

# THE US SHALE BOOM

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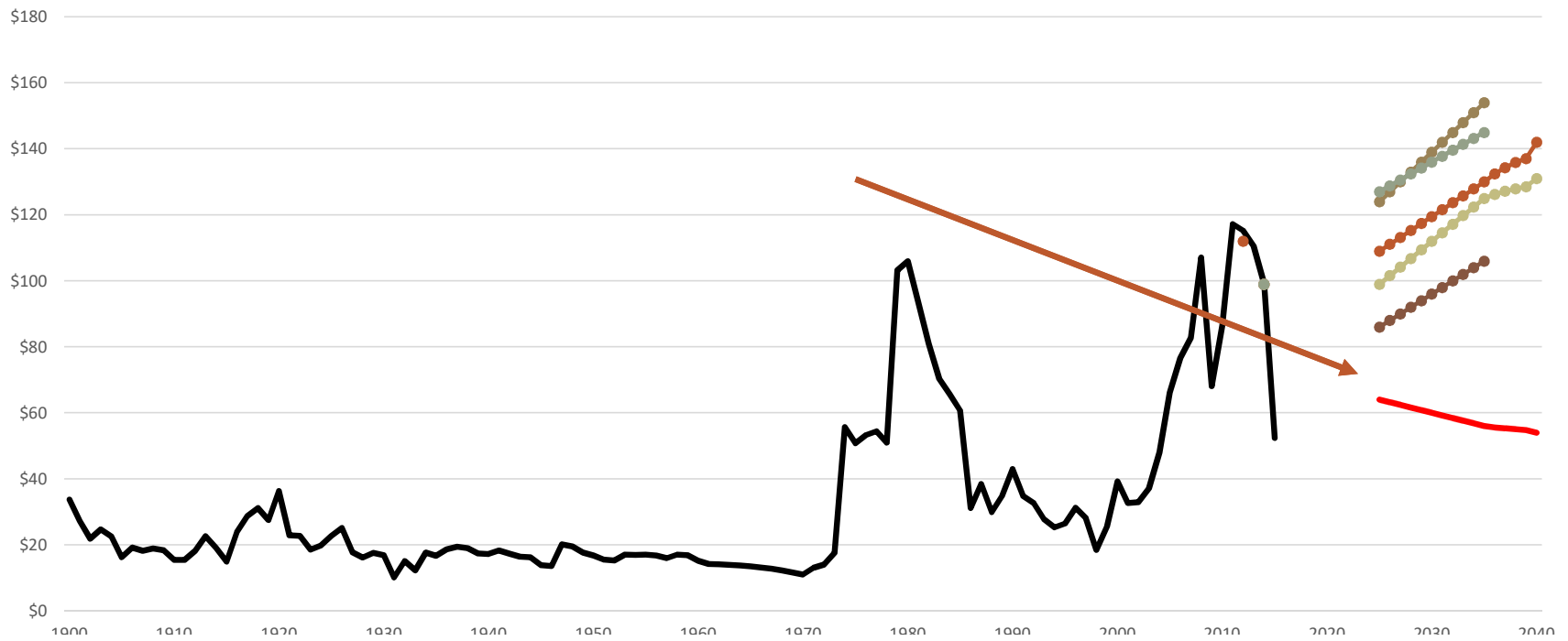
CIBO, WOODSTOCK VT

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# 2014 DOE PRICE FORECAST SURVEY



