

U.S. Petroleum and Biofuels Outlook



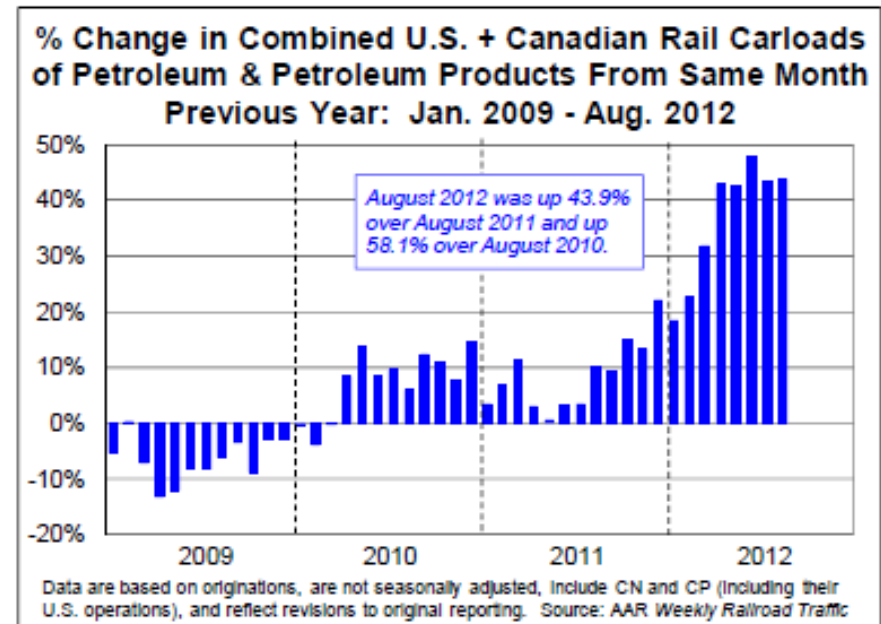
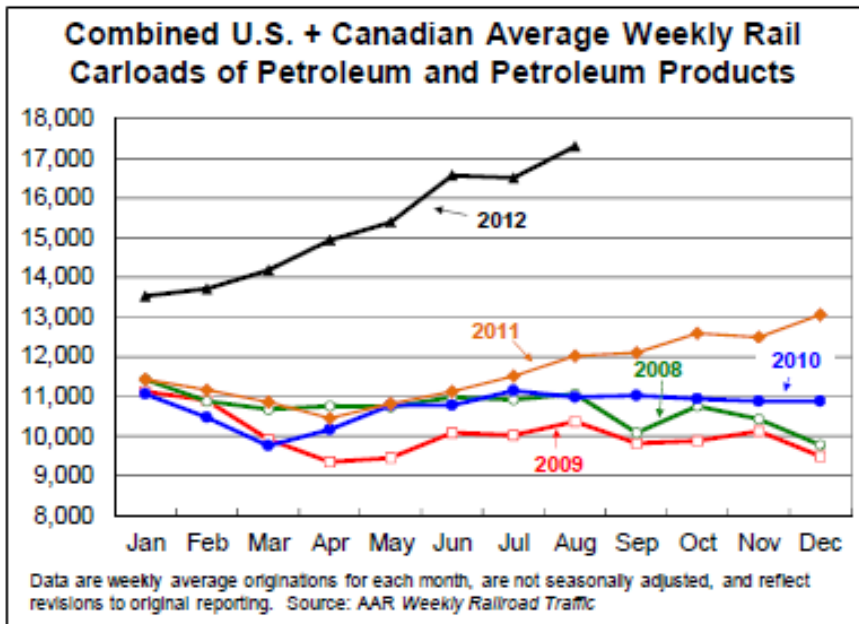
*Rail Energy Transportation Advisory Committee
Mindi Farber-DeAnda and Michael Bredehoeft
Biofuels & Emerging Technologies, Office Energy Analysis*

September 20, 2012/ Washington, DC

Overview

- Crude oil & petroleum products
 - Recent developments
 - Tight oil, shale plays – historic and projected growth
 - Movements between regions
- Biofuels
 - Status
 - Producing vs. consuming regions
 - Projected growth

Dramatic increase in carloads of crude oil and petroleum products



Source: AAR Weekly Railroad Traffic. September 2012.

Mindi Farber-DeAnda and Michael Bredehoeft
 RETAC Fall Meeting
 September 20, 2012

