Recent Developments in China and India

And Their Influence on Global Natural Gas Markets

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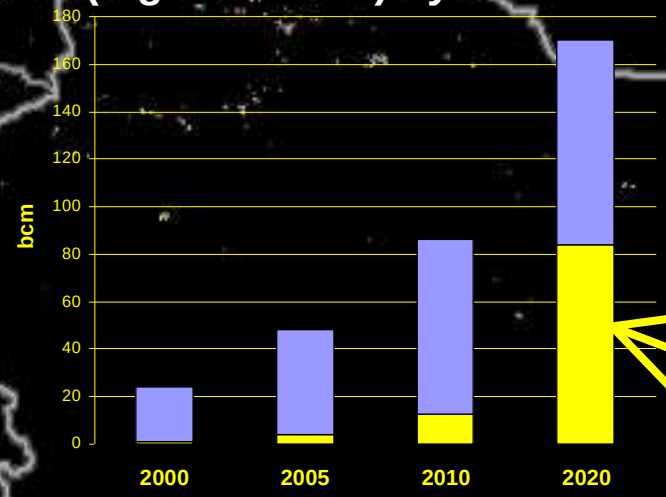
http://pesd.stanford.edu/

MARKAL model focuses on three major demand centers in China

50% of 170 bcm total gas demand (high estimate) by 2020



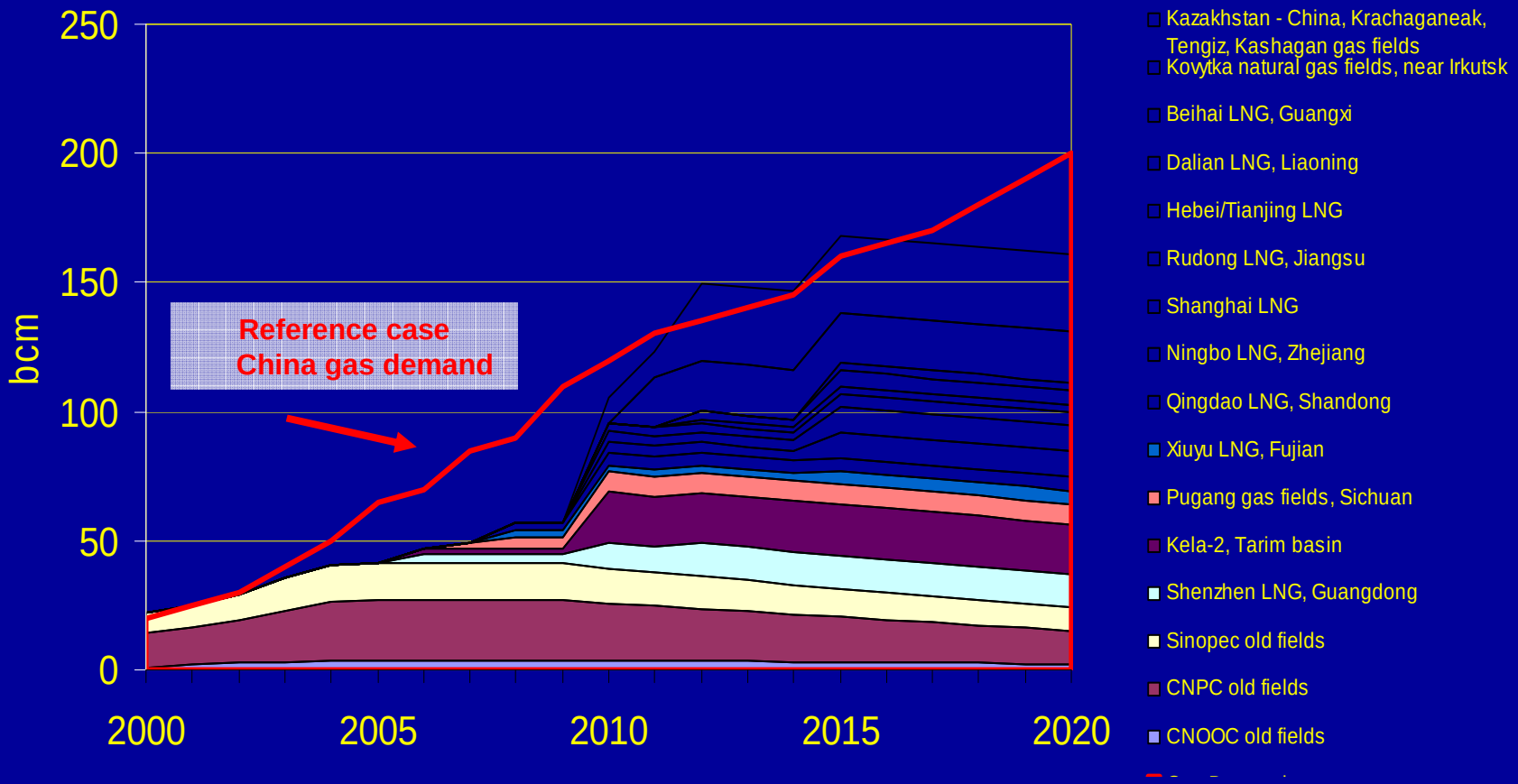
Beijing

Shanghai

Guangdong

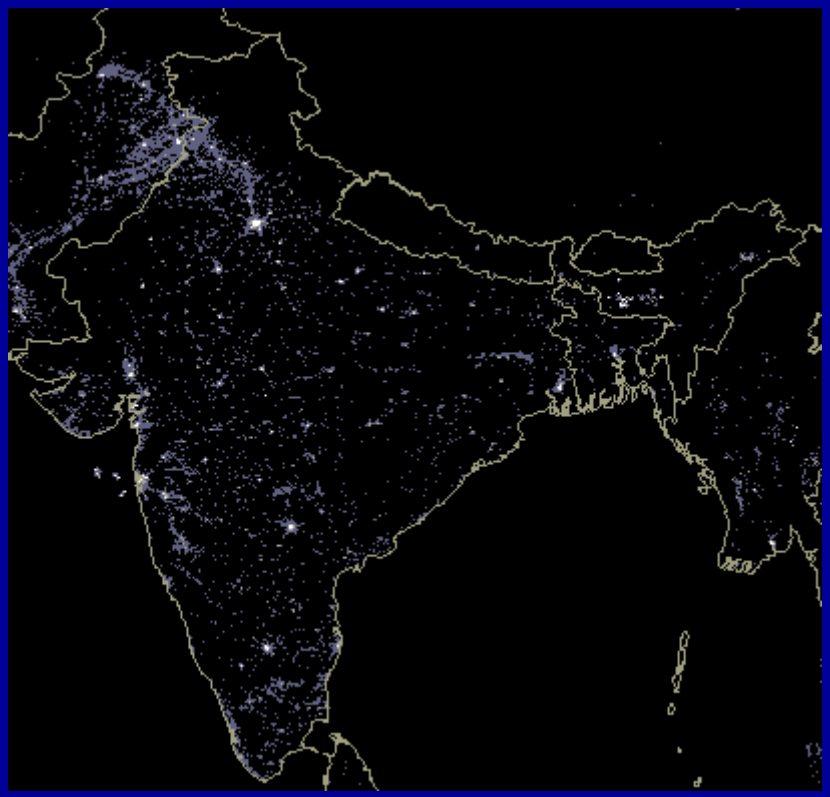
Source: ERI projections natural gas demand

