



**RUNAWAY  
TRAIN:** THE RECKLESS EXPANSION  
OF CRUDE-BY-RAIL IN  
NORTH AMERICA

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This report was researched and written by Lorne Stockman with contributions from Shakuntala Makhijani, Jen Richmond, Matt Krogh, and Steve Kretzmann.

Cover Photo: Lorne Stockman: Crude oil tank cars lined up outside a refinery in East Houston, Texas

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This report is dedicated to the 47 people who lost their lives on July 6, 2013 when a train carrying Bakken crude oil from North Dakota derailed and exploded in the town center of Lac-Mégantic, Quebec.

They were:

Éliane Parenteau, Frédéric Boutin, Kathy Clusiaux, Élodie Turcotte, Yannick Bouchard, Karine Lafontaine, Maxime Dubois, Mélissa Roy, Yves Boulet, Karine Champagne, Gaétan Lafontaine, Joanie Turmel, Roger Paquet, Jo-Annie Lapointe, Guy Bolduc, Andrée-Anne Sévigny, Diane Bizier, David Lacroix-Beaudoin, Stéphane Bolduc, Marianne Poulin, Geneviève Breton, Mathieu Pelletier, Sylvie Charron, Henriette Latulippe, David Martin, Jean-Pierre Roy, Jean-Guy Veilleux, Lucie Vadnais, Michel Junior Guertin, Natachat Gaudreau, Kevin Roy, Éric Pépin-Lajeunesse, Talitha Coumi Bégnocche, Stéphane Lapierre, Marie-Noëlle Faucher, Martin Rodrigue, Réal Custeau, Marie-Sémie Alliance, Alyssa Charest Bégnocche, Jimmy Sirois, Jacques Giroux, Denise Dubois, Marie-France Boulet, Richard Veilleux, Louisette Poirier, Willfried Ratsch, Bianka Charest Bégnocche.

We remember.



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# 4 EXECUTIVE SUMMARY

**This report tracks the rise of crude-by-rail in North America, detailing where crude trains are being loaded and unloaded, how many trains carrying crude oil are crossing the North American continent, and who is involved in this burgeoning trade.**

This report is the first in a series covering North America's booming crude-by-rail industry and is being published in conjunction with a unique interactive online map of crude-by-rail terminals and potential routes.

Future reports in this series will look at the economics of crude-by-rail, safety, and climate change issues. Please see [www.priceofoil.org/rail](http://www.priceofoil.org/rail) for the map and links to reports and data.

The growth of crude-by-rail in North America has been primarily driven by the relentless growth in fracked oil (known as light tight oil), which is at the heart of America's ongoing oil boom.

Key findings of this report are:

▣ Today there are 188 terminals in Canada and the United States actively loading and unloading crude oil onto and off of trains. At least 33 of these terminals are expanding their capacity to handle more crude. An additional 51 new terminals are under construction or planned.

▣ Over 800,000 barrels per day (bpd) of crude oil were shipped on U.S. railroads in 2013, a 70-fold increase from 2005. Including Canada, total North American crude-by-rail shipments are currently around one million bpd.

▣ However, crude-by-rail loading capacity is already at 3.5 million bpd, which is 3.5 times the current traffic level. By 2016 capacity could grow to over 5.1 million bpd.

▣ We calculate that if one million bpd is being loaded and unloaded then roughly 135 crude oil trains of 100 cars each are moving each day through North America. This means that at any given time, there are around 9 million barrels of oil moving on trains through North America.

▣ If all the operating, expanding, under construction, and planned terminals were utilized to full capacity, it would entail some 675 trains with 100 cars each, carrying a total of around 45 million barrels of oil through North American communities every day.

▣ BNSF, owned by Warren Buffet, carries up to 70 percent of all the crude-by-rail traffic in North America today. This railroad alone expects to load one million barrels per day onto its network by the end of 2014.

A train carrying up to 114 cars sits waiting to be loaded with Bakken crude oil at a transfer station operated by Inergy Crude Logistics in Epping, N.D., Sept 24, 2013. (©Ken Cedeno/Corbis/APImages)





❑ Many of the U.S. crude-by-rail terminal operators operate as Master Limited Partnerships (MLPs). These companies avoid corporate level income taxes entirely and distribute cash to shareholders on a tax-deferred basis. This translates into a massive subsidy for crude-by-rail operations.

North Dakota is at the heart of both the oil boom and the crude-by-rail boom. However, loading terminals are also proliferating in Texas, Colorado, Oklahoma, Wyoming and other U.S. states where oil production is rising, as well as in Alberta and Saskatchewan in Canada. The failure of a number of pipeline proposals that aimed to take North Dakota crude to market reveals that producers see rail as a long-term transport solution for Bakken oil that gives them increased flexibility to serve different markets, rather than a stopgap measure in lieu of pipeline capacity. For the Canadian tar sands, the opposite is the case.

Terminals designed to unload trains are also appearing all over the continent, not only at refineries but also at ports on the east and west coasts, and along major inland waterways such as the Mississippi, Hudson, and James Rivers.

Some of these terminals are designed to unload crude oil from trains and transfer it to barges and tankers for delivery further afield. In some cases these terminals are positioned to facilitate the

export of Canadian tar sands crude via the United States, and may one day be used to export U.S. crude oil.

The proliferation of barges and tankers carrying crude oil on major rivers, together with the thousands of miles of rail lines that run adjacent to and across North America's rivers and wetlands, translate into a massive threat to the continent's water resources over and above that already posed by fracking and tar sands extraction. This was painfully demonstrated by the accidents and spills in Aliceville, Alabama and Lynchburg, Virginia, as well as at the tragic disaster in Lac-Mégantic, Quebec, all of which spilled oil into bodies of water.

Citizens and local governments across North America are taking action to oppose crude trains passing through their communities and to fight against new or expanded terminals in their midst. Further action is needed to ensure that regulators put the safety of communities above profits for the oil and rail industries.

Communities need to organize to stop this runaway train in its tracks. This report and the online map that accompanies it seek to assist that process by providing data on what the crude-by-rail industry is doing, where it is operating, and what it has planned.



# INTRODUCTION

**Driven by relentless growth in the production of fracked tight oil in the U.S. and Canada, the shipment of crude oil by rail has skyrocketed across North America. Since 2009, the amount of crude oil transported on North America's rail network has grown from almost nothing to around one million barrels per day (bpd) in early 2014.**

Accompanying this growth is the increasing risk of accidents faced by communities along rail routes. Exploding trains and spilling oil have shocked communities living close to rail lines all over the North American continent. In the most devastating incident to date, 47 people were killed when a train carrying North Dakotan crude oil derailed and exploded in the town center of Lac-Mégantic, Quebec, in July 2013.

The safety of transporting crude oil, ethanol, and other hazardous materials by rail came sharply into focus with the Lac-Mégantic incident. Subsequent accidents have shown that far from being an isolated incident, Lac-Mégantic was indicative of a disturbing aspect of the ongoing North American oil boom. There were 117

crude-by-rail spills in the U.S. alone in 2013, a near tenfold rise on 2008.<sup>1</sup> As the industry rushes to exploit resources as quickly and as profitably as it can, the safety of North American communities and the integrity of North American land, water, and air resources are put at risk. Table 1 lists 10 major accidents involving crude oil trains in North America in 2013 and 2014 to date.

Regulators in both the U.S. and Canada were asleep at the wheel when Lac-Mégantic happened, having no specific regulations in place for a high-risk activity that within just a few years had grown almost 70-fold by the time this tragic loss of life occurred. Safety measures that would genuinely protect the public remain unsanctioned.

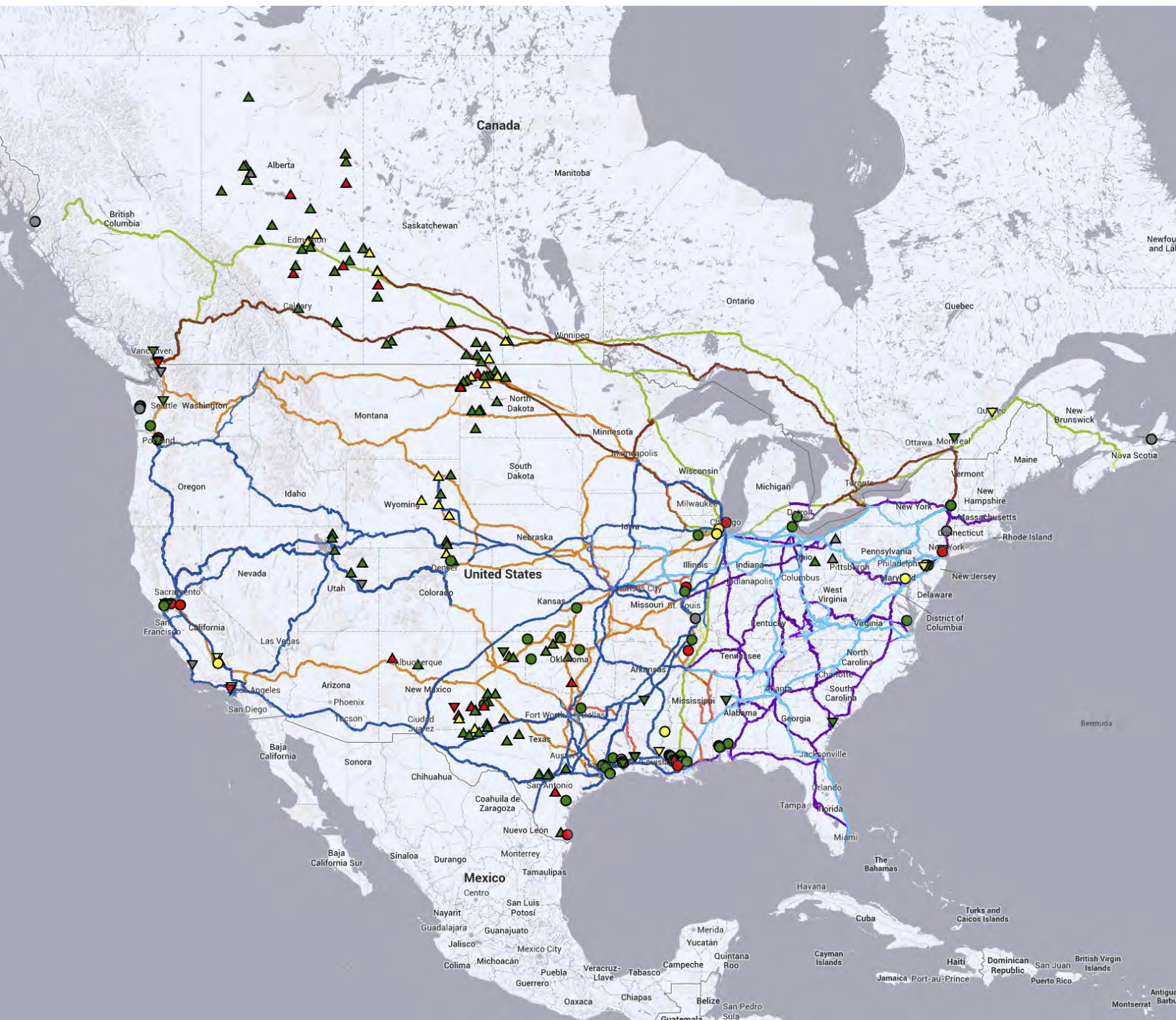
This report tracks the rise of crude-by-rail in North America, detailing where it is going on and who is behind it. Future reports in this series will look in more detail at the safety and regulatory issues as well as the economics of crude-by-rail and the implications for climate change.