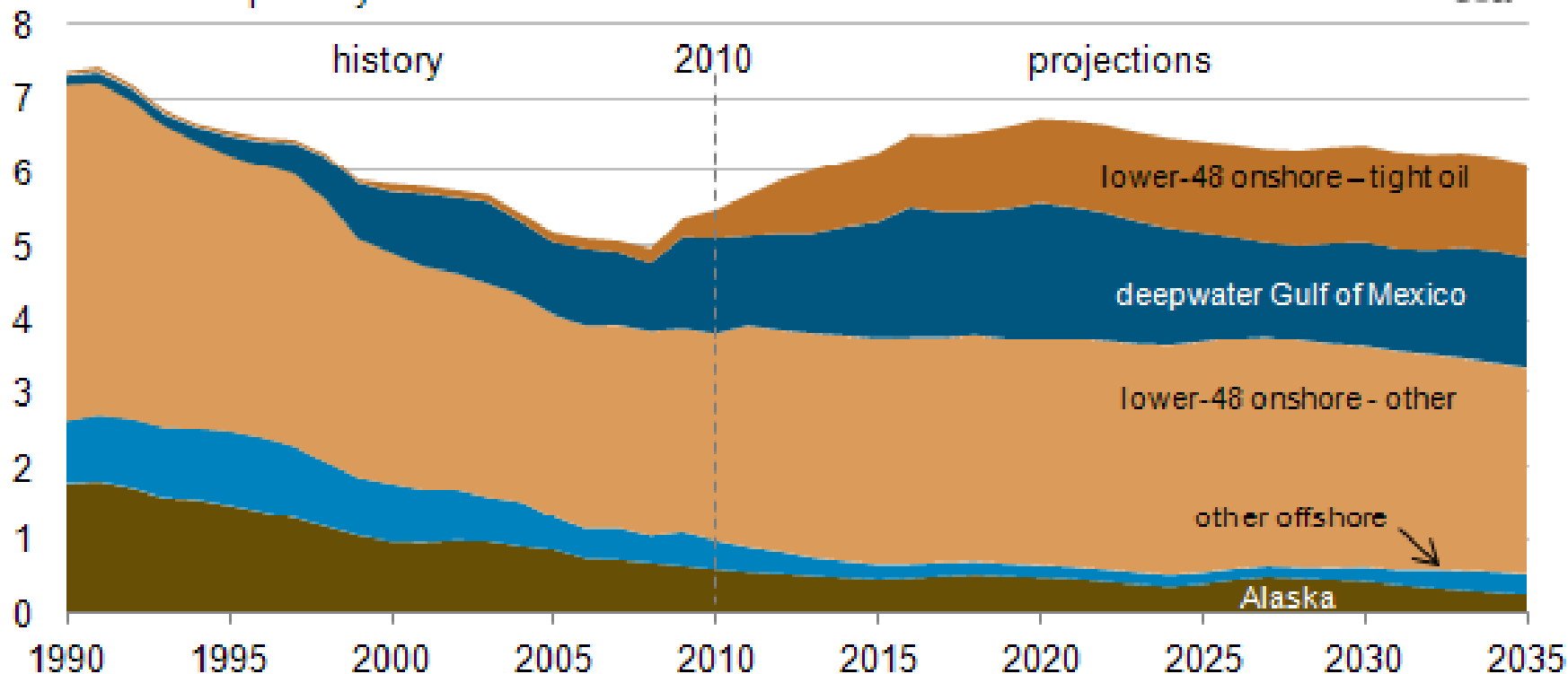
Recent developments in petroleum production

- **Drilling technologies unlocking new hydrocarbon resources**
 - Directional Drilling – allows well to access more of reservoir
 - Fracking – fracturing of the rock using high-pressure fluid in order to unlock hydrocarbons
- **Increased crude oil production changing movement patterns**
 - Increased domestic production in Midwest
 - Increased crude oil and product imports from Canada
 - Increased product exports to Mexico
- **Infrastructure**
 - Many new discoveries located inland
 - Lack of petroleum industry infrastructure – pipelines, ports, rivers

EIA projects tight oil will drive U.S. crude oil production growth

U.S. crude oil production

million barrels per day



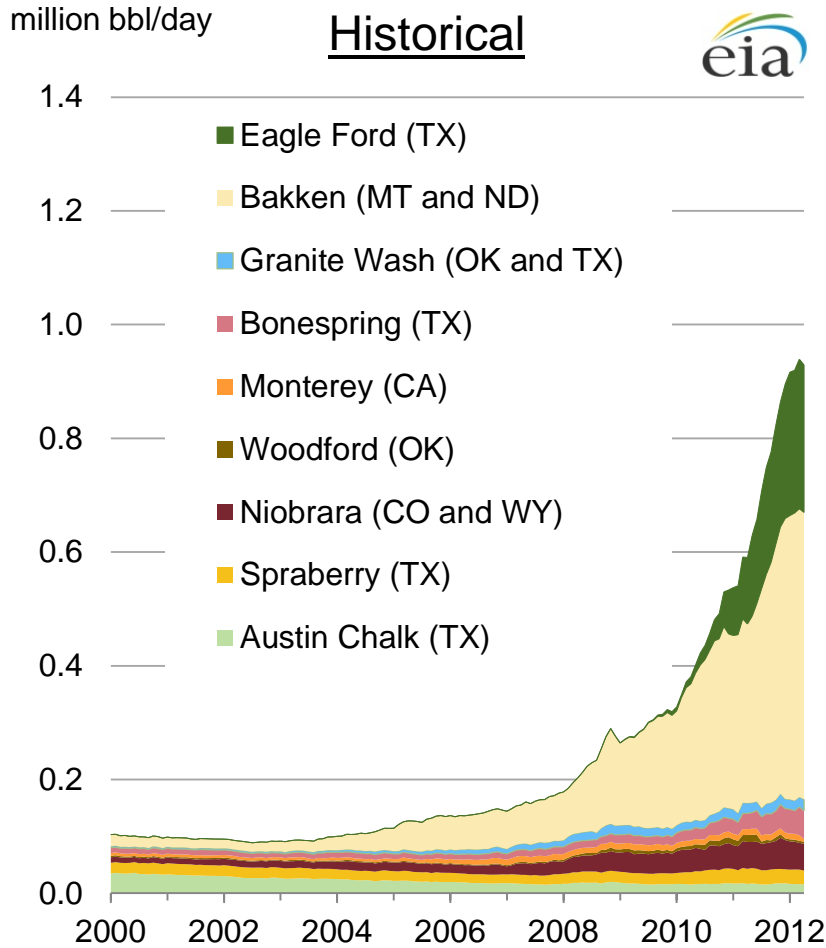
Source: U.S. Energy Information Administration, *Today In Energy*. February 12, 2012
AEO2012 Early Release.