# WHAT WENT WRONG (FOR SOME)?

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## THE UNEXPECTED

- MARCELLUS/UTICA KEPT US PRICES VERY LOW
- DIFFERENTIALS VERY HIGH IN MARCELLUS/UTICA

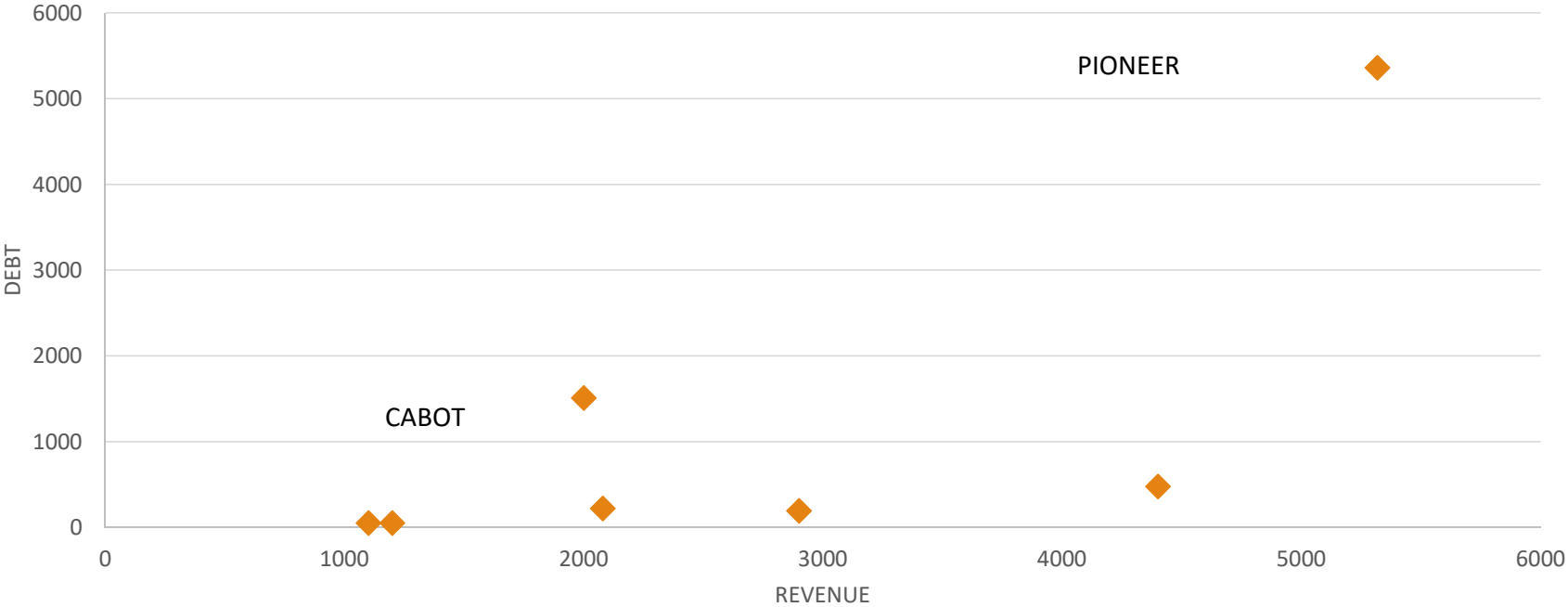
## WHAT SHOULD HAVE BEEN EXPECTED

- OIL PRICES \$50 OR SO; NATURAL GAS PRICES UNDER \$5/MMBTU
- GAS RISKIER THAN OIL (NO GASPEC IN NORTH AMERICA)
- HIGH DEBTS, HIGH RISK
  - SMALL COMPANIES
- MORE PRODUCTION POTENTIAL THAN PRODUCTION (SAMSON)

