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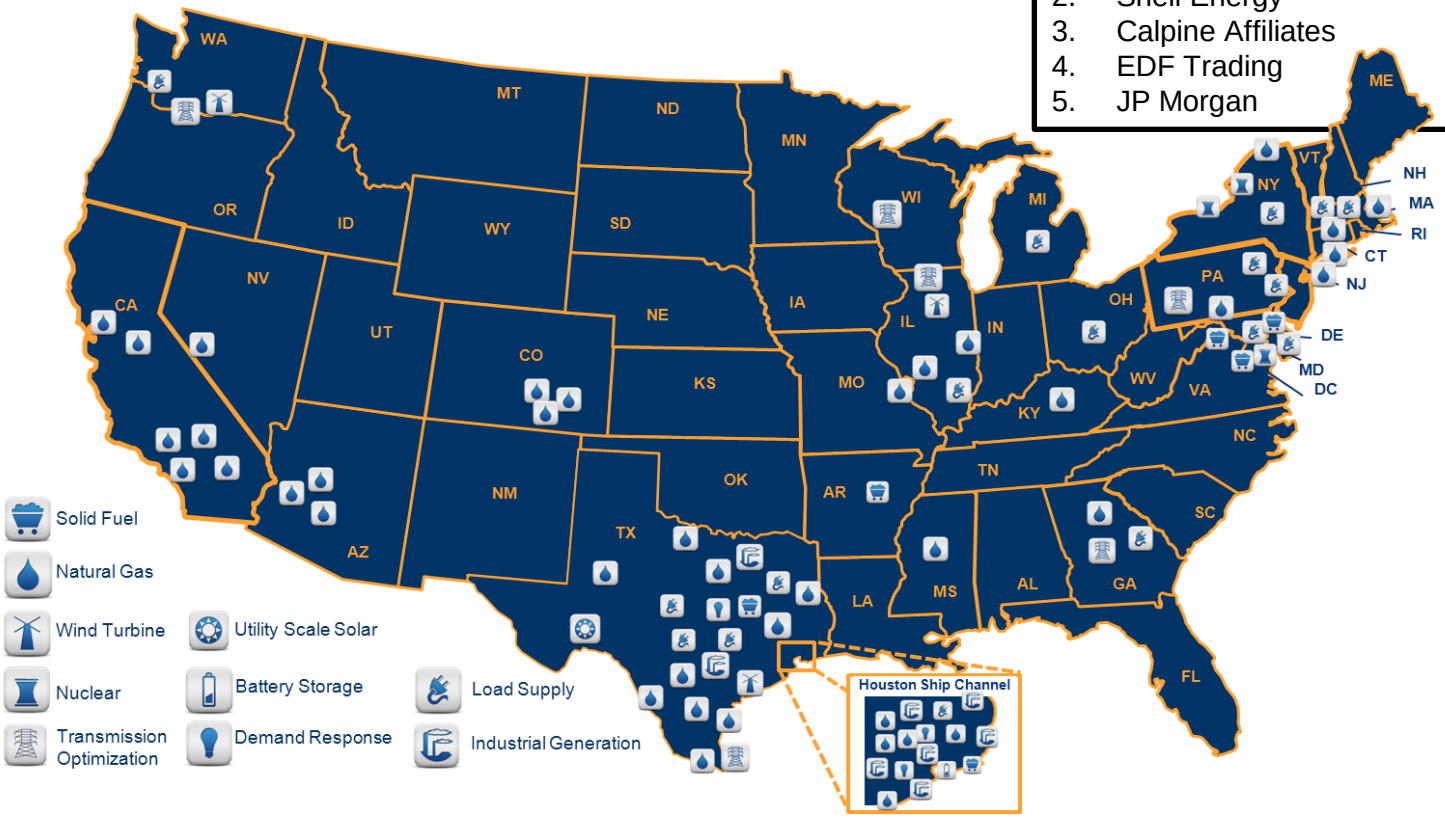
Energy Market Update:

EDF Energy Services

EDF Trading's North American Power Footprint

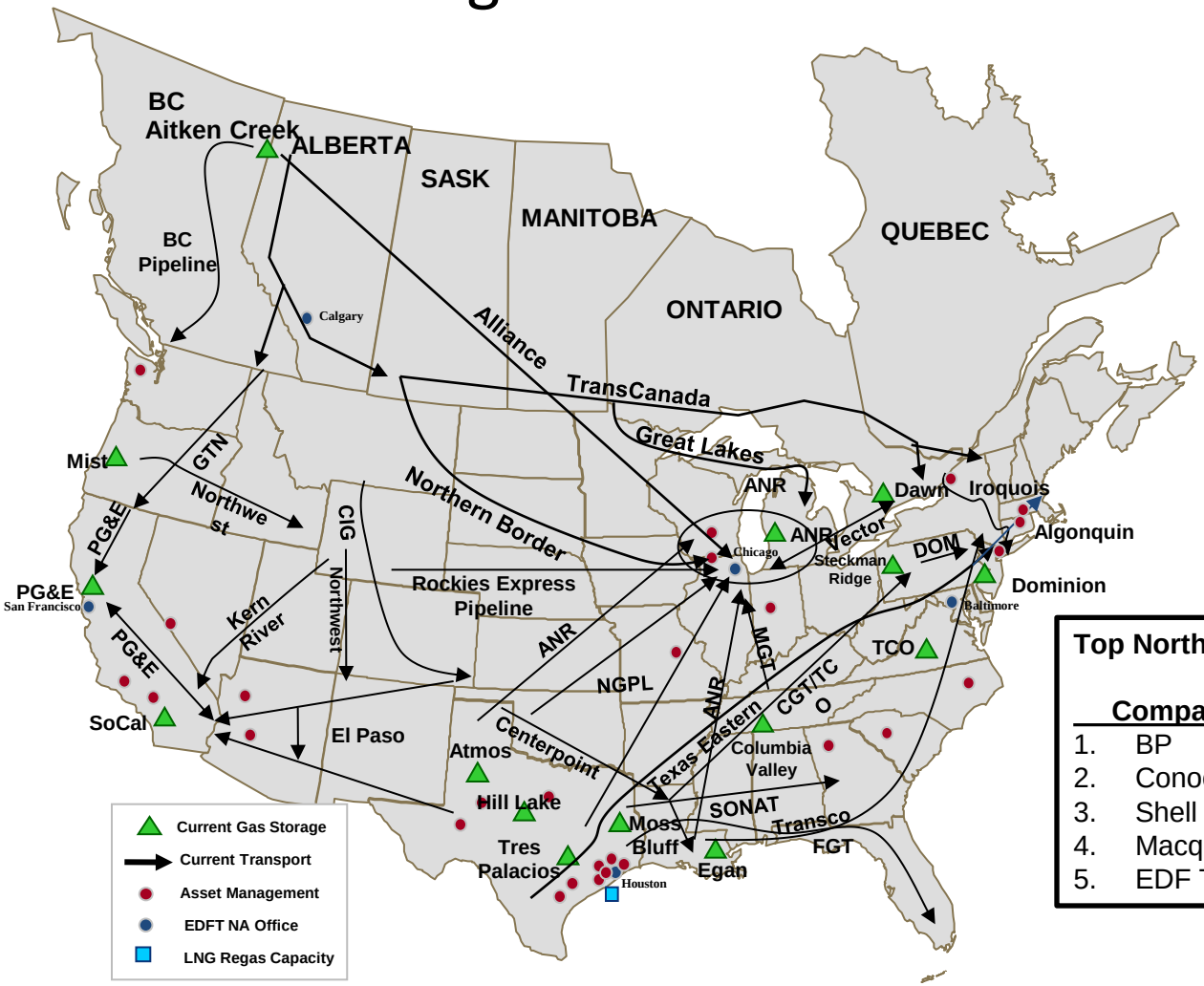
Top North American Power Marketers*

	Company	3Q 2012 MWhr Sold
1.	Exelon Generation	119,256,077
2.	Shell Energy	70,037,410
3.	Calpine Affiliates	44,045,958
4.	EDF Trading	42,756,647
5.	JP Morgan	36,689,837



EDF

EDF Trading's North American Gas Footprint



Top North American Gas Marketers*

	Company	3Q 2012 (Bcf/d)
1.	BP	23.1
2.	ConocoPhillips	16.2
3.	Shell Energy	12.6
4.	Macquarie Energy	9.8
5.	EDF Trading	7.6

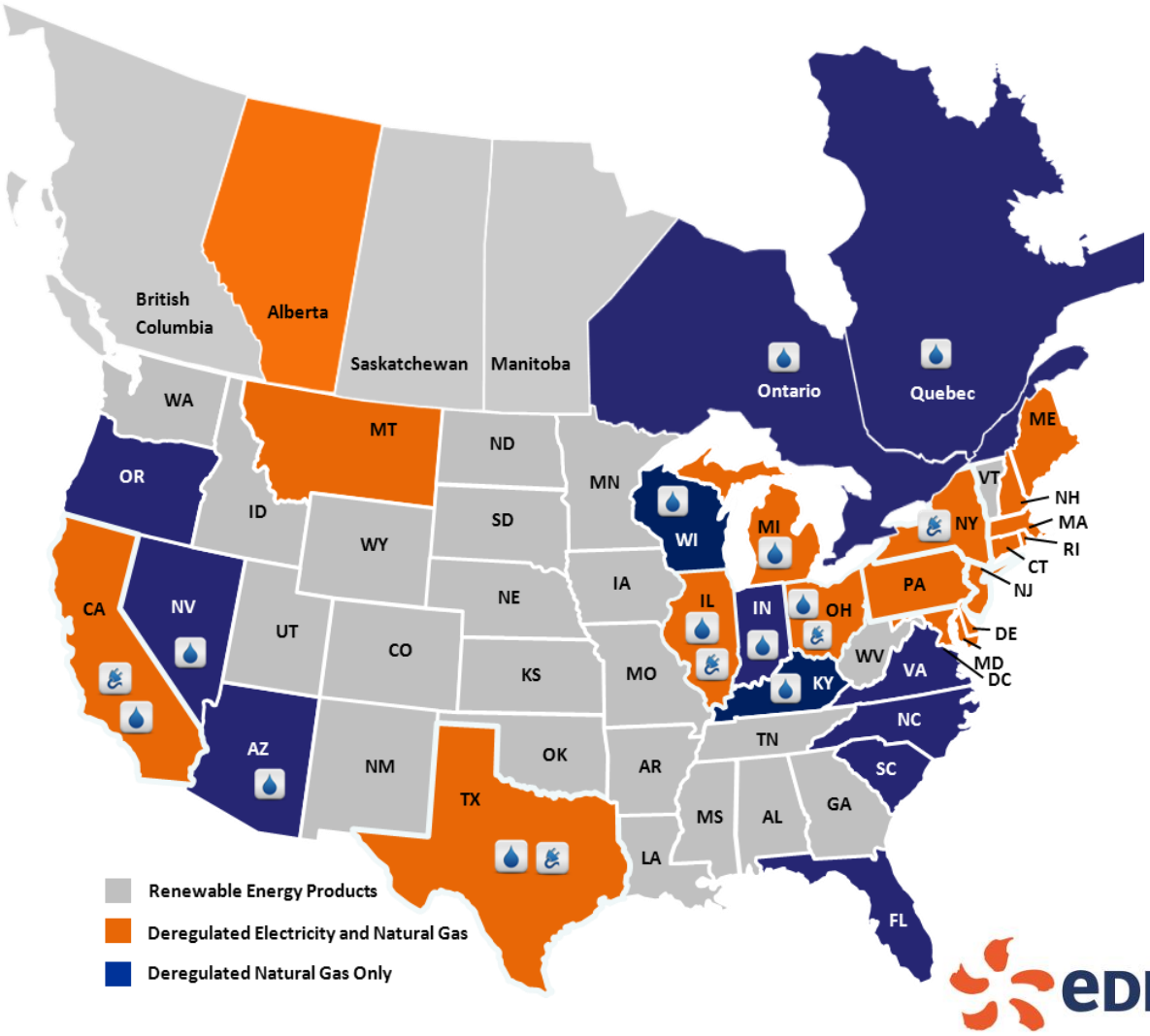
EDF Energy Services

Electricity:

- EDF currently serves 1,600 MWs of large C&I load in the following markets:
  - Texas (ERCOT)
  - Illinois (PJM and MISO)
  - New York (NYISO)
  - California (CAISO)
  - Ohio (PJM)

Natural Gas:

- EDF currently serves clients in twelve states and provinces throughout Canada and the US
- Loads ~ 300,000 mmbtu/d



What are the primary variables affecting energy prices?

- **Shale gas/tight oil explosion**
- **Weak demand**
- **Coal-to-gas switching**
- **Renewables**
- **Demand Response and efficiency**
- **Resource adequacy and reserve margins**
- **CSAPR and other regulations**

What are the consequences?

- **Industrial renaissance in US**
- **LNG exports**
- **Low prices fix low prices**

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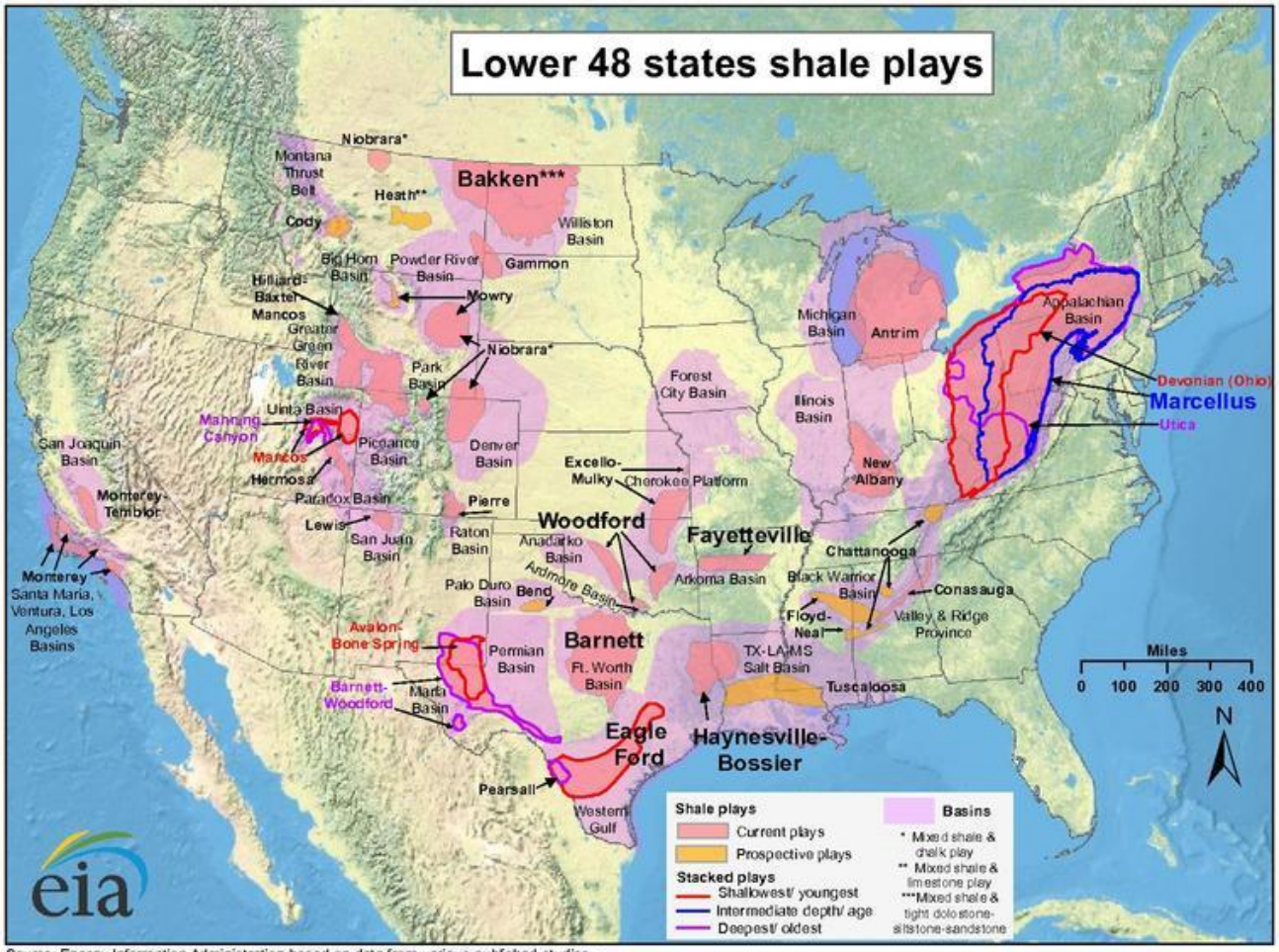
Shale Gas & Tight Oil