North American shale plays (as of May 2011)

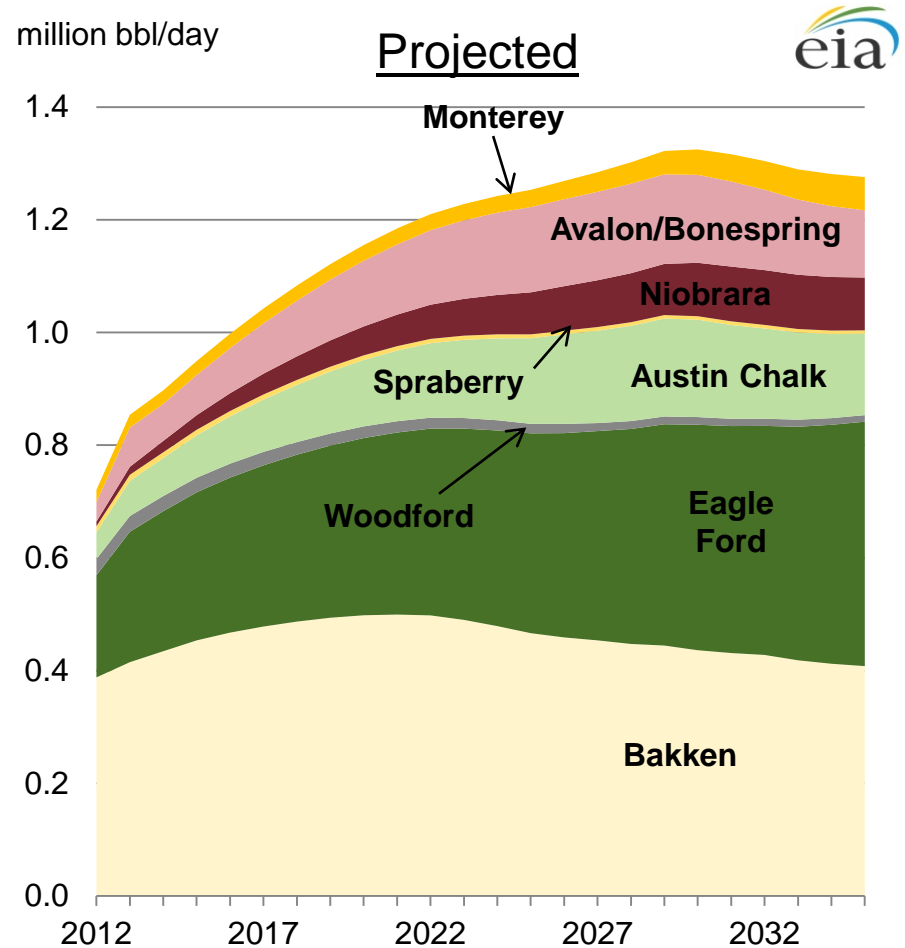


Source: U.S. Energy Information Administration based on data from various published studies. Canada and Mexico plays from ARI.

Tight oil production for selected plays – historical and projected



Source: HPDI, Texas RRC, North Dakota department of mineral resources, and EIA, through April, 2012.