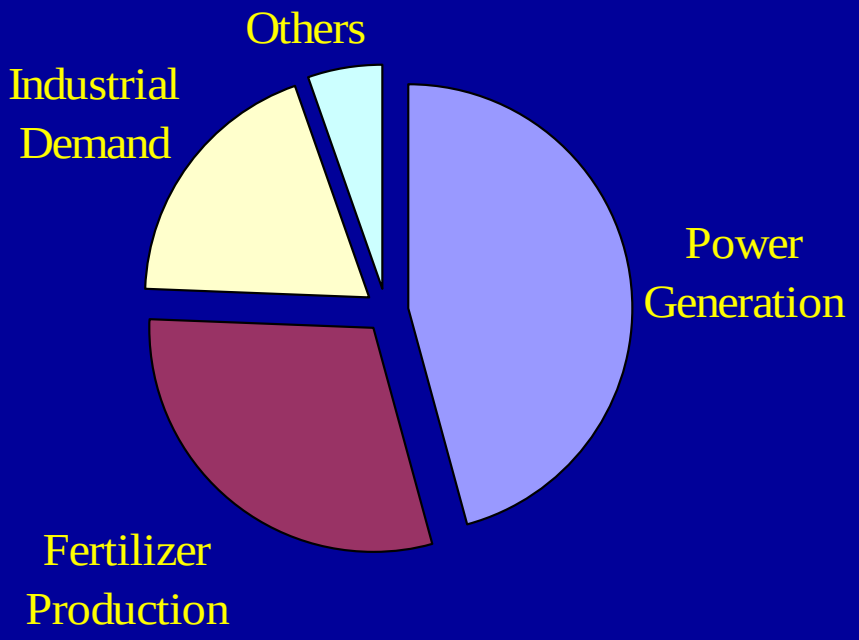
Natural gas sourcing could be a challenge