**Table 1: Ten Major Accidents Involving Crude-by-Rail in USA and Canada, 2013-2014**

Date	Location	Railroad	Crude Source	Fire?	Spill Volume (U.S. Gallons)	Type of Incident
Mar. 27, 2013	Parkers Prairie, Minnesota	Canadian Pacific	Canada, possibly tar sands	No	10,000-15,000	Derailment
Jul. 5, 2013	Lac-Mégantic, Quebec, Canada	Montreal, Maine & Atlantic Railway	Bakken, North Dakota	Yes	>26,500	Derailment
Oct. 19, 2013	Gainford, Alberta, Canada	Canadian National	Unknown	Yes	Unknown	Derailment
Nov. 8, 2013	Aliceville, Alabama	Genesee & Wyoming	Bakken, North Dakota	Yes	<748,400	Derailment
Dec. 30, 2013	Casselton, North Dakota	BNSF	Bakken, North Dakota	Yes	>400,000	Derailment
Jan. 7, 2014	Plaster Rock, New Brunswick, Canada	Canadian National	Unknown, Western Canada	Yes	Unknown	Derailment
Feb. 3, 2014	Wisconsin/Minnesota	Canadian Pacific	Unknown	No	<12,000	Leak from tank car over 70 miles of track
Feb. 13, 2014	Vandergrift, Pennsylvania	Norfolk Southern	Tar Sands Bitumen, Alberta, Canada	No	4,550	Derailment
Apr. 30, 2014	Lynchburg, Virginia	CSX	Bakken, North Dakota	Yes	<50,000	Derailment
May 9, 2014	LaSalle, Colorado	Union Pacific	Niobrara, Colorado	No	6,500	Derailment

1. Pipeline and Hazardous Materials Safety Administration (PHMSA) data <https://hazmatonline.phmsa.dot.gov/IncidentReportsSearch/search.aspx>. Also See: Andy Rowell, "Crude by Rail Spills Increased 10 Times from 2008-2013" Oil Change International, March 26, 2014. <http://priceofoil.org/2014/03/26/number-crude-rail-spills-increased-10-times-2008-2013/>





Map 1: The North American Crude-by-Rail System

**MAP KEY**

**RAILROADS**

- Burlington Northern Santa Fe
- Canadian National
- Canadian Pacific
- CSX
- Kansas City Southern
- Norfolk Southern
- Union Pacific

**STATUS**

- Operating
- Operating & Expanding
- Under Construction
- Planning

**FACILITY TYPE**

- △ Upstream
- Midstream
- ▽ Downstream

# METEORIC RISE: THE RAPID GROWTH OF NORTH AMERICAN CRUDE-BY-RAIL

From a trickle of less than 12,000 bpd in 2005 - roughly one train load per week - over 830,000 barrels of crude oil were unloaded at U.S. rail terminals each day in 2013 - a 70-fold increase (see Figure 1).<sup>2</sup>

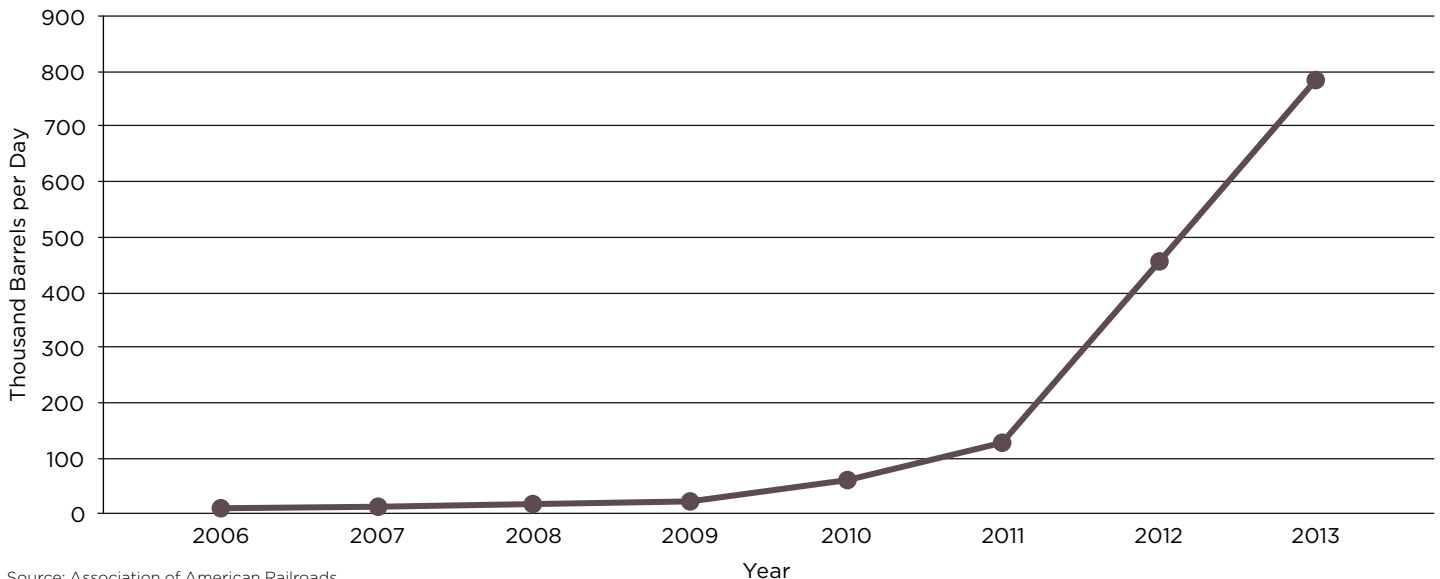
Including Canadian deliveries, there are currently close to one million barrels of crude oil being loaded and unloaded every day in North America.<sup>3</sup> That is the equivalent of between 14 and 16 trains of

100 or more cars each being loaded and the same number of trains being unloaded every day.<sup>4</sup> However, as some crude oil is still carried in smaller loads, known as 'manifest freight' rather than whole unit trains (see Box 1), in reality there are many more trains being loaded and unloaded every day with a smaller number of cars carrying crude. Shipping by unit train is more cost effective than manifest freight, and the industry is moving increasingly towards shipping oil this

way as more terminals designed to load and unload unit trains with oil come online.

It takes on average around nine days for crude oil to travel across North America by rail from source to destination. If we assume that all crude is shipped in unit trains of around 100 cars, this means that on an average day there are about 135 trains carrying a total of nine million barrels of crude oil through North America's communities at any given time.

Figure 1: Crude Oil Delivered on U.S. Class 1 Railroads



Source: Association of American Railroads

<sup>2</sup> Association of American Railroads, Moving Crude Oil by Rail, December 2013, <https://www.aar.org/keyissues/Documents/Background-Papers/Crude-oil-by-rail.pdf>

<sup>3</sup> The Canadian National Energy Board (NEB) tracks Canadian crude oil exports by rail here: <http://www.neb-one.gc.ca/cf-nsi/rnrqynfmtr/sttstc/crdlndptrlmrdct/2014/cndncrdlxprtstl-eng.html> These reached 146,000 bpd in the fourth quarter of 2013. However, there are additional movements of crude-by-rail within Canada, mainly from western Canada to refineries in eastern Canada. This is estimated to bring Canadian crude-by-rail to around 200,000 bpd.

<sup>4</sup> See Box 1 for details of tank car and train carrying capacity.



## Box 1: Unit Trains, Manifest Trains and Crude Oil Carrying Capacity

**Unit trains** are trains which are loaded as a single train with one product to be transported from source to destination, without being broken up or mixed with carriages from other trains. They are usually between 100 and 120 cars long.

**Manifest freight** refers to a train with cars carrying different products from multiple sources. With manifest freight, a small number of cars are loaded with crude oil and these are joined with railcars carrying other commodities to make up the full train. Cars that are part of a manifest or mixed train take longer to reach their destination as they are switched between different

trains along their journey and can spend several days in switching yards. Shipping oil (and in fact any product) is cheaper, faster, and more efficient by unit train.

Tank cars come in two sizes and the amount of oil they can carry depends on the weight of the oil. For example, Bakken oil is light oil whereas tar sands crude is heavy. The amount of oil being carried by any one train depends on the tank car size, the weight of the oil and the number of tank cars. The table below is indicative.

**Tank Car and Train Crude Oil Carrying Capacity Estimate** Note: Gallons are U.S. Gallons, 42 in a barrel. All figures have been rounded.

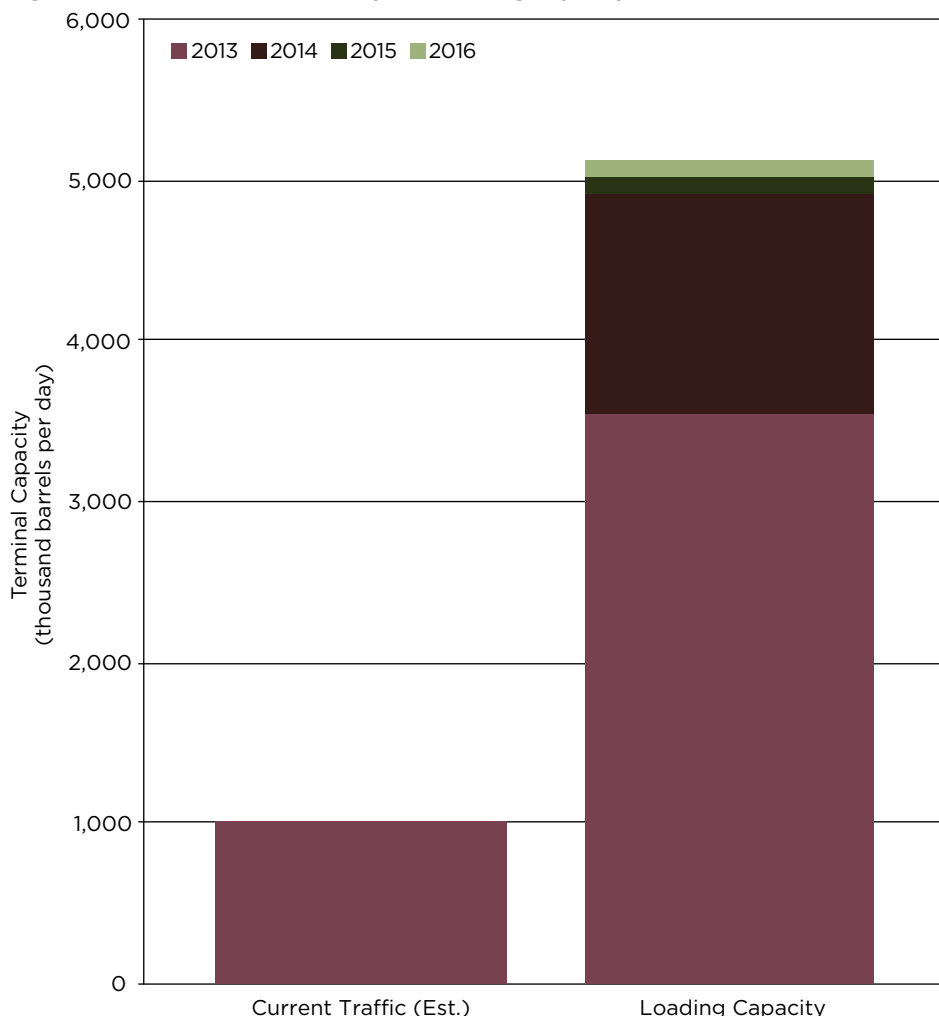
	Tank Car Capacity	Manifest Train (e.g. 20 Cars)	Unit Train (e.g. 120 Cars)
Light Crude	600-700 barrels 25,000 - 29,000 gallons	12,000 - 14,000 barrels 500,000 - 600,000 gallons	72,000 - 84,000 barrels 3 million - 3.5 million gallons
Heavy Crude	500-550 barrels 21,000 - 23,000 gallons	10,000 - 11,000 barrels 420,000 - 460,000 gallons	60,000 - 66,000 barrels 2.5 million - 2.77 million gallons

This dramatic expansion in crude-by-rail shipments is likely just the beginning. Our data shows that at the end of 2013, North American rail terminals had the capacity to load at least 3.5 million bpd. Loading capacity is set to grow by at least an additional 1.4 million bpd by the end of 2014, and could reach over 5.1 million bpd by 2016 if all currently announced expansions and new terminals are completed (see Figure 2). It should be noted that we were unable to find capacity figures for some of the smaller terminals in our database and therefore these figures may be an underestimate.