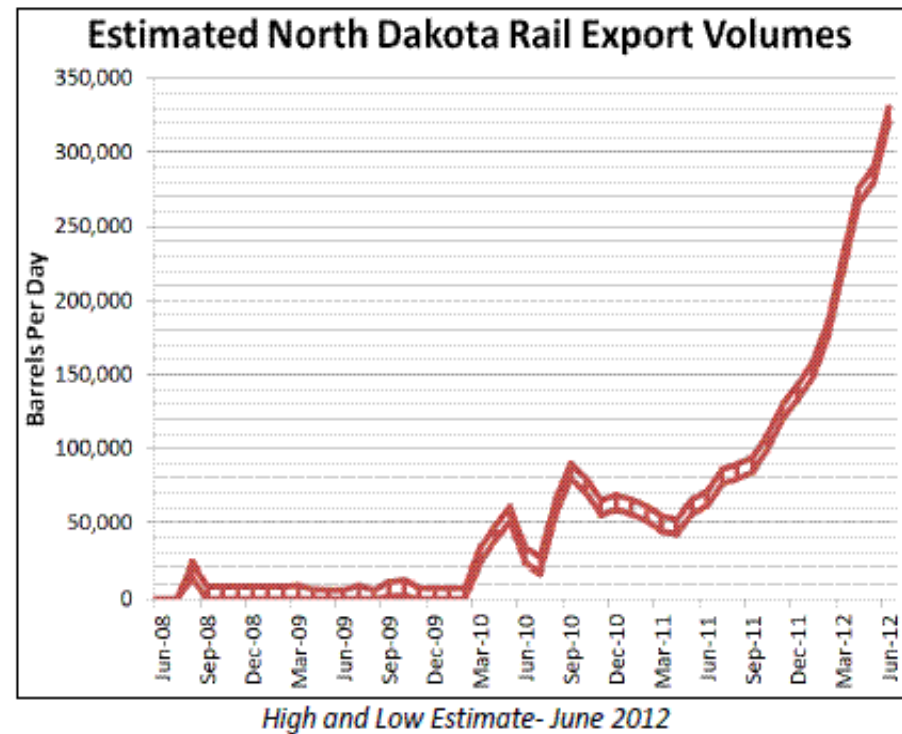
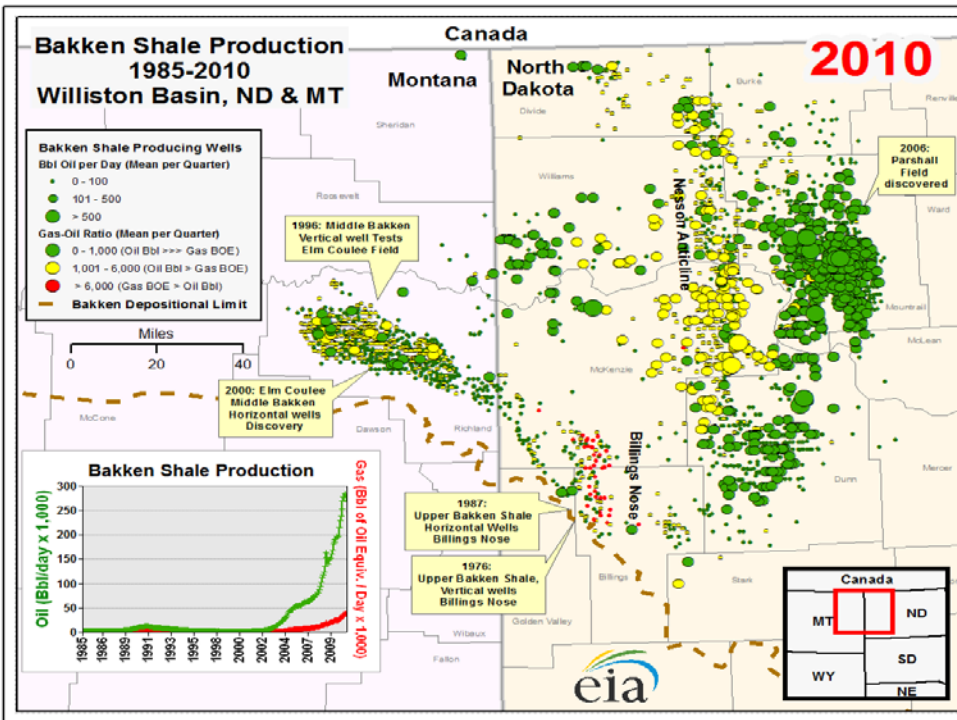


Source: U.S. Energy Information Administration, Annual Energy Outlook 2012, Early Release

Bakken Formation (Montana & North Dakota)

