

LNG Development in the US and North America: January 2008 Update

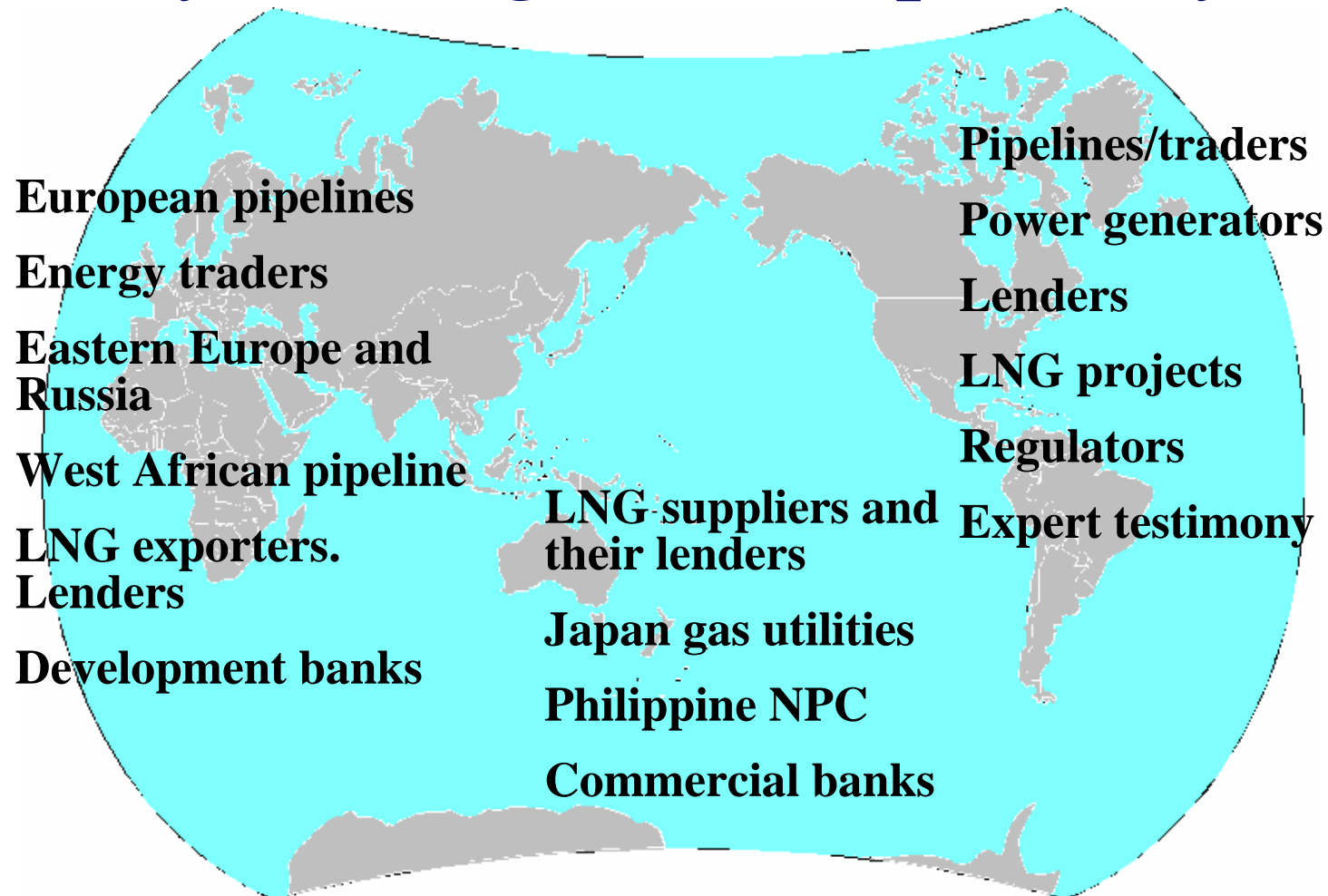
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**UNECE Working Party on Gas
Geneva - January 22, 2008**

Agenda

- ◆ Domestic gas supply
- ◆ Rising electric power demand
- ◆ Emerging carbon and GHG emission limitations
- ◆ LNG demand, trading, contracting
- ◆ Conclusions

BSA's energy and economic analysis assignments span 24 years.