While much of this capacity is currently underutilized, and it may be that there will always be some amount of spare capacity in the system, this shows the vast ambition of the North American oil industry and its disregard for the safety of communities. Given the number of accidents that occurred as crude-by-rail movements topped one million bpd (see Table 1), a fivefold increase in this traffic is clearly reckless.

If shipments were to reach the full capacity of all loading terminals currently operating and being constructed or planned, the number of trains carrying crude on an average day could quintuple to around 675 hundred-car trains. They would be hauling over 45 million barrels of hazardous crude oil every day through thousands of North American communities.

**Figure 2: North American Crude-by-Rail Loading Capacity and Current Traffic Level**



Source: Oil Change International

# TERMINAL OBSESSION: THE PROLIFERATION OF FACILITIES TO LOAD AND UNLOAD CRUDE OIL TRAINS

Crude oil is loaded and unloaded onto and off of trains at specially-designed railroad terminals. These are springing up close to oil fields, at various oil storage hubs, at ports, and at refineries all over North America at remarkable speed. Oil Change International has compiled a database of these terminals, which can be viewed via an interactive online map available at [www.priceofoil.org/rail](http://www.priceofoil.org/rail).

At the time of writing, there were 188 terminals in Canada and the United States actively loading and unloading crude oil onto and off of trains. At least 33 of these terminals were expanding their capacity to handle more crude, while another 51 terminals were under construction or planned (see Figure 3).

We divide these terminals into three types: Upstream, Midstream and Downstream.

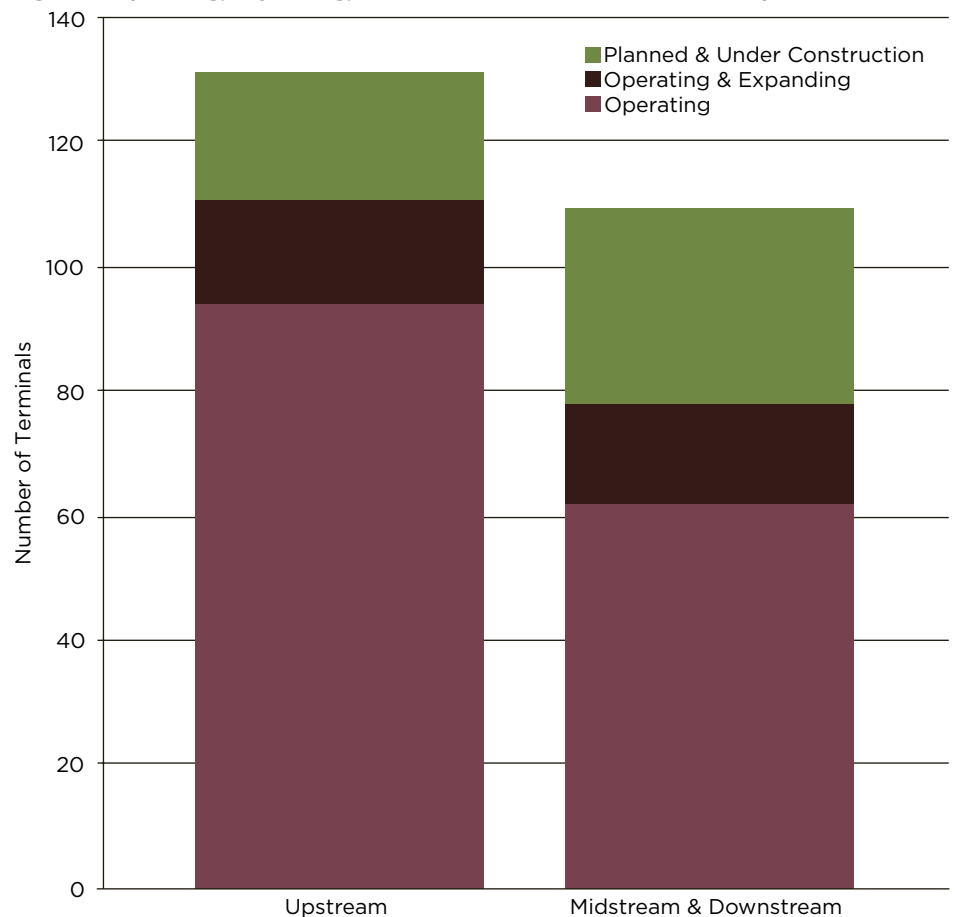
**Upstream terminals** load crude oil onto trains. These are generally located close to oil fields although some are a distance from actual oil production, receiving the crude through local pipelines or via tanker trucks.

**Midstream terminals** unload crude oil from trains but are not the final destination. At these terminals, crude oil is pumped from tank cars into storage tanks to be transferred to barges or into local pipelines for delivery to refineries. Some of these terminals are located on major waterways

such as the Mississippi, Hudson, and James Rivers. Others are located at coastal ports. Some of these waterside terminals are positioned to export crude oil from the North American continent.

**Downstream terminals** unload crude oil from trains at refineries, the final destination for that crude.

**Figure 3: Operating, Expanding, and Planned North American Crude-by-Rail Terminals**



Source: Oil Change International





**Map 2: Upstream Terminals in North America**

## UPSTREAM TERMINALS

The rise of the crude-by-rail trade follows the relentless rise in onshore crude oil production facilitated by the emergence of hydraulic fracturing (fracking) and horizontal drilling. The North American oil boom has been primarily focused in North Dakota and West Texas, but is also now proliferating in Colorado, Kansas, Montana, Ohio, Oklahoma, Utah, Wyoming, and other states in the U.S., as well as in Alberta and Saskatchewan in Canada.

At the time of writing there were 111 terminals loading crude oil in the U.S. and Canada, with 17 of these expanding and an additional 20 planned or under construction (see Figure 4).

The barrel per day capacity of these terminals is currently much higher than observed movements of crude-by-rail, which were at around one million bpd in early 2014. With over 3.5 million bpd of loading capacity available, it appears that there is over three and a half times the capacity than is currently being used. If all expansions and currently planned terminals are completed, there could be the capacity to load over 5.1 million barrels of crude oil onto trains every day in the U.S. and Canada.

Much of the forthcoming capacity – about 1.4 million bpd – is scheduled to come on line in 2014, following a year of at least 1.5 million bpd of capacity additions much of

which came online in the latter half of 2013. With billions of dollars of additional investment in track capacity in oil producing regions, it is likely that 2014 will see another significant jump in crude-by-rail shipments.

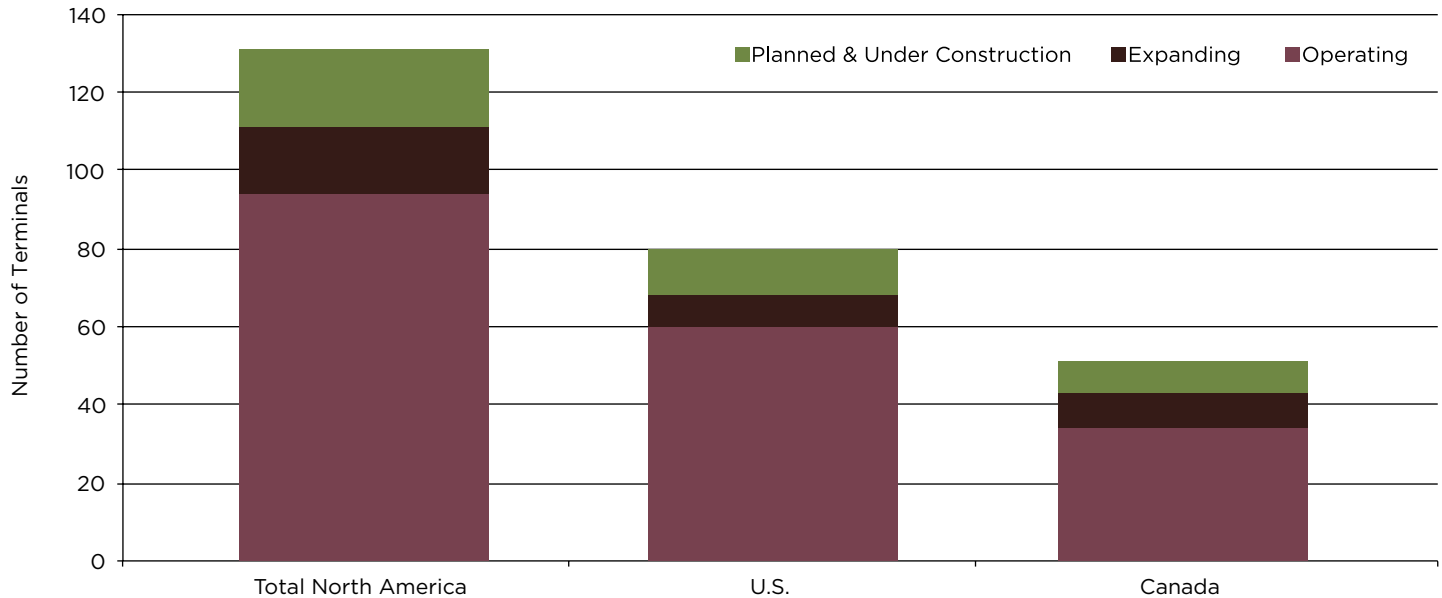
It is also possible that North America's crude-by-rail system will continue to have large amounts of spare capacity, as building terminals is relatively cheap and terminal operators compete for customers. Manifest terminals can be as simple as a rail siding with equipment to pump oil between a tanker truck and a rail car. This is more labor intensive than capital intensive. Initial capital costs can be as low as \$1 million and start-up can take only a couple of months.<sup>5</sup>

Unit train terminals require significantly more capital, land, and time to construct. The construction cost of unit train terminals has been estimated at between USD\$40 and USD\$125 million in North Dakota and between CAD\$85 and

CAD\$125 million in Canada. Between 150 to 200 acres of relatively flat land and 12 to 18 months are required for construction. Equipment to heat tar sands bitumen to enable loading onto trains adds additional capital and operating costs.

However, because even the most expensive unit train terminals require far less capital than the billions of dollars needed to build a pipeline, the capital risked by overbuilding crude-by-rail capacity is relatively low.

**Figure 4: Crude Oil Rail Loading Terminals in the United States and Canada**



## Box 2: Track Capacity – Oil Trumps All in North America’s Race for Rail Track Access

Since late 2013, a disturbing trend has emerged on the nation’s railways. Not only are trains full of crude oil derailing and exploding with frightening regularity, but crude oil trains are also pushing other rail traffic off the rails, notably grain and people.