Wells Drilled by Type and Location

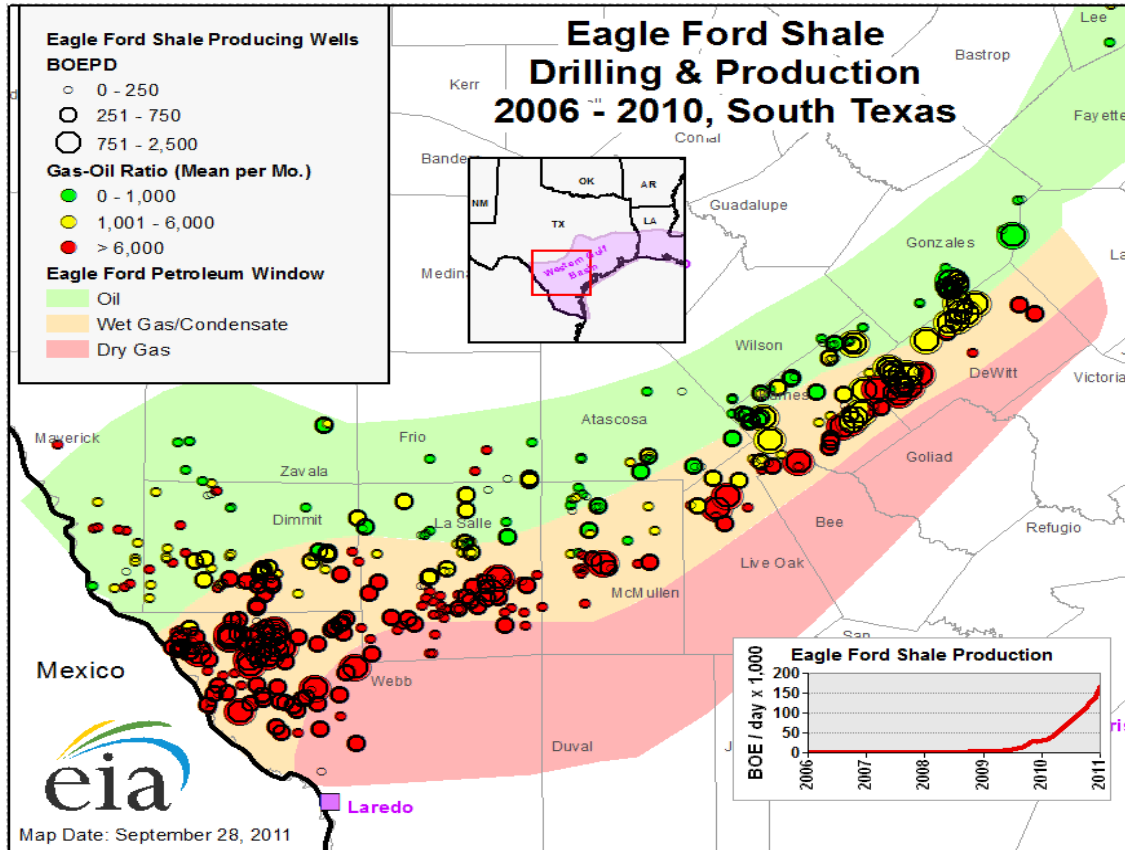
Rail Volume Trends



Source: EIA. Today in Energy. November 2, 2011.

Source: North Dakota Pipeline Authority

Eagle Ford (South Texas)



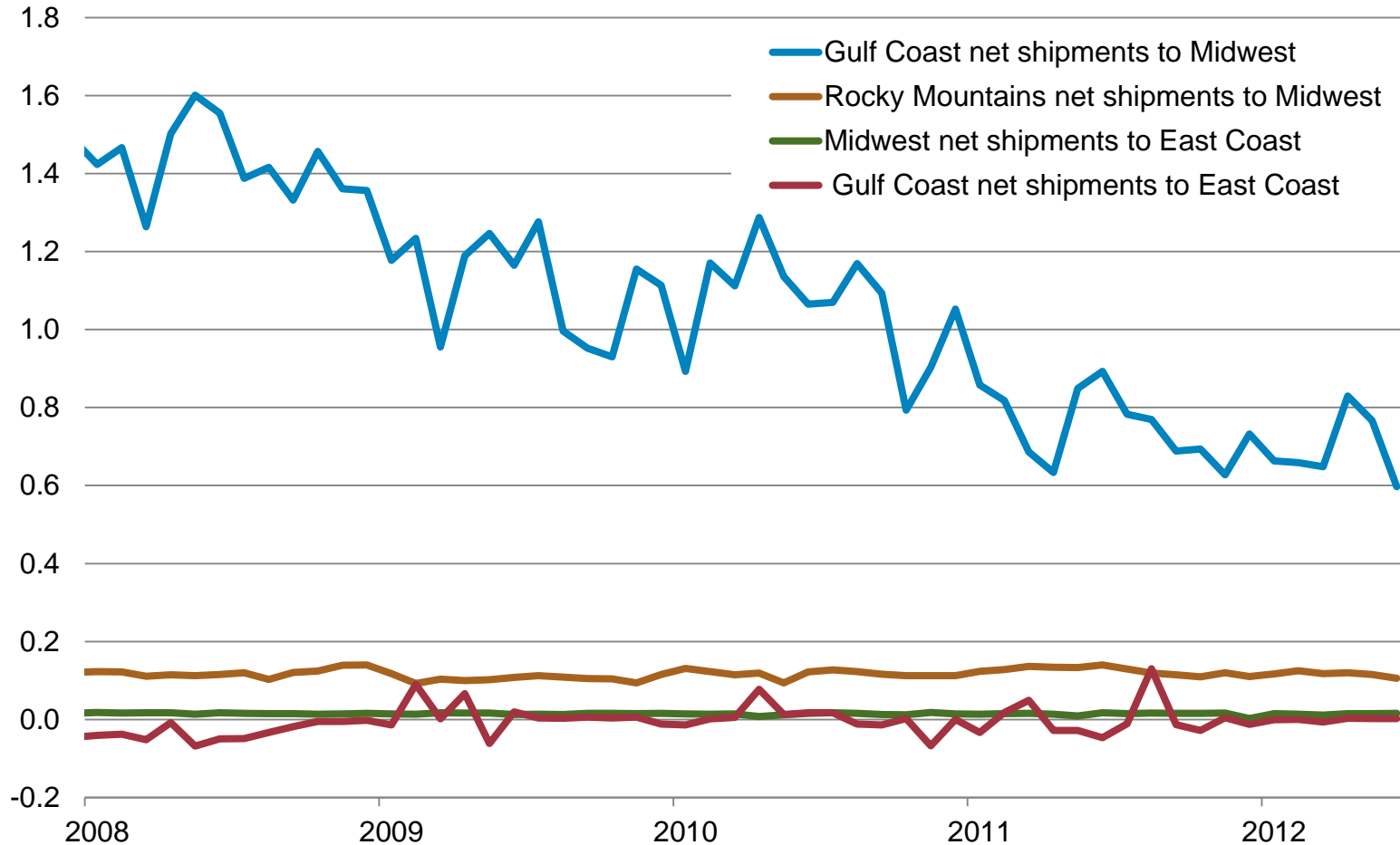
- As of 2010, development focused on gas wells.
- Oil zone to the north mostly untapped.
- Tight oil production could rival Bakken.