Source: Author's estimates based on company statements

Study Design: Consumers rather than Regions

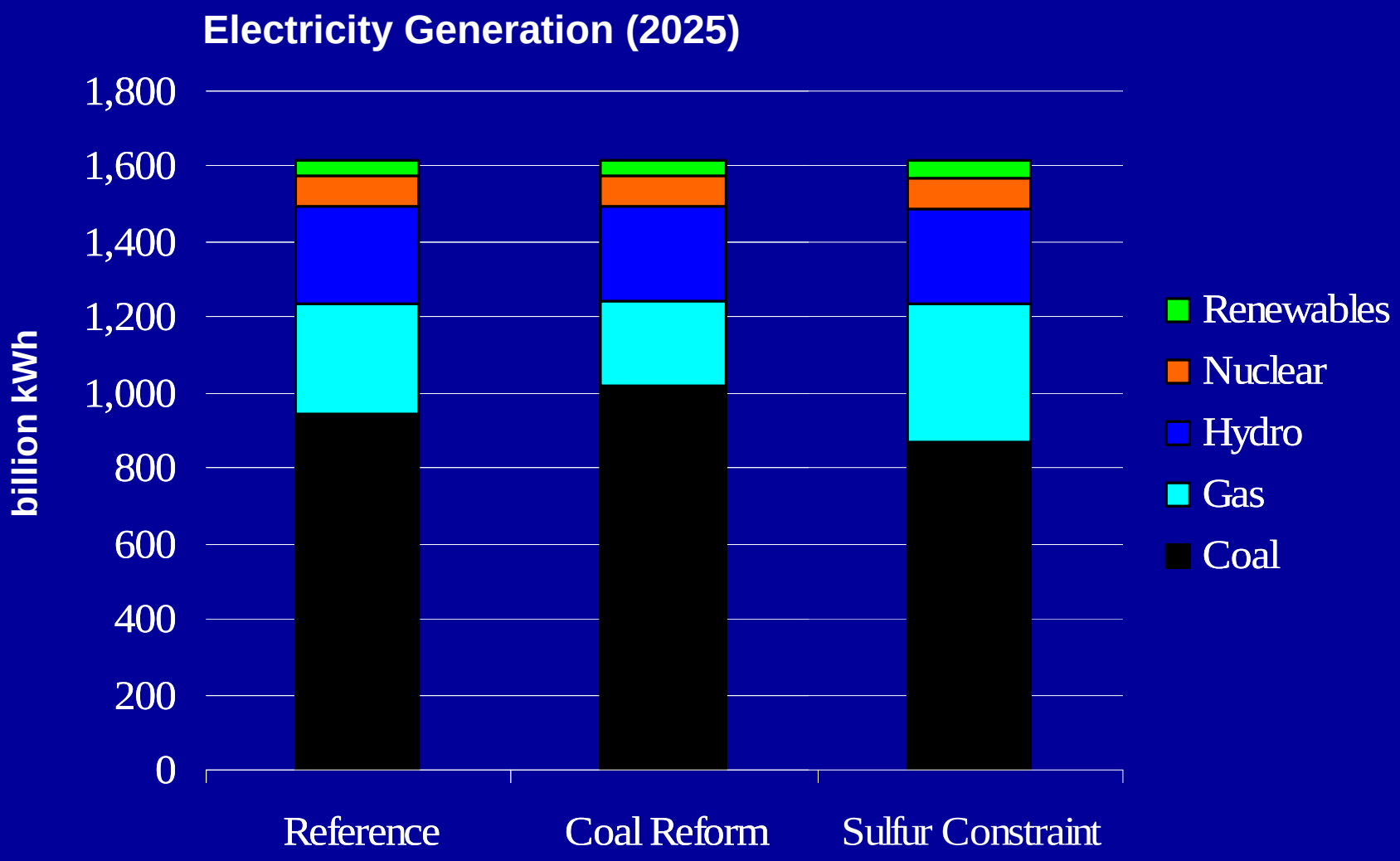




Indian Gas Market:	**30 bcm**