Shale Gas has Revolutionized US Energy



Source: Energy Information Administration based on data from various published studies.
Updated: May 9, 2011

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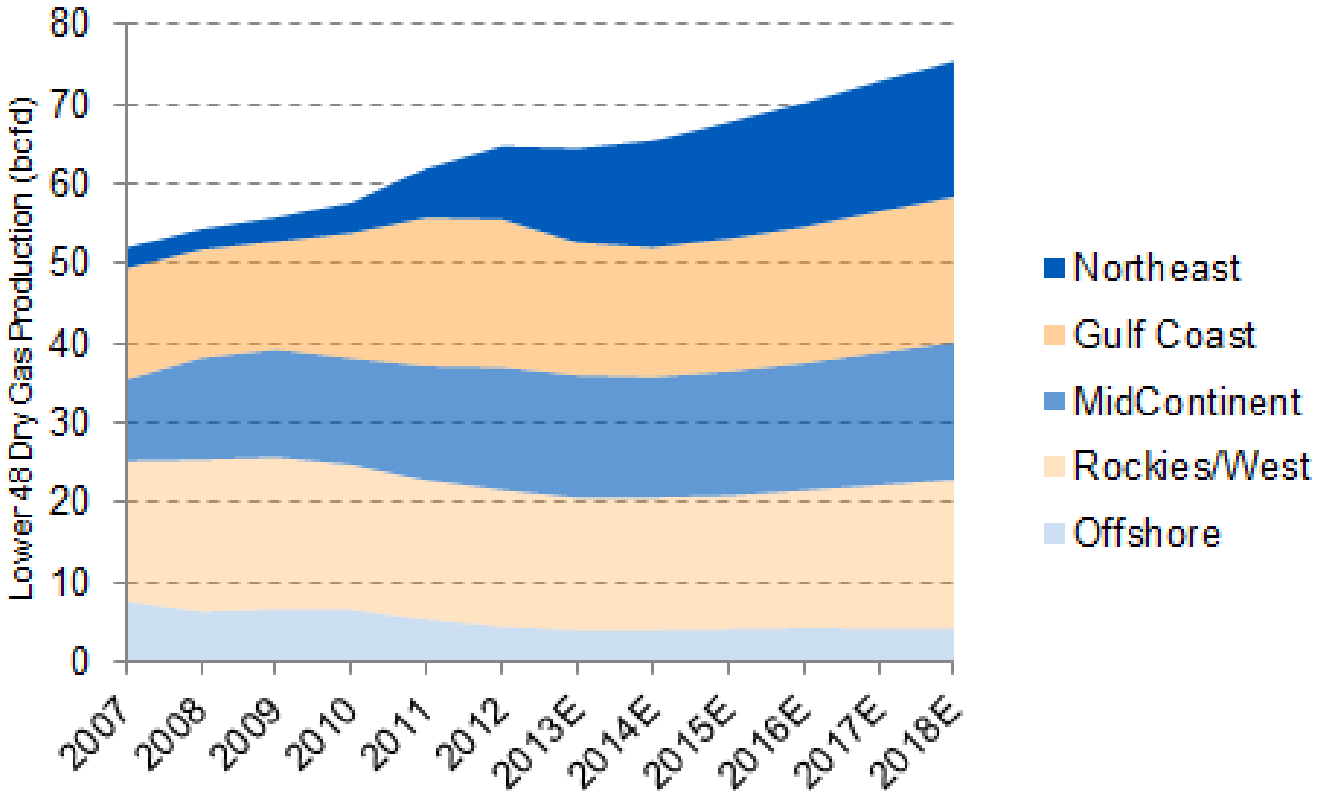
US Shale Gas Boom



Source: EIA, Wood Mackenzie

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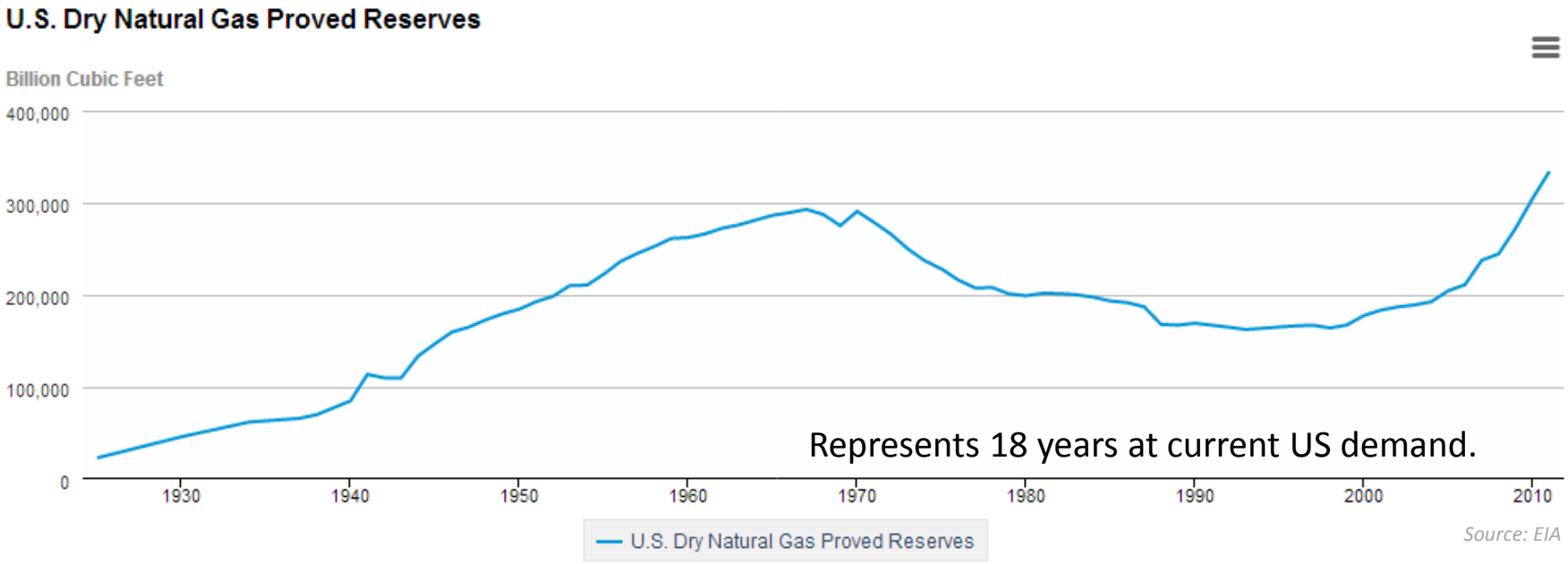
US Shale Gas Boom



Bearish Price Trend of Natural Gas

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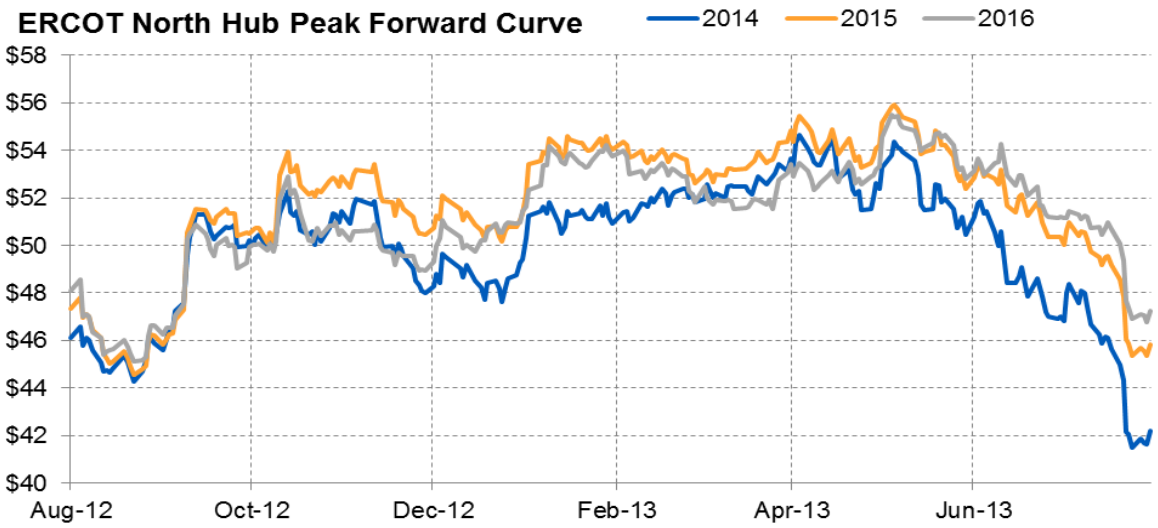
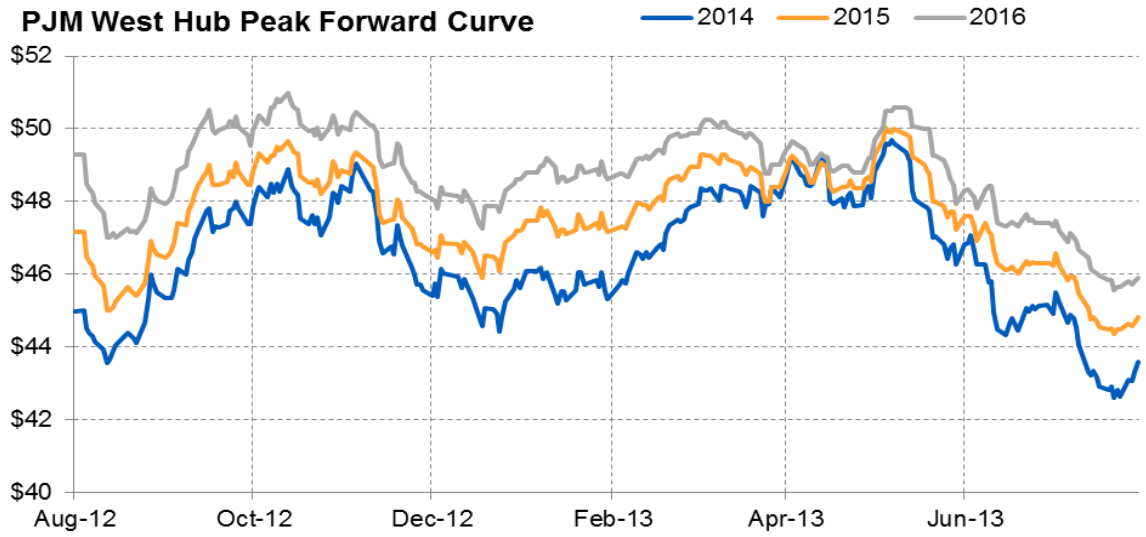

ERCOT North Hub Peak Forward Curve
2014
2015
2016
$58
$56
$54
$52
$50
$48
$46
$44
$42
$40
Aug-12
Oct-12
Dec-12
Feb-13
Apr-13
Jun-13


PJM West Hub Peak Forward Curve
2014
2015
2016
$52
$50
$48
$46
$44
$42
$40
Aug-12
Oct-12
Dec-12
Feb-13
Apr-13
Jun-13

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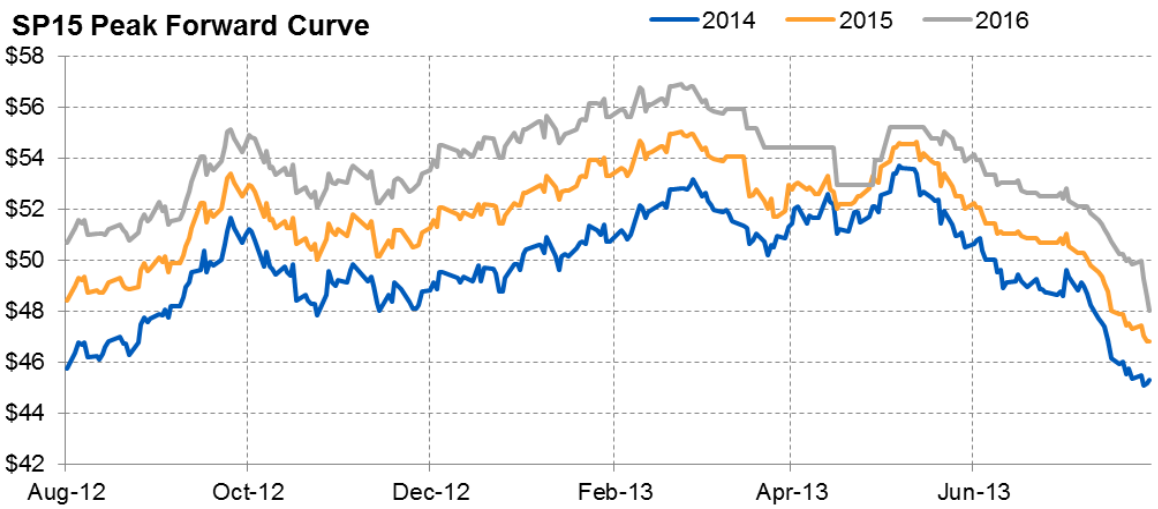
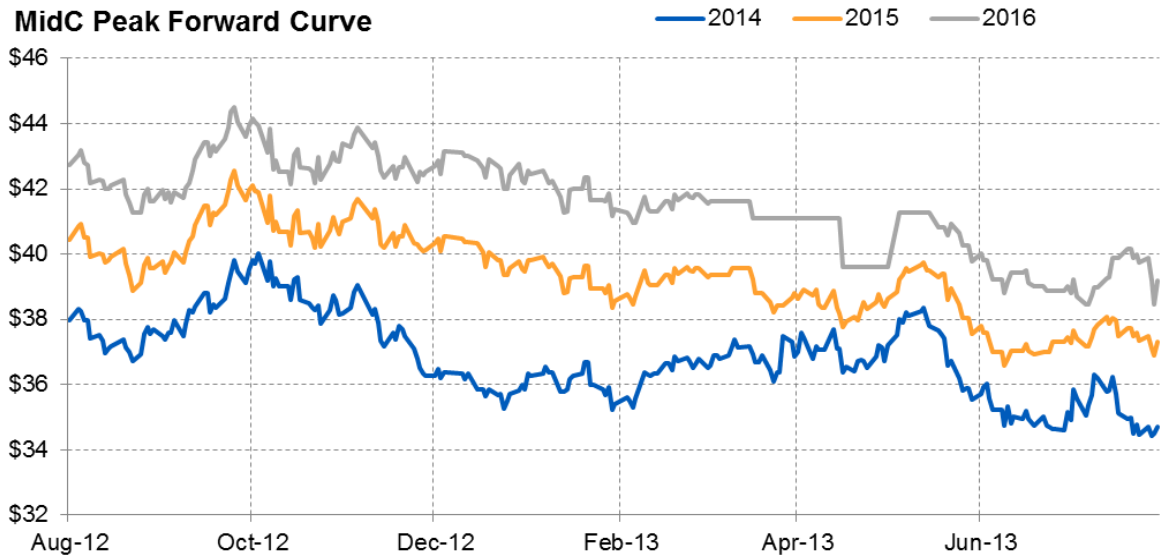

