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THE EFFECTS OF NORTH DAKOTA OIL PRODUCTION ON THE MINNESOTA ECONOMY

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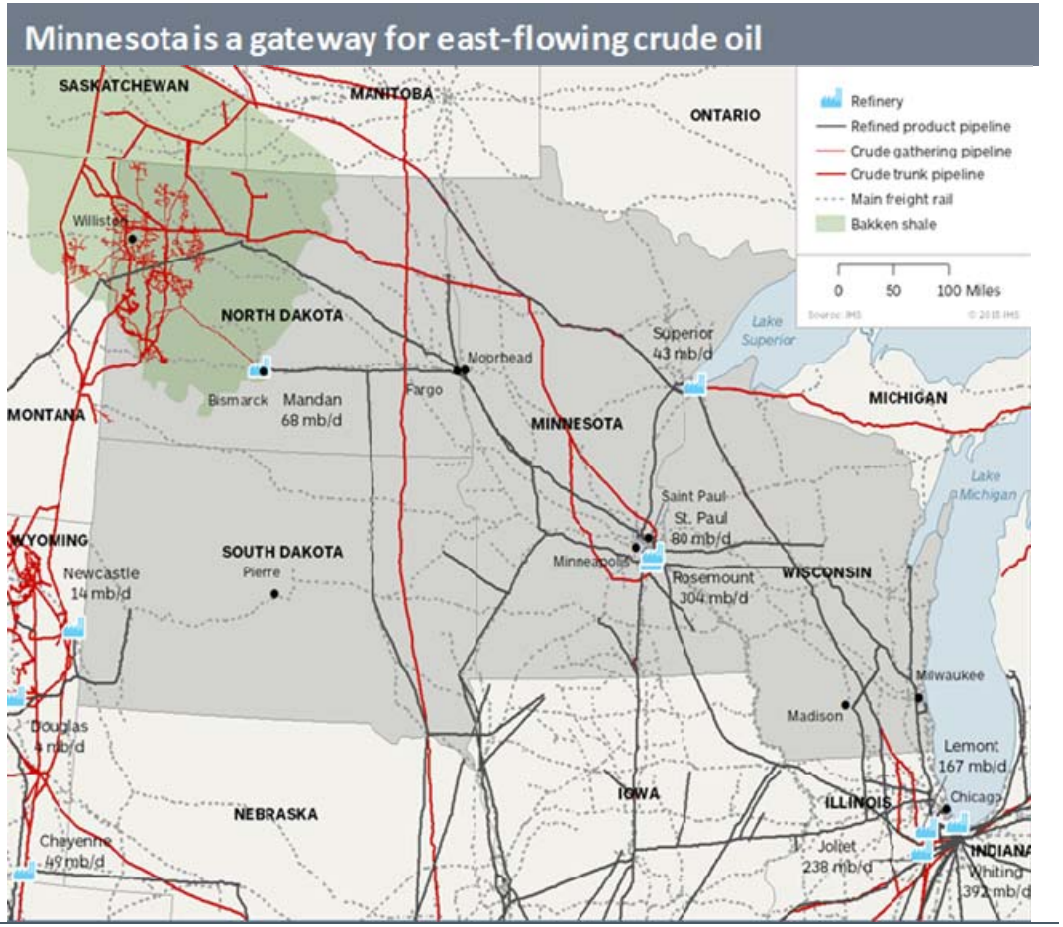
Overview and approach