Californian Gas Market:	**60 bcm**

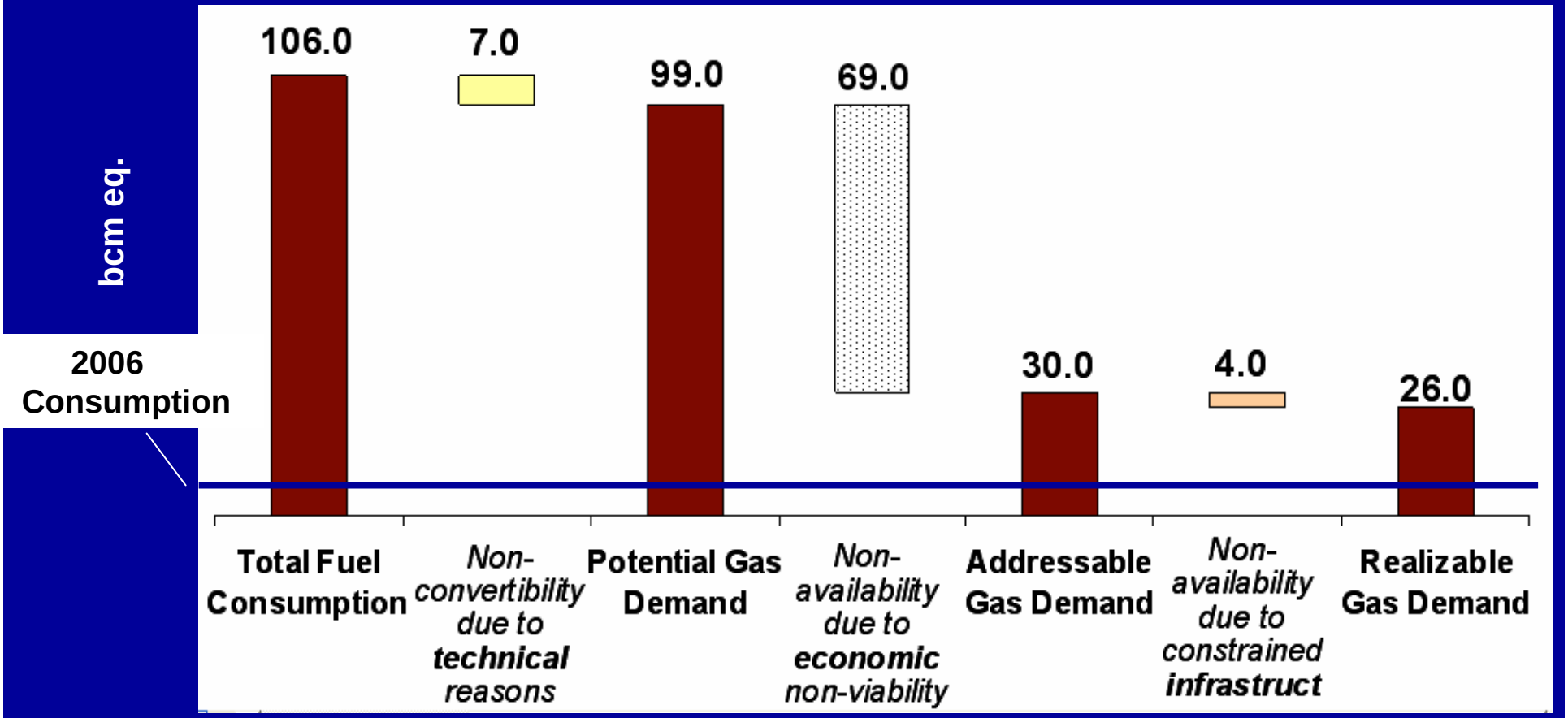
Source: Ministry of Petroleum and Natural Gas (2006), "Petroleum Statistics."