Following a bumper harvest of wheat and canola on the Canadian prairies in 2013, grain suppliers found themselves struggling to get their product to market as they played second fiddle to crude oil on North America’s rail network. In January 2014, Bloomberg reported that Canadian grain shipments to export terminals in Vancouver were two months behind schedule.<sup>6</sup>

Keith Bruch, vice president of operations for Paterson GlobalFoods Inc. told the news agency that “it’s looking more and more that grain is becoming second choice to oil”.<sup>7</sup> He described how grain ships have been left waiting in the Port of Vancouver for as much as six weeks at a cost of up to C\$20,000 (more than US\$18,000) per day. The problem has also affected U.S. grain suppliers. “Moving crude by rail has definitely impacted our ability to supply our facilities” said Sam Snyder, director of corporate development for Minneapolis-based Grain Millers Inc.<sup>8</sup> In an effort to relieve the situation, Canadian

regulators moved in March 2014 to force rail operators to double the amount of grain they transport.<sup>9</sup>

Crude trains have also caused eight to ten hour delays to Amtrak’s Empire Builder passenger train service, which runs through North Dakota on its way to and from Chicago, Portland, and Seattle. According to Ross Capon, president of the National Rail Passengers Association, “[t]he train acts as a vital transportation link for hundreds of rural communities to essential services in urban population centers” and is Amtrak’s most popular overnight service.<sup>10</sup> The route, which in North Dakota relies on track owned by BNSF, currently skips three stops in an effort to regain lost time on the journey due to the delays caused by crude trains. Passengers wishing to travel to those locations in North Dakota now have to disembark the train at 3 a.m. and board buses to get to their destinations.

BNSF announced spending of \$247 million on track improvements in North Dakota and Montana in order to increase capacity to accommodate the surge in crude-by-rail traffic.<sup>11</sup> It remains to be seen whether this will solve the issue as crude-by-rail traffic continues to grow.

5 <http://www.crude-by-rail-destinations-2013.com/media/downloads/13-day-two-1520-john-wadsworth.pdf> See slide 12.

6 Jen Skerritt, “Record Grain Crop Stuck on Prairie as Railways Tap Oil” January 23, 2014, Bloomberg News. <http://www.bloomberg.com/news/2014-01-23/record-grain-crop-stuck-on-prairie-as-railways-tap-oil.html>

7 Ibid.

8 Ibid.

9 Progressive Railroading “Canadian government adopts measures to get more export grain moving by rail” March 10, 2014. [http://www.progressiverailroading.com/federal\\_legislation\\_regulation/article/Canadian-government-adopts-measures-to-get-more-export-grain-moving-by-rail--39708](http://www.progressiverailroading.com/federal_legislation_regulation/article/Canadian-government-adopts-measures-to-get-more-export-grain-moving-by-rail--39708)

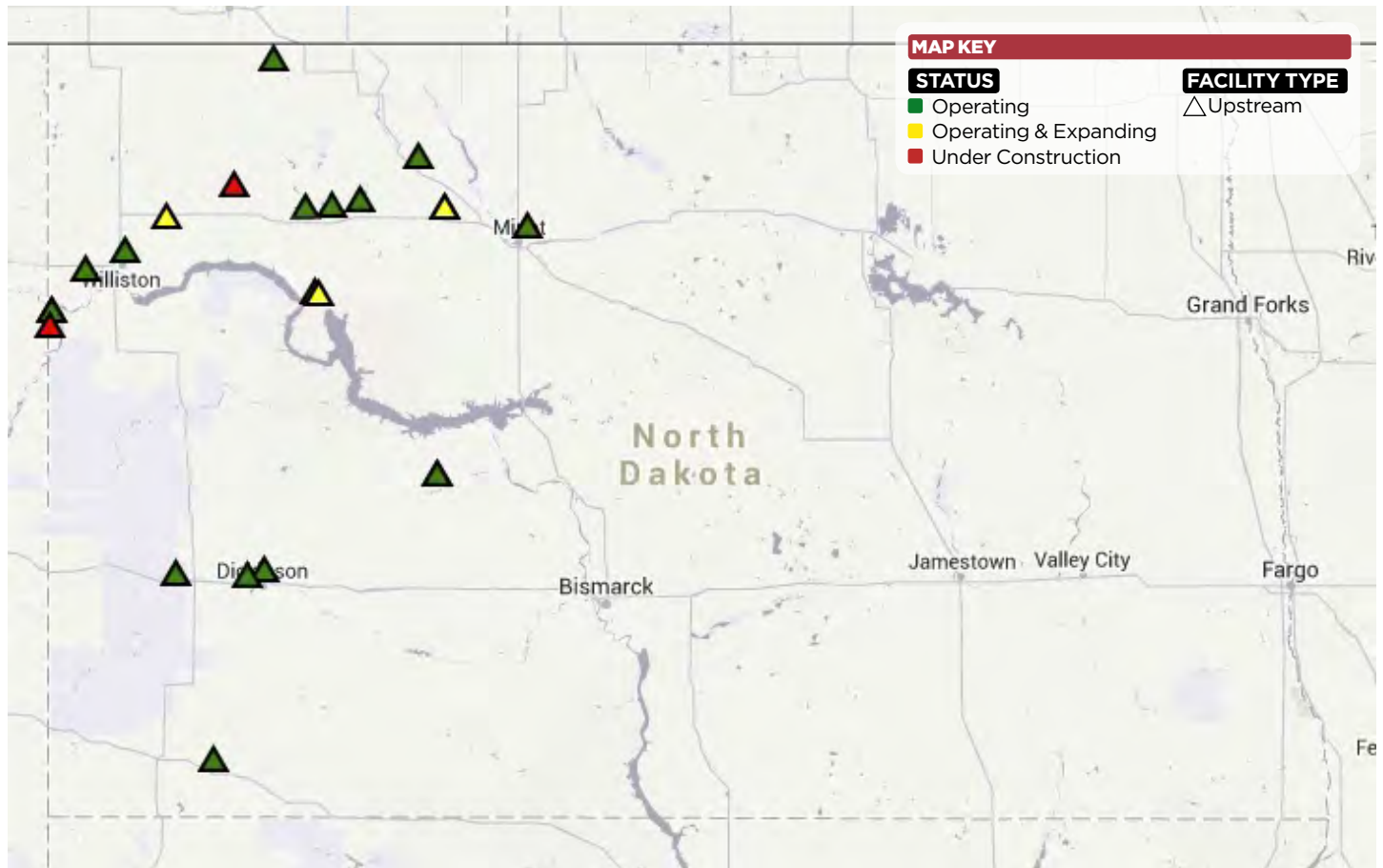
10 Keith Laing, “Oil shipments blocking Amtrak trains” January 29, 2014. The Hill. <http://thehill.com/blogs/transportation-report/railroads/196894-oil-shipments-blocking-amtrak-passenger-trains#ixzz2yUkXstGw>

11 Progressive Railroading “BNSF budgets \$247 million for North Dakota infrastructure upgrades, Sen. Heitkamp says” March 11, 2014. [http://www.progressiverailroading.com/bnsf\\_railway/news/BNSF-budgets-247-million-for-North-Dakota-infrastructure-upgrades-Sen-Heitkamp-says--39728](http://www.progressiverailroading.com/bnsf_railway/news/BNSF-budgets-247-million-for-North-Dakota-infrastructure-upgrades-Sen-Heitkamp-says--39728)



A fireball goes up at the site of an oil train derailment Monday, Dec 30, 2013, in Casselton, N.D. (©AP Photo/Bruce Crummy)





**Map 3: Upstream Terminals in North Dakota**

### North Dakota: Heart of the Oil Boom and Birthplace of the Crude-by-Rail Boom

While fracking did not begin in North Dakota, loading 100-car crude oil trains did. Fracking was initially developed as a means to extract natural gas from tight shale formations primarily in Texas, Pennsylvania, Wyoming, and West Virginia. Following a crash in the price of natural gas in 2009, drillers started to move fracking rigs to “liquid rich plays” primarily in West Texas and North Dakota. The result has been the fastest growing oil boom in North America’s history.

As production grew at a breakneck pace, existing pipeline infrastructure to deliver the oil to North American refineries, most of which are located on the country’s coasts, quickly filled up.

Nowhere was this more pronounced than in the Bakken oil field, which spans North Dakota, Montana and

Saskatchewan. Unlike West Texas, this part of the continent had never seen major oil production before and therefore had very limited pipeline infrastructure and refinery capacity. Heavily concentrated in North Dakota, production in the U.S. Bakken has grown fivefold since 2010 (see Figure 5).

Shipments of oil by rail from North Dakota alone have risen from near zero in 2009 to around 800,000 bpd in early 2014 (see Figure 6). North Dakota therefore currently represents up to 80 percent of total North American crude-by-rail volumes.<sup>12</sup>

In developing rail transport infrastructure for its Bakken oil production, one oil company, EOG Resources, was ahead of the game, building its own unit train loading terminal in Stanley, North Dakota in 2009. This was the first facility designed to load an entire unit train (100 to 120 cars) with crude oil in North America. The first unit train was loaded on December 31, 2009. By the end of 2010, the number of railcars