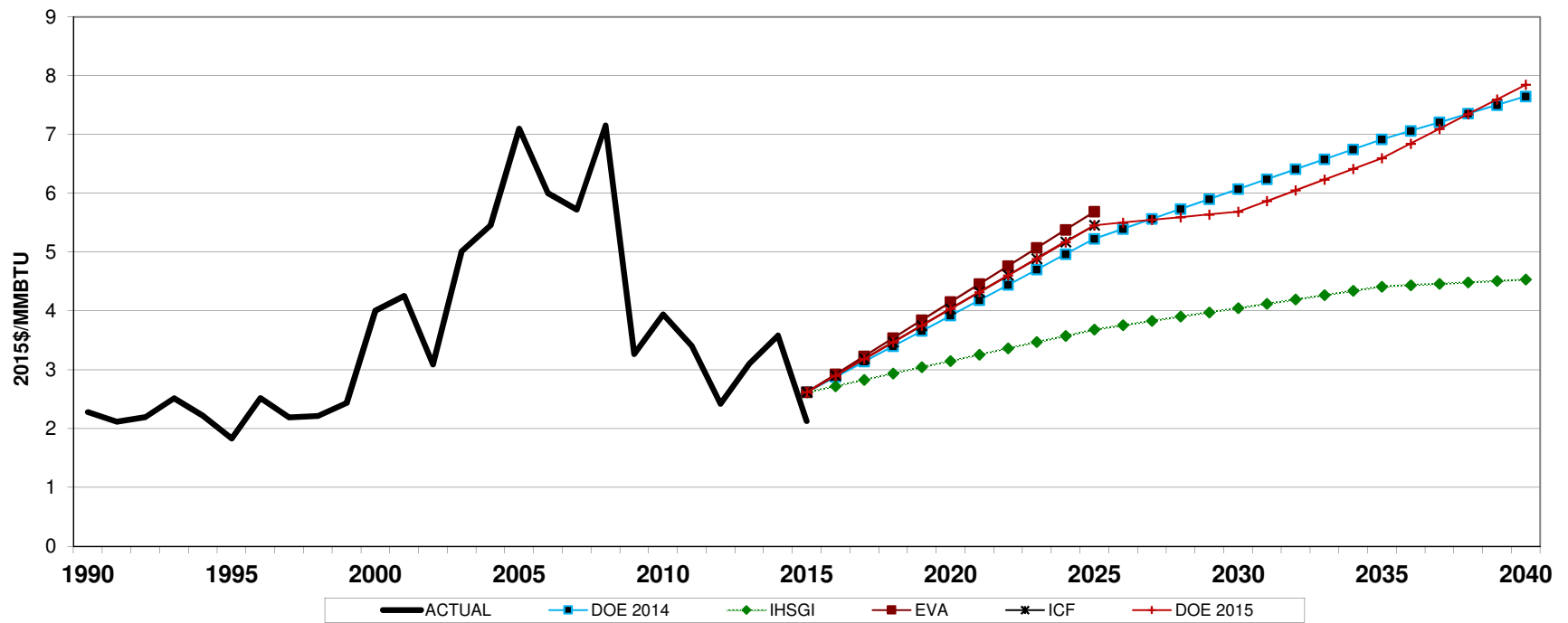
## IRRATIONAL EXUBERANCE

- ASSUME PRICES DO WHAT YOU WANT
  - SPEND MONEY CARELESSLY
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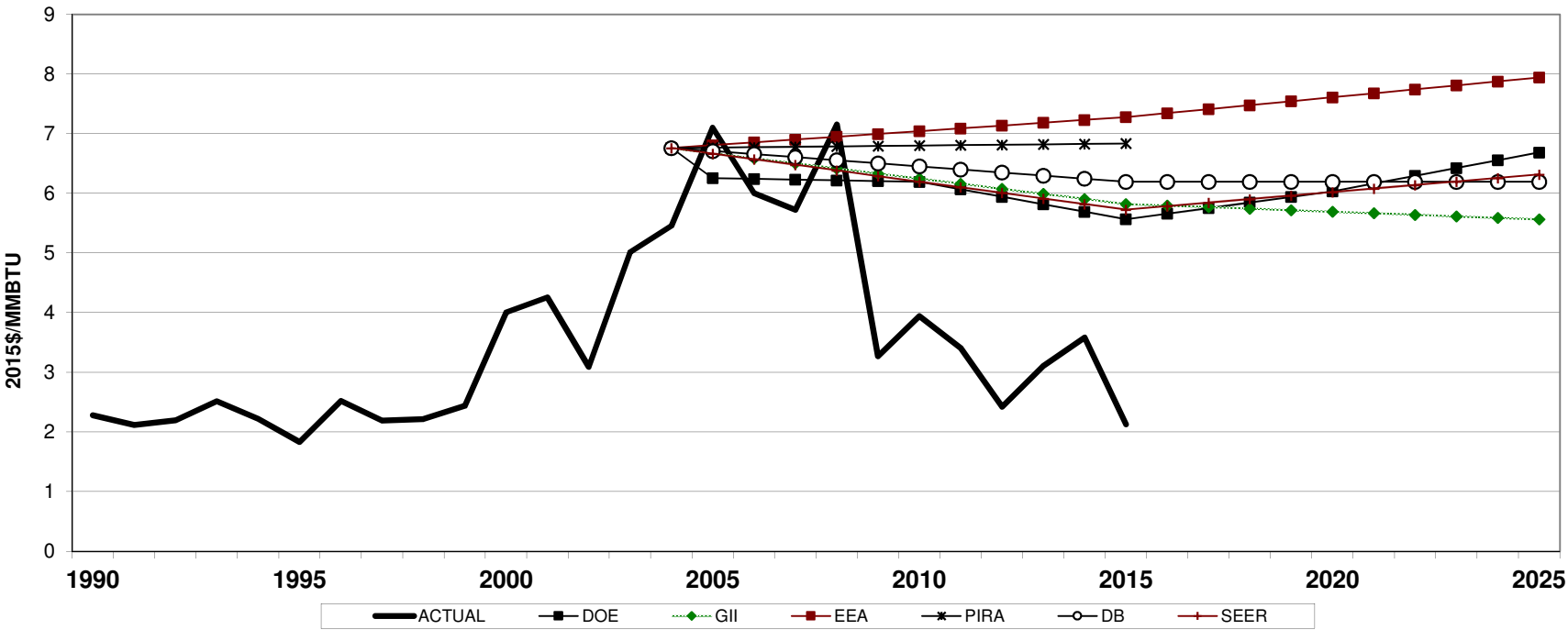
# DEBT AND REVENUE (\$MIL)