SP15 Peak Forward Curve
2014
2015
2016
$58
$56
$54
$52
$50
$48
$46
$44
$42
Aug-12
Oct-12
Dec-12
Feb-13
Apr-13
Jun-13


MidC Peak Forward Curve
2014
2015
2016
$46
$44
$42
$40
$38
$36
$34
$32
Aug-12
Oct-12
Dec-12
Feb-13
Apr-13
Jun-13

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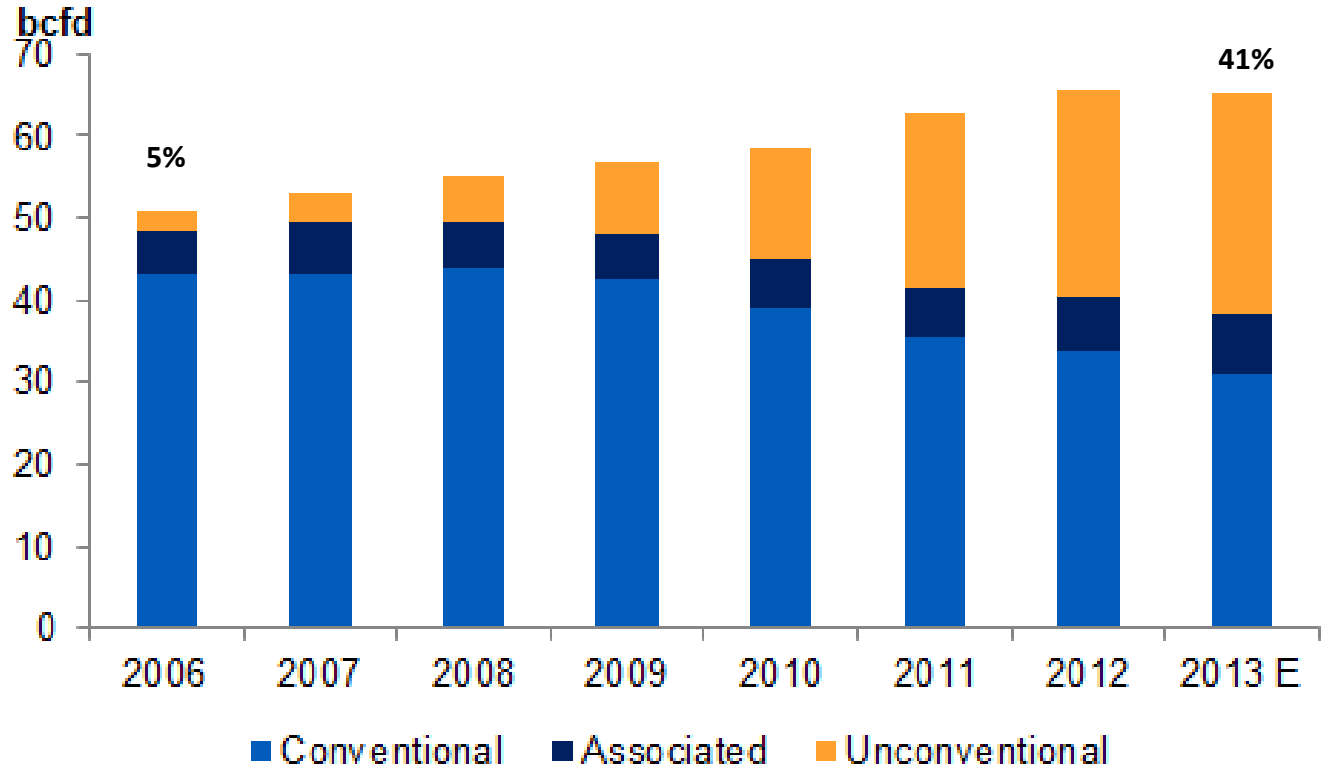
US Gas Production by Source

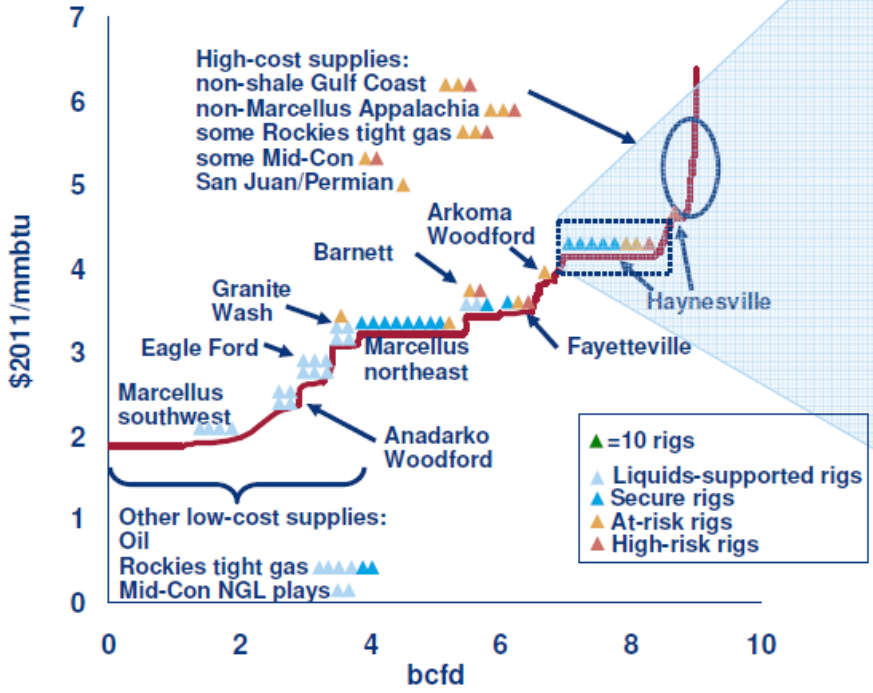


Source: EIA, Wood Mackenzie

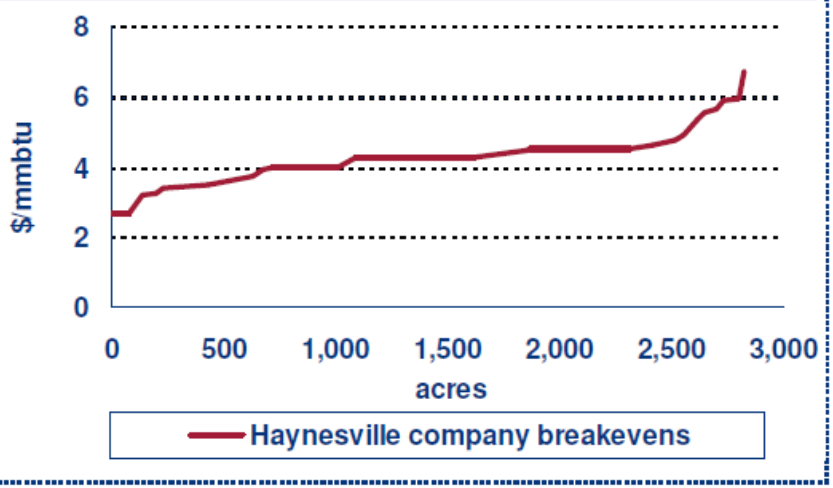
Shale Play Break-evens Cap the Market

In 2012 low-cost gas supply is increasing from associated and rich-gas sources. But average play breakevens only tell part of the story for higher-cost plays

2012 US new-drill supply and at risk rigs



Haynesville operators' breakevens

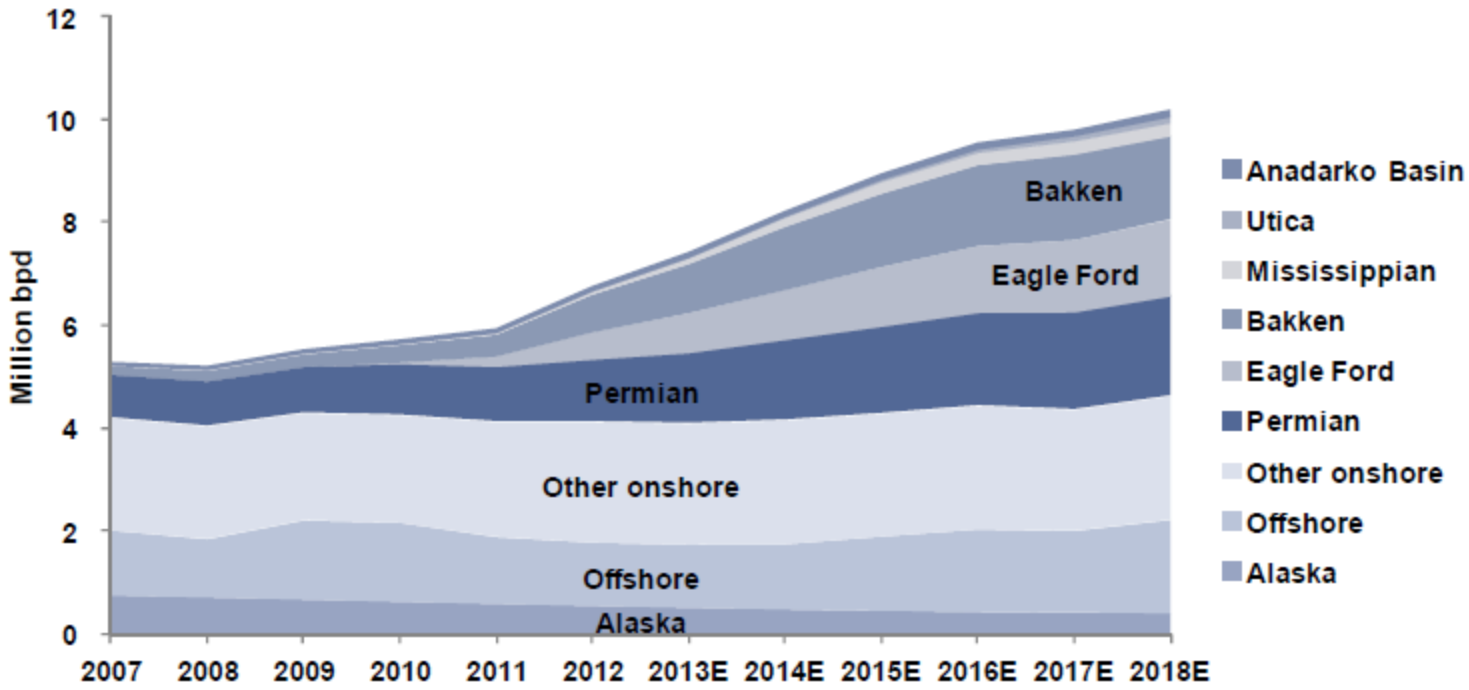


- 45% of new-drilled gas volumes have breakevens below $3/mmbtu, while 33% of gas rigs operate in plays with breakevens below $3/mmbtu
- 200 gas rigs operate in plays with average breakevens above $4/mmbtu, contributing 26% of new-drilled gas volumes
- The cost curve at left shows average breakevens by play, but each play features a range of breakevens—supporting some drilling even in plays with higher costs on average, as illustrated in the Haynesville chart at right

Sources: Wood Mackenzie North America Gas Service, Upstream Service, Company reports

US Oil Boom

Annual US crude oil production, 2007-18E, million barrels per day



Source: EIA, Goldman Sachs Research estimates

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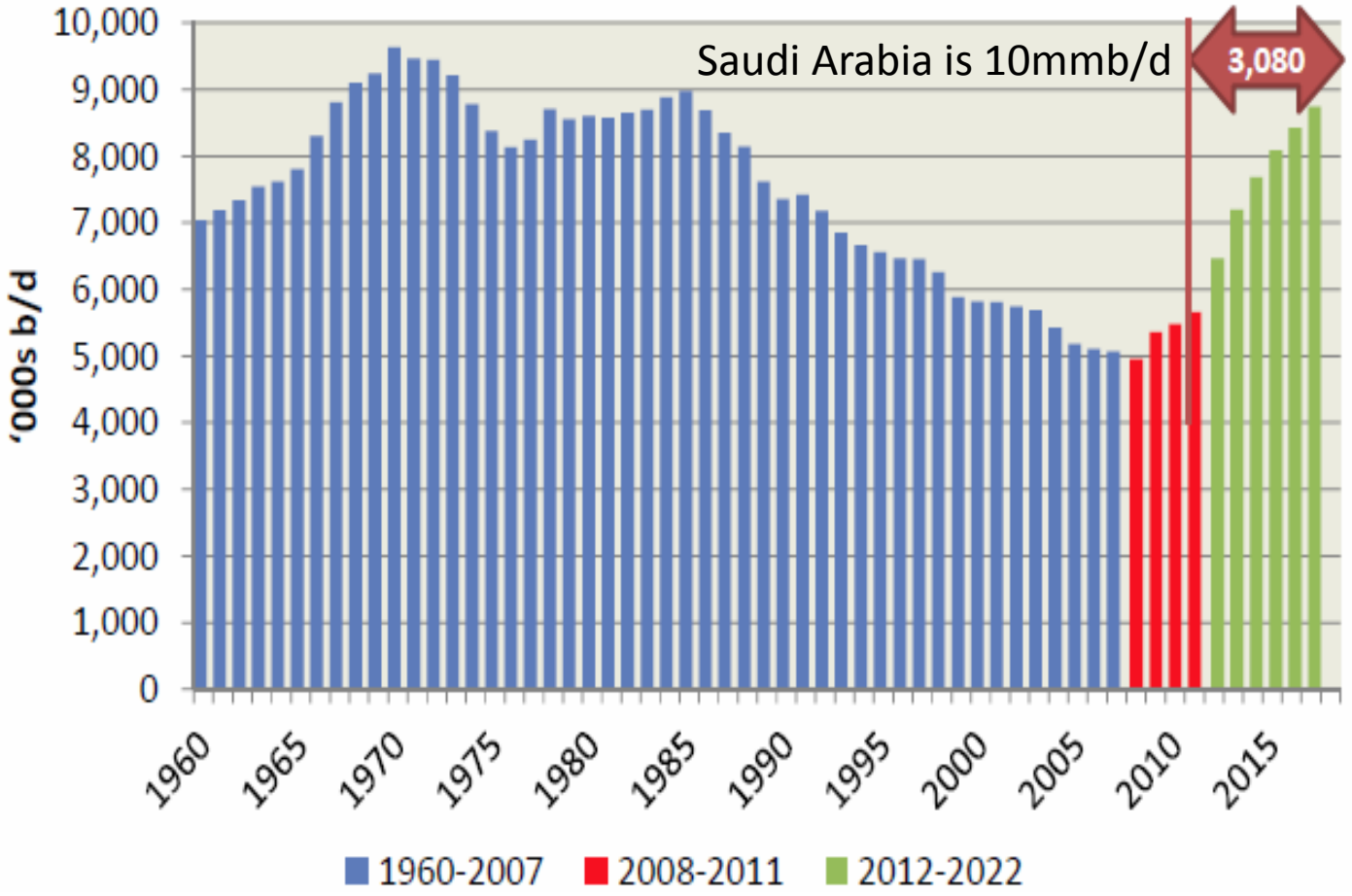
US Crude Oil Production