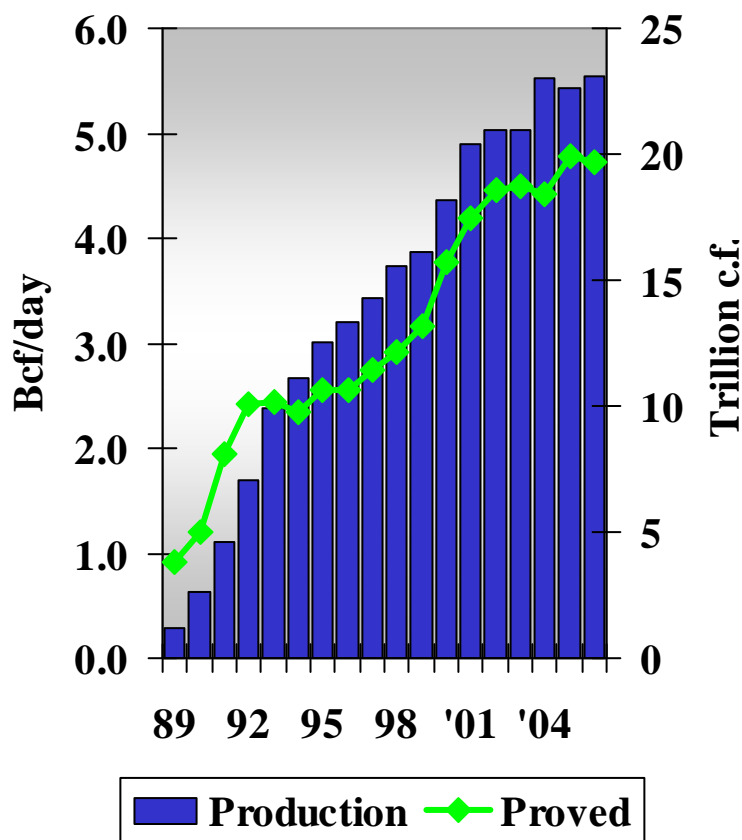


Snapshot of the North American gas market.

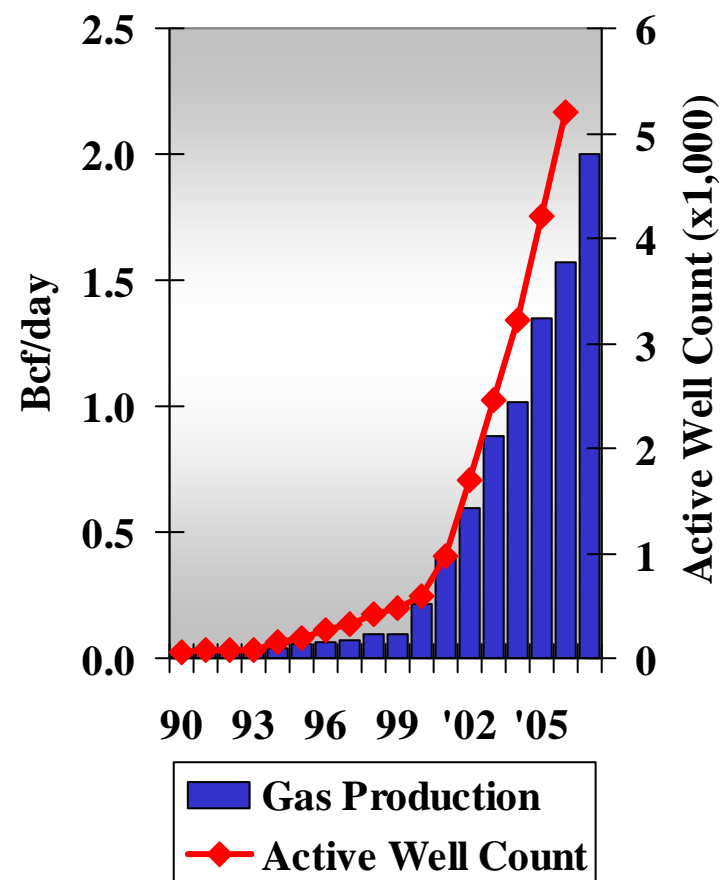
- ◆ US and Canada, respectively, produced 525 Mcm and 186 Mcm – US highlights for 2006:
 - US production supplied 81% of gas demand.
 - Remaining 19% mostly imported from Canada.
 - Proved reserves rose to 6.0 Tcm, continuing up-trend.
 - LNG supplied 3.4% of US market (2007); six new receivingimport terminals are presently under construction.
- ◆ Electricity generation is fastest growing US gas market, 288 new gas-powered plants since 1992.
- ◆ Practically uniform gas quality specifications throughout North America, e.g., 950-1050 Btu/cf.

Unconventional gas is driving the growth in US proved reserves.