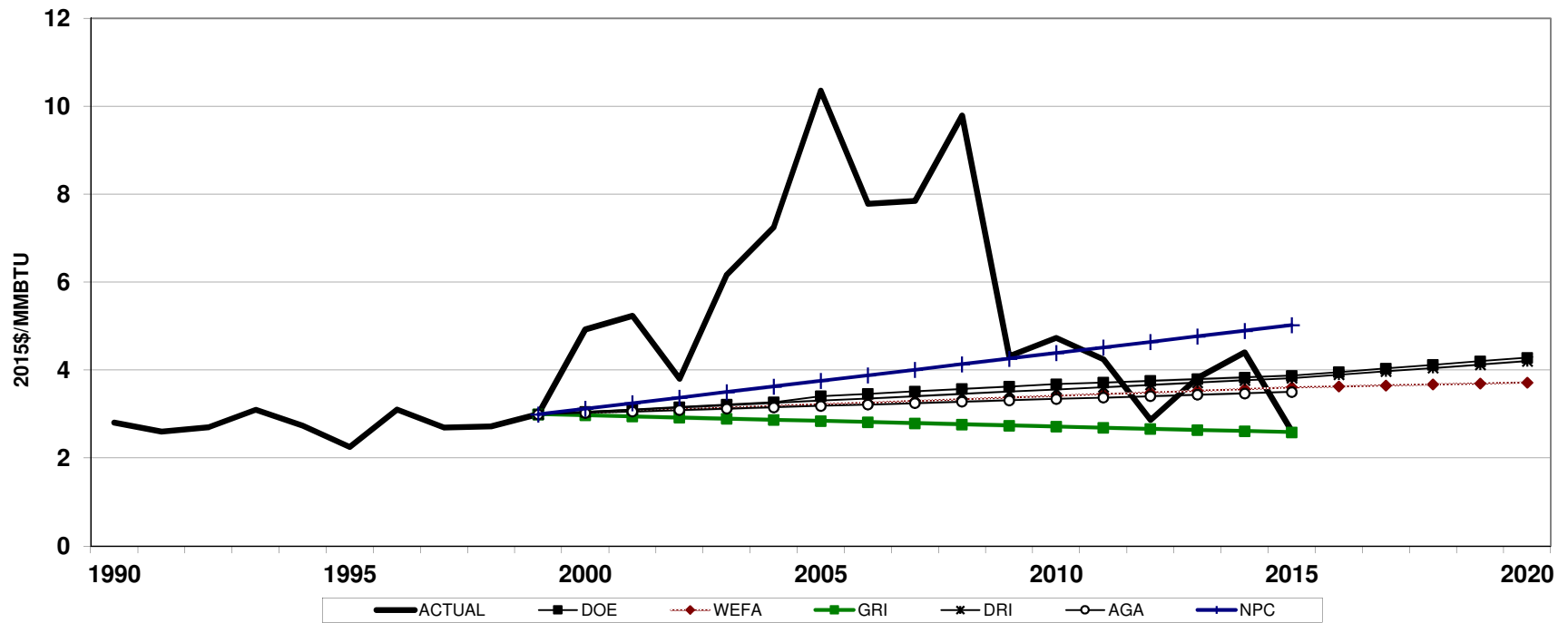
# MOST RECENT US GAS PRICE FORECASTS



# 2006 US GAS FORECASTS



# GAS PRICE FORECASTS 2001




# DUAL VIEWS ON BREAKEVEN COSTS

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## NO ONE MAKING MONEY

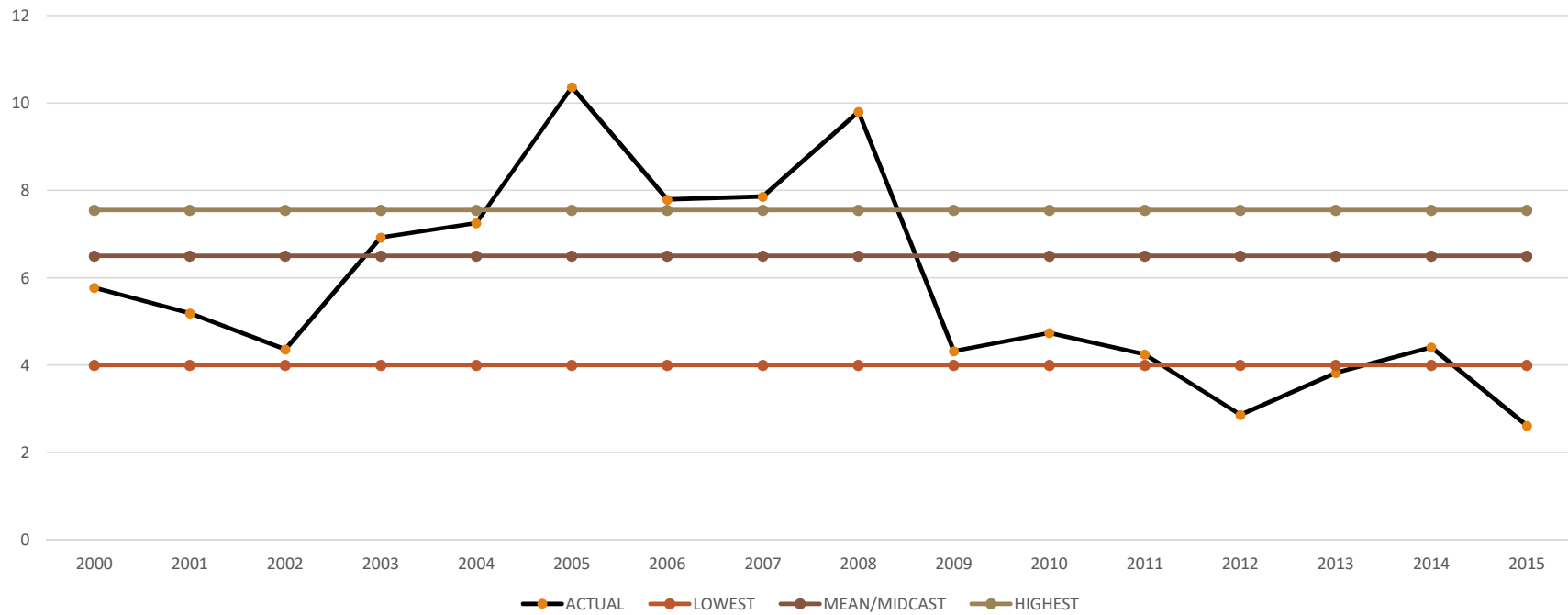
- RECYCLING INVESTMENT CAPITAL
- AVERAGE WELLS, NOT LATEST
- INCLUDES INTEREST

## HIGH PROFITS

- USUALLY COMPANY VIEWS
  - MIGHT EXCLUDE G&A
  - PRIMARILY HIGH-GRADING
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# SHALE GAS BREAKEVEN COSTS (PRE-2014)



# WHY THE MISUNDERSTANDING OF BREAKEVEN COSTS?

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## BAD ESTIMATES

- INCLUDING INTEREST PAYMENTS
- ASSUMING HIGH LEASE PAYMENTS
- HISTORICAL AVERAGE VS CURRENT COSTS

## STATIC INSTEAD OF DYNAMIC

- NUMEROUS WAYS TO LOWER COSTS
  - RAPIDLY CHANGING TECHNOLOGY
  - CYCLICAL COST BEHAVIOR
  - HIGH-GRADING

# EVOLUTION OF MARCELLUS

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	DECLINE RATE	EUR IN BCFe	IP	HORIZ LENGTH	EUR/FT
2008	43.87%	2	1.4	2280	0.88
2009	43.21%	3.3	2.4	2890	1.14
2010	48.52%	4.9	4.0	3800	1.29
2011	49.02%	4.5	4.0	4100	1.10
2012	48.38%	4.2	4.3	4500	0.93
2013	46.22%	5.4	5.8	4751	1.14

SOURCE: SWINDELL 2016.