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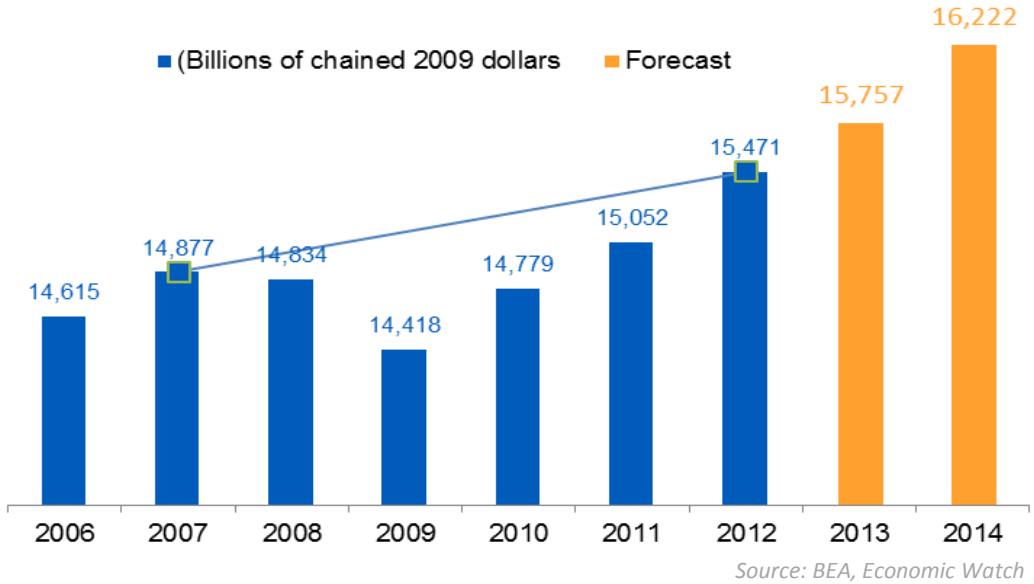
Weak Demand

Weak Demand: .8% Realized GDP Growth '07-'12



Source: BEA, Economic Watch

- Structural industrial demand losses due to global recession.
- Structural job losses due to global recession.
- Increase in proportion of economy based on services.
- Increased productivity.
- Demand response and efficiency.

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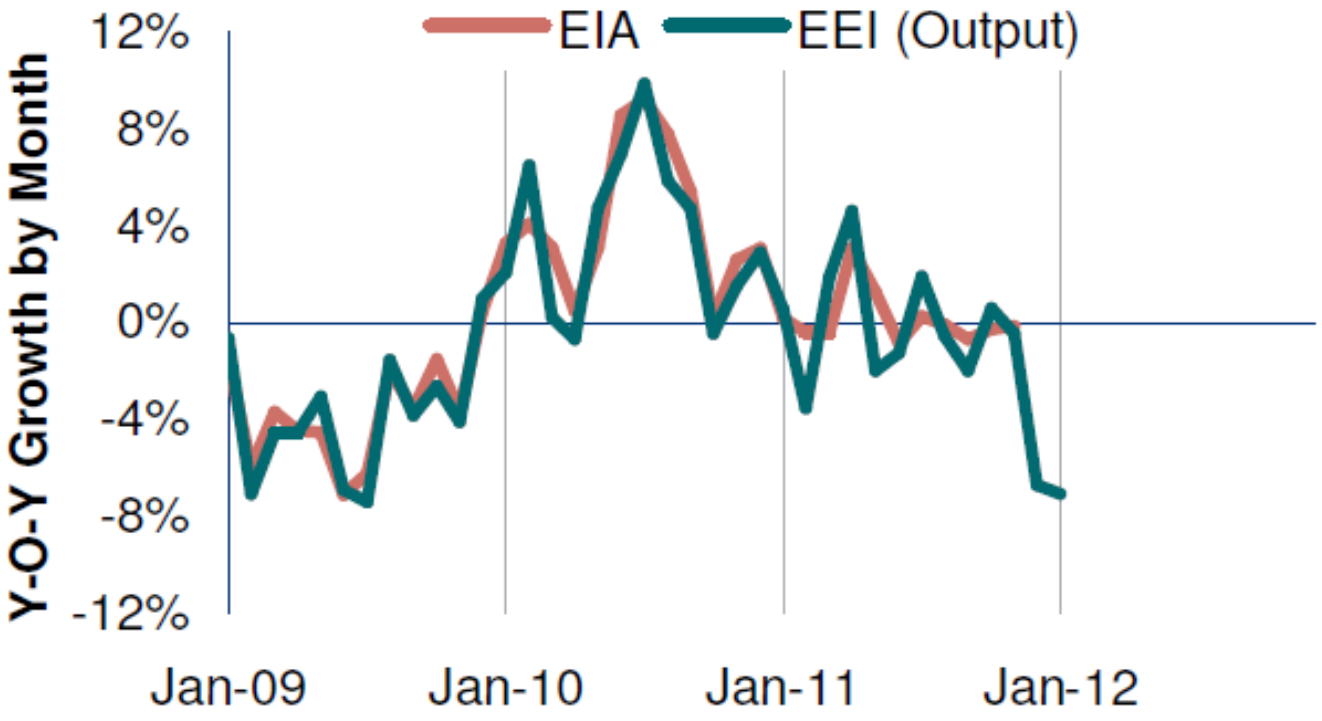
Growth in US Electricity Demand and Output



Source: EIA, EEI and Wood Mackenzie North America Power Service

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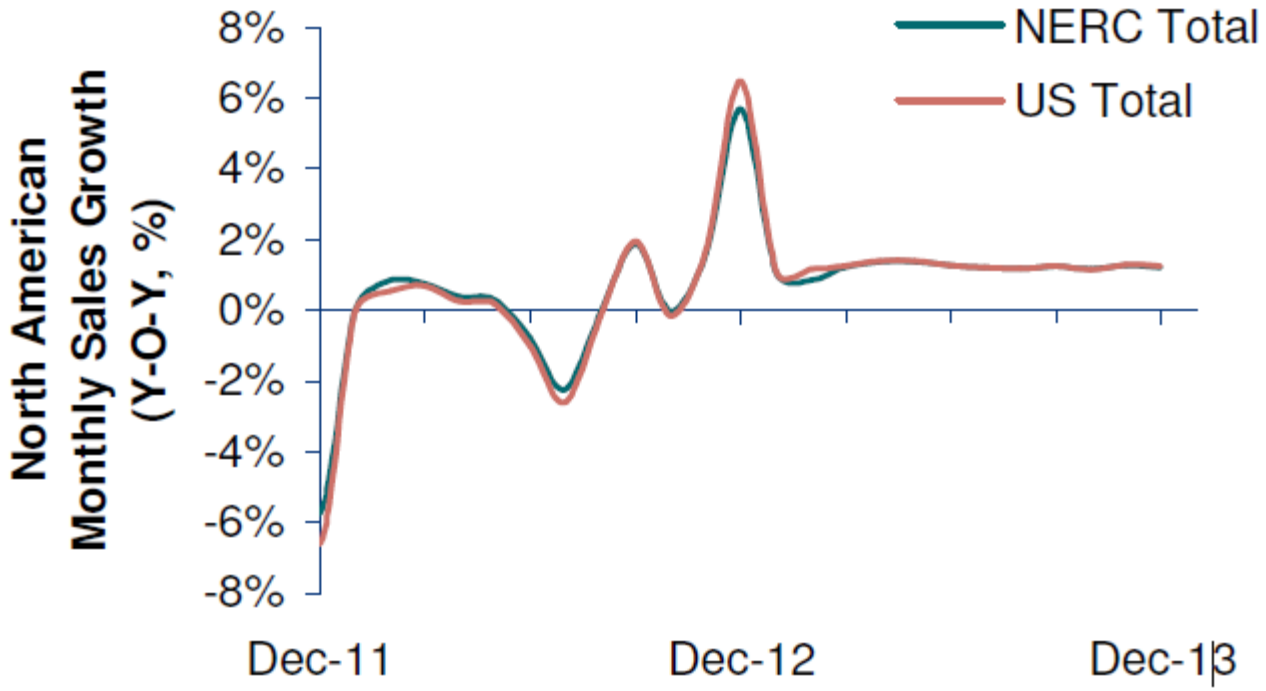
Sales Growth (yoy)



Source: Wood Mackenzie North America Power Service

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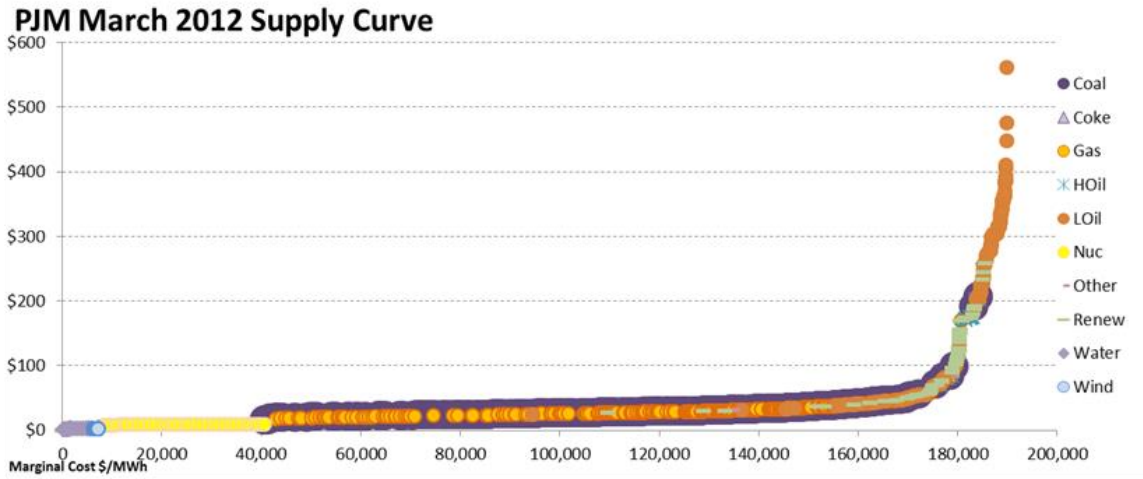
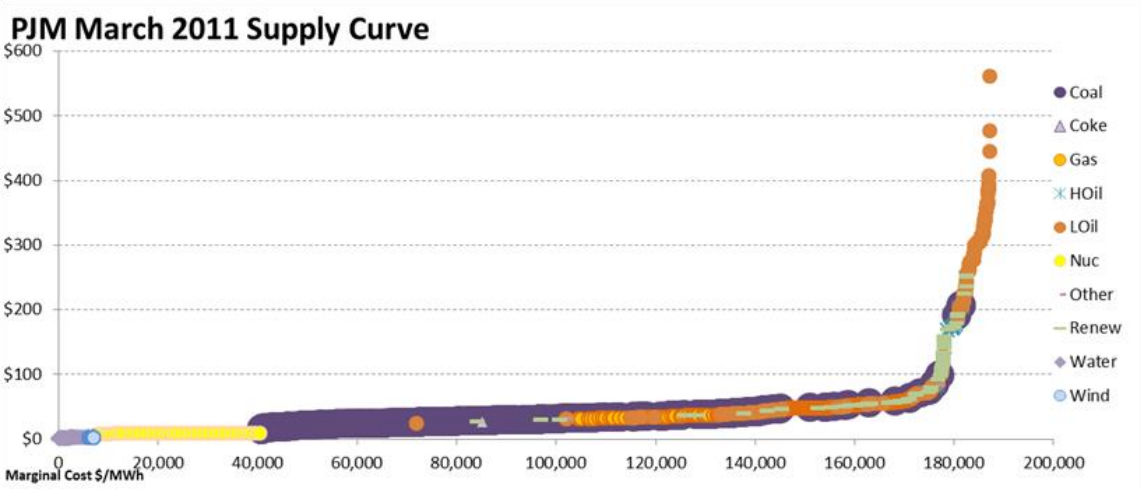
Coal-to-Gas Switching

Coal-to-gas Switching





- Natural gas weakness has pushed gas generation below coal generation in the dispatch stack in many regions (SERC, PJM first)
- This switching has grown to the extent that not only CCGTs, but also peakers have begun to displace coal assets
- The extent of switching is a function of the market's ability to adjust to coal on the margin
- Our estimate is that with current forwards, a normal summer will result in 3.4bcfd switching