Coal-Bed Methane

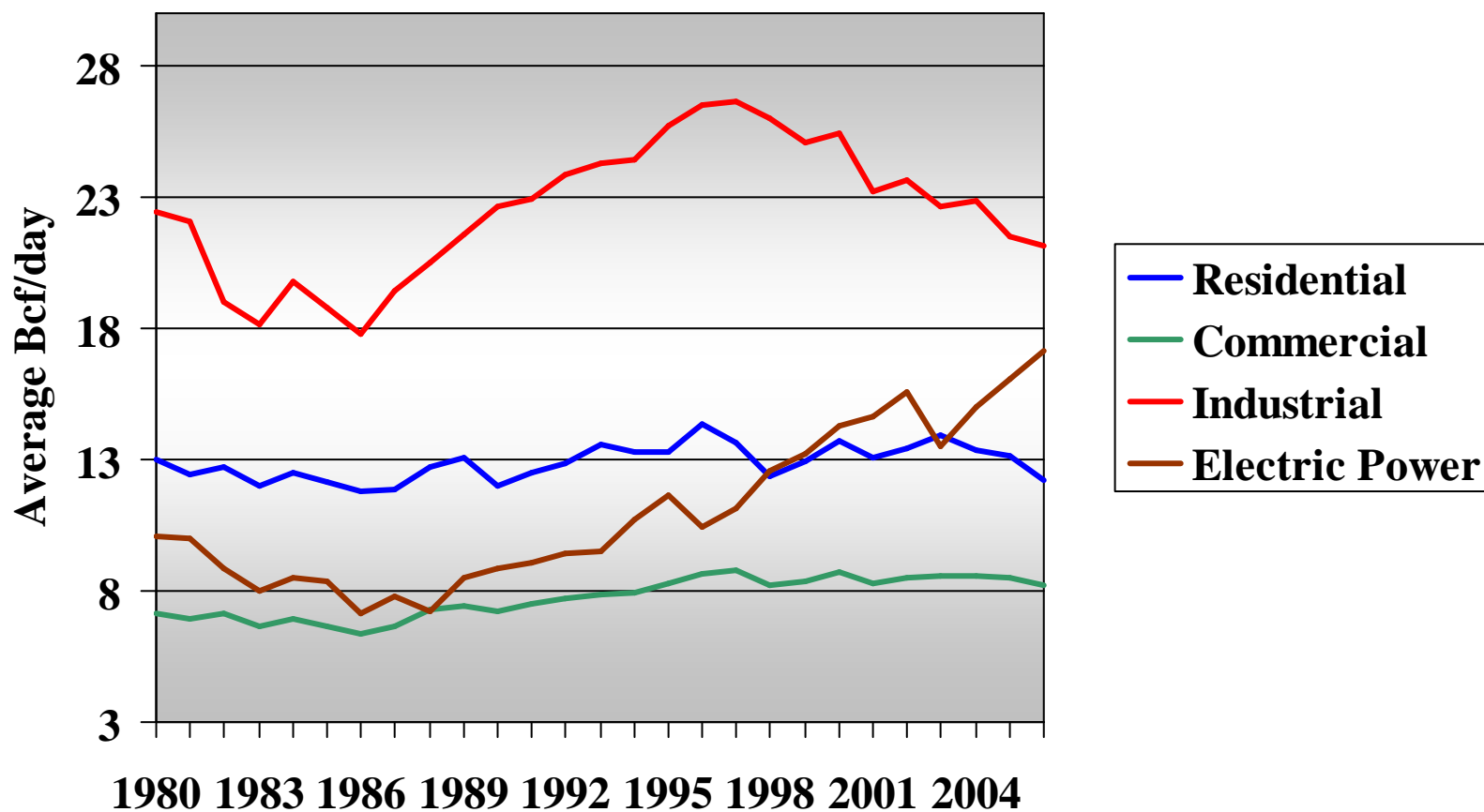


Barnett Shale



Source: BSA 2007, from EIA, IHS, Texas RRC.

Electricity generation will soon be the largest US gas demand sector.



Source: BSA 2007, from EIA.