Source: EIA. *Today in Energy*. November 3, 2011

Crude oil net shipments between regions – pipeline and tanker/barge only



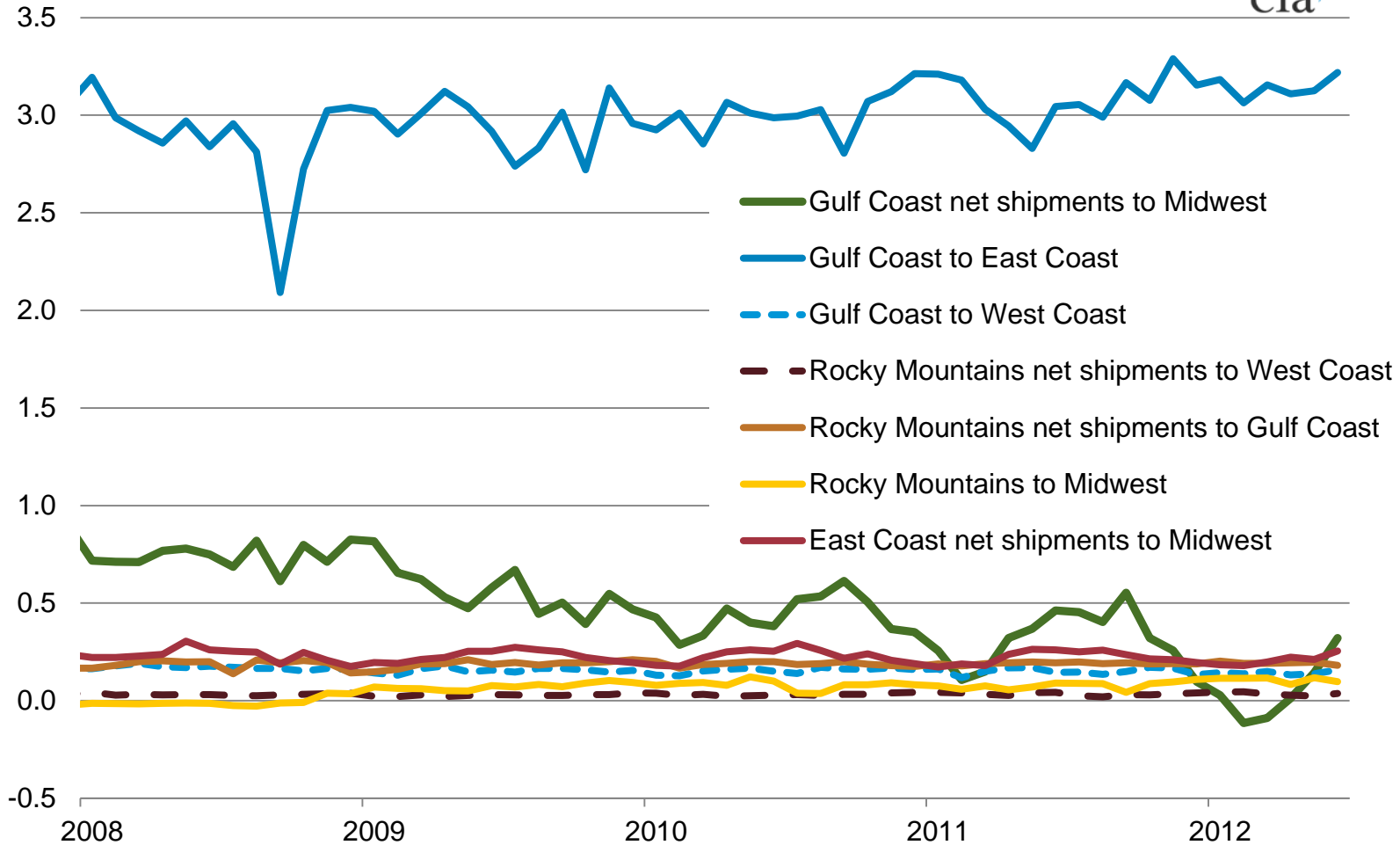
million bbl/day



Source: U.S. Energy Information Administration

Petroleum product shipments between regions – pipeline and tanker/barge only

million bbl/day

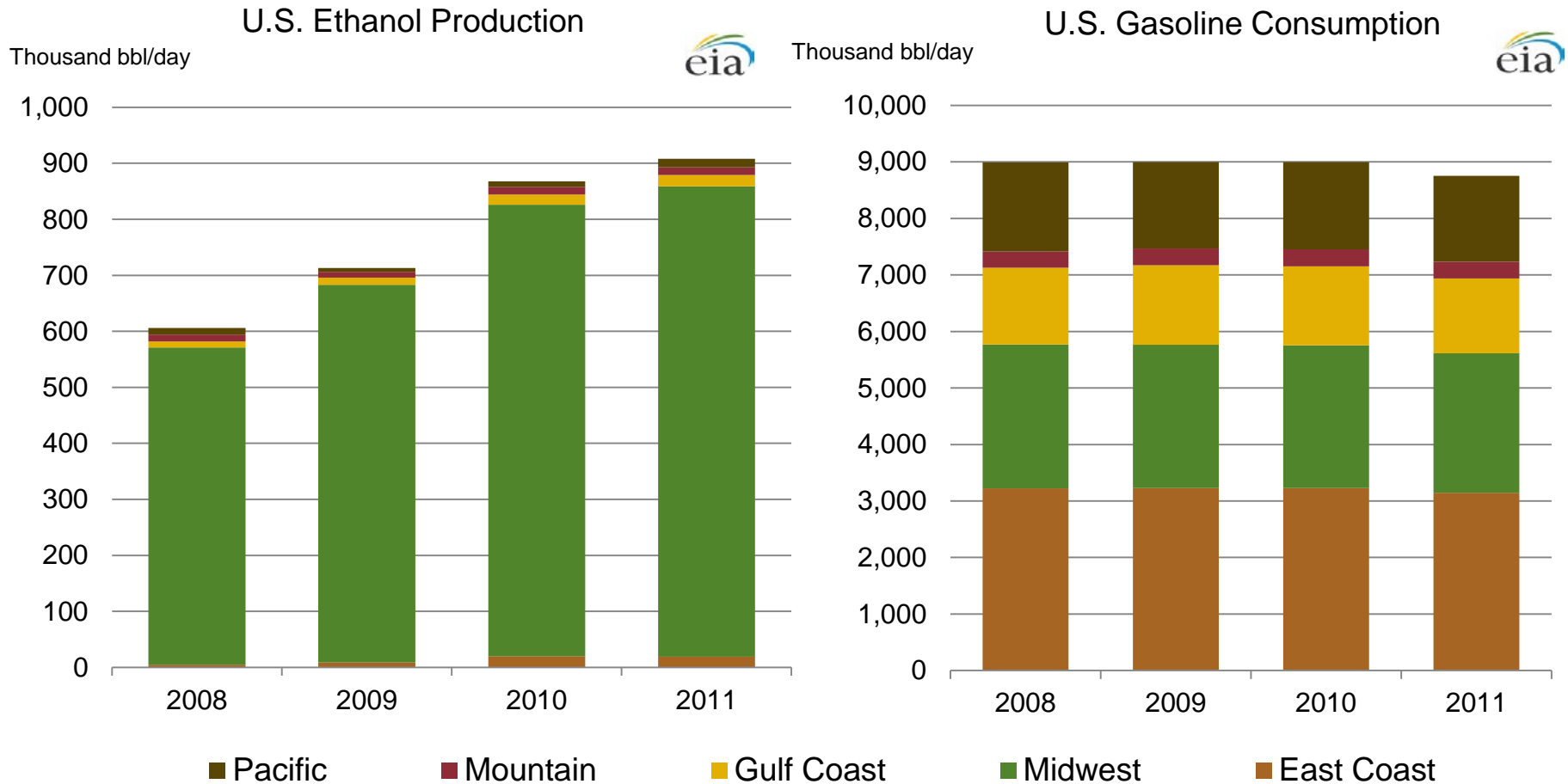


Source: U.S. Energy Information Administration

Ethanol logistics

- Ethanol comprises roughly 10 percent of the finished gasoline consumed in the United States – “blend wall”
- Ethanol production is exceeding demand and U.S. exports of ethanol reached record levels in 2011