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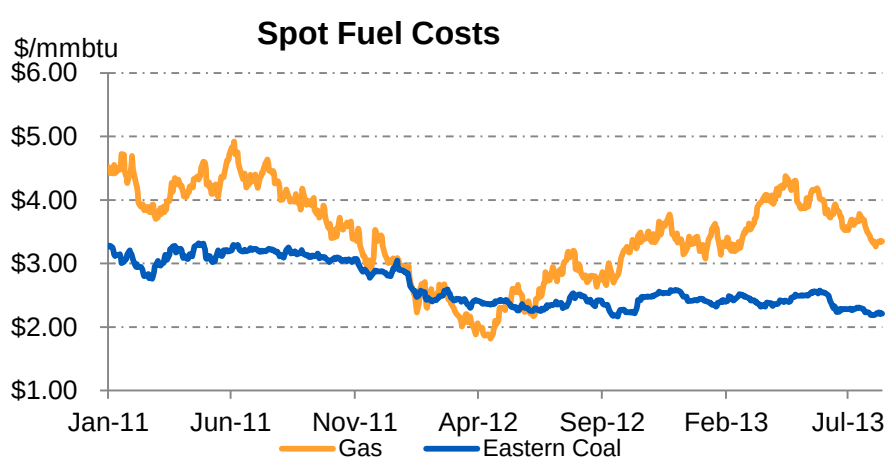
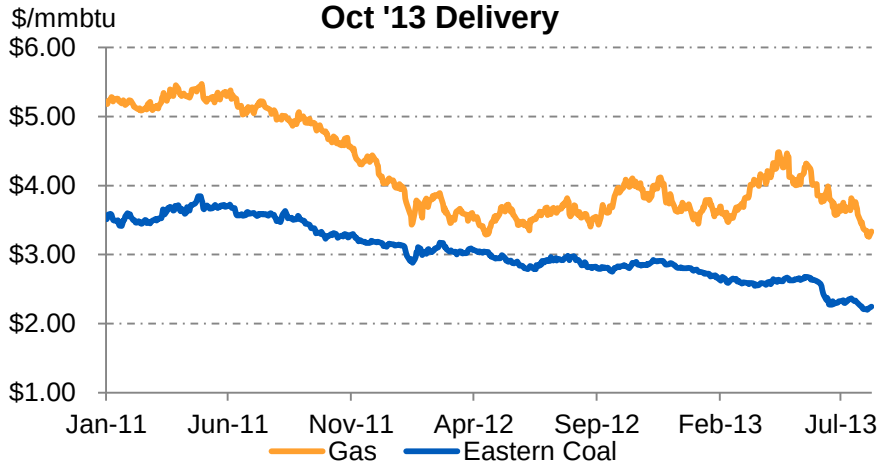
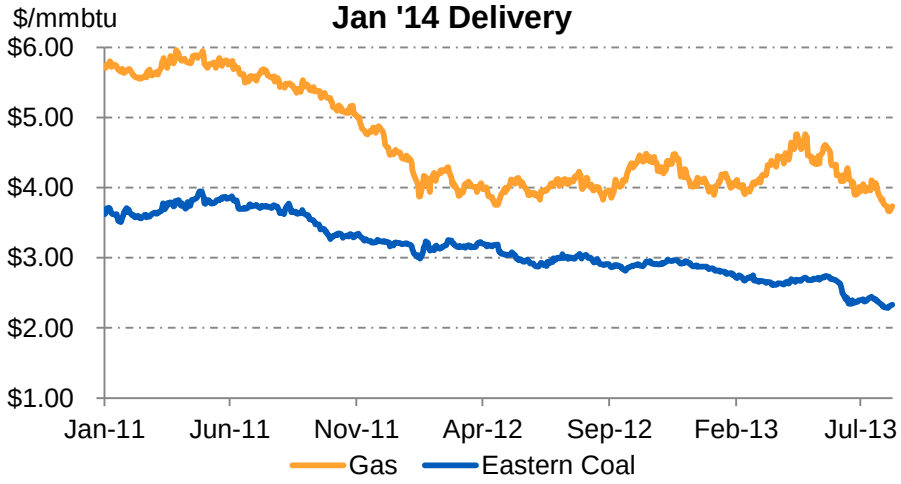
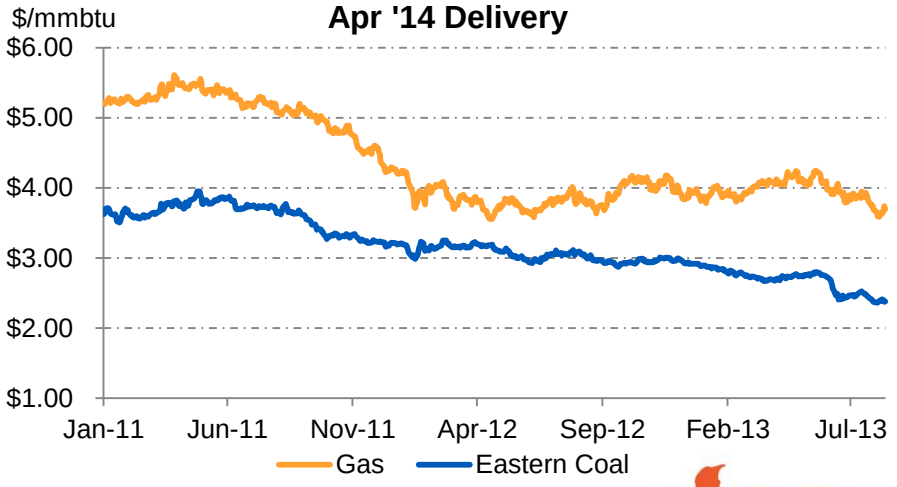
Coal-to-gas Switching Economics









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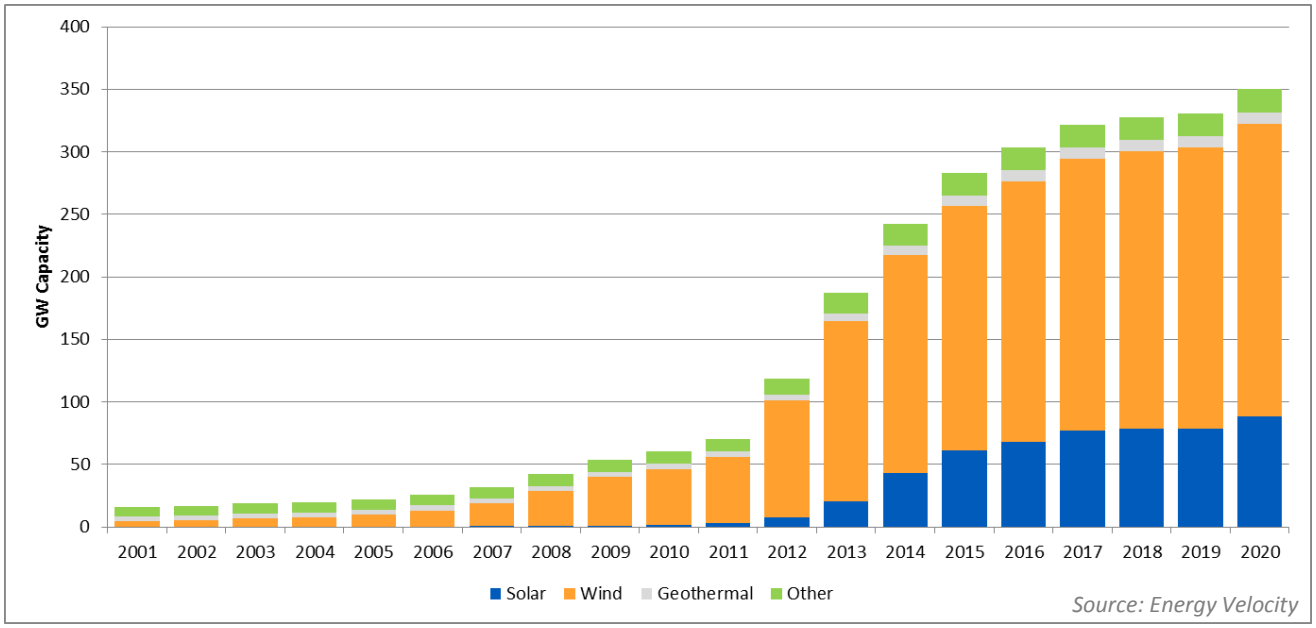
Growth of Renewables

Growth of Renewables

Since 2001 more than 3,000 MW of solar and 50,000 MW of wind have been built across North America, with consequences:

- Increased congestion;
- Increased need for expensive peaking, quick-start and regulation services;
- Dampening of forward curves with consequent affect on new build economics.

United States Renewable Generation and Proposed Generation



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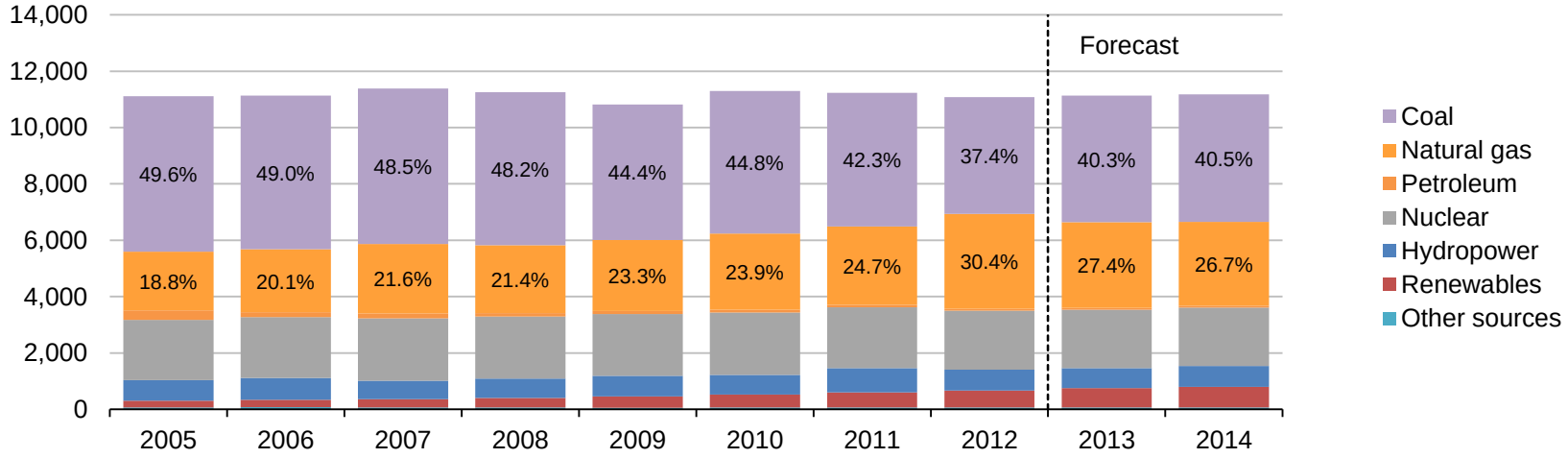
Changing US Generation Mix

- Natural gas' share of total generation has gone from approximately 12% in 2001 to more than 30% in the 2012 .
- Non-hydro renewable generation is growing from 5% share in 2012. Wind penetration is already affecting power plant dispatch and prices in ERCOT, MISO and Pacific Northwest.
- The growth in gas and renewable generation has largely come out of coal's share of total generation.

North American Power Generation by Fuel Type

U.S. Electricity Generation by Fuel, All Sectors

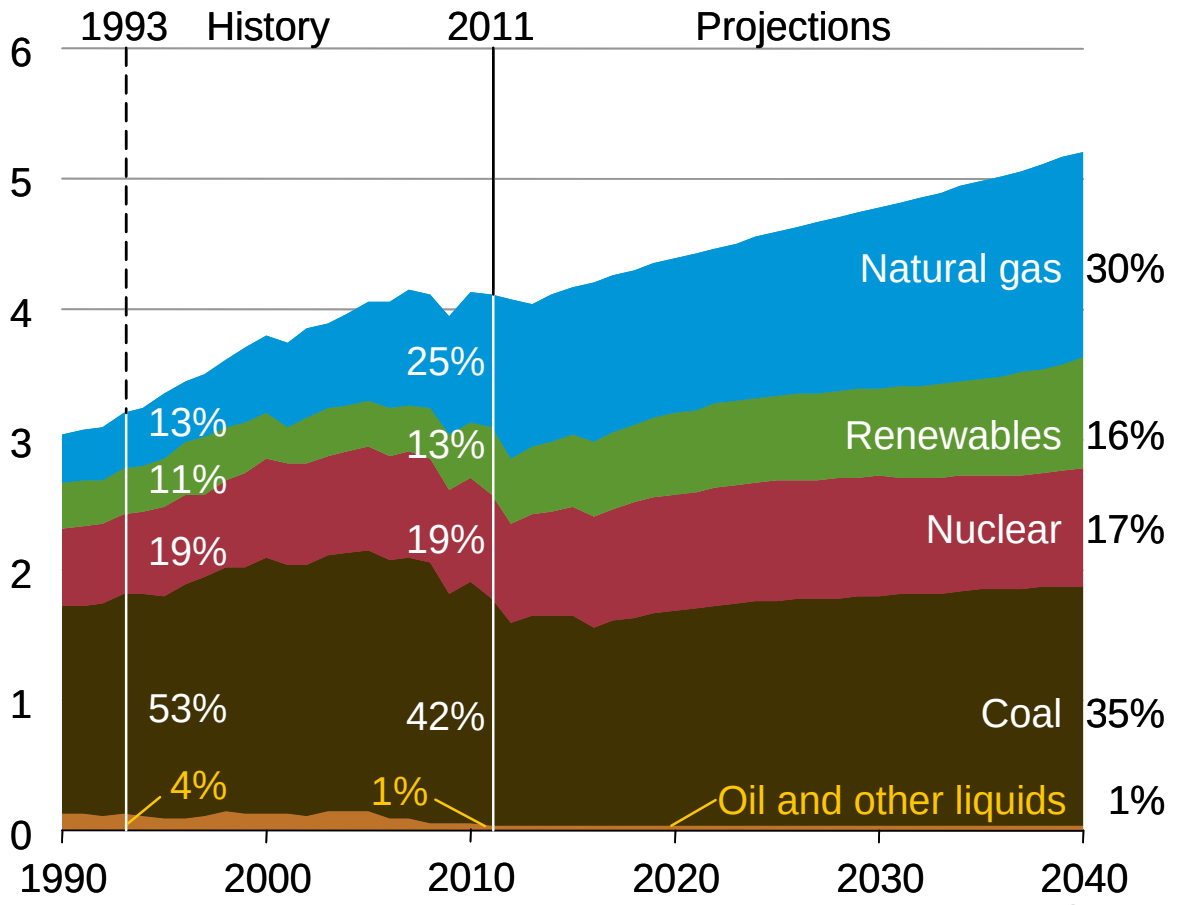
thousand megawatt hours per day



Note: Labels show percentage share of total generation provided by coal and natural gas.

