



Railroad Safety Advisory Committee



Crude Oil and Ethanol Transportation Trends

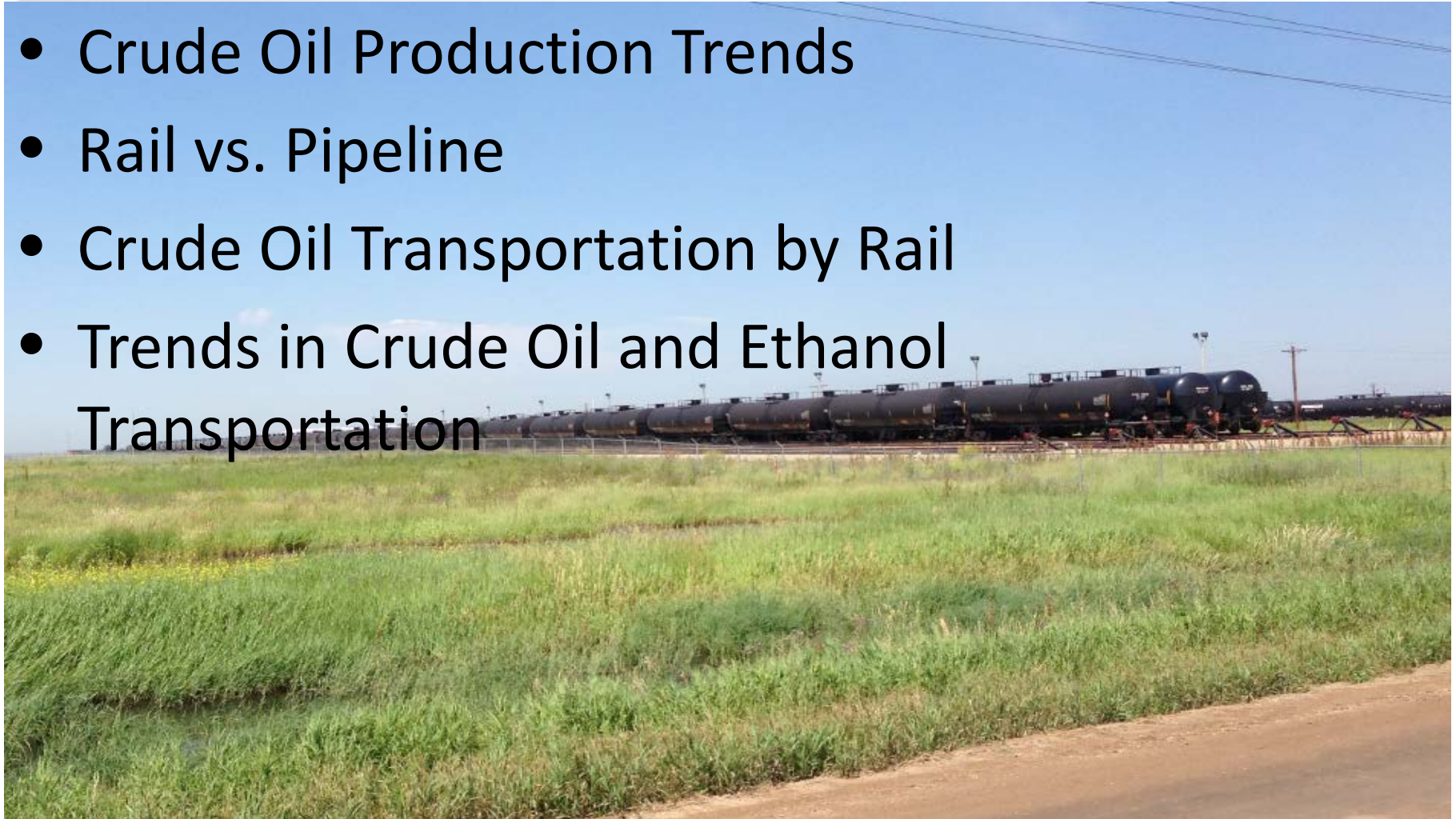
to the

49th Railroad Safety Advisory Committee Meeting

August 29, 2013
Washington, DC

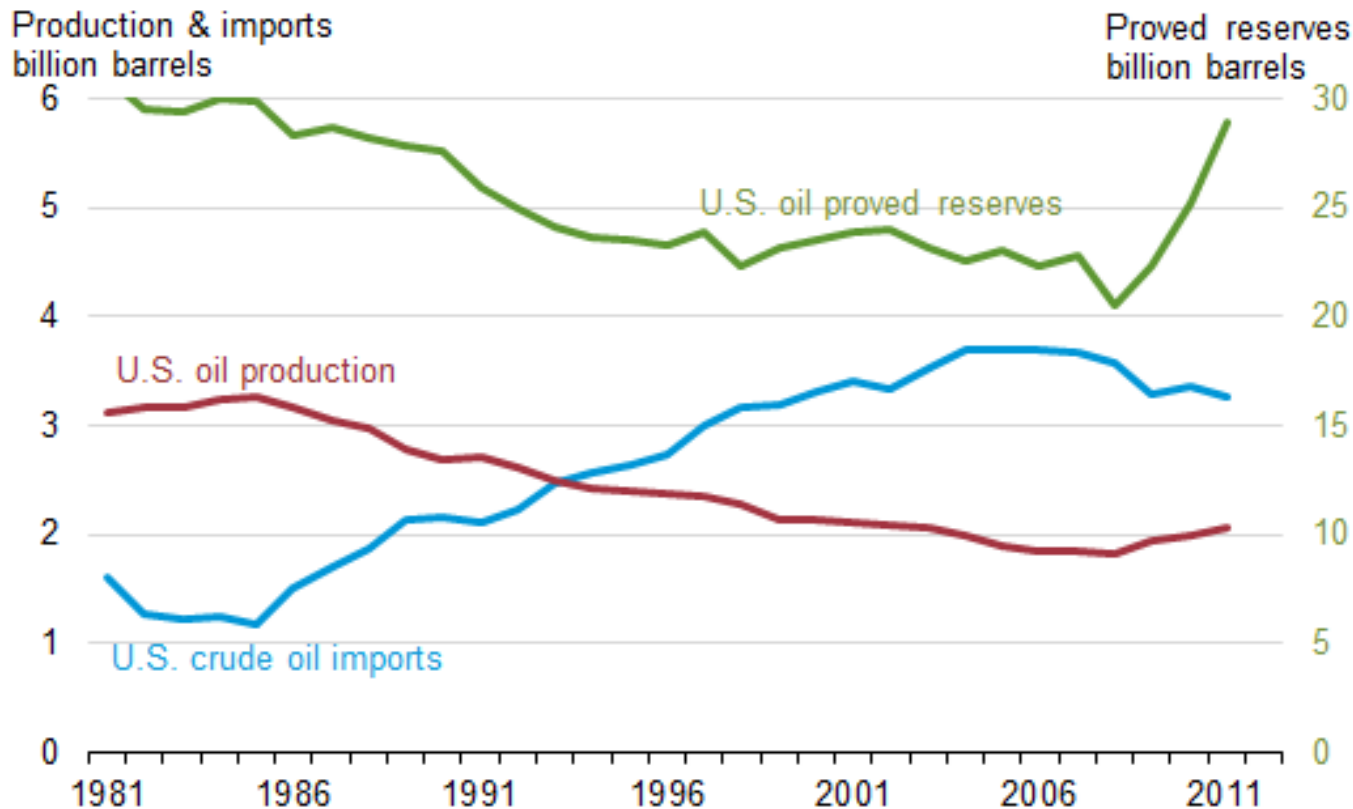
Overview

- Crude Oil Production Trends
- Rail vs. Pipeline
- Crude Oil Transportation by Rail
- Trends in Crude Oil and Ethanol Transportation



General Crude Oil Trends

Figure 4. U.S. crude oil and lease condensate reserves, production, and imports, 1981-2011

