

# OTP/MDU Witness

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Summary:

OTP/MDU Exhibits

341 - 350

## *My Testimony is about Trade-offs*

**What are the potential costs of future greenhouse gas regulation?**



**What are the cost and other risks of not using coal at Big Stone II?**

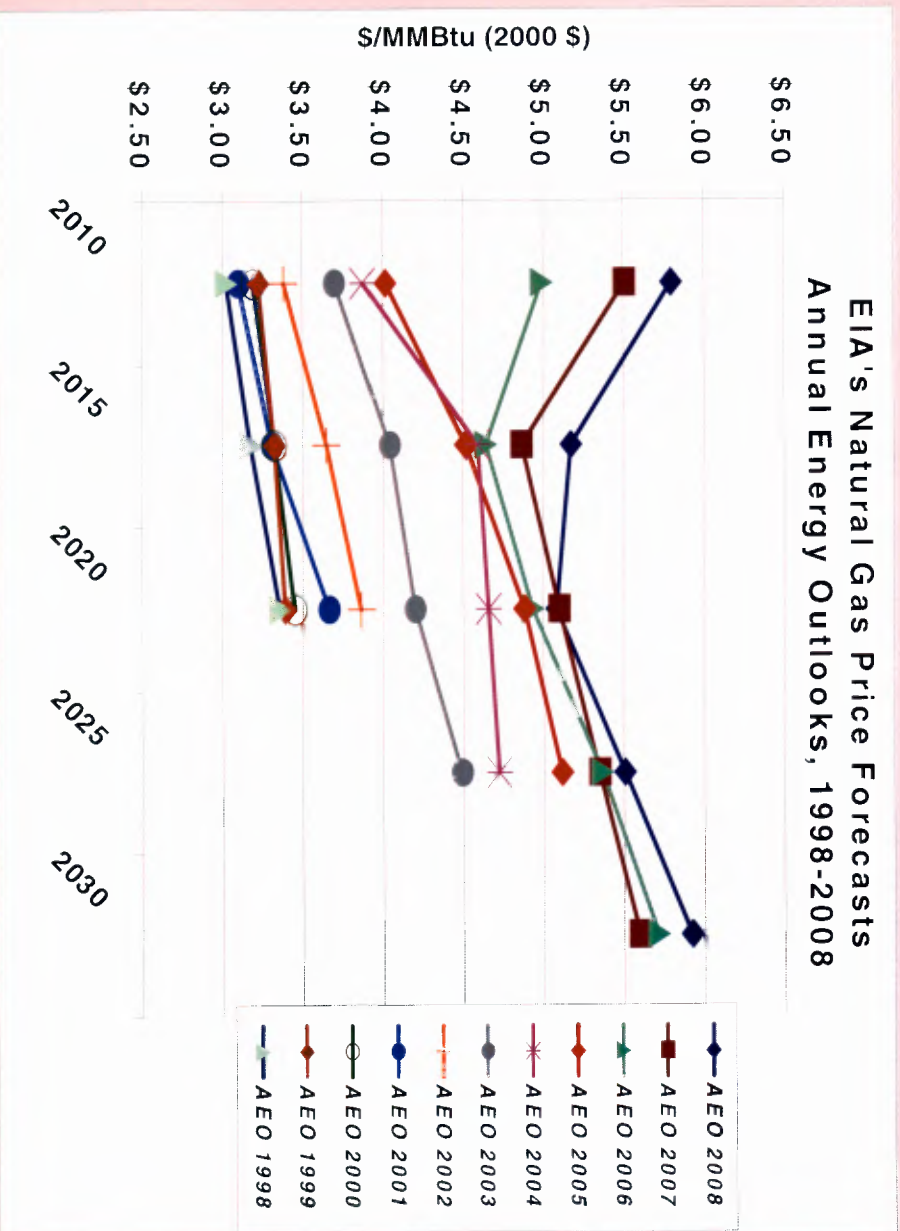
Alternatives to Big Stone II likely entail natural gas as a primary or backup fuel supply, or as power purchased from the pool.

- Risks of higher natural gas prices
- Greater price volatility
- Increased exposure to natural gas price spikes