- 39 percent of the 2011/2012 corn crop was used to produce ethanol
- Ethanol is transported by rail, barge, and truck to blenders and gasoline bulk terminals throughout the United States
 - Ethanol’s properties have limited its suitability for pipelines
 - Sufficient railcar capacity available?
 - EIA does not survey ethanol shipments between regions; net receipts by region are calculated and serve to balance regional supply and demand.

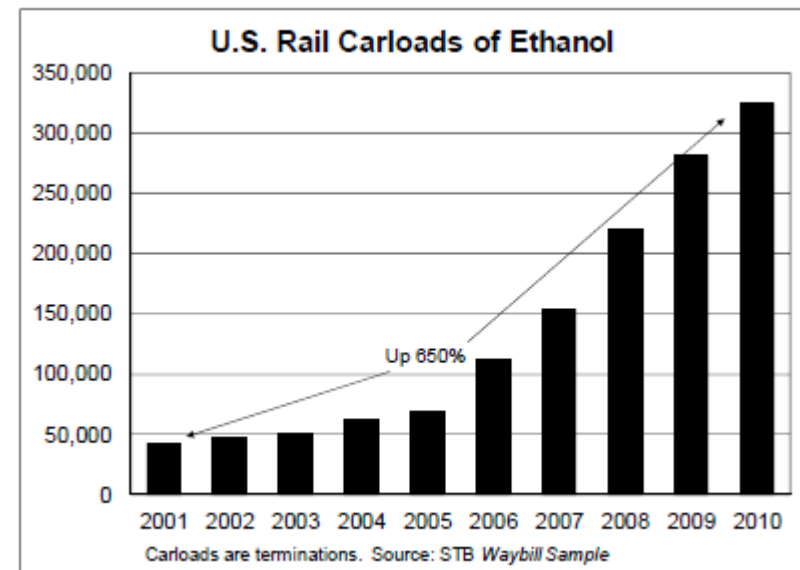
Ethanol moves by rail from the Midwest to the regions where gasoline is consumed



Source: U.S. Energy Information Administration.