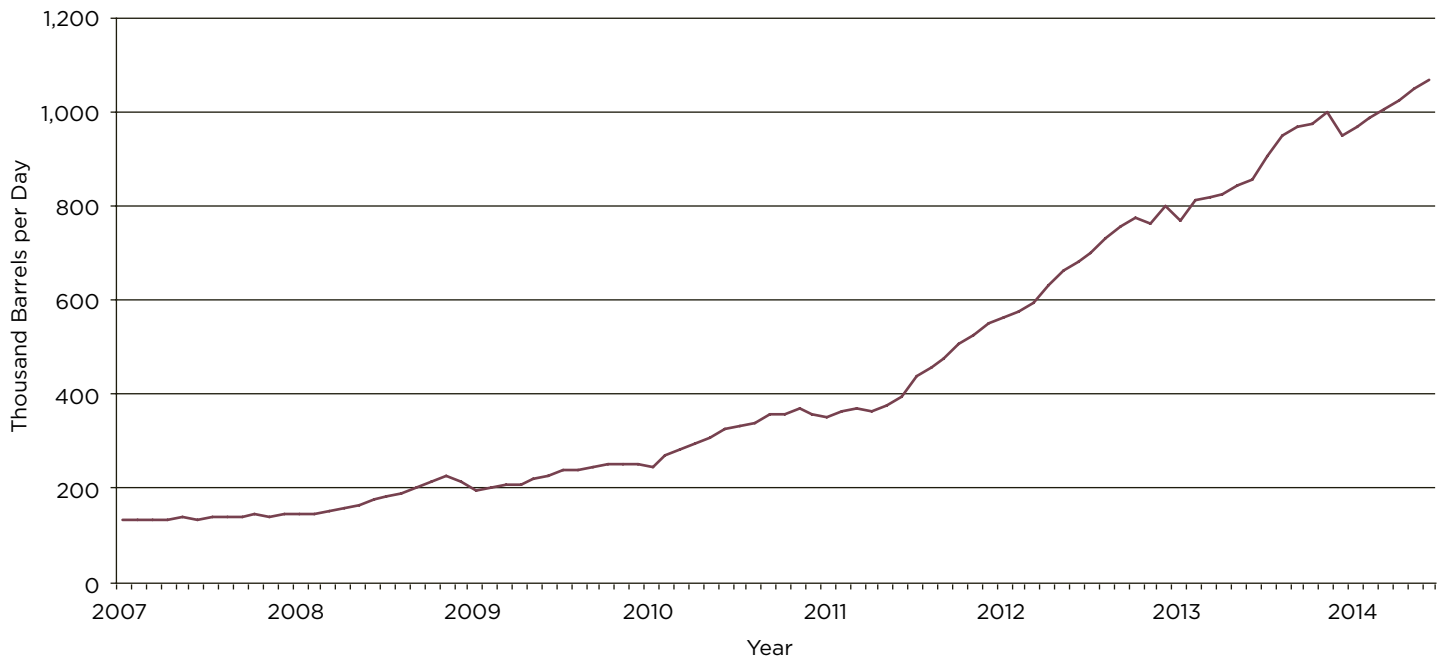
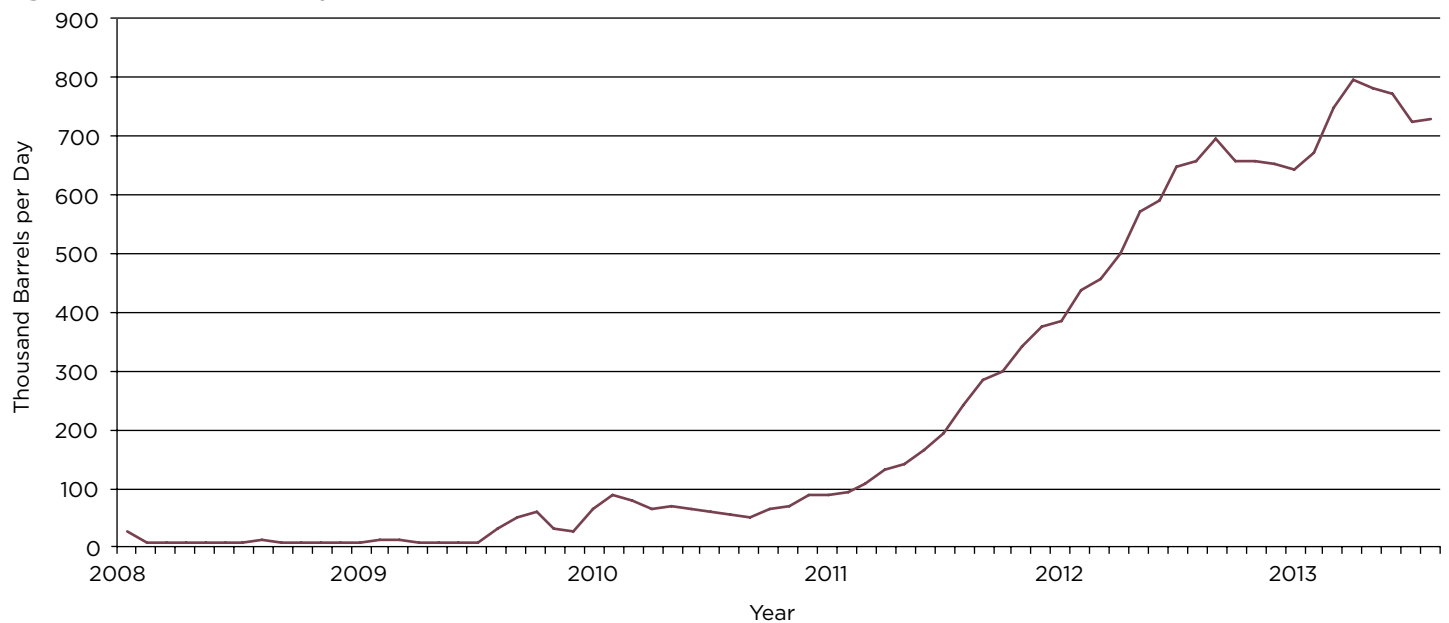
loaded with crude oil in the United States had almost tripled. Between 2010 and 2012, the amount of crude oil received at terminals in the U.S. expanded eightfold. It then further doubled in 2013 (see Figure 1).

What started in North Dakota soon spread to oil fields in Texas, Oklahoma, Wyoming, and Canada, as oil production in all these regions increasingly overwhelmed either local refinery capacity or pipeline capacity to distant coastal refineries, or both.

By 2011, North America’s onshore oil producers were realizing that putting their crude on the rails affords them a level of market access that pipelines simply cannot offer. While pipelines are fixed pieces of infrastructure from Point A to Point B, oil producers can use trains to deliver their crude to just about any point in North America according to the whims of the market. As some petroleum products have always travelled by rail from refineries to various points around

<sup>12</sup> There may be some discrepancies between Association of American Railroads (AAR) and North Dakota Pipeline Authority data. This may explain why North Dakota’s figures are close to what the AAR reports as a U.S. total. This could come from different formulas for barrels per tank car, where the volumes are being measured. Therefore, all crude volumes cited in this report should be seen as estimates with perhaps a 10 percent error range. Also note that rail shipments from North Dakota have declined recently due to narrower price differentials.



**Figure 5: Oil Production Growth in the U.S. Bakken****Figure 6: The Rise of Crude-by-Rail in North Dakota**

Source: North Dakota Pipeline Authority<sup>13</sup>

the continent, the North American rail network already provided access to many refineries in the U.S. and Canada. While most refineries require some additional infrastructure to offload large amounts of crude from tank cars, they nearly all have track running directly to the refinery and are therefore already connected to the continental rail network. This flexibility has cemented crude-by-rail's role in the North American oil market as producers

no longer consider it merely a stopgap measure while they wait for pipelines to be built.

At least two major pipeline proposals both designed to take North Dakotan oil to market have failed to get enough commitments from shippers to go forward. The first, a proposal by Oneok to connect North Dakota with America's biggest pipeline hub in Cushing,

Oklahoma, was abandoned in November 2012.<sup>14</sup> More recently, Koch Industries announced in January 2014 that its proposed pipeline to Illinois will not go ahead.<sup>15</sup> Both of these proposed pipelines failed to get enough shippers to commit to long-term contracts. The commercial failure of these pipeline projects clearly signals that as far as North Dakota's oil producers are concerned, crude-by-rail is here to stay.

<sup>13</sup> <http://northdakotapipelines.com/rail-transportation/>

<sup>14</sup> R.T. Dukes, "Oneok Cancels Bakken Crude Express Plans" November 30, 2012. <http://bakkenshale.com/news/oneok-cancels-bakken-crude-express-plans/>

<sup>15</sup> Kirk Eggleston, "Koch Cancels Proposed Bakken Pipeline - Dakota Express Pipeline" January 22, 2014. <http://bakkenshale.com/pipeline-midstream-news/koch-cancels-proposed-bakken-pipeline-dakota-express-pipeline/>

16 There are currently 20 terminals in North Dakota with over 1.3 million bpd of loading capacity. This could increase to over 1.7 million bpd when current expansions and new construction are completed. Refineries on the U.S. East and West Coasts and in Eastern Canada are prime markets for Bakken crude-by-rail, as are inland refineries in the American mid-continent. The viability of sending Bakken oil to the Gulf Coast is more fragile as the distance is greater, and the Gulf Coast is already awash in similar quality oil from West Texas and other more proximate sources. This suppresses the price of light oil on the Gulf Coast and limits the profitability of railing crude all the way from North Dakota.<sup>16</sup>

However, these dynamics are constantly changing as oil price differentials – the

difference in the price of oil between various locations in North America and around the world – shift over time according to supply and demand balances. It is precisely this ability to exploit favorable differentials, as and when they are available, that makes crude-by-rail so attractive to oil producers in the Bakken and elsewhere.

### Beyond North Dakota

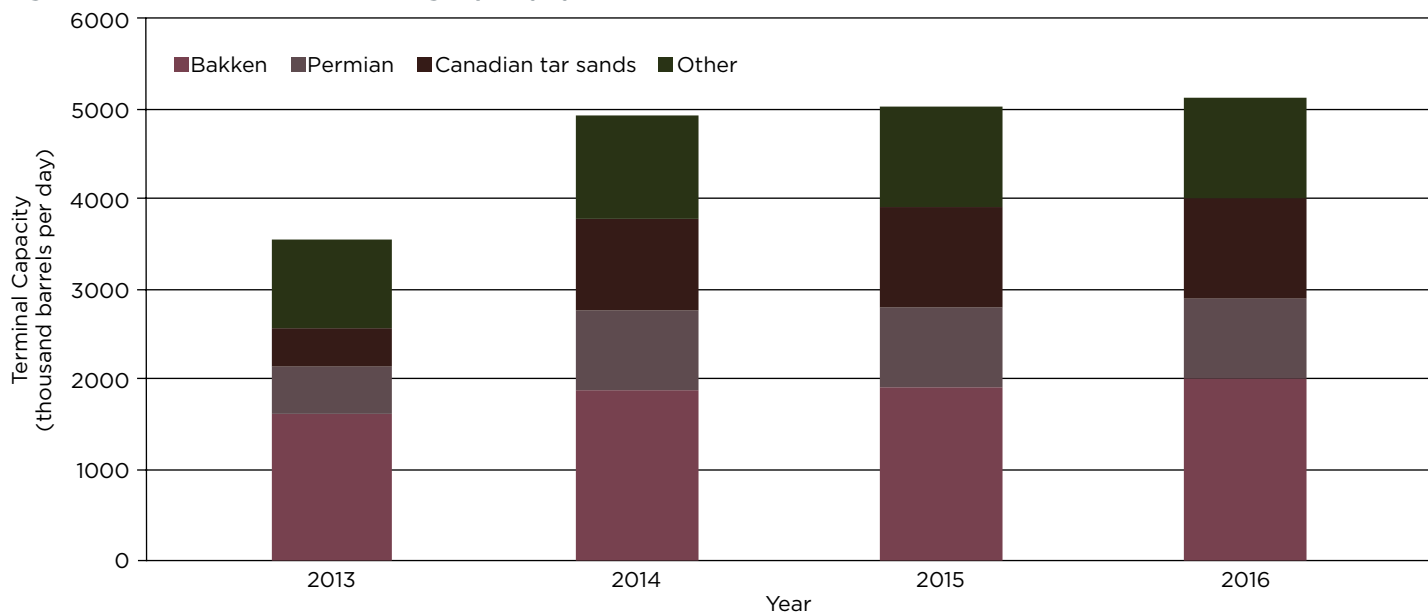
Outside of North Dakota, the Permian Basin in northern Texas has the next biggest concentration of rail terminals for loading crude in the United States. At least 525,000 bpd of loading capacity exists today, which is expected to rise to 880,000 bpd by the end of 2014.

There are also upstream terminals operating and under construction in

the Eagle Ford field in southern West Texas, as well as in Utah, Wyoming, Colorado, New Mexico, Oklahoma, Ohio, and Kansas. Together these terminals have a capacity of at least 950,000 bpd today with a few expansions expected to raise capacity to 1.1 million bpd by the end of 2014 (see Figure 7). As some of the terminals listed in our database do not have publically disclosed capacity figures, we believe there is likely greater capacity available than these figures suggest.

Some of these terminals also handle sand for fracking operations as well as drilling equipment such as pipes and cement. These terminals offload this equipment in one part of the facility and load crude in another.