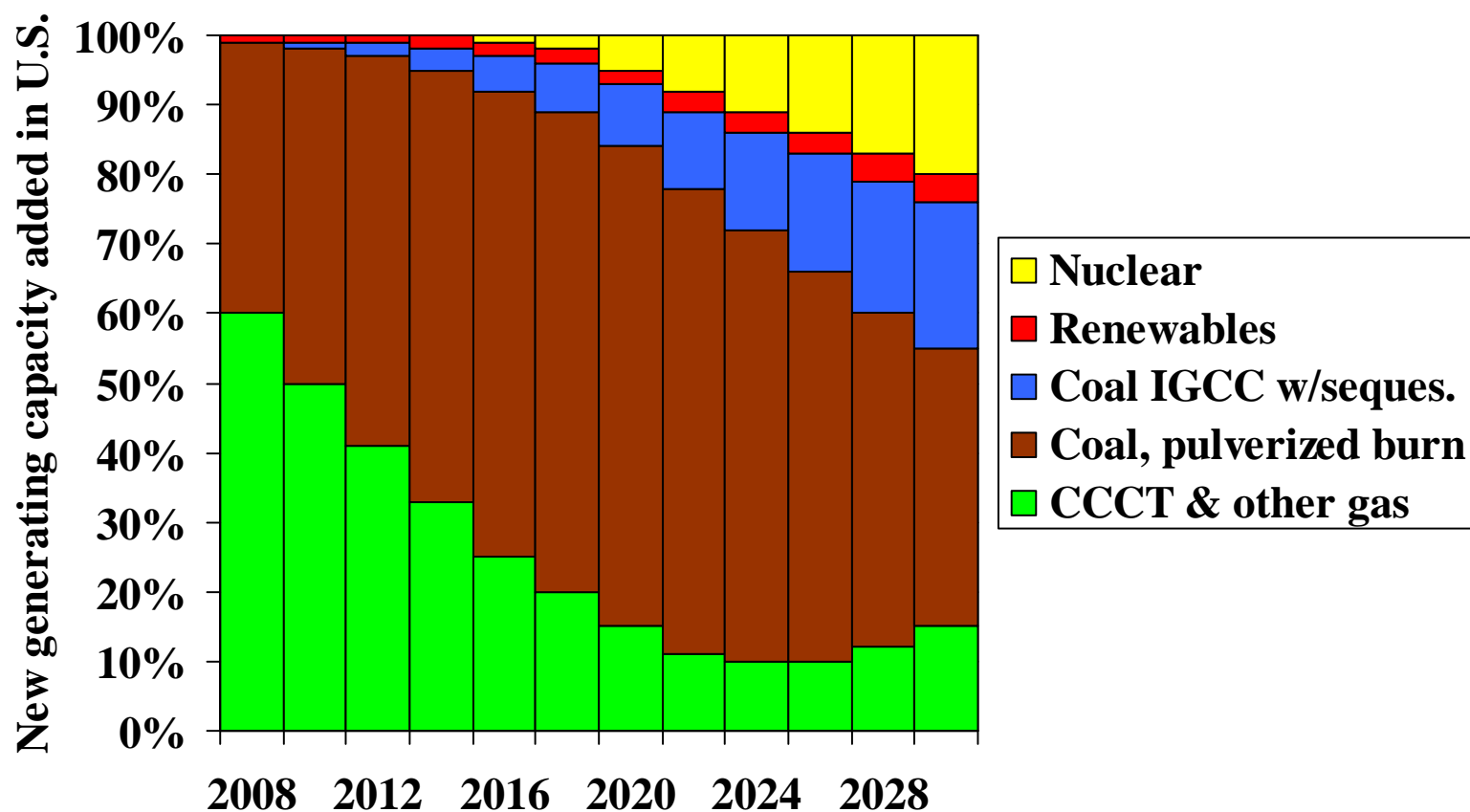
Few new coal-burning power plants will be built in North America.

- ◆ Investors and states have begun preparing for major limitations on emissions of CO₂ and other greenhouse gases (GHG).
- ◆ Most proposed new coal-fired electric power plants in the US have been cancelled, e.g., TXU's 9.1 GW of planned projects in Texas.
- ◆ Natural gas will fill most of the immediate gap, raising demand significantly.