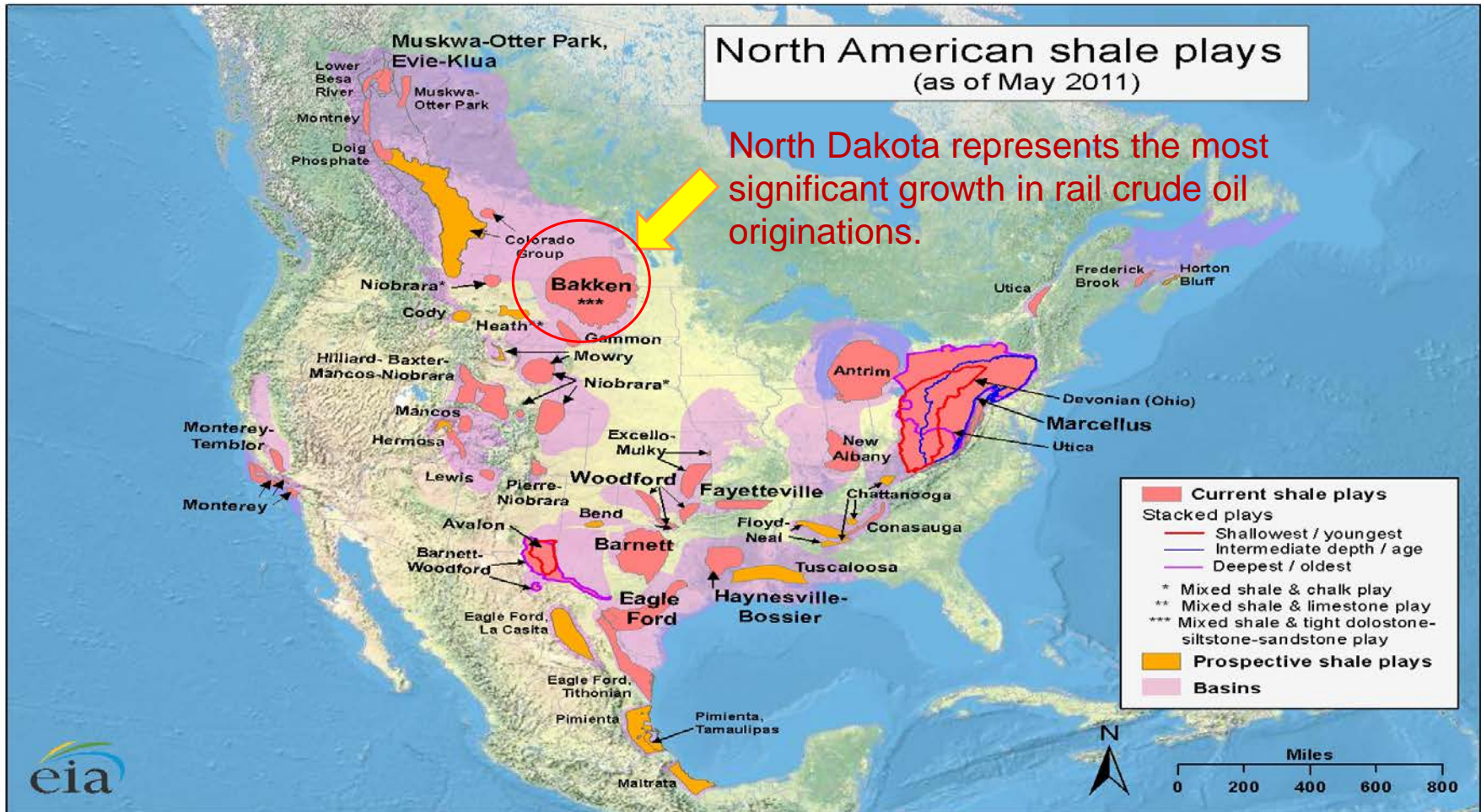


Sources: U.S. Energy Information Administration, Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves", and Form EIA-814, "Monthly Imports Report".