Changing Fuel Mix

Electricity generation by fuel type ((trillion KWh per year))



Source: EIA

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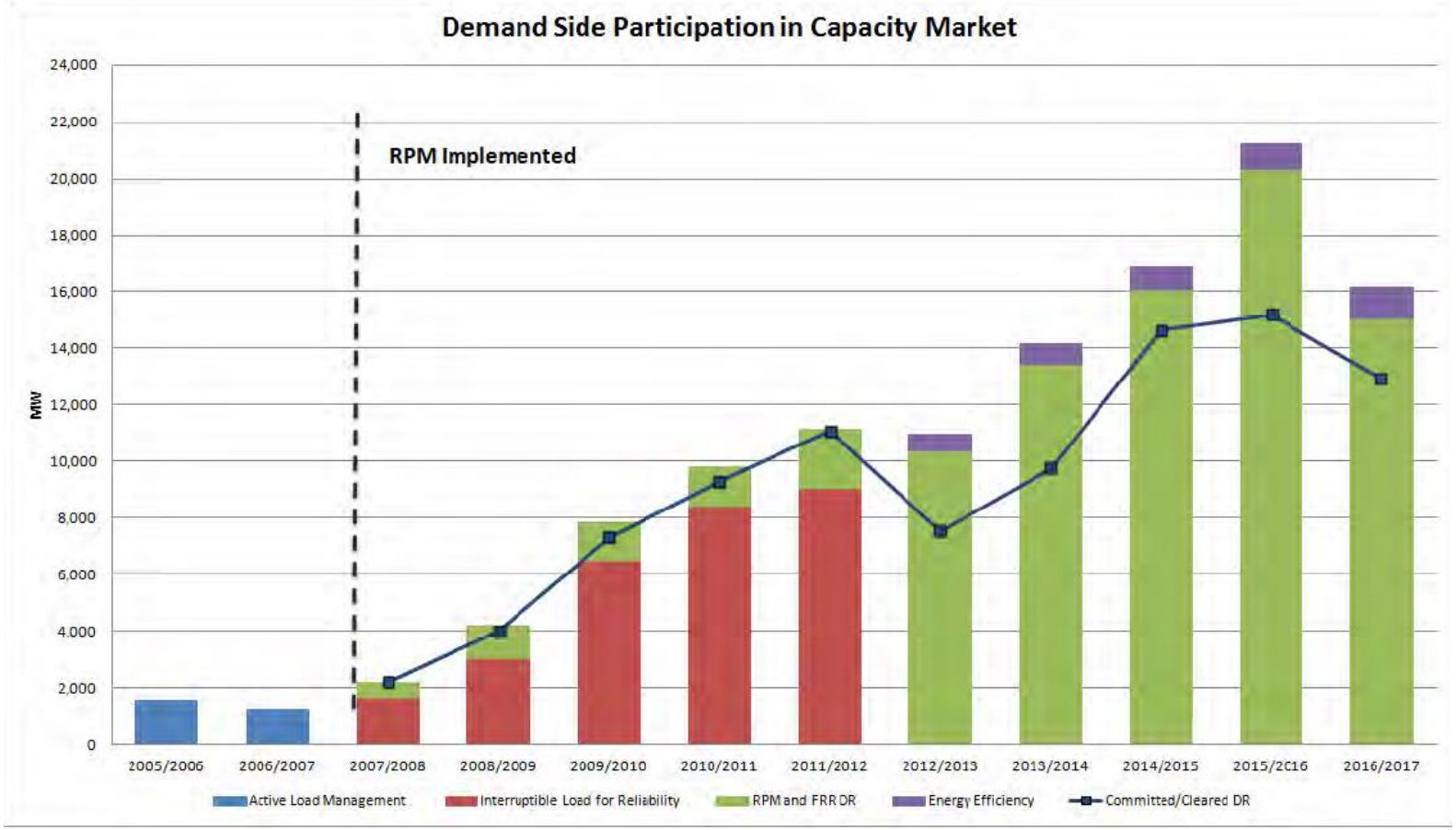
Demand Response & Efficiency

Growth of Demand Response (PJM)



Source: PJM

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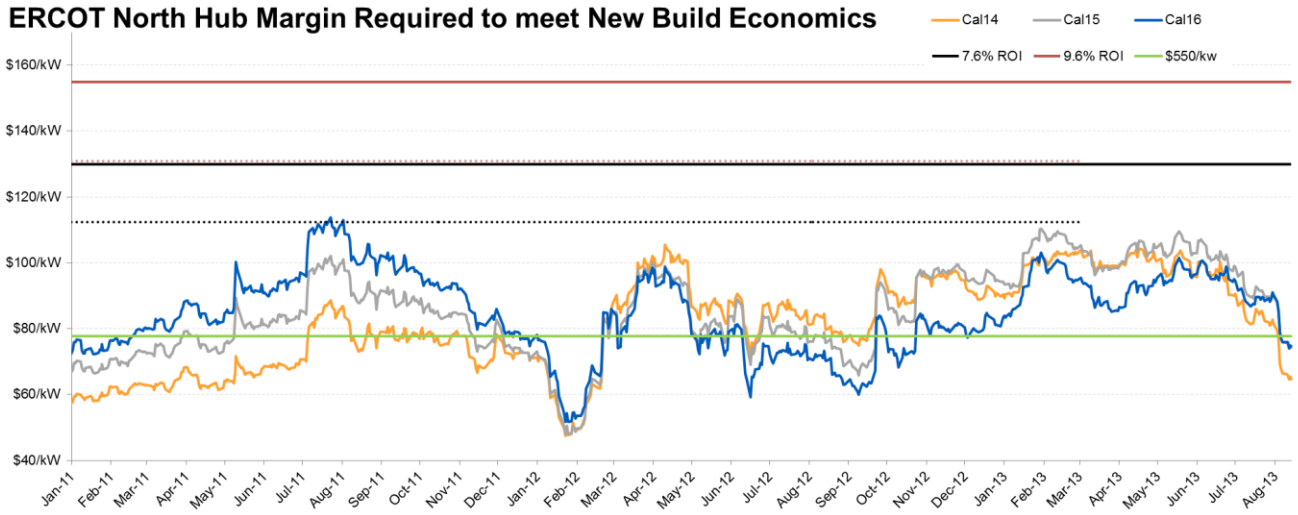
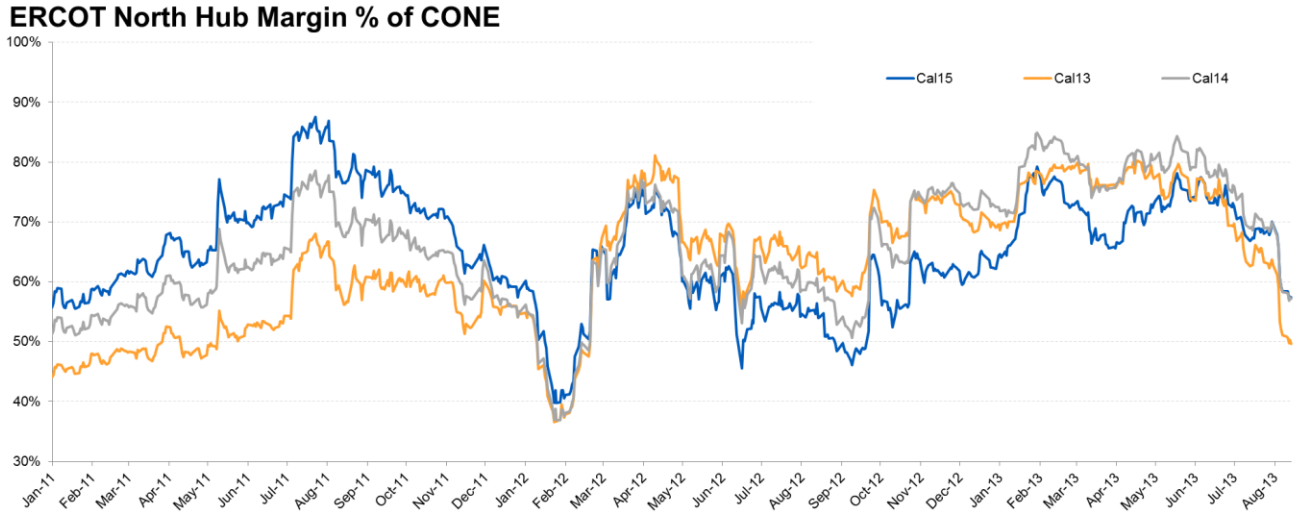
Resource Adequacy

Forward Curves Do Not Support New Build in ERCOT





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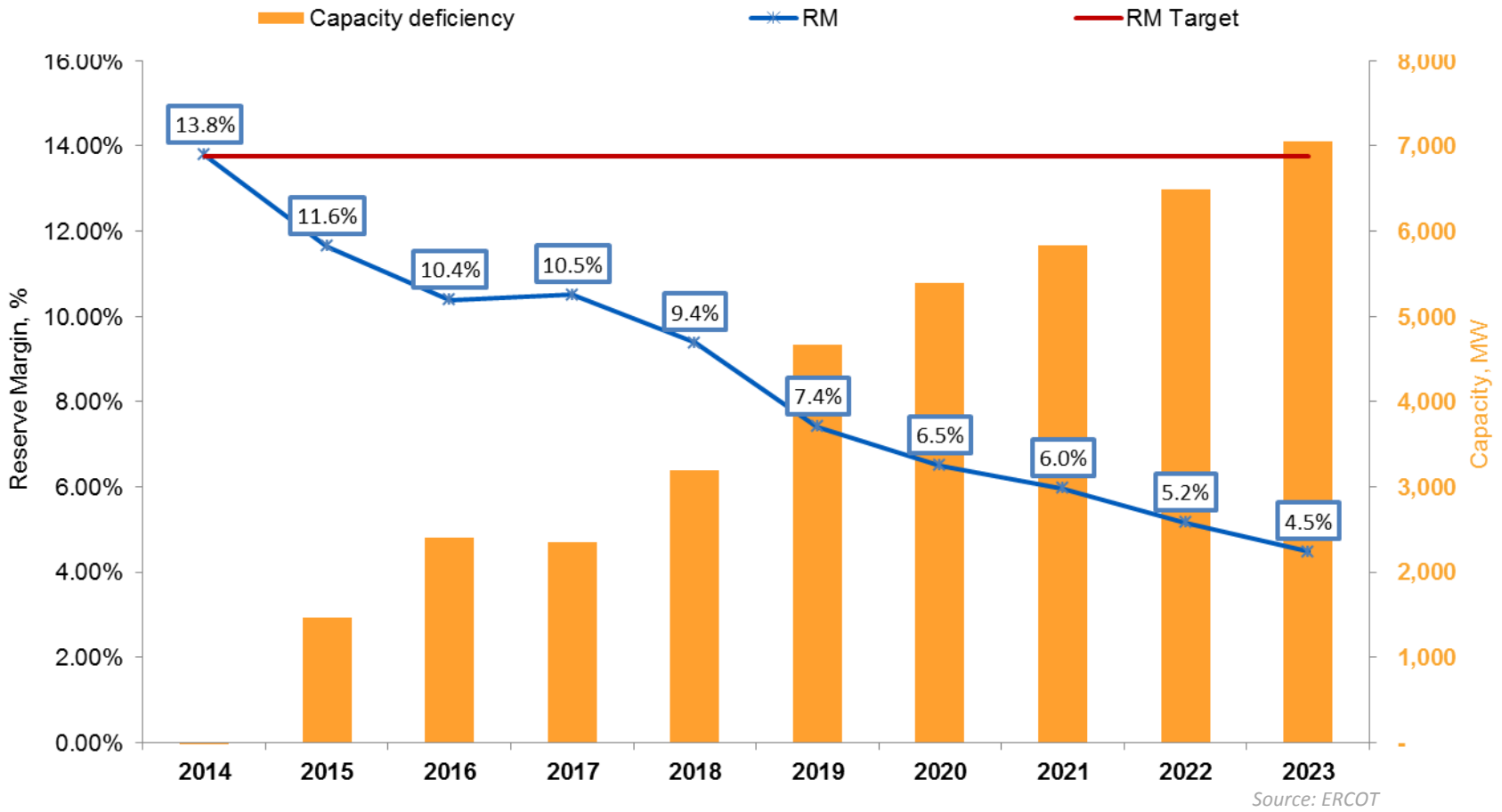
Yet, Reserve Margins (RM) Decline