# POTENTIAL PRESSURES ON PRICES

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## MEXICO

- REFORM COULD REDUCE DEMAND BY 1.3 TCF

## WEATHER

- SHORT-TERM FLUCTUATIONS

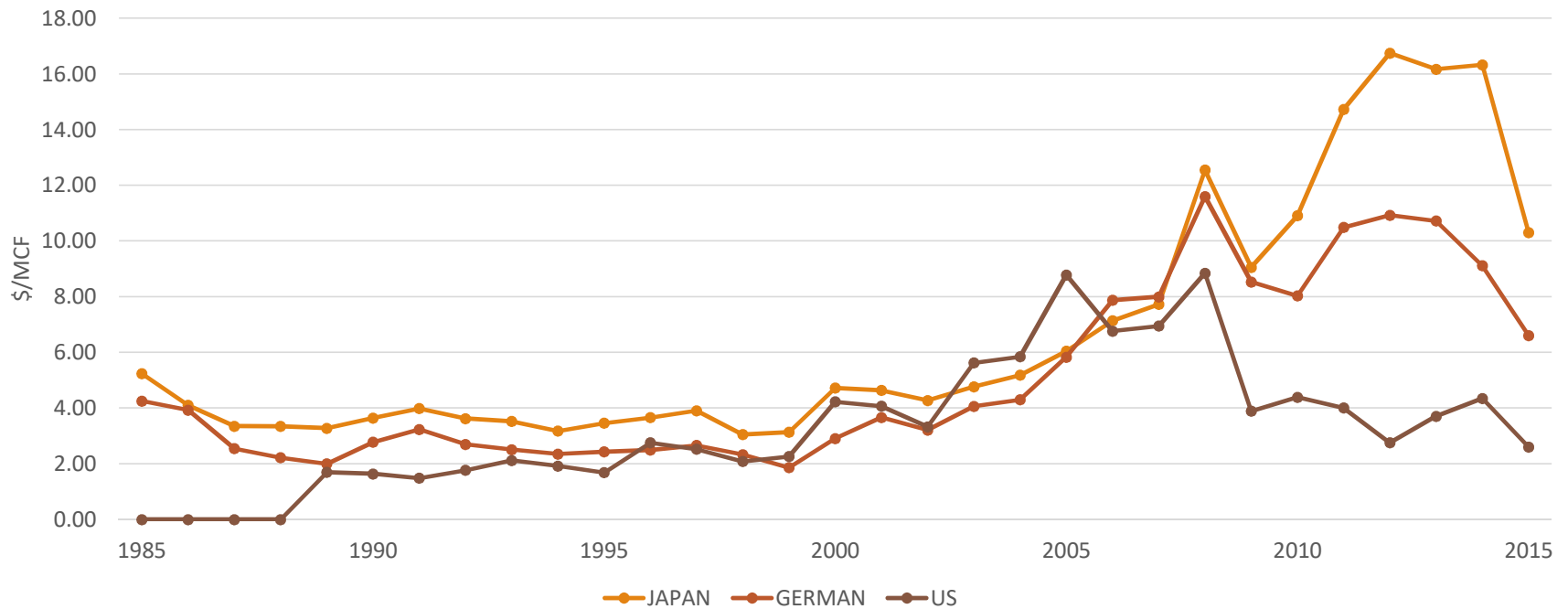
## LNG EXPORTS

- CURRENTLY INSIGNIFICANT
- UNLIKELY TO HAVE SIGNIFICANT RISE

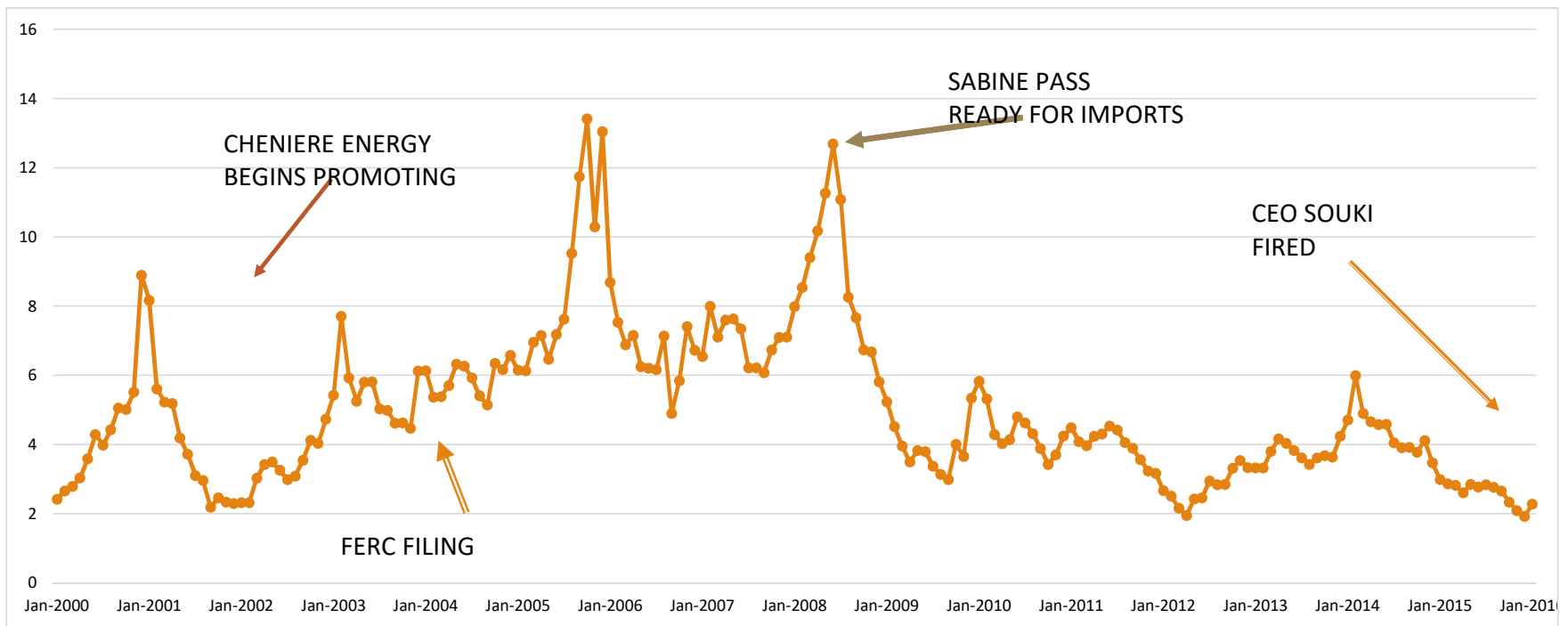
## ELECTRIC POWER CONSUMPTION

- MORE RENEWABLES, MORE GAS