Figure 7: North American Crude Loading Capacity by Oil Source



Source: Oil Change International

Workers remove damaged tanker cars along the tracks where several CSX tanker cars carrying crude oil derailed and caught fire along the James River near downtown Lynchburg, Va. on April 30, 2014 (©AP Photo/Steve Helber)

16 Sandy Fielden, "On the Rails Again? – Bakken Crude Netbacks Favor East and West Coasts" RBN Energy LLC. <https://rbnenergy.com/on-the-rails-again-bakken-crude-netbacks-favor-east-and-west-coasts>





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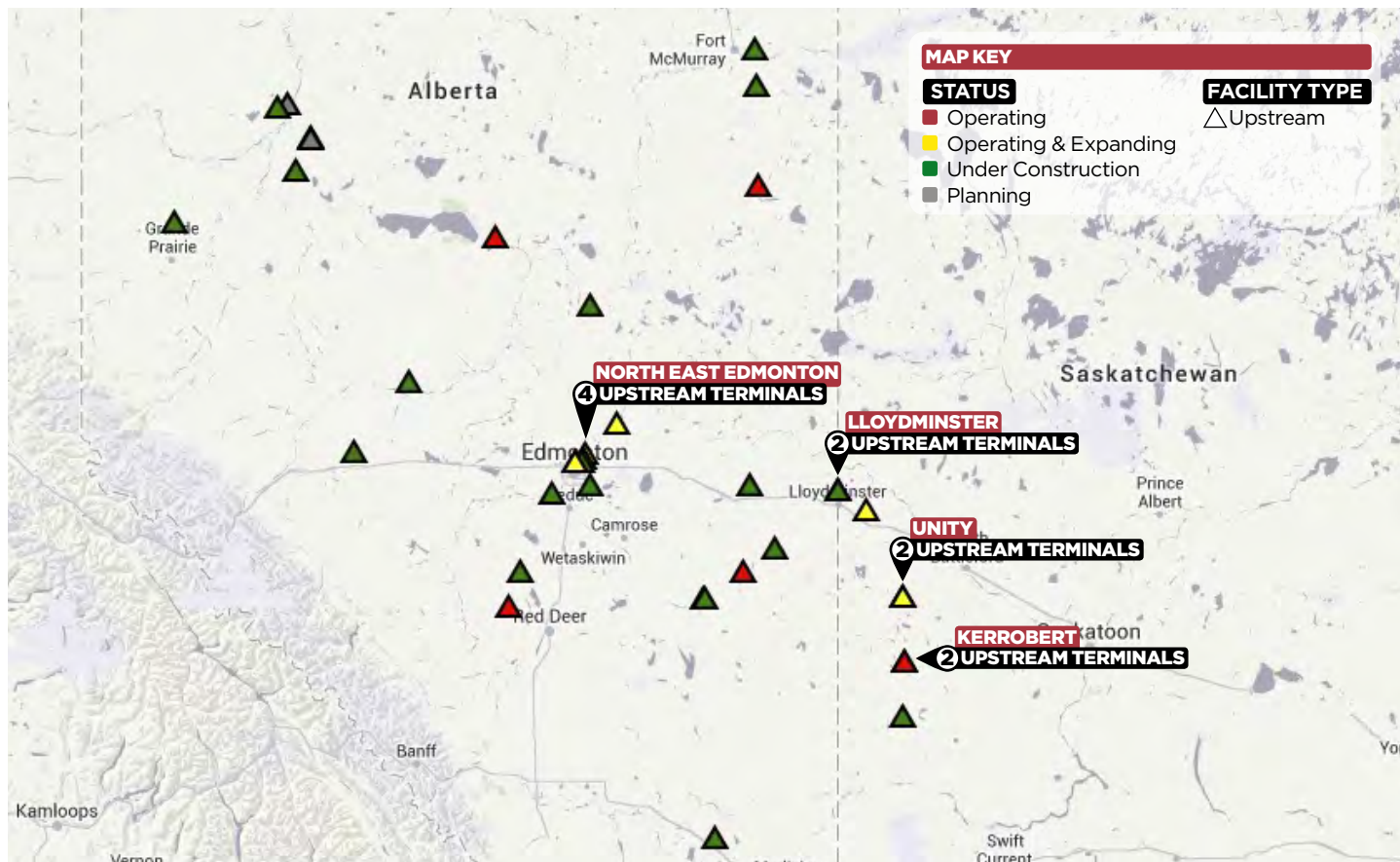
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**Map 4: Upstream Terminals Capable of Loading Tar Sands Crude**

### The Next Wave: Canadian Tar Sands Hit the Rails

Perhaps no source of oil in North America is more subject to shifting price differentials than Canada's low quality, landlocked tar sands bitumen. Primarily produced in northern Alberta, far from major oil consuming markets, tar sands bitumen crude has the double disadvantage of remote location and poor quality.

Tar sands crude is technically bitumen, a semi-solid hydrocarbon rather than a liquid crude oil, with high sulfur and heavy metal content. As a result of its high density and abundance of impurities, it requires intensive refining that not all refineries are equipped to handle. Its market is therefore limited.

Supported by high oil prices since 2005, tar sands production has grown at a pace that has outstripped its nearby refining markets in western Canada and

the U.S. Midwest, even though a number of large Midwest refineries have recently completed projects to handle more of this low quality feedstock.<sup>17</sup>

Primarily because of the controversy surrounding the intense impacts of tar sands extraction – including its high carbon intensity and the difficulty of cleaning up spills of this heavy toxic crude – proposed pipelines to deliver tar sands crude to the Canadian west coast (Northern Gateway) and the U.S. Gulf Coast (Keystone XL) have been severely delayed and may never be built.

In 2013, Canadian tar sands producers started to take notice of the crude-by-rail boom in the U.S. and began to use rail to take their product to market. At the time of writing there were 31 terminals in operation that load tar sands or heavy crude, with six of these expanding and an additional eight planned or under construction (see Figure 8).

However, many of these terminals are currently only loading manifest shipments (see Box 1) and not all are exclusively dedicated to handling tar sands crude. In addition to tar sands bitumen, some of these terminals handle light crudes as well as heavy crudes extracted by conventional drilling (conventional heavy oil). Because some of the terminals have not clearly disclosed how much capacity is dedicated to loading tar sands crude but instead disclose a total capacity figure, we list tar sands capacity as *the capacity of terminals equipped to load tar sands crude*. It should therefore be noted that actual tar sands loading capacity is likely to be smaller than this figure.

The first terminal designed to load unit trains with Canadian tar sands crude, the Canexus terminal in Bruderheim, northeast of Edmonton, Alberta, started operations in December 2013. It has a capacity of 70,000 bpd and loads tar sands bitumen from MEG's Christina Lake SAGD project, among others.

However, this terminal has been operating significantly under capacity since it started up, rarely loading more than 30,000 bpd.<sup>18</sup> This was partly due to severe weather, but could also be attributed to weakening prices for heavy oil on the Gulf Coast that make it unprofitable to ship tar sands bitumen there by rail. We will cover the economics of tar sands by rail in more detail in a forthcoming report.

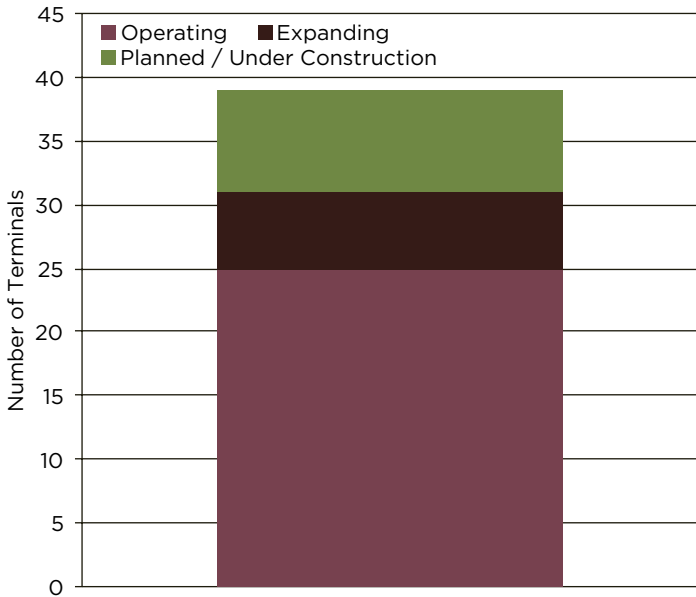
The total capacity of terminals capable of loading tar sands crude today is 450,000 bpd, and could expand to just under 1.1 million bpd by the end of 2015 (see Figure 9). As mentioned above, it is not clear that all of this capacity is dedicated to loading tar sands crude.

Some of the terminals currently loading or planning to load tar sands crude, including some in western Saskatchewan, are a distance from tar sands production. They receive tar sands crude via short distance pipelines or by truck (see map).

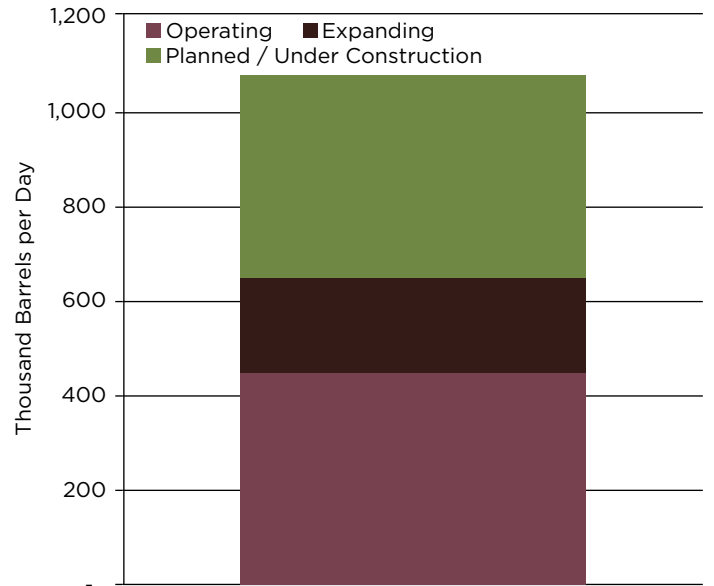


A warning placard on a tank car carrying crude oil is seen on a train idled on the tracks near a crude loading terminal in Trenton, N.D. on Nov. 6, 2013. The number 1267 denotes that the contents of the tank are Petroleum Crude Oil. (©AP Photo/Matthew Brown)