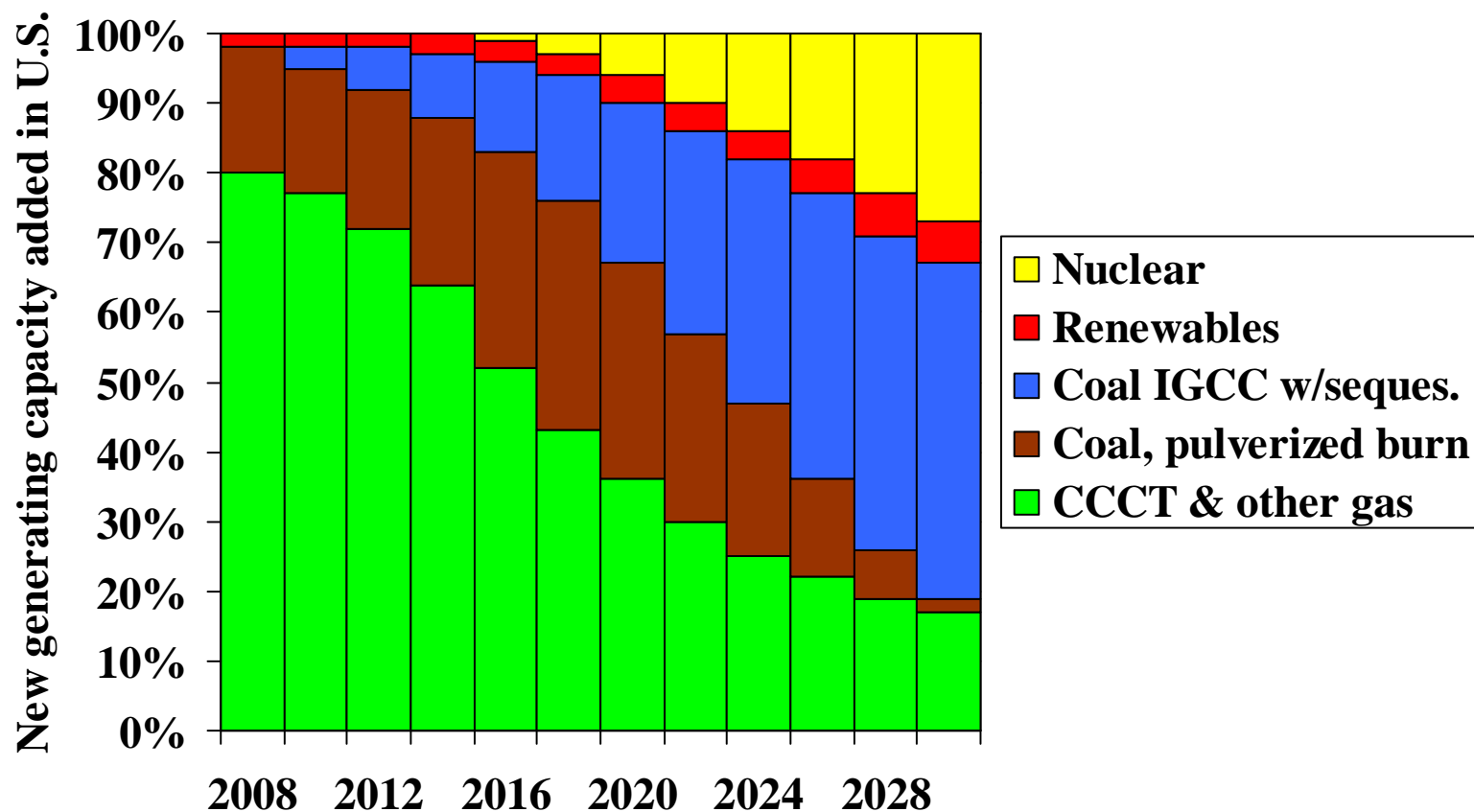
**New Conventional Coal
Plants are “Over the Cliff.”**

Without GHG controls, 56% of new power plants will be coal-fired.



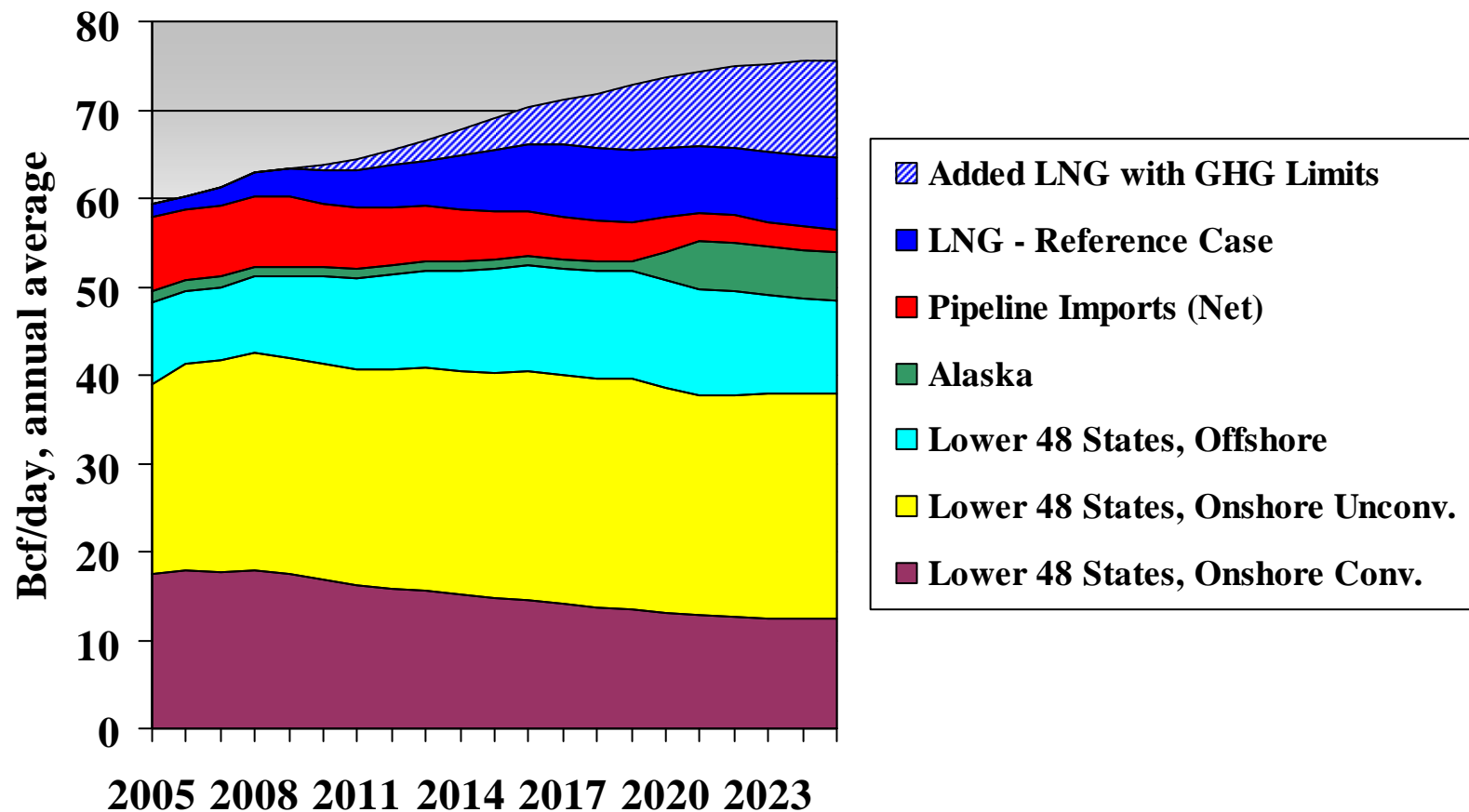
Source: BSA 2007, independent estimates.