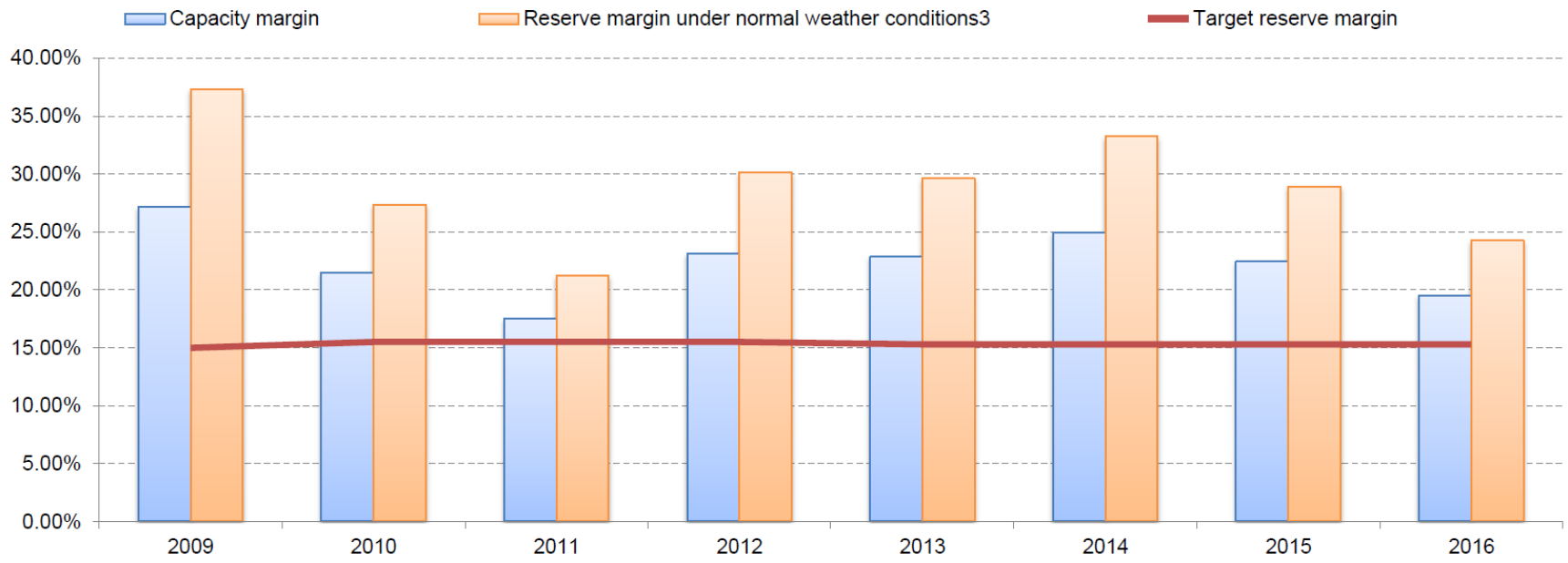


Source: ERCOT

EDF

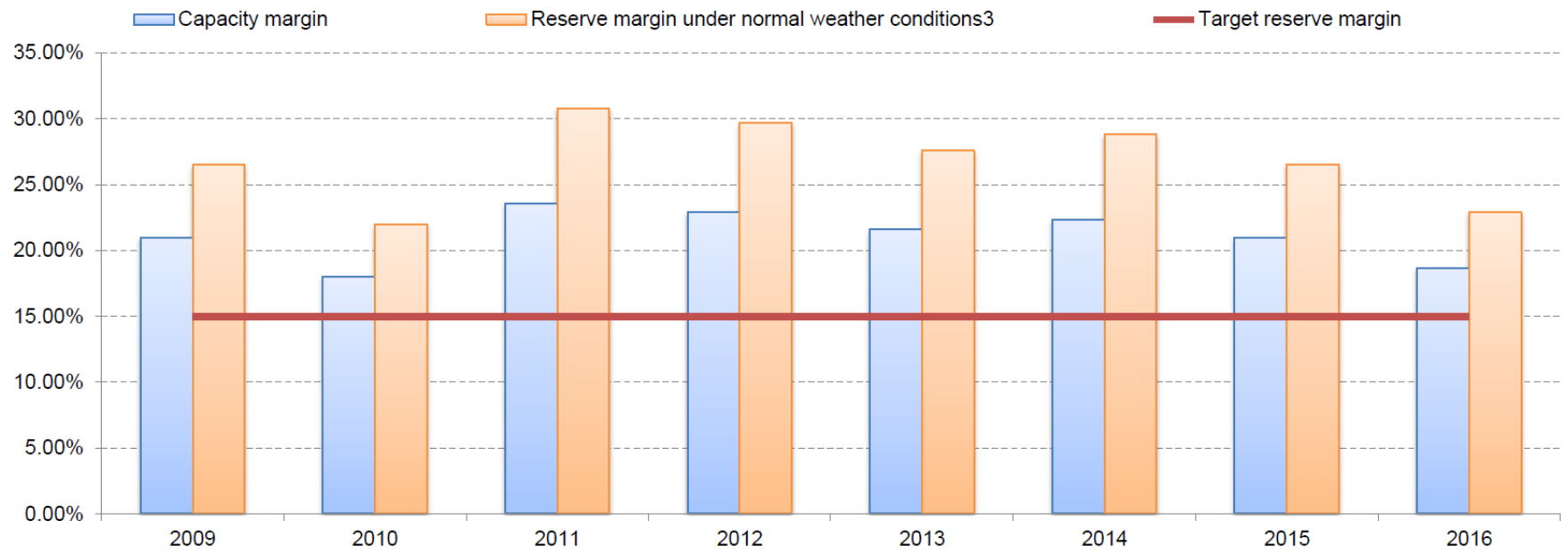
Excess Reserve Margins Persist in East

Summer Peak Demand, Supply, and Capacity and Reserve Margins



Excess Reserve Margins Persist in West

Summer Peak Demand, Supply, and Capacity and Reserve Margins



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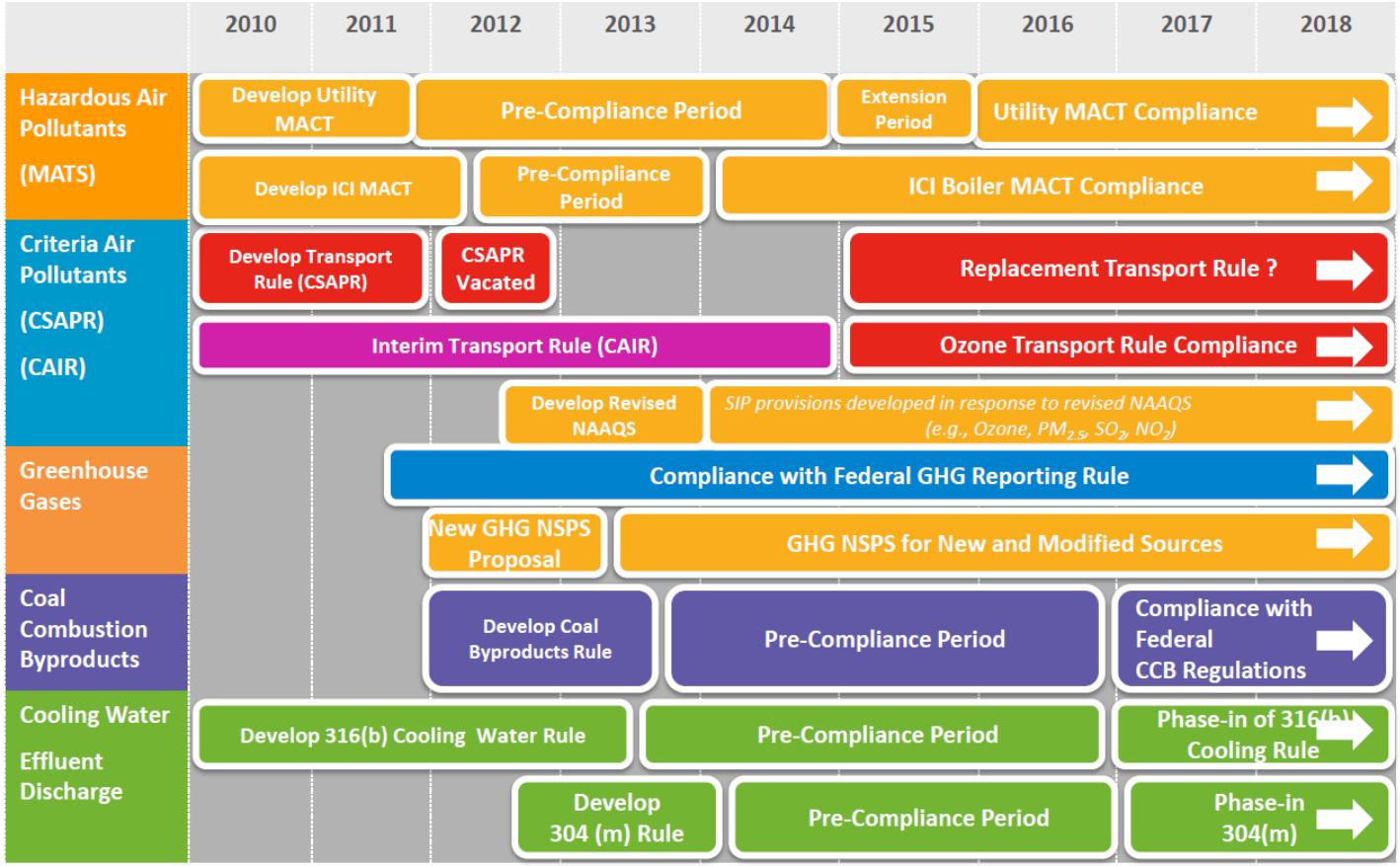
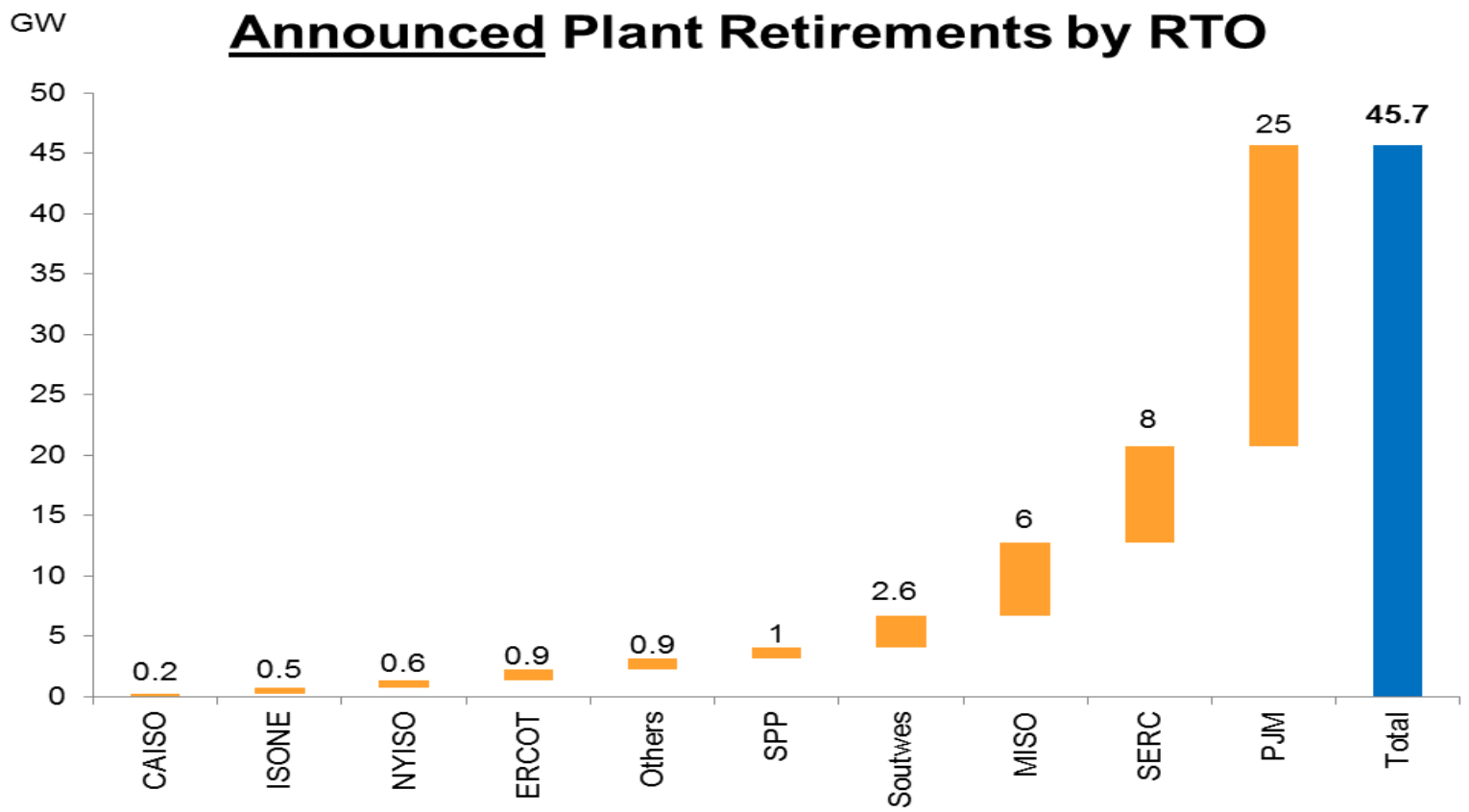
Regulatory Pressure

Regulatory Pressure

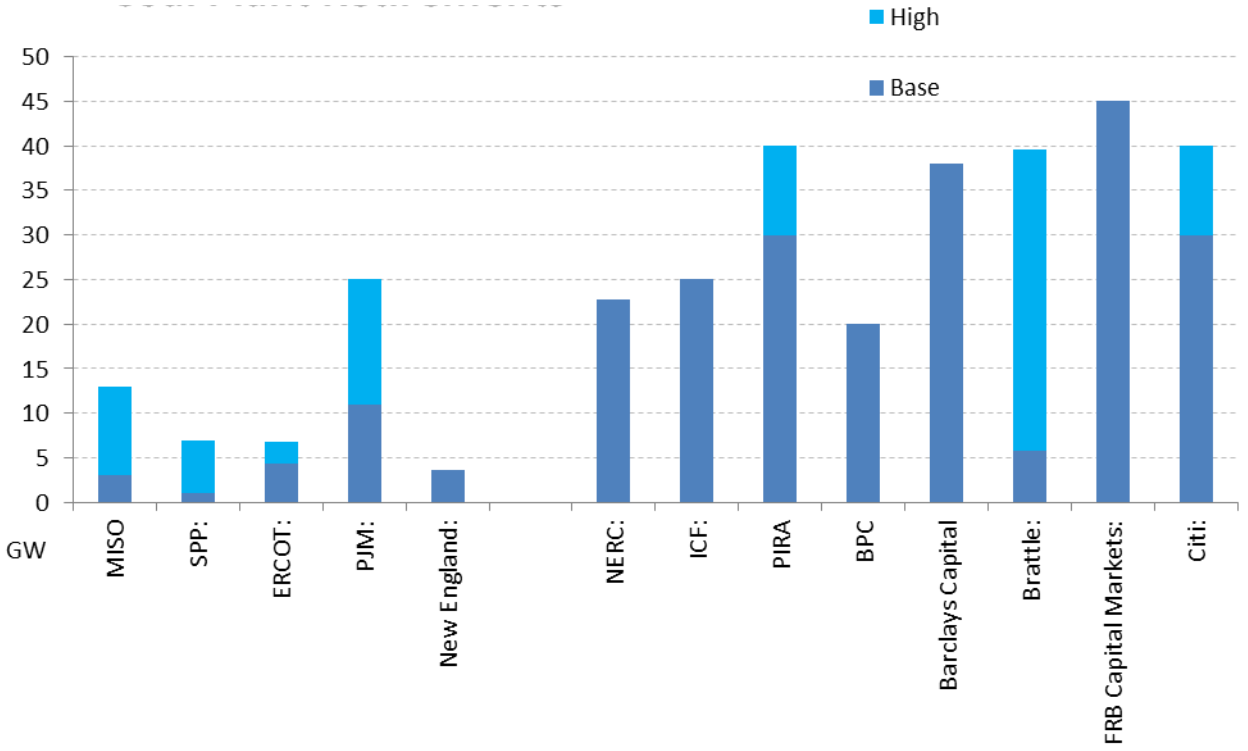


Source: PJM; adapted from M. J. Bradley & Associates LLC

Capacity Reductions Key in Many Regions



Coal Plant Retirements



Source: Barclays

- Retirements from EPA mandates are estimated to be between 20 and 50 gigawatts, with some outliers around 70 gigawatts
- At least 10 gigawatts are already in the process