Sulfur Constraints – Shift to Gas and Advanced Coal



Potential for gas switching in industry

Analysis of Potential Gas Demand From Industry (2025)

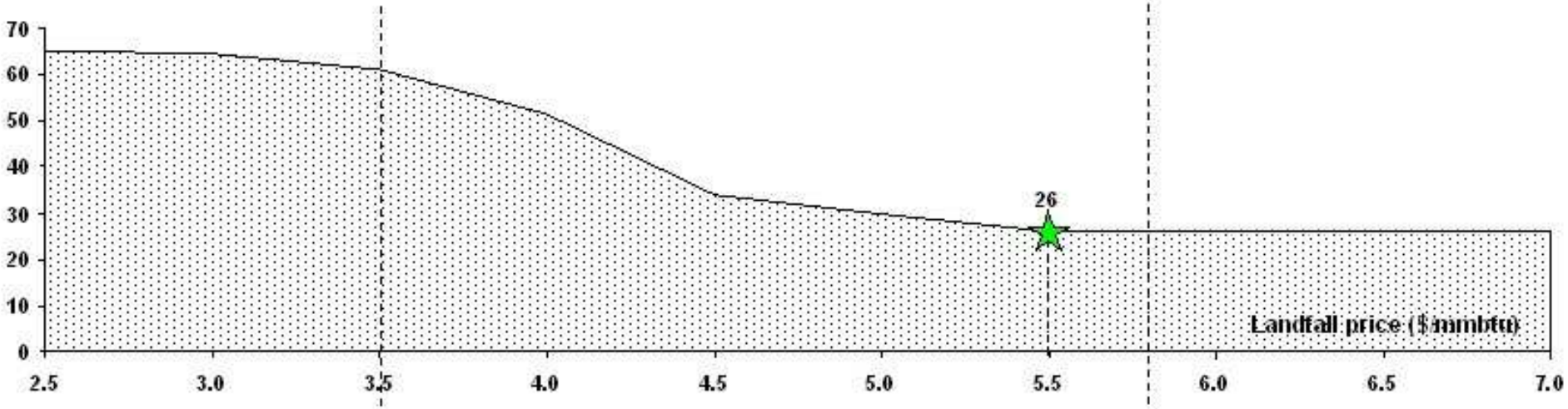


The gas demand from Industrial segment is expected to be fairly price elastic at low to moderate gas prices

Preliminary Outputs from A.T.Kearney – Stanford Study

Gas demand curve – Industrial sector (2025)

(bcm)



Low Gas Prices

- Gas demand high as it is competitive to all fuels including coal
  - Conversion of coal/liquid fuel based units