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# DIVERGING NATURAL GAS PRICES

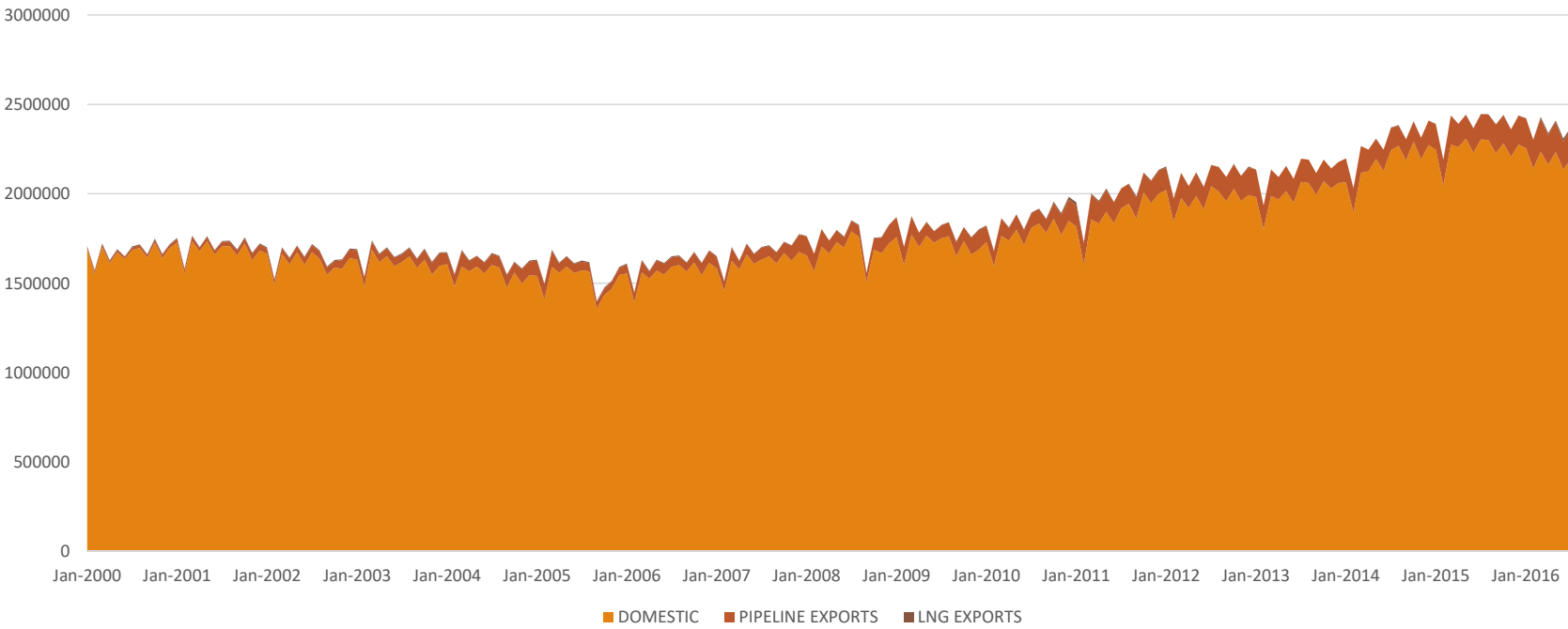


# NATURAL GAS AND LNG PLANS



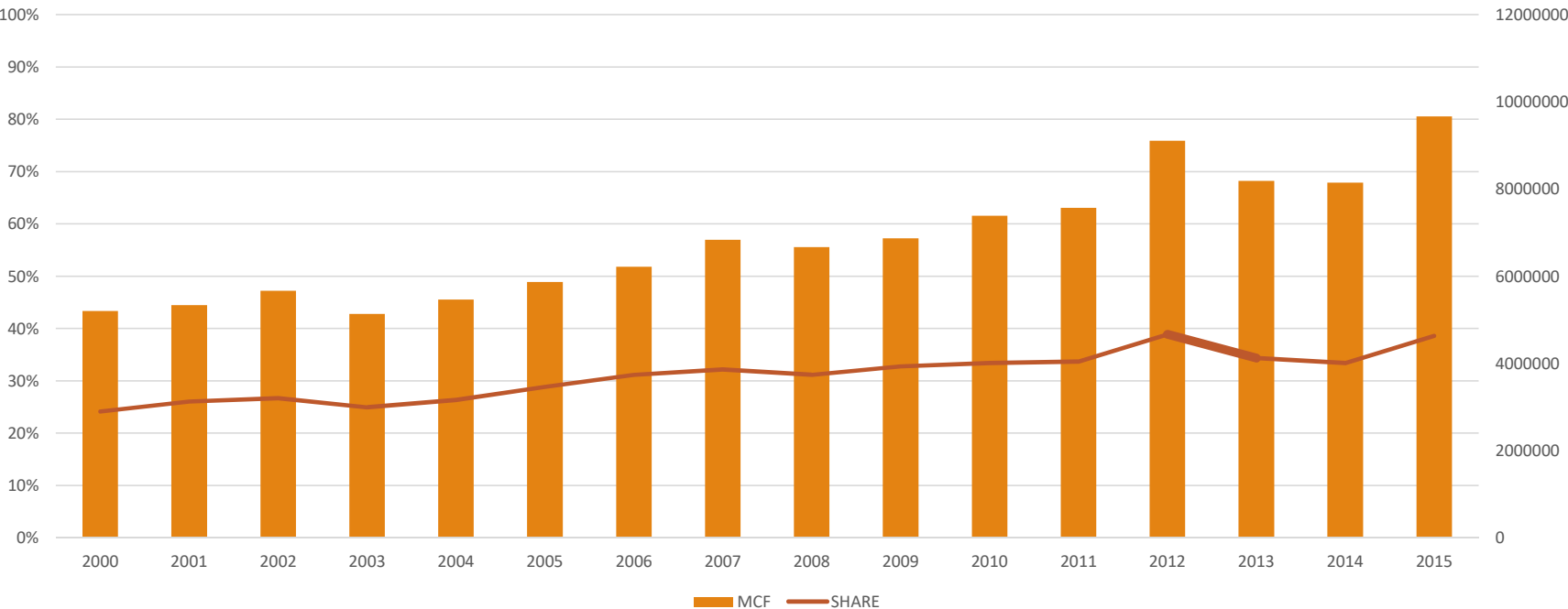
CHENIERE PLANNED IMPORTS WHEN LNG PRICES WERE HIGH.

# LNG EXPORTS VERY SMALL



# GAS USE FOR POWER RISING

2 TCF/YR IN 5 YEARS





# LONG-RUN OUTLOOK

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THE ABILITY TO RAISE SHALE GAS SUPPLY BY 2 TCF/YR AT \$4/MCF SUGGESTS A CEILING

ONLY ELECTRICITY DEMAND LIKELY TO INCREASE

BEWARE NUCLEAR PUSH, AND RENEWABLE CUTS

CANADA AND MEXICO BOTH MORE LIKELY TO BUY LESS

LNG EXPORTS UNLIKELY TO BE SIGNIFICANT

BUT VOLATILITY IS A NATURAL ELEMENT IN COMMODITY MARKETS

# PRICE AND SHALE GAS SUPPLY INCREASE