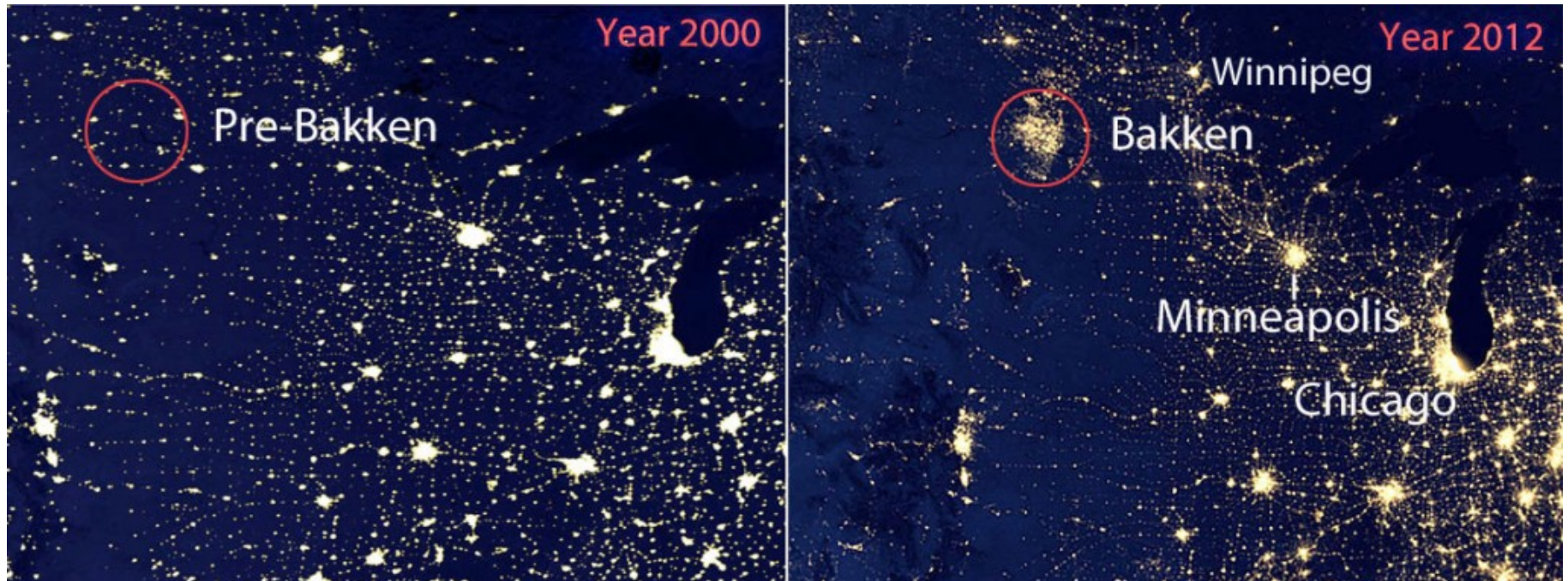


U.S. proved reserves of natural gas began growing sharply in the mid-2000s as operators adopted expanded horizontal drilling programs and applied new hydraulic fracturing techniques in shale formations. Starting with 2009, similar horizontal drilling programs were applied in several of the nation's tight oil formations – reserves additions from tight oil plays have reversed the long-term trend of generally declining proved U.S. oil and lease condensate reserves.