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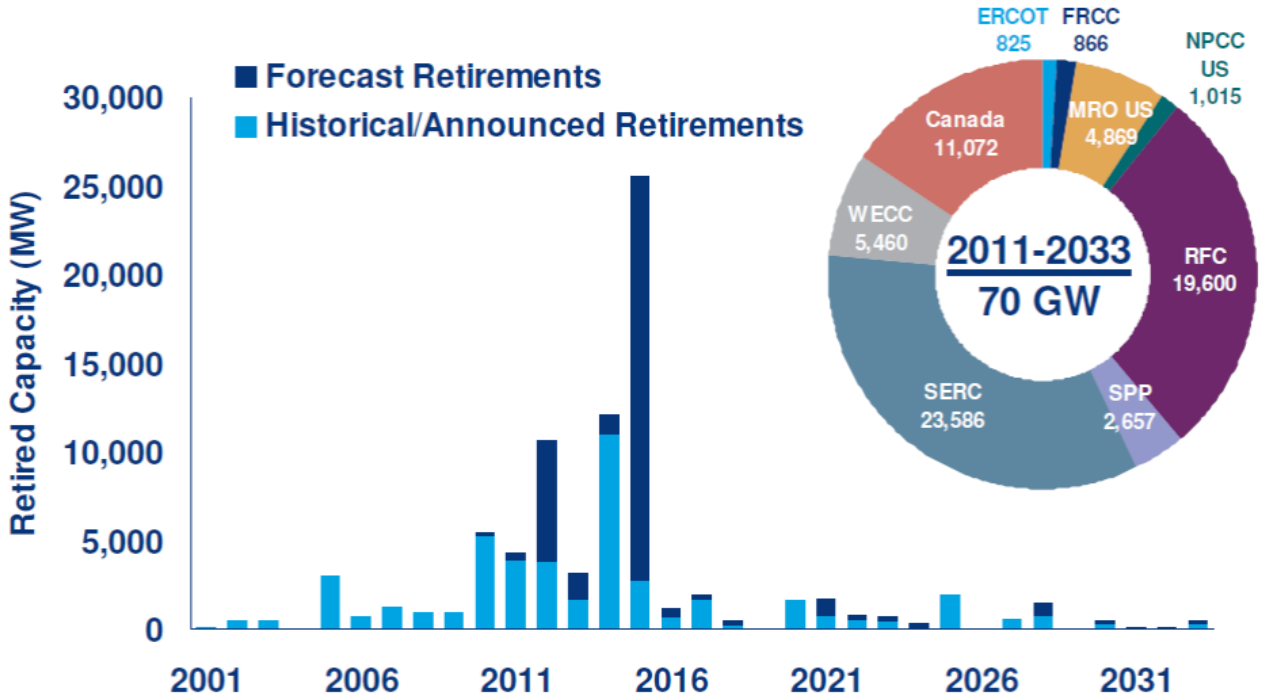
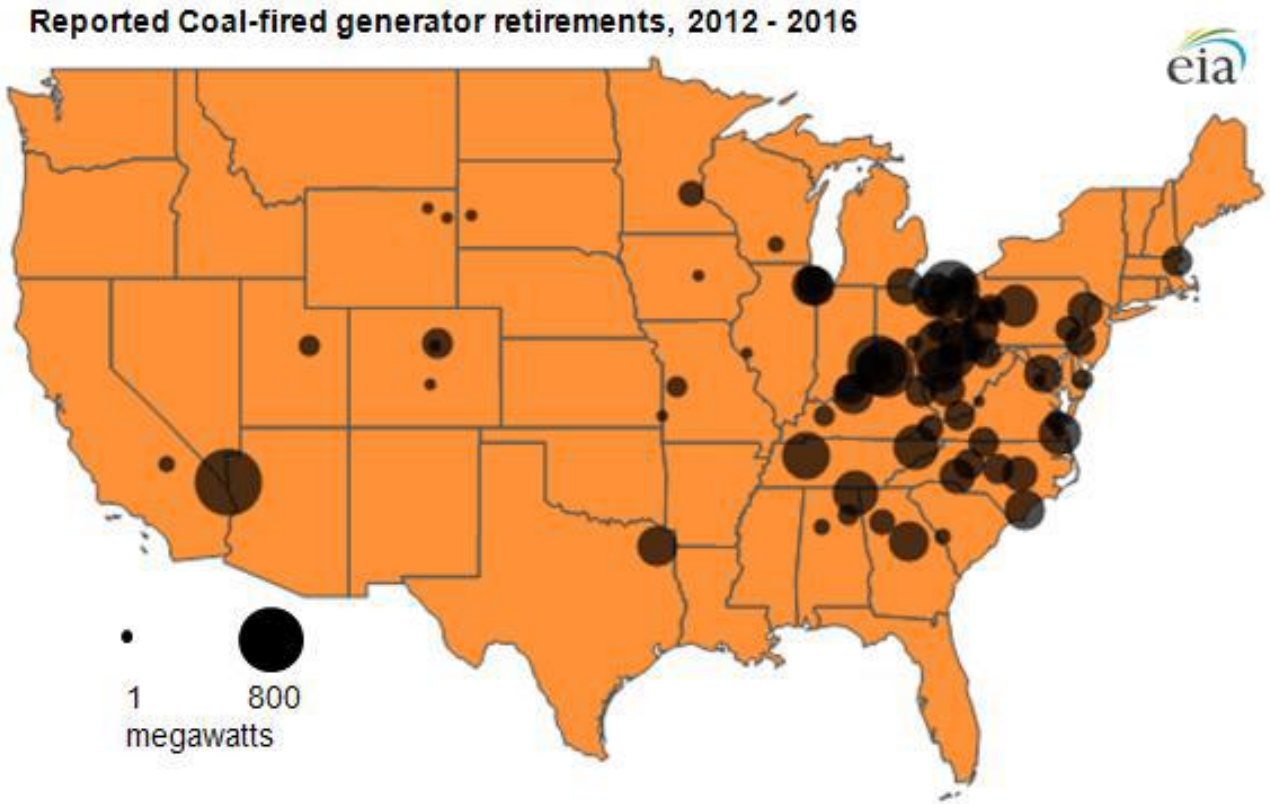
Coal Plant Retirements



Wood Mackenzie

EDF

Coal Plant Retirements



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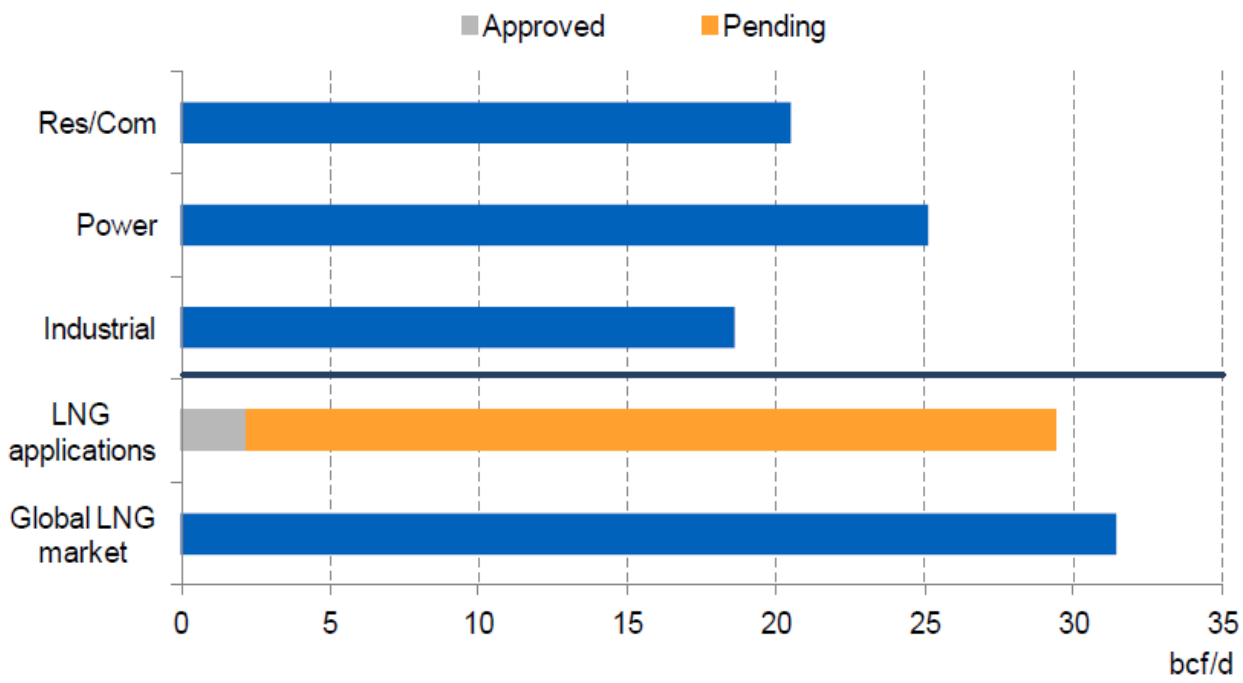
LNG Exports

LNG Exports

Fig 1. LNG export applications vs. primary US demand sectors and global LNG market



Source: EDFT, EIA

- First exports in 2015
- DOE assumes a net macroeconomic benefit to the US economy
- 23 applications represent over 29bcf/d of natural gas export capacity (size of current global market)
- Most experts assume 6 to 12 bcf/d of final approved capacity
- Making LNG larger than any other potential form of price shock in the US market
- Also contributes to local congestion
- However, supports domestic production

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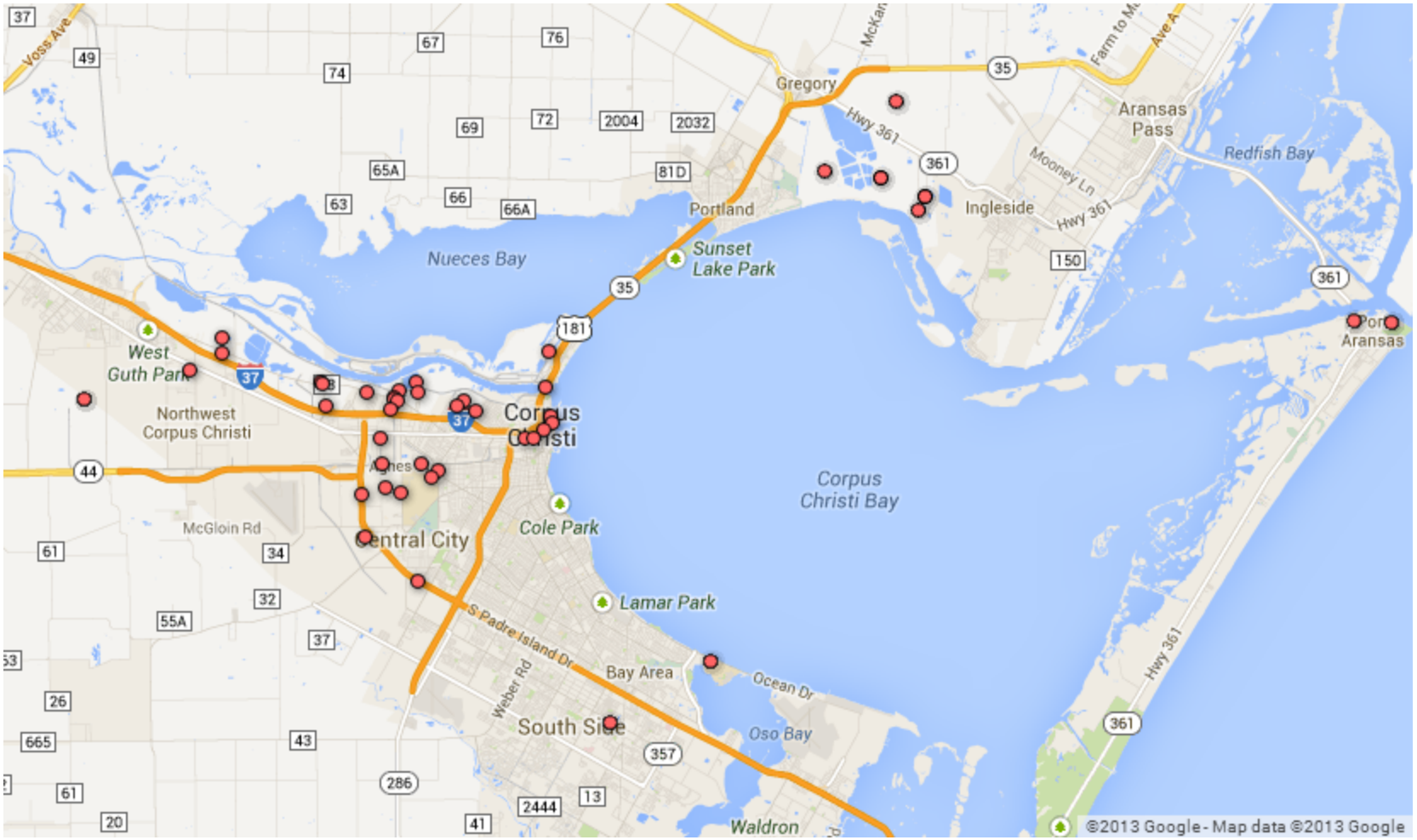
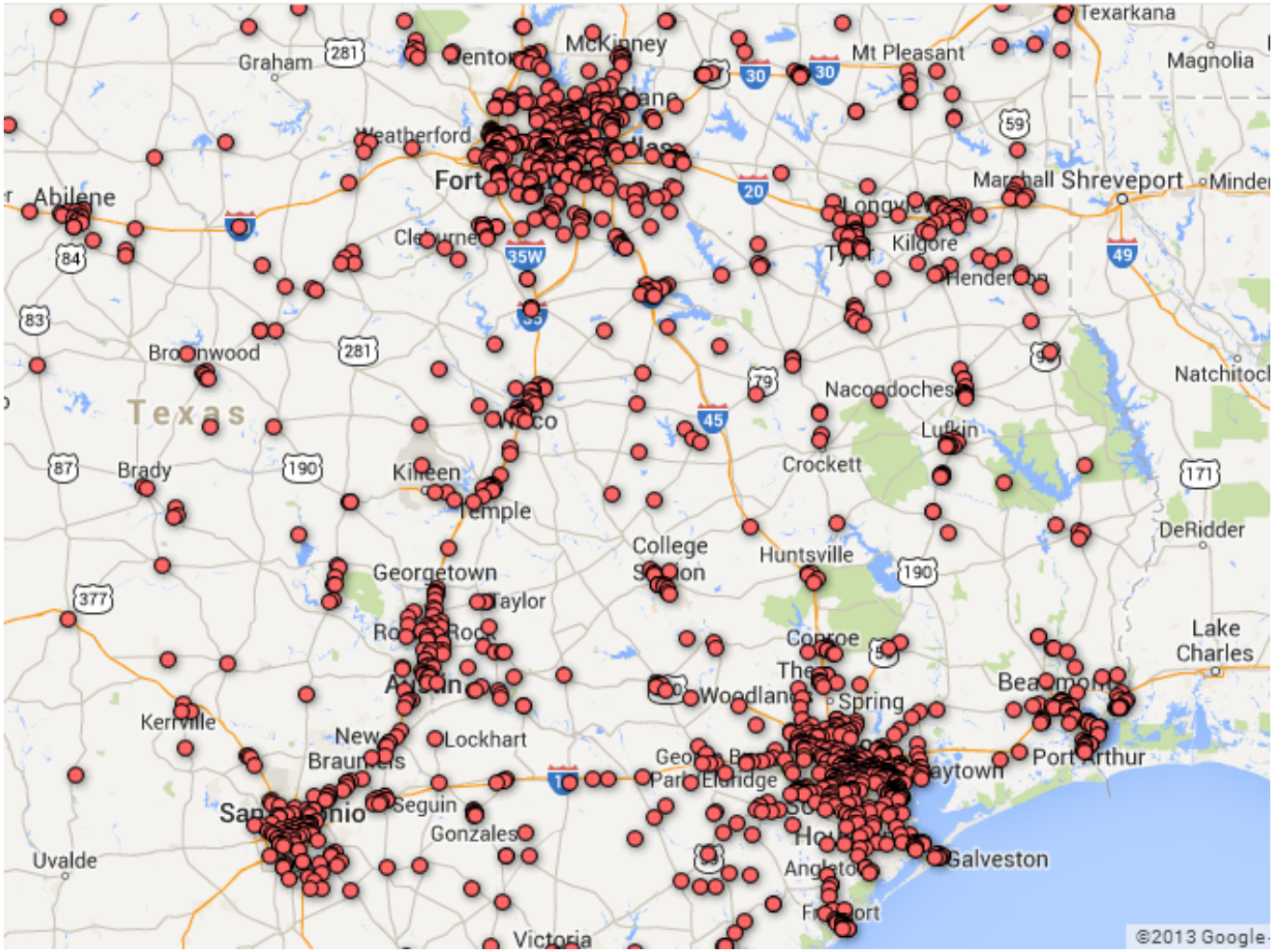
US Industrial Renaissance

US Industrial Renaissance: Led by Shale



Source: EDFT and IIR with Google Fusion Tables

US Industrial Renaissance: Led by Shale



Source: EDFT and IIR with Google Fusion Tables

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Conclusions

Conclusions

- **Shale gas/tight oil explosion will not abate**
- **Weak demand is already recovering, yet with efficiency**
- **Coal-to-gas switching provides a floor to the market**
- **Renewables will continue, but with pause for infrastructure build-out and solutions for intermittency**
- **Demand Response and efficiency will revolutionize consumption**
- **Resource adequacy and reserve margin challenges will not be easy to fix**
- **CSAPR and other regulations add real costs, and reduce liquidity in the short run**

Source: EDFT and IIR with Google Fusion Tables

Battle of the Fundamentals: Manage Risk!