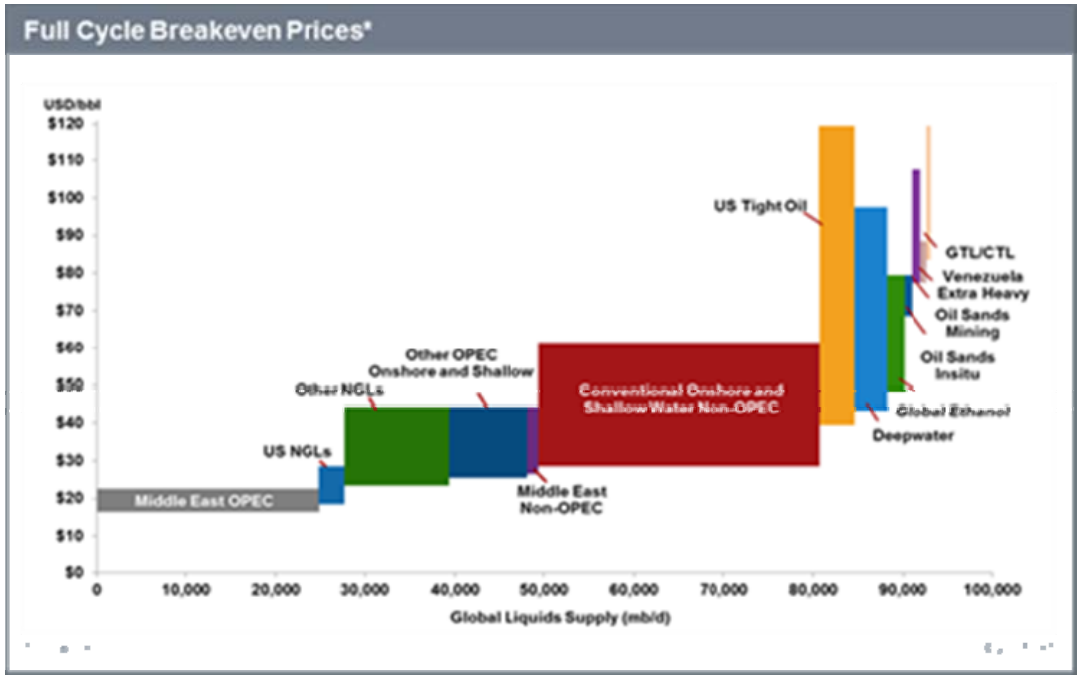


Overview of situation

- Bakken shale formation is in western North Dakota and eastern Montana, 427 miles from St. Paul.
- Oil production in North Dakota rose rapidly from 123,600 barrels per day in 2007 to 1 million barrels per day by April 2014, making it the 2nd largest oil-producing state.
- Increasing amounts of crude oil began to be shipped eastward across Minnesota by rail, which has increased the visibility of oil-production impacts in Minnesota.
- Study has 4 phases:
  - Energy Forecast
  - Transportation Forecast
  - Economic Impact
  - SCOPE Analysis (similar to SWOT)

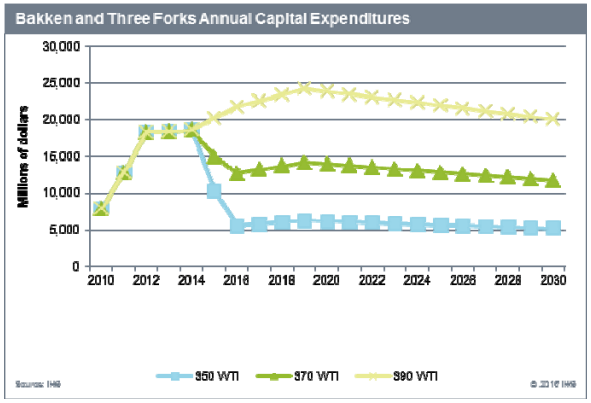
Phase 1 ENERGY

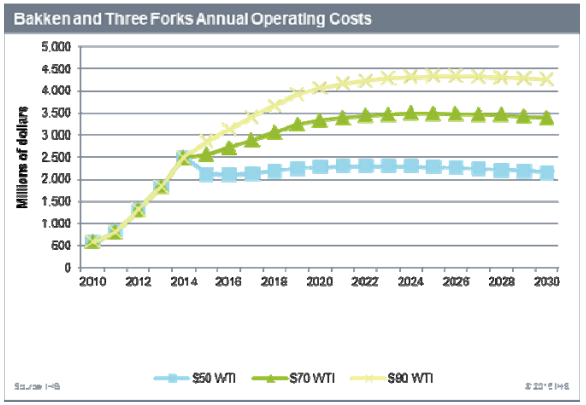
- The study looked at three price scenarios: $50, $70, and $90/bbl.
- The overall breakeven cost of oil production in the Bakken is between $58 and $62/bbl.