Crude Oil



Bakken Region





Oil Production and Proved Reserves, 2011



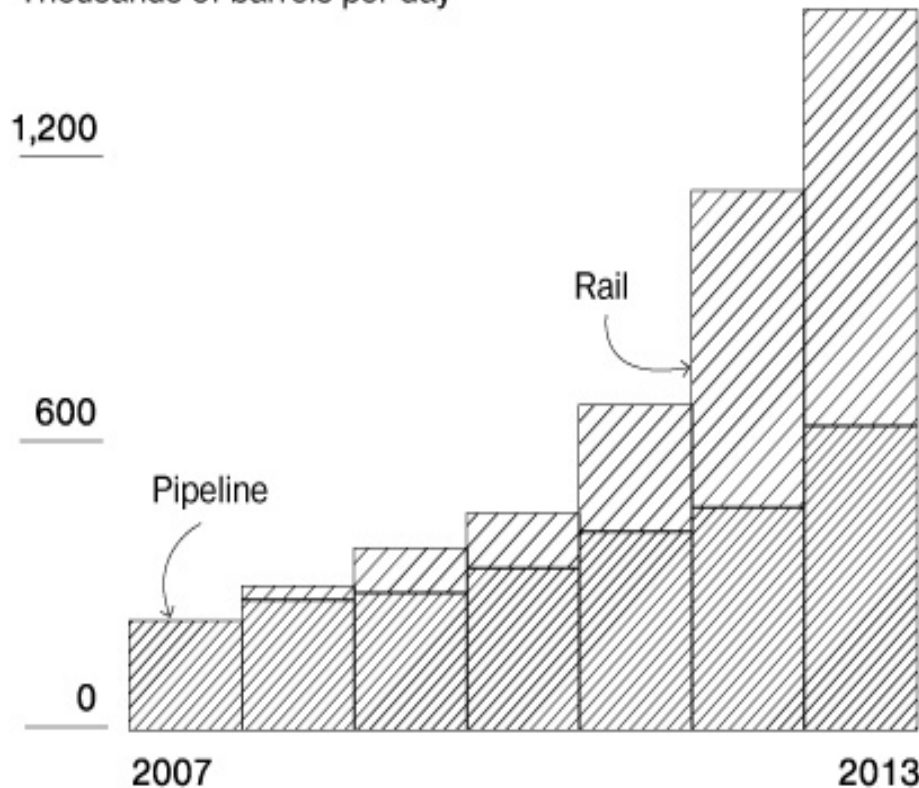
Basin	Play	State(s)	2011 Production (million barrels)	2011 Reserves (million barrels)
Williston	Bakken	NS, SD, MT	123	1,998
Western Gulf	Eagle Ford	TX	71	1,251
Fort Worth	Barnett	TX	8	118
Denver-Julesberg	Niobrara	CO, KS, NE, WY	2	8
Subtotal	---	---	204	3,375
Other tight plays	---	---	24	253
All U.S. tight oil plays	---	---	228	3,628

Source: U.S. **Energy Information Administration**, Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves."

Rail vs Pipeline

Export Capacity of the Williston Basin

Thousands of barrels per day



GRAPHIC BY BLOOMBERG BUSINESSWEEK;
DATA: NORTH DAKOTA PIPELINE AUTHORITY

Data

- 400,000 barrels out of the Bakken each day.
- 71% by train, up from 25% in January 2012.
- 20% by pipeline, down from 61% in 2011.

Why?

- Trains don't require long-term contracts or need to wait for pipelines to be built.
- Pipes connect point A to point B, refiners can access nearly any market in the U.S. by rail.

Competitors or partners?

- Pipeline companies have started investing in rail projects.
 - Plains All American Pipeline purchased four terminals in North Dakota, Texas, Colorado, and Louisiana, and one to be built in Bakersfield, California.
 - Kinder Morgan is investing in a crude-by-rail terminal in Houston capable of taking delivery of 210,000 barrels of oil per day.