Strict GHG controls would reduce coal-fired plant additions to 21%.



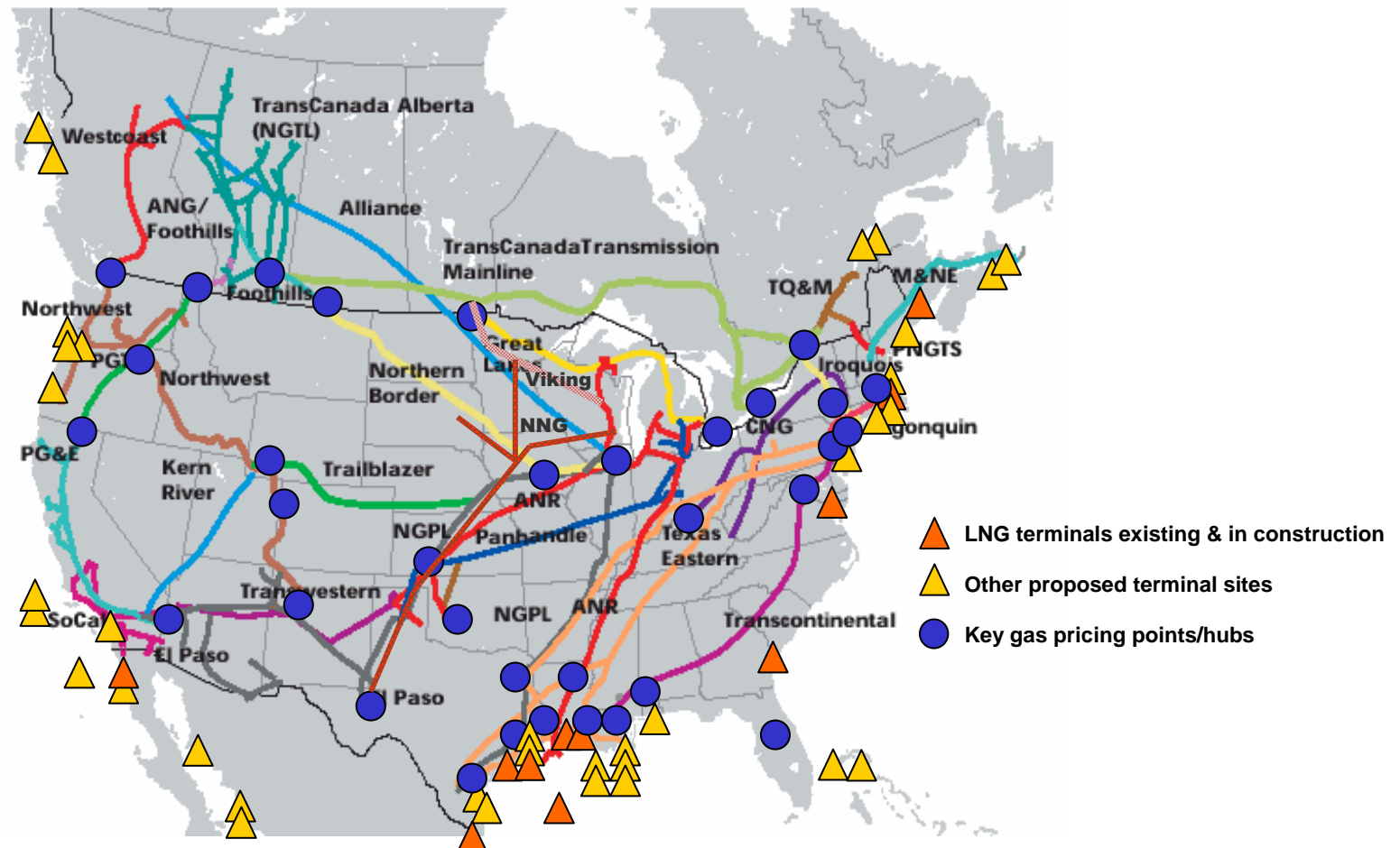
Source: BSA 2007, independent estimates.