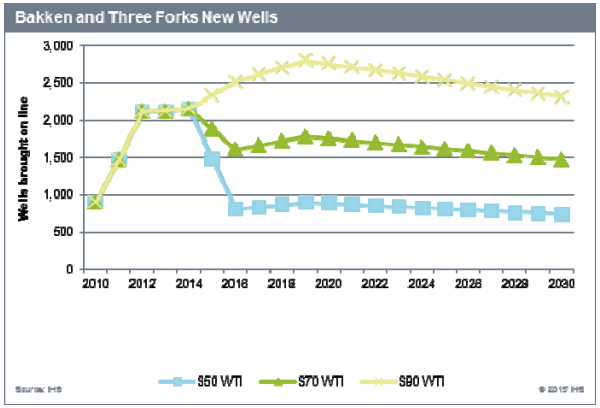


Oil production and spending in the Bakken and Three Forks

- Low scenario results in lower expenditures.
- Base scenario relatively flat.
- High scenario allows for growth before eventual plateau.

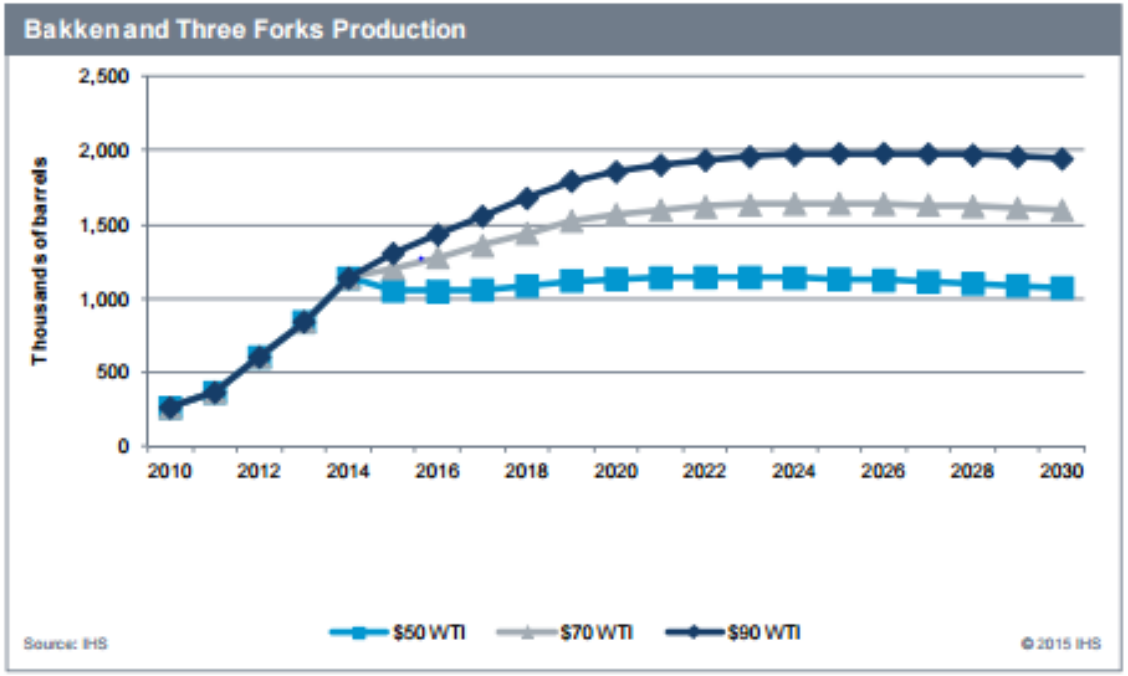






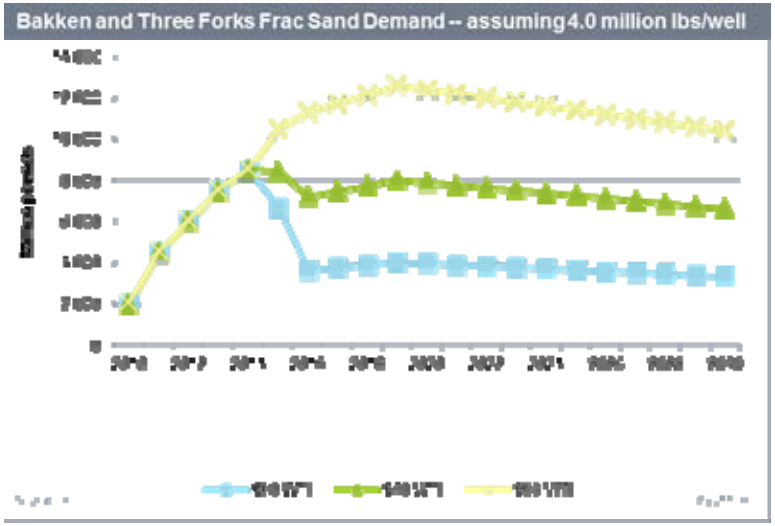
Bakken and Three Forks Production Forecasts

- Even under the $50/barrel scenario, production is expected to plateau, not decline. In fact, is has increased slightly.
- Under the base scenario, there is modest growth, with robust growth under the $90/barrel scenario.
- In the real world, oil prices are likely to fluctuate and are likely to be a mixture of the three scenarios.



Minnesota's frac sand in the Bakken

- Frac sand demand is not expected to increase unless oil prices move above $70/bbl. Even with higher oil prices, the demand increase will be only for a few years as the number of wells is expected to decline after 2019.
