($/Mcf), 1973-2004.
b) Odessa American, *Petrochemical manufacturer Huntsman renews call for natural gas- price probe*, October 28, 2004.

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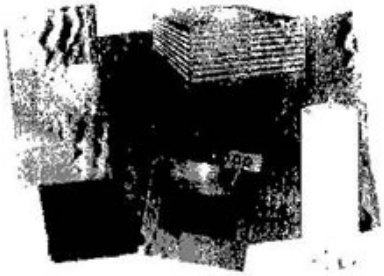
Accelerated Energy Efficiency and Renewables Alternative to LNG Imports on West Coast

2004/G437

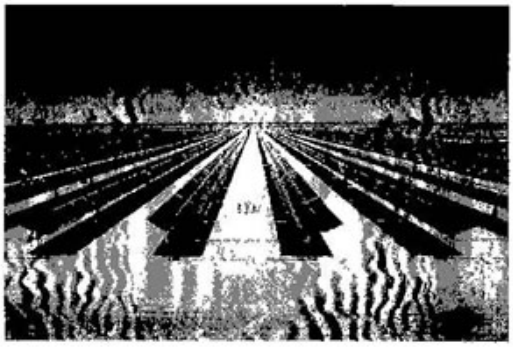
Aggressive efficiency/renewables is cost-effective alternative to LNG

- Gas demand is static, no growth in 2002-2016,
- Demand and price can be decreased considerably by aggresively implementing energy conservation renewable energy,
- Potential to reduce natural demand by the equivalent of at least 2 LNG terminals,
- Best environmental, fuel price, and public policy.



Energy

Money Isn't All You're Saving



2004/G437

California and natural gas needs – Increase supply or decrease demand?

Gas Demand, Projected Demand Increase, Gas Options	Gas Quantity, mmcfd (million cubic feet per day)
Average daily natural gas use in California, 2003	6,000
Projected increase in gas demand by 2016 over 2002 baseline	~0[a]
Average projected daily natural gas delivery from one LNG terminal	700-800
Reduction in California gas demand from conservation measures and renewable energy supplies identified as cost-effective priorities by state	1,500+[b]

Note (a): From presentations by CEC, PGE, SoCalGas/SDGE at CEC/CPUC Natural Gas Workshop, Dec. 9-10, 2003. 2006-2016 demand increase in SoCalGas/SDGE territory: 0 mmcfd; in PGE territory: 0-200 mmcfd; CEC statewide: ~0 mmcfd.

Note (b): Derived from Synapse Energy Economics evaluation submitted in March 23, 2004 RACE coalition comments in CPUC Utility Long-Term Natural Gas Procurement Proceeding, Rulemaking 04-01-25 30,000 Gwh of electric power saved through improved energy efficiency; 30,000 Gwh saved through accelerating renewables from 20% to 30% in 2017. 30,000 Gwh ~ equal to gas throughput of one LNG terminal. Assume 8,000 Btu/kwh mean heat rate for electricity production. Additional savings possible through accelerated retirement of coastal utility boiler plants and community choice commitments to 40% RPS by 2017.

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What is the cost of energy options for California?

Energy Options[a] and 2004 Residential Power Rates	$/kwh[b]
Natural gas combined-cycle power plant (baseload)	0.05
Natural gas simple cycle power plant (peaking)	0.16
Wind	0.05
Solar thermal (parabolic trough)	0.14 – 0.17
Geothermal (flash)	0.05
Energy conservation measures[c]	0.03 – 0.06
San Diego Gas & Electric 2004 residential charge	0.15[d]
CFE, North Baja California 2004 residential charge	0.22[e]

Note (a): California Energy Commission, *Comparative Cost of California Central station Electricity Generation Technologies*, August 2003, pg. 3 and 11.
Note (b): "levelized direct cost" – assumes life-of-project natural gas cost in $5/MMBtu to $6/MMBtu range.
Note (c): California Consumer Power and Conservation Financing Authority, "*Clean Growth: Clean Energy for California's Economic Future – Energy Resource Investment Plan*," February 2002, Table 6-2, pg. 54.
Note (d): Includes only metered kwh usage charge and "electric energy charge," April 2004.
Note (e): Includes only December 2003 published CFE summer usage charge based on 1,000 kwh/month.

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