Added GHG gas demand in the US will come mostly from LNG.



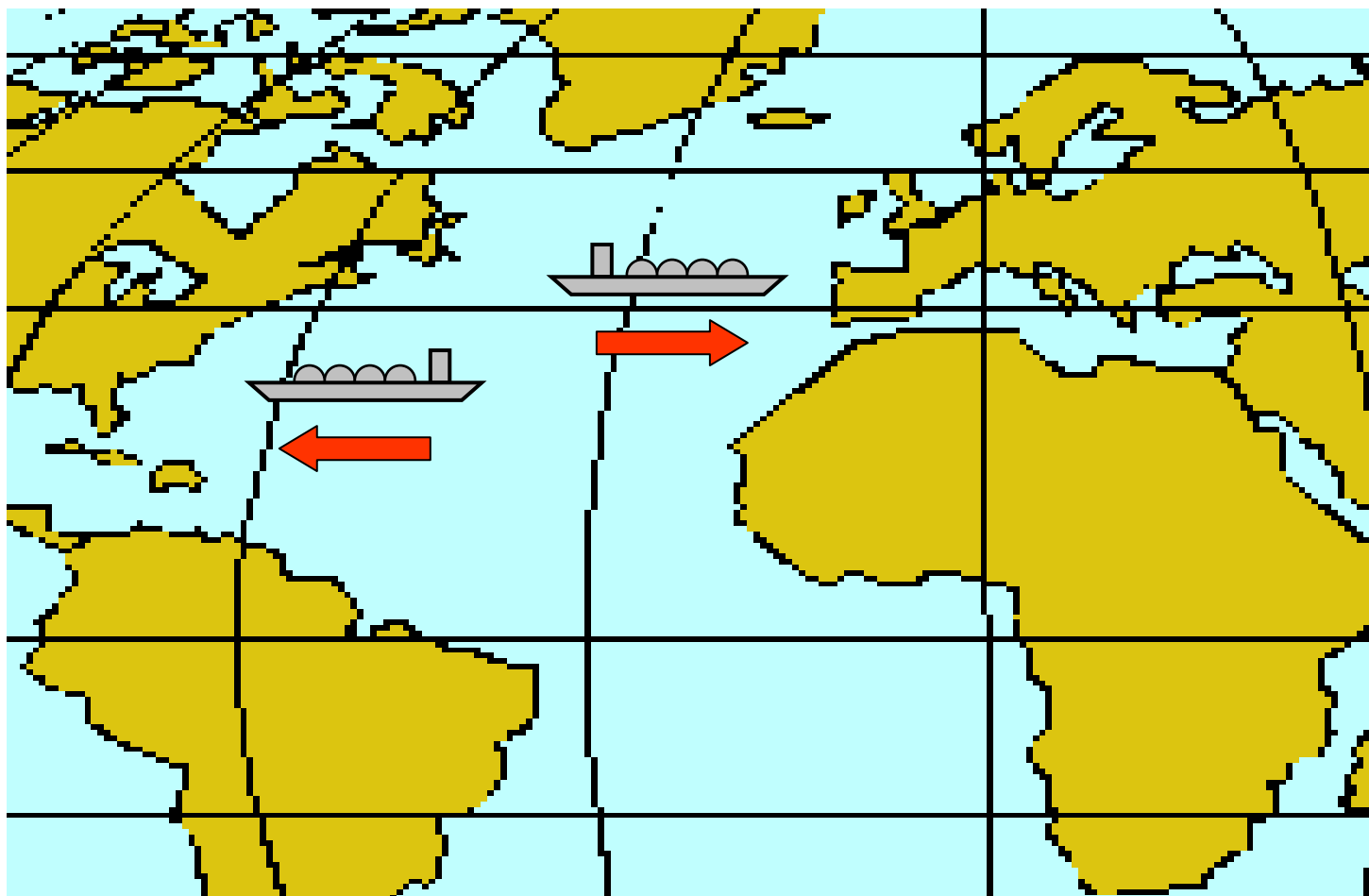
Source: BSA 2008, from AEO2008, BSA estimates of added gas demand.