Moderate Gas Prices

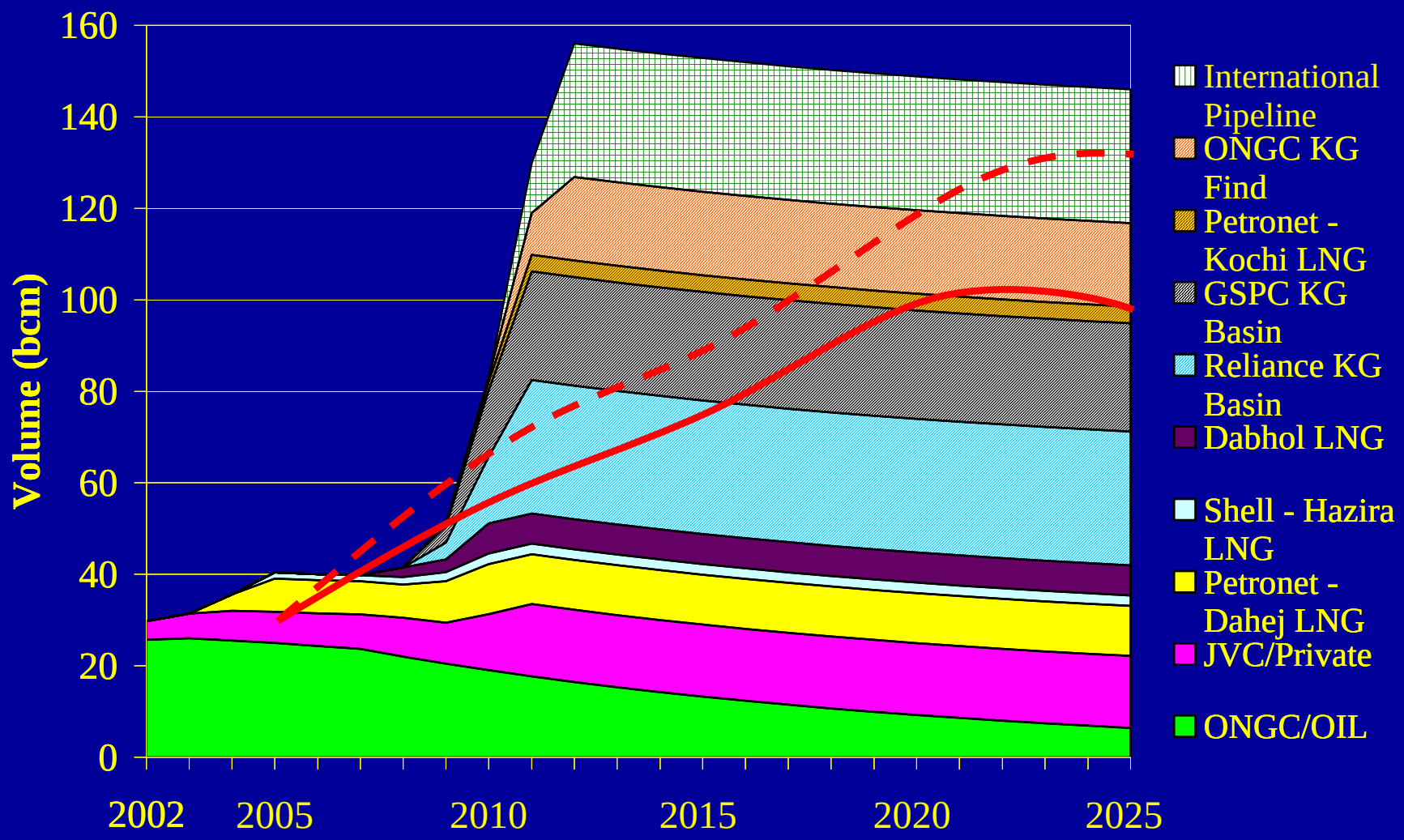
- Gas demand very elastic especially in the lower range
  - At higher prices, gas becomes uncompetitive for conversion of coal based capacities
  - Gas prices attractive for conversion of liquid based capacities
  - Gas provides an attractive option for incremental capacities
  - As the price increases, viability of conversion reduces

High Gas Prices

- Gas demand inelastic
  - Demand mainly from existing gas based capacities and liquid fuel conversions is sustained due to superior economics
  - Prospects of attracting new capacities on gas reduces in the higher ranges

Source:A.T.Kearney Analysis

Potential Gas Supplies in India



Source: Jackson/PESD estimates based on company statements, consultant reports, and government projections