- Total annual production of industrial sand in Minnesota is estimated to be about 7 million tons, where about two-thirds are used for fracking and the majority is used in locations other than the Bakken.



Phase 2
TRANSPORTATION

Total commodity flow tonnages in Minnesota by mode

Mode	2012	2014	2015	2019	2030	Percent of 2012	Percent of 2030	CAGR 2012-2030
	(Tons in thousands)							
Rail	456,612	466,607	464,144	467,779	526,327	53.6%	47.9%	0.8%
Truck	357,048	390,754	402,226	444,001	534,787	42.0%	48.6%	2.3%
Water	38,328	36,287	36,662	36,392	35,328	6.0%	3.2%	-0.5%
Air	195	201	205	215	262	0.0%	0.0%	1.4%
Total	853,083	887,859	903,236	970,387	1,096,694	101%	100%	1.4%

Source: IHS Transearch database for 2012, 2015
CAGR: compound annual growth rate
Note: Percent sums vary +/- due to rounding error

- Truck and rail transported about 96% of all commodities, by weight.
- Reliance on truck shipping is expected to increase: truck and rail shares are forecasted to be 48% and 49%, respectively, by 2030.

Unit train forecasts

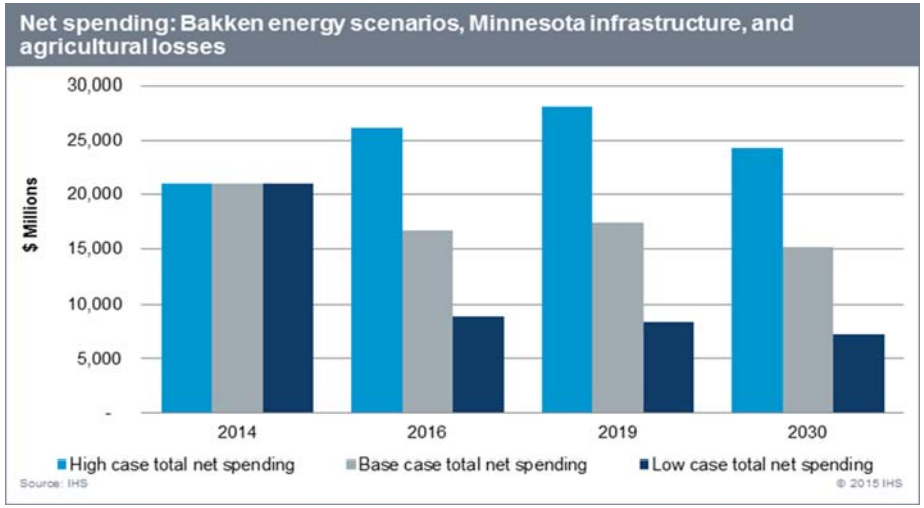
Revised unit train forecasts based on alternative oil price scenarios