North American LNG import capacity will triple by 2010, to 18 Bcf/d.



Source: BSA 2008, from industry estimates, base-map from Intelligence Press.

LNG diversions will drive out price arbitrage in the Atlantic Basin.



Source: BSA 2005.

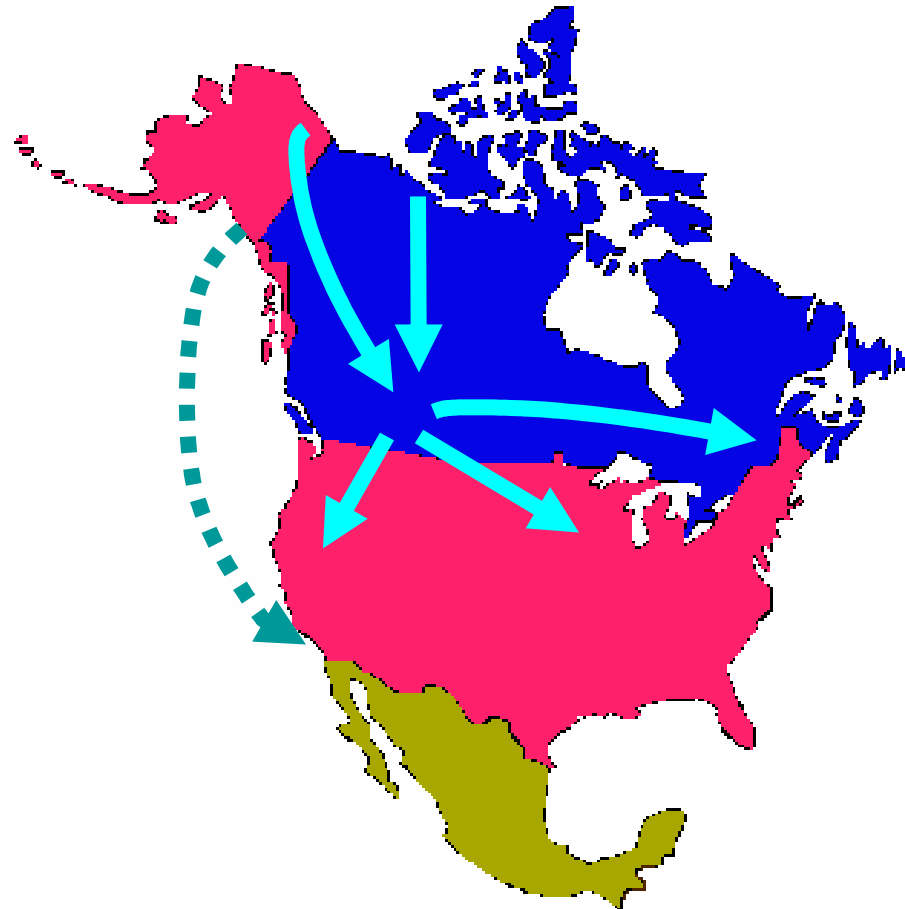
BSA price analysis makes use of the World Gas Trade Model (WGTM).



Source: Altos Management Partners, 2005.

Arctic gas: Rising demand will enable supplies to enter markets.

- ◆ Arctic gas pipelines will enter service in the next decade.
- ◆ Alberta's importance as a hub will grow.
- ◆ Arctic gas won't have a major effect on reducing LNG import volumes.



NGVs are encountering competitors in North America.



- ◆ Current growth in:
 - Gasoline-electric hybrids
 - Ethanol vehicles
 - Biodiesel usage
- ◆ ...is supplanting much of the enthusiasm for CNG vehicles, despite NGVs' total lack of petroleum demand.

Conclusions

- ◆ Recent high North American gas prices have:
 - Stabilized continental gas production and increased reserves.
 - Reduced demand in buildings and industries
 - Not prevented rising gas demand for electricity generation.
- ◆ The US will enact GHG emission limits in 2008-09; many CO₂ sequestration sites are available in aging oil wells.
- ◆ North American reliance on LNG will rise to 15-20% within a decade – mostly into Gulf of Mexico ports.
- ◆ LNG will bring international gas market pressures to North America, reinforcing the oil price correlation and changing internal basis relationships.
- ◆ The Alaskan gas pipeline will ease prices in the late 2010s



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