# Natural gas price forecasts continue to spiral upward year-by-year

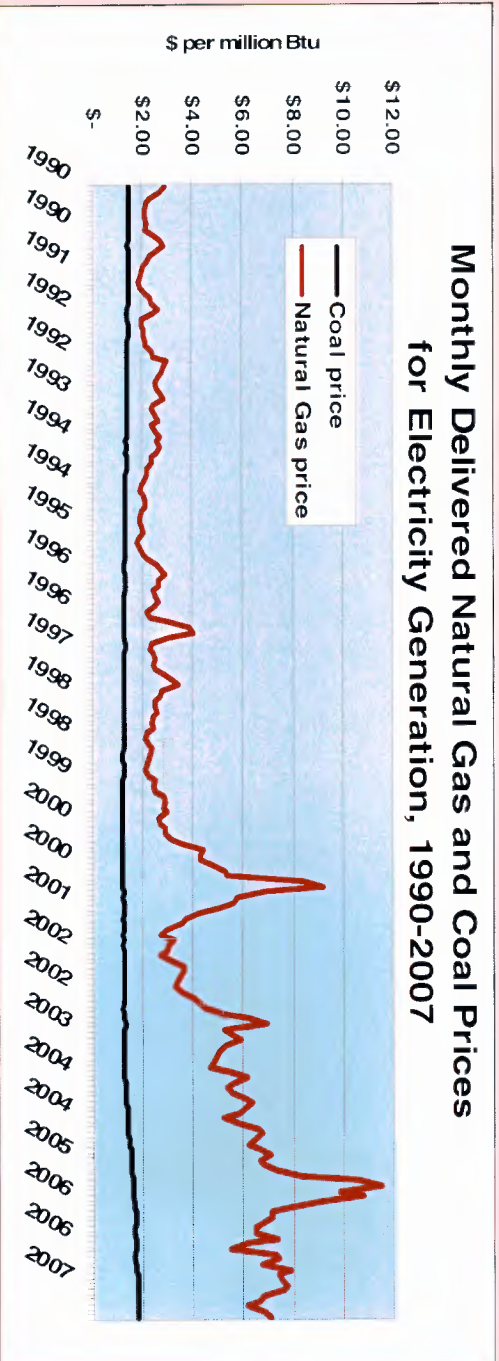
History of Natural Gas Price Forecasts

EIA's Natural Gas Price Forecasts  
Annual Energy Outlooks, 1998-2008



# Increasing volatility in natural gas prices

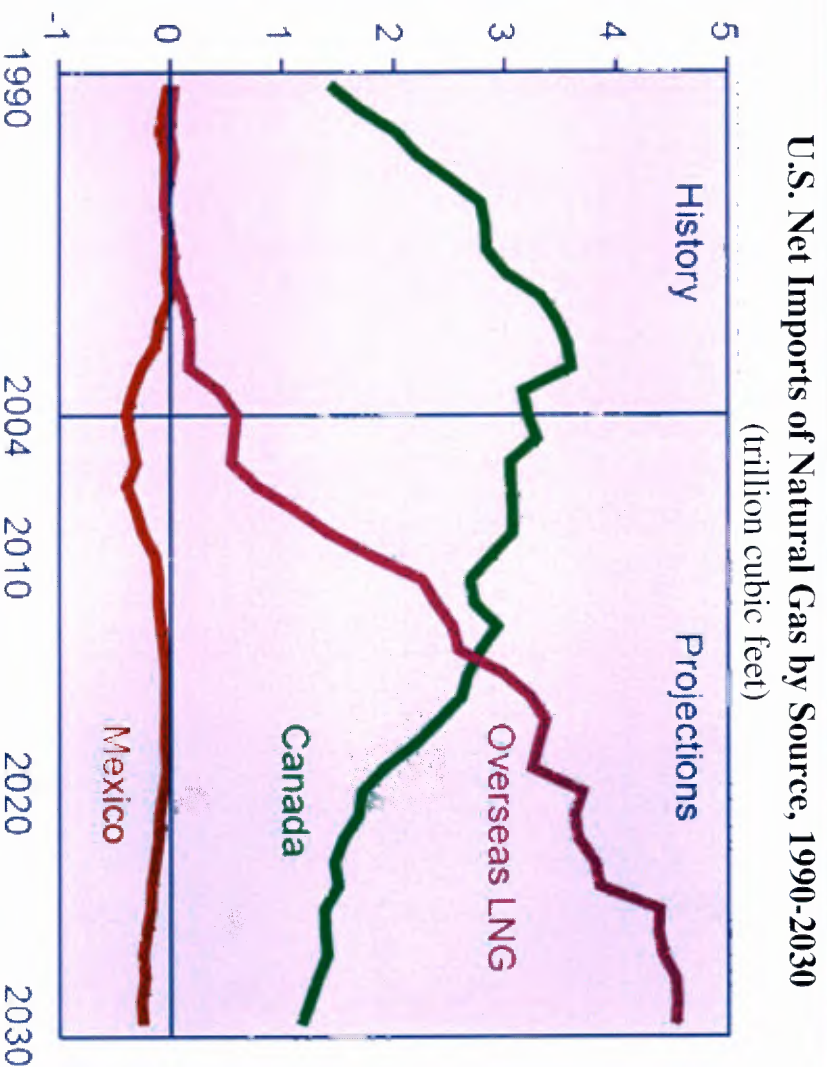
Monthly Delivered Natural Gas and Coal Prices for Electricity Generation, 1990-2007



Changes in Monthly Delivered Natural Gas and Coal Prices for Electricity Generation, 1990-2007