Alternative Prices	2014	2015	2020	2025	2030
$90/barrel WTI					
Annual	3,311	2,127	3,667	5,237	6,035
Daily	9	6	11	15	17
$70/barrel WTI without pipelines					
Annual	3,311	1,612	2,369	3,650	3,953
Daily	9	5	7	10	11
$70/barrel WTI with pipelines					
Annual	3,311	1,612	0	0	0
Daily	9	5	0	0	0
$50/barrel WTI					
Annual	3,311	835	146	671	833
Daily	9	3	1	2	0

Below 100

- North Dakota crude petroleum through rail shipments required approximately 3,300 unit trains in 2014.
- At $70/barrel WTI, IHS estimates that approximately 1,600 unit trains per year, or about five per day, will transit Minnesota in 2015.
- Assuming no new pipelines come online, at the $70/barrel WTI, by 2030, we expect nearly 4,000 unit trains per year, or 11 per day. At the $90/barrel WTI, by 2030, the annual number of unit trains could increase to approximately 6,000, or as many as 17 trains per day.
- Assuming new pipelines come online, the number of unit trains per day carrying Bakken-related production would drop to close to zero by 2020.
- Based on the revised Canadian crude-oil production estimates, the number of unit trains annually passing through Minnesota could fall slightly below 400, translating to about one train per day.

Phase 3
ECONOMICS

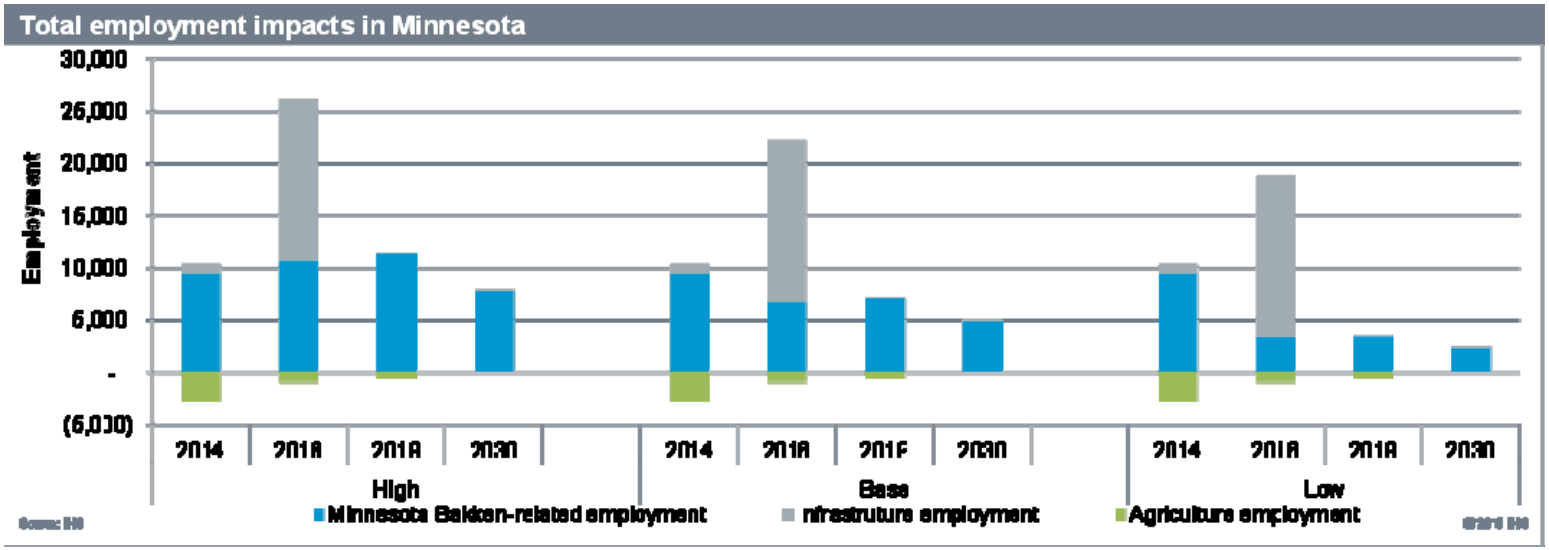


The economic impact were based on 3 direct effects:

- Expenditures for capital equipment and operations in ND for unconventional energy
- Construction of infrastructure in MN, such as the Sandpiper pipeline
- Losses in agriculture income from competition with crude oil for scarce rail capacity

Impacts were estimated for 4 years: 2014, 2016, 2019, and 2030 for all 3 price scenarios.