Unit Train Loading Operations in North Dakota





Rail Movement of Crude Oil



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- From 2005 through 2012, crude oil traffic increased 37x.
 - The number of carloads originated held steady until 2010 when growth began.
 - Carloads originated increased from 85,277 in 2011 to 266,495 in 2012.
 - 97,135 carloads in 1Q13 which is 166% percent more than during the 1Q12 and 922% hauled during all of 2008
 - Growth is expected to continue for the foreseeable future.
 - Issues center on supply of tank cars.
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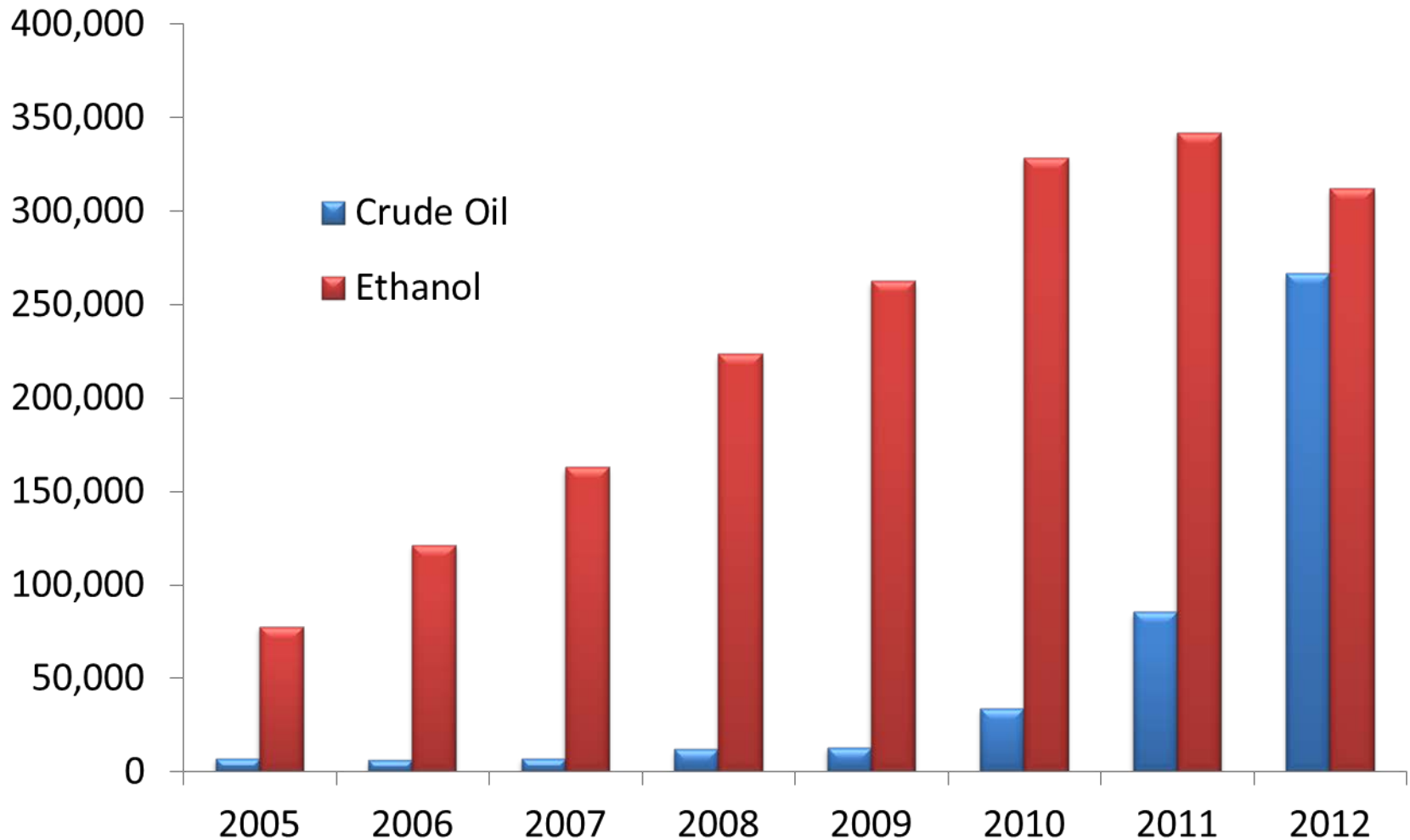
Rail Movement Ethanol



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- From 2005 through 2011, ethanol traffic increased by 441%.
 - The number of carloads increased from 77,000 per year to nearly 342,000 per year.
 - Traffic recently dropped to 311,000 carloads per year from 2011 levels, an 9% decrease.
 - In 2012, remained the commodity with the most originations.
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Crude Oil and Ethanol Rail Originations