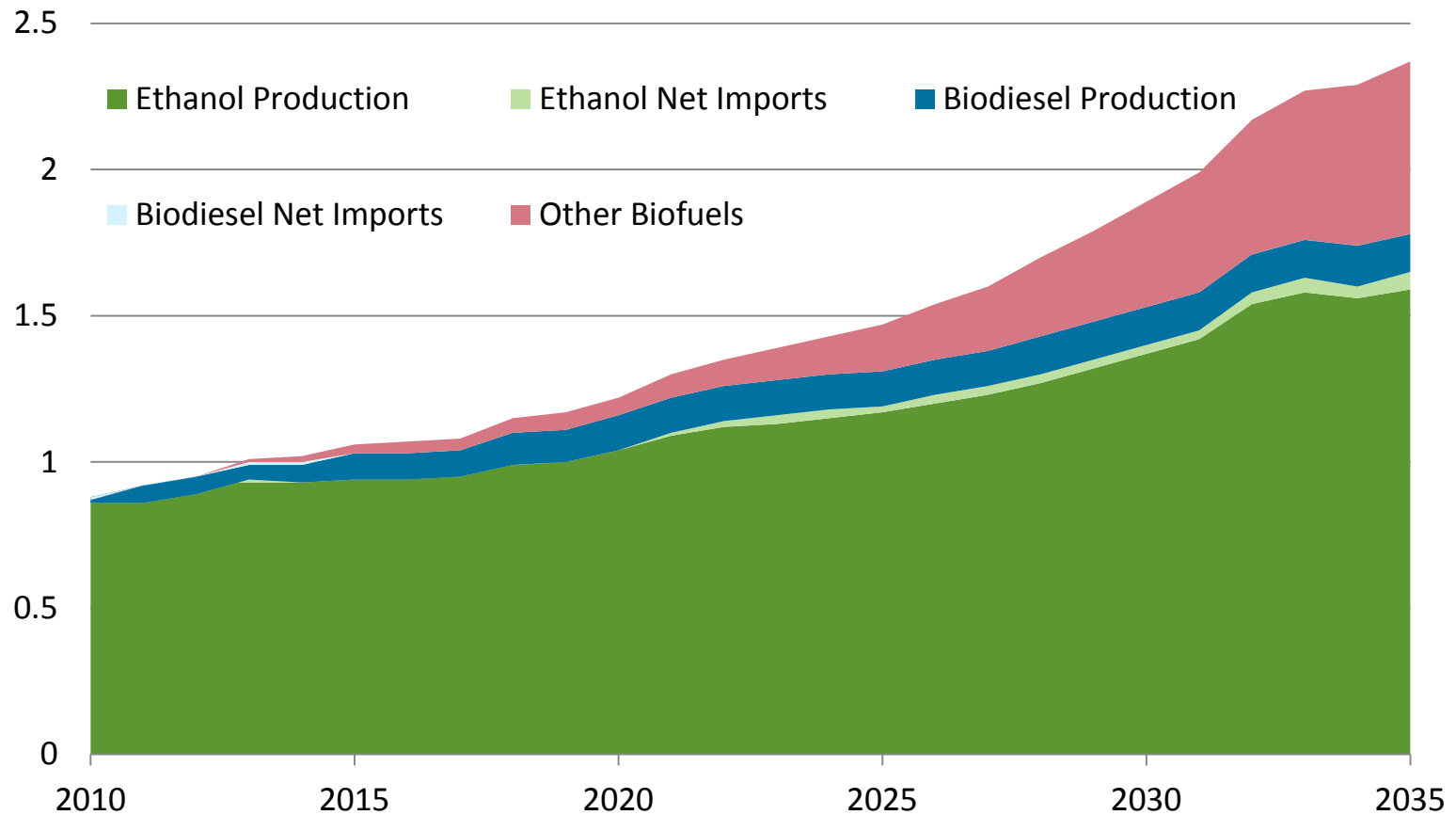
Ethanol rail car data reporting is out-of-date

- AAR stopped reporting ethanol data in its monthly Rail Time Indicators reports. AAR cites STB as the source but data is over a year old. AAR's Railroads and Ethanol fact sheet dated June 2012 stated:
 - Railroads carried nearly 325,000 carloads of ethanol in 2010
 - Accounting for 1.1 percent of total carloads
 - 15-20 percent of ethanol rail movements originate on non-Class I railroads (short lines)
 - Ethanol is shipped in 30,000-gallon tank cars. ~63,000 are in service.
 - Almost all tank cars are owned by shippers or leasing companies, not by railroads



AEO2012 projections of biofuels production and net imports

million bbl/day



Source: U.S. Energy Information Administration. Annual Energy Outlook 2012.

For more information

U.S. Energy Information Administration home page | www.eia.gov

Short-Term Energy Outlook | www.eia.gov/steo

Annual Energy Outlook | www.eia.gov/aeo

International Energy Outlook | www.eia.gov/ieo

Monthly Energy Review | www.eia.gov/mer

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