Minnesota's employment impacts from energy, infrastructure, and agriculture



Minnesota's total economic impacts from spending in North Dakota, infrastructure, and agriculture

Economic impacts in Minnesota by scenario and year				
Scenario and measure	**2014**	**2018**	**2019**	**2030**
October high scenario				
Output	$1,813.8	$4,843.3	$2,400.3	$1,740.9
Employment	7,748	25,211	10,950	7,984
Value Added	$1,085.0	$2,492.6	$1,355.8	$974.9
Labor income	$585.4	$1,574.9	$785.3	$547.8
December base scenario				
Output	$1,813.8	$3,789.1	$1,483.5	$1,112.5
Employment	7,749	21,210	8,671	6,068
Value Added	$1,085.0	$2,019.0	$845.7	$623.3
Labor income	$585.4	$1,299.2	$470.8	$346.7
February low scenario				
Output	$1,813.8	$3,077.9	$709.2	$567.7
Employment	7,749	17,902	3,089	2,569
Value Added	$1,085.0	$1,621.8	$411.1	$315.0
Labor income	$585.4	$1,071.3	$223.9	$174.7

Note: all dollar amounts are in millions, employment in total jobs

Sources: Minnesota Implan Group, IMPAN input/output models for Minnesota and North Dakota, 2014. Analysis performed by IHS.

Phase 4
SCOPE

Situation, Core Competencies, and Obstacles

- Situation today and core competencies: these sections recap the discussion from earlier sections of the report.
- Obstacles:
  - Distance to the Bakken
  - Workforce issues
  - Increase in North Dakota's oil and gas tax revenues
  - Local delays caused by unit trains
  - The "edge effect" and business costs

Prospects and expectations

- Educate Minnesota businesses about opportunities in North Dakota to: 1) support oil production, and 2) participate in spending for infrastructure and public services.
- Identify forward linkage opportunities in sectors that use crude oil as an input (e.g., fuel or feedstock), or provide storage & transportation services.
- Support transportation infrastructure improvements within Minnesota such as:
  - Roads, at-grade RR intersections, rail capacity, bypasses around towns.
- Completion of crude oil pipelines diverts crude oil flows from rail to pipeline sooner.

Prospects and expectations

- Provide workforce training in core occupations used in oil production, mfg. sectors in supply chain & construction.
- Benefit from the North Dakota wealth effect
  - Offer goods and services not available in North Dakota.
- Form cross-border initiatives as necessary to:
  - Mitigate impacts of shipping oil and agricultural commodities.
  - Provide workforce training.
  - Implement bi-state efforts at business attraction.

Key takeaways

- Regardless of the price scenario, North Dakota will continue to be a major oil producer.
- The overall economic impacts of North Dakota oil on Minnesota's economy are positive, but modest.
- New and expanded oil pipelines may lessen competition for rail capacity.
- Twin Cities are a major intermodal transportation center – rail, highway, air, and pipelines
  - Leverage location advantage to provide transportation services.
- Transportation improvements are essential to mitigate local effects.

Key takeaways

- Minnesota will continue to benefit from spending in the Bakken after capital expenditures drop off after 2019 under base price scenario.
- The state will benefit most from in-state infrastructure spending, which will have short-term impacts.
- The negative effects on agriculture from competition with crude for rail capacity disappears by 2019.
- Minnesota can potentially leverage its geographic advantage in the delivered price of crude oil to increase its refining capacity.
- Minnesota business could expand current efforts to capture shares of North Dakota's rising income and wealth.
- Minnesota could use its competitive advantages to maximize economic benefit from North Dakota oil production, but not become too dependent on it.

Thank You!

Find a copy of the study at:

http://mn.gov/deed/images/NorthDakotaOilStudy.pdf

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