Sources of Rail Originations of Crude Oil



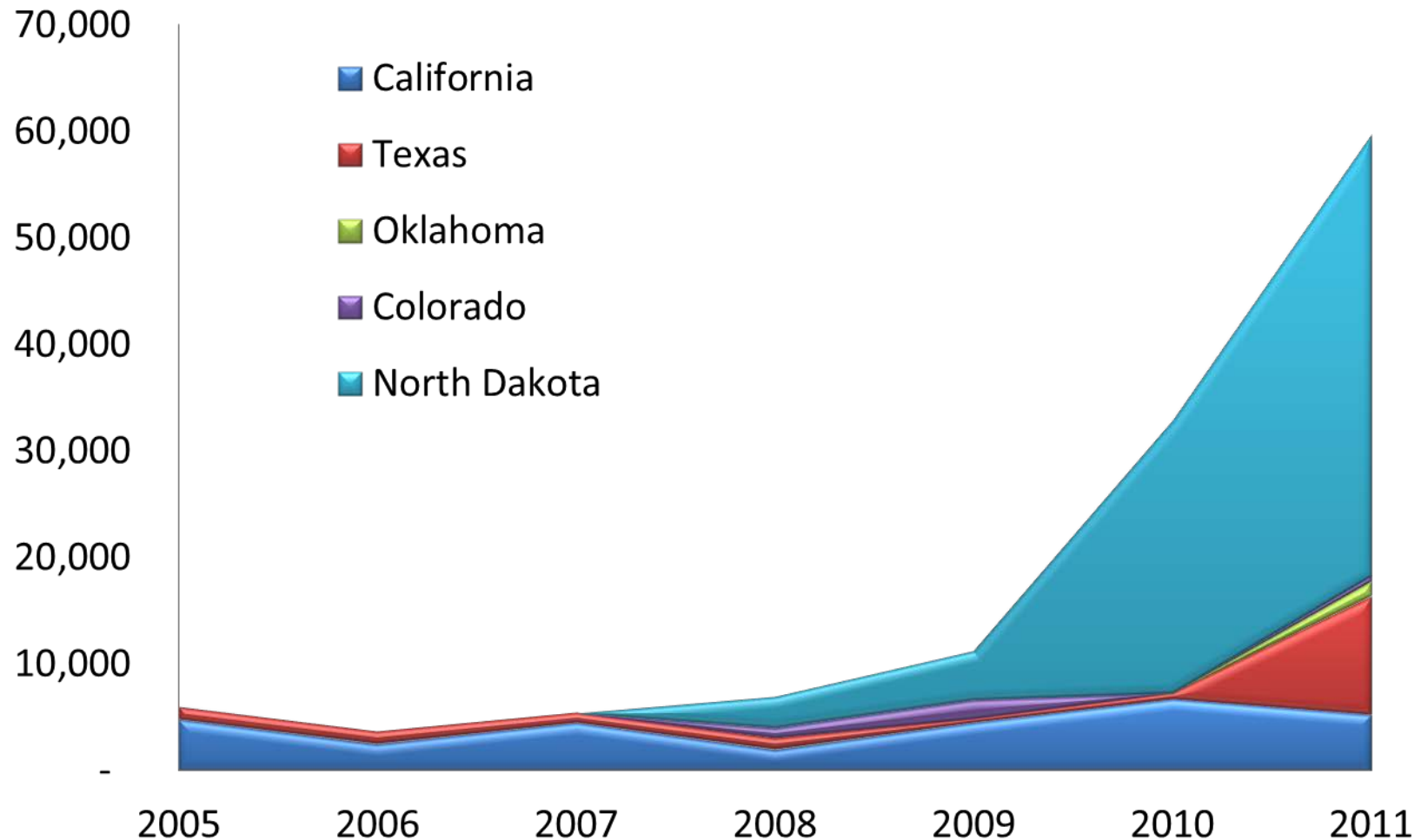
Crude Oil Originations

- Prior to 2008, California accounted the most rail originations of crude oil.
- Beginning in 2008, North Dakota surpassed California.
- In 2010, North Dakota originations were significantly above any of the Nation's producer States.
- Texas crude oil originations have grown from 600 in 2010 to 11,000 in 2011 (the last year that detailed data is available).

Destinations

- For 2011, the major crude oil rail destinations by State are Louisiana, Oklahoma, and Texas.
- Crude oil from North Dakota travels by rail to the Gulf refineries or picks up the pipeline in Cushing or Stroud, Oklahoma.
- Crude is also being shipped by rail to refineries on the East coast.

Crude Oil – Rail Car Originations by State





Questions?