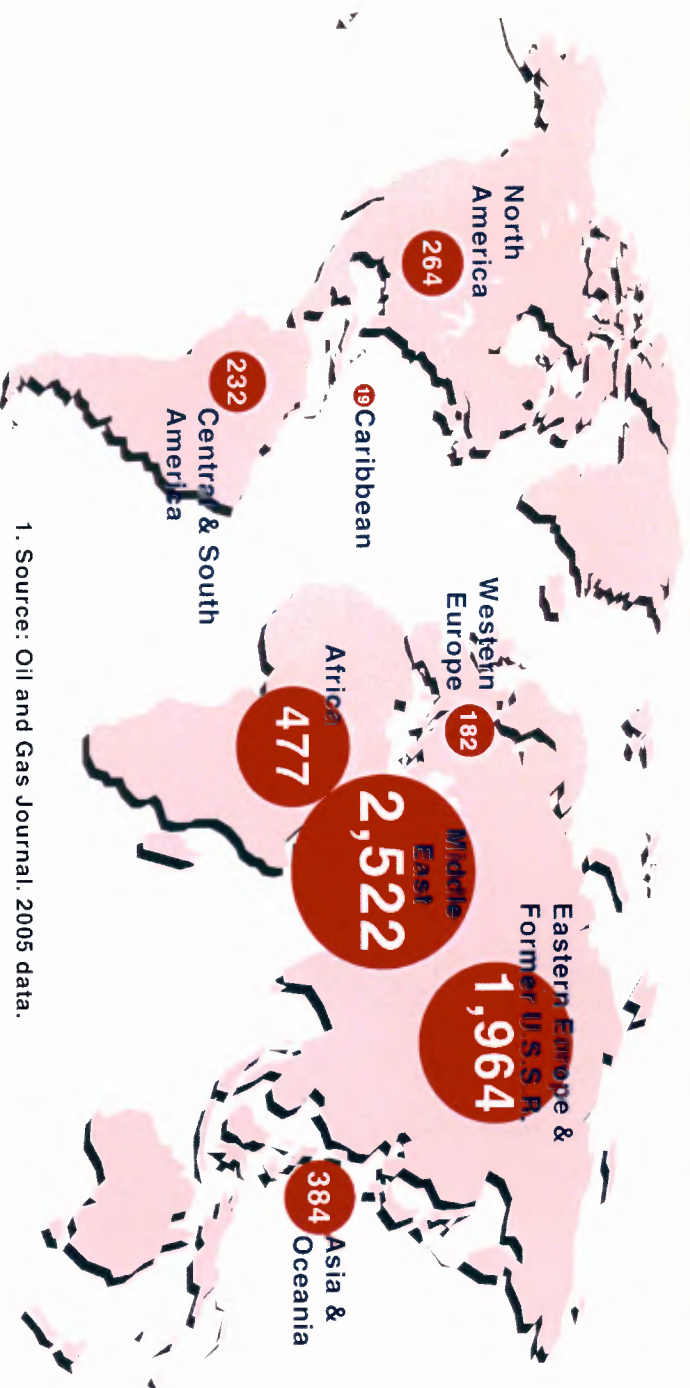
# Future Sources of natural gas for the U.S. will increasingly come from overseas LNG



Source: U.S. Department of Energy, Energy Information Administration, *International Energy Outlook 2007*, Report #DOE/EIA-0484(2007), May 2007, Figure 46. [http://www.eia.doe.gov/oiaf/ieo/figure\\_46.html](http://www.eia.doe.gov/oiaf/ieo/figure_46.html). Figure developed using historic data in *Annual Energy Review 2005* and forecasts in *Annual Energy Outlook 2007*.

# Future Sources of natural gas are an energy independence issue for the U.S.

Proven World Gas Reserves: 6,044 Trillion Cubic Feet



1. Source: Oil and Gas Journal. 2005 data.

Source: Adapted from Kevin R. Petak, Energy and Environmental Analysis, Inc., *Oil and Gas Prices: Will They Stay Linked?*, presented at 2006 EIA Energy Outlook and Modeling Conference, Washington DC, March 27, 2006, <http://www.eia.doe.gov/oiiaf/aeo/conf/pdf/petak.pdf>. Data source for chart is *Oil and Gas Journal*.

## ***High natural gas prices and price volatility pose risks for electricity generators and customers***

- For 500 MW of gas combined cycle:
  - 1¢ change in gas prices → \$280,000/year
  - \$1.00/MMBtu or more → tens of \$millions/year
- Additional considerations: North Dakota
  - ND counties to be served by Big Stone II have lower than average household income
  - ND households have higher than average consumption of gas and oil → doubly vulnerable to gas price volatility
  - Higher rates for customers → less household income for other purposes
  - Coal use at Big Stone II would moderate price spikes in household energy budgets