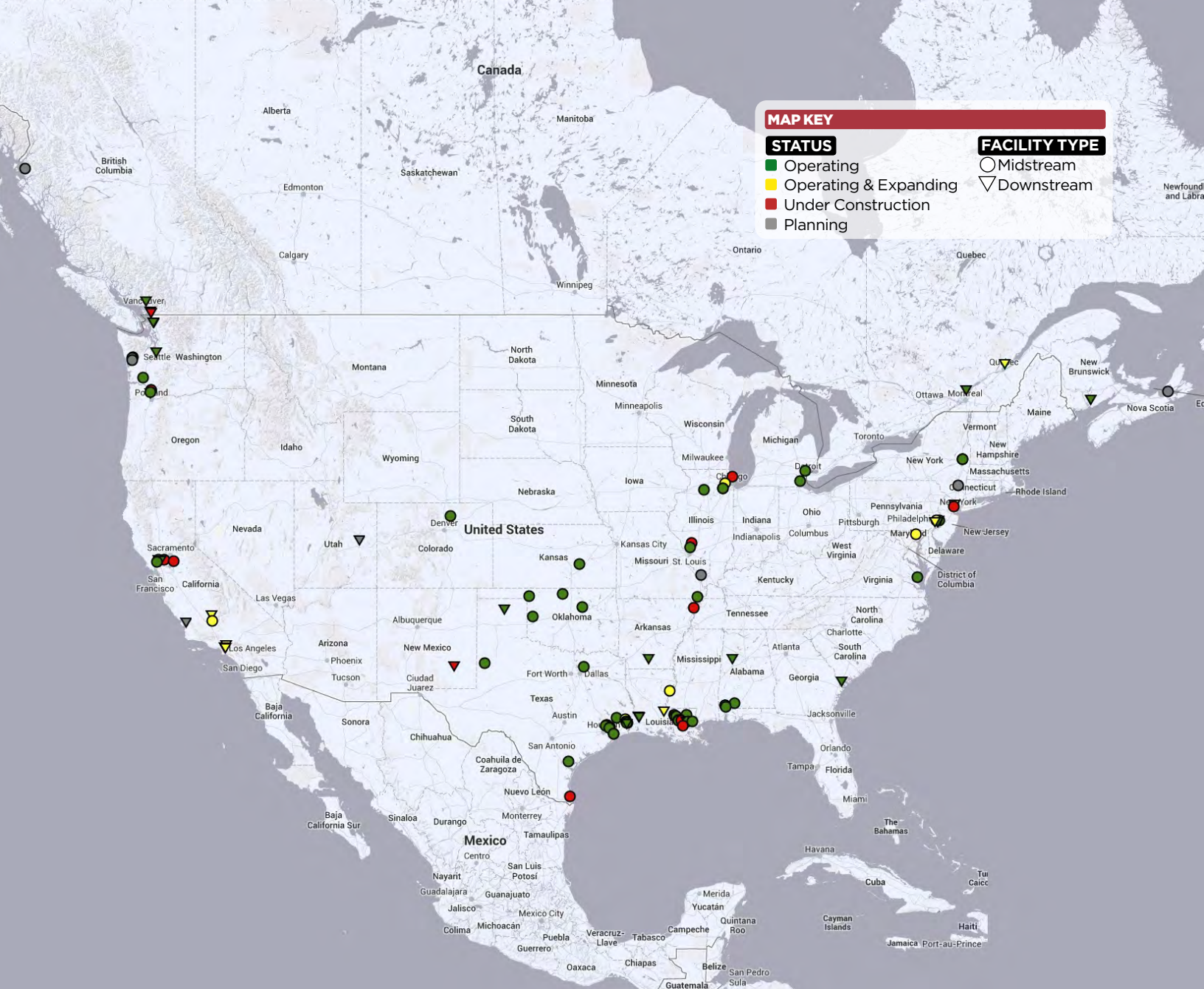
**Figure 8: Number of Terminals Equipped to Load Canadian Tar Sands Crude**



**Figure 9: Capacity of Terminals Equipped to Load Canadian Tar Sands Crude**







**Map 5: Midstream & Downstream Terminals in North America**

## MIDSTREAM AND DOWNSTREAM TERMINALS

The midstream and downstream terminals in our database unload crude oil from trains either directly to a refinery (downstream), or they load it into storage tanks to be transferred on to another mode of delivery such as barges or pipelines (midstream).

Unloading terminals are heavily concentrated on the Gulf Coast (see Figure 10), which correlates with the concentration of some 50 percent of U.S. refining capacity in that region. Most Canadian unloading capacity is located in eastern Canada, where

refineries that are not connected by pipeline to Western Canadian or U.S. oil production are located.

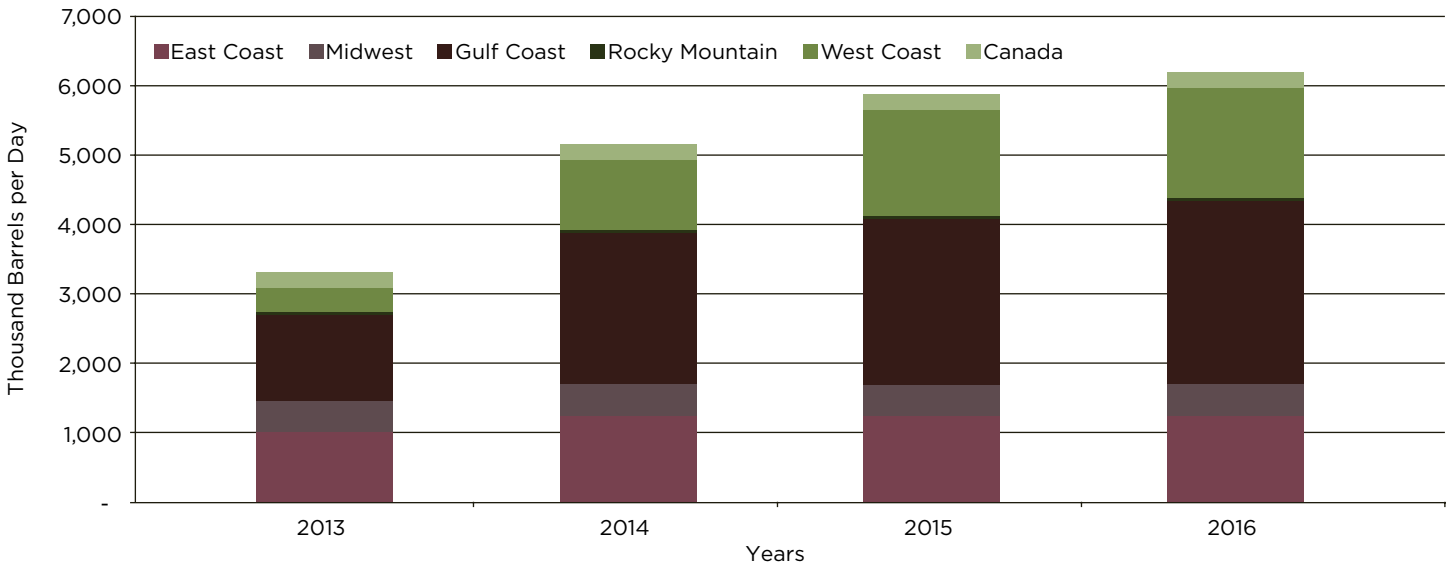
Gulf Coast unloading terminals offer North America’s oil producers a way around pipeline bottlenecks to the continent’s largest refining capacity. But East and West Coast terminals not only offer access to North American refining markets that may never be connected by pipelines, but also potentially the most efficient route to exporting North American crude oil to world markets. At the same time, these East and West Coast terminals currently face the most opposition from local communities.

## Tar Sands Unloading Terminals

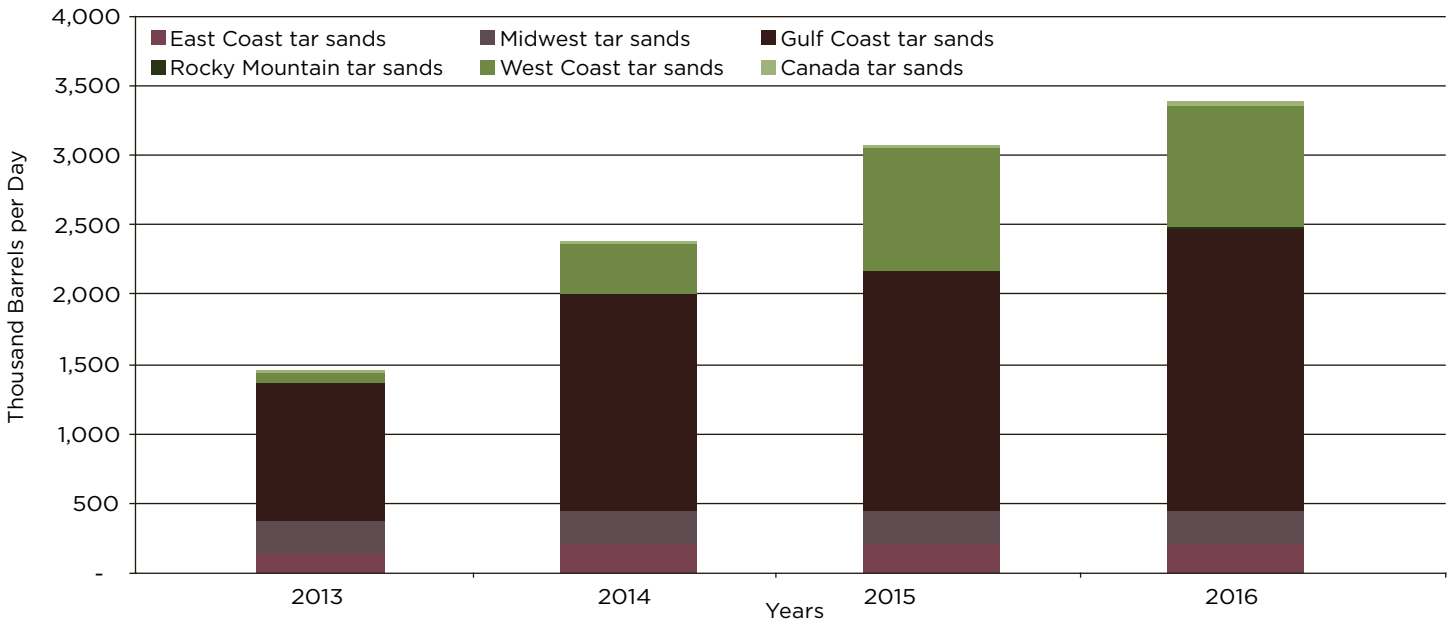
Terminals designed to unload tar sands crude are currently concentrated in the Gulf Coast region, where the biggest concentration of heavy oil refining capacity is located. However, as with the loading terminals, as many of them are designed to handle both light and heavy crudes, it is unclear how much of their capacity is dedicated solely to unloading tar sands crude. Therefore, we define this capacity as the *capacity of terminals equipped to unload tar sands* (see Figure 11).

The Gulf Coast terminals have about one million bpd of unloading capacity today, set to grow to over two million bpd in

**Figure 10: Crude Unloading (Midstream & Downstream) Capacity by Region<sup>19</sup>**



**Figure 11: The Capacity of Terminals Equipped to Unload Tar Sands**



2016. Some of this capacity is at refineries such as those operated by Valero in Port Arthur, Texas and St. Charles, Louisiana. Valero has ordered 1,600 insulated and coiled tank cars specifically for hauling tar sands crude to its refineries.<sup>20</sup>

The Gulf Coast also has significant midstream capacity on the Mississippi River, where crude oil, including tar sands crude, is unloaded from trains and pumped

from storage tanks into local pipelines or loaded onto barges that deliver to coastal refineries via the Intracoastal Waterway (see Box 3).

<sup>19</sup> U.S. regions are based on Petroleum Administration for Defense Districts (PADD) as defined by the Energy Information Administration.  
<sup>20</sup> Argus Media, "Valero plans heavy crude moves to US Gulf, California" March 7, 2013. <http://www.argusmedia.com/pages/NewsBody.aspx?id=837732&menu=yes>

### Box 3: Rollin' Down the River

The Gulf Coast region is home to over eight million bpd in refining capacity, the largest concentration in North America and the world. For a long time, Gulf Coast refineries received most of their crude oil from ocean tankers that docked at deep water berths adjacent to the refineries. Today, more crude is available from the mainland of the United States and Canada.

As pipeline capacity linking much of the new oil production to the Gulf Coast refineries is limited, rail is filling the gap. However, there remain limits on how much crude some refineries can unload from trains.

On the other hand, many refineries have ample capacity to unload crude from tankers and barges at existing docks. Therefore, some shippers are choosing to unload crude from trains at terminals on the Mississippi River and load it onto barges that travel downriver and along the Intracoastal Waterway<sup>21</sup> to deliver to coastal refineries.

The bulk of these rail-to-barge terminals are located in Louisiana, with four of them around St. James and several more around Baton Rouge and New Orleans. Crude oil delivered to these terminals makes the bulk of the journey by train while finishing the last, much shorter leg of its journey by barge. However, some terminals are also now operating far upriver in Illinois and Missouri, from where crude oil makes a much longer journey on the water.

There are also two rail terminals in Albany, New York that load Bakken, and potentially tar sands, crude onto barges for delivery to East Coast refineries. Another large (160,000 bpd) terminal

in Yorktown, Virginia loads crude onto barges that travel down the James River and into the Chesapeake Bay, also for delivery to East Coast refineries. The Eddystone Terminal near Philadelphia will load barges on the Delaware River to deliver Bakken crude to the Delta Airlines owned Trainer Refinery.<sup>22</sup>

Many of the Mississippi River terminals are equipped to handle tar sands, which has frightening implications for the waterway. So far in 2014 alone there have been two barge oil spills on the busy Gulf Coast waterways. In late February, a barge carrying light crude oil on the Mississippi River close to St. Charles, Louisiana collided with a tug and leaked oil into the river.<sup>23</sup> One month later a barge collided with a ship in Galveston Bay, Texas and spilled 168,000 gallons of fuel oil into the ecologically sensitive area.<sup>24</sup>

As we have seen with tar sands pipeline spills in Kalamazoo, Michigan and Mayflower, Arkansas, tar sands bitumen is heavier than water and therefore sinks, making it impossible to clean from water bodies.<sup>25</sup> The threat of hundreds of thousands of gallons of tar sands bitumen spilling into the Mississippi River could irreversibly pollute this crucial body of water.

Tar sands spills would also pose a threat to the Hudson River if Global Partners is allowed to go ahead with plans to bring tar sands crude in trains to its Albany terminal.

River barges have a capacity to carry between 10,000 and 30,000 barrels of crude oil. Two or three barges are typically tied together and towed by a single tug. Coastal barges can carry up to 185,000 barrels, while typical ocean going tankers plying the North American coast carry up to one million barrels.

### East Coast Terminals: A Route to Europe Hanging in the Balance

There are 14 existing unloading terminals in the U.S. East Coast region with a current unloading capacity of around one million bpd. Five of these terminals have expansion plans, and one additional new terminal is planned in New Windsor, New York.<sup>26</sup> These terminals primarily serve the region's refineries which lack pipeline connection to either America's booming onshore oil production or Canada's tar sands. Until the rise of crude-by-rail, these refineries were dependent on crude oil imports from across the Atlantic, which put them at a disadvantage compared

to better-connected inland refineries, primarily in the Midwest.

With the expansion of crude-by-rail, some of the East Coast rail-to-barge terminals are poised to play a much more pivotal role in North America's booming oil industry. At the end of 2013, Buckeye Partners, a mid-sized U.S. midstream company, revealed plans in an investor conference call to ship tar sands crude by rail to a terminal under development in Perth Amboy, New Jersey. Buckeye would then load the tar sands crude onto tankers to be shipped to its terminal in the Bahamas. From the Bahamas the crude

could be shipped anywhere in the world, with heavy oil refineries in Spain a likely option.<sup>27</sup>

A planned terminal in Nova Scotia, Canada is also slated to facilitate transatlantic exports of tar sands crude. NuStar's terminal in Port Tupper, Nova Scotia currently handles imported crude and is already equipped to accommodate Ultra-Large Crude Carriers. The company recently announced that it is considering building a rail unloading terminal that could bring crude from Alberta (likely tar sands crude) for export.<sup>28</sup>

21 The Intracoastal Waterway is a 3,000-mile inland waterway along the Atlantic and Gulf coasts of the United States.

22 OPIS, "Eddystone Crude-By-Rail Terminal Ready for First Ops at End-March" TankTerminals.com March 5, 2014. [www.tankterminals.com/news\\_detail.php?id=2692](http://www.tankterminals.com/news_detail.php?id=2692)

23 Associated Press, "65 miles of Mississippi River closed after barge collision spills oil near Vacherie" February 23, 2014. [http://www.nola.com/news/index.ssf/2014/02/65\\_miles\\_of\\_mississippi\\_river.html](http://www.nola.com/news/index.ssf/2014/02/65_miles_of_mississippi_river.html)

24 Neena Satija, "Oil Spill Threatens Galveston Bay's Fishing Industry" March 26, 2014, The Texas Tribune. <http://www.texastribune.org/2014/03/26/galveston-bays-lucrative-fishing-industry-threaten/>

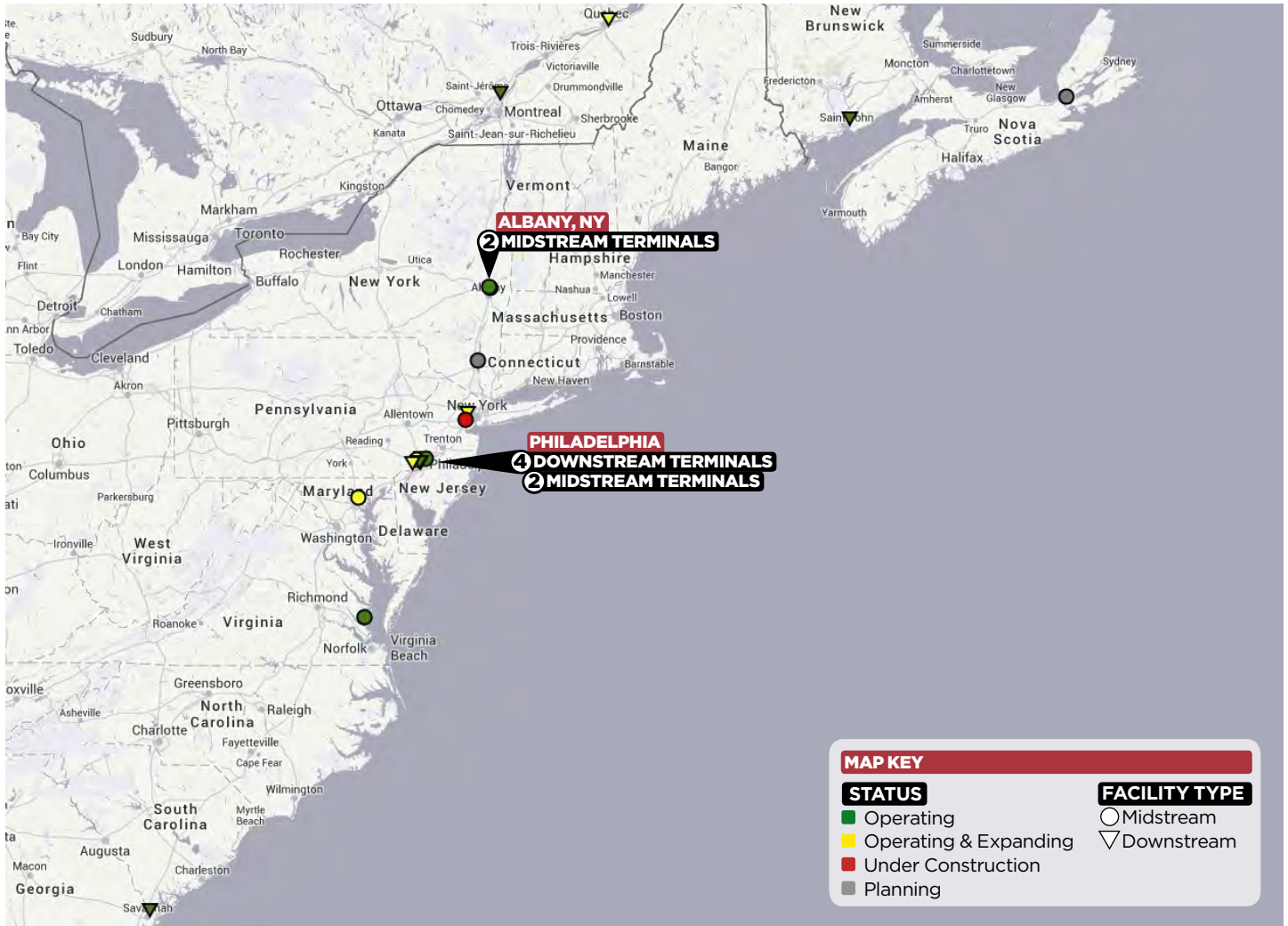
25 See: <http://insideclimatenews.org/topic/dilbit> for various articles on these two tar sands dilbit spills.

26 See [www.priceofoil.org/rail](http://www.priceofoil.org/rail)

27 Platts Oilgram News "Buckeye sets plan in motion to attract Canadian crude to BORCO terminal" November 1, 2013. <http://www.platts.com/latest-news/oil/houston/buckeye-sets-plan-in-motion-to-attract-canadian-21769644>

28 John Alberstat, "Oil facility planned at Point Tupper" September 10, 2013, The ChronicleHerald <http://thechronicleherald.ca/business/1153262-oil-facility-planned-at-point-tupper>





**Map 6: East Coast Midstream & Downstream Terminals**

Either of these projects could facilitate exports of tar sands crude into the Atlantic Basin and potentially to Europe long before TransCanada’s proposed Energy East pipeline could be built. This pipeline’s proposed start date is 2018, but the project faces stiff opposition in Ontario and Quebec which is bound to delay it and possibly stop it in its tracks.<sup>29</sup>

East Coast crude-by-rail terminal operators are starting to find that their expansion plans face increasing opposition from citizens concerned about the number of trains and types of crude oil that will pass through their communities.

Global Companies’ plans to increase the amount of tar sands crude it handles at

its Albany, New York terminal have been stopped by a moratorium issued by Albany County. This follows an executive order from New York Governor Cuomo for a comprehensive review of the state’s ability to handle spills and accidents from crude trains.<sup>30</sup> The company is also seeking to build a new facility downriver from Albany in New Windsor, New York.<sup>31</sup>

The executive order from Governor Cuomo is one action among many emerging from increasingly anxious communities in the path of crude trains. Following the string of explosive accidents beginning with the fatal Lac-Mégantic disaster in July 2013, communities living near crude-by-rail terminals and along rail lines that have seen increasing crude-by-rail traffic are voicing

their concerns and demanding action to ensure their safety.

Mayors from several major cities that have seen crude-by-rail traffic mushroom, including Chicago, Albany, Madison, Kansas City, Philadelphia, and Milwaukee, have formed a Cross-border Mayoral Rail Safety Coalition together with the Mayor of Lac-Mégantic, in an effort to tighten safety standards and keep reckless expansion in check.<sup>32</sup> They travelled to Washington, DC in early March 2014 to demand that the U.S. Congress require, among other measures, that the DOT-111 tank cars used to transport North American crude by rail be retrofitted to the latest standards and that tracks be repaired to prevent derailments.<sup>33</sup>

29 Gerrit De Vynck “TransCanada to Face Hurdles in Quest for Eastern Pipeline” August 6, 2013, Bloomberg <http://www.bloomberg.com/news/2013-08-06/transcanada-to-face-hurdles-in-quest-for-eastern-pipeline.html>

30 Scott Waldman, “State demands answers from Crude-Oil shipper” March 25, 2014, Capital. <http://www.capitalnewyork.com/article/albany/2014/03/8542546/state-demands-answers-crude-oil-shipper>

31 Brian Nearing, “Rail yard plan for crude bypasses Albany port” December 13, 2013, Times Union <http://www.timesunion.com/business/article/Rail-yard-plan-for-crude-bypasses-Albany-port-5076524.php>

32 Andy Rowell, “US Mayors Demand Action on Crude by Rail” Oil Change International, March 18, 2014 <http://priceofoil.org/2014/03/18/us-mayors-demand-action-crude-rail/>

33 Carmel Kilkenny, “Railway Safety Coalition demanding action in Washington” March 11, 2013, Radio Canada International. <http://www.rcinet.ca/en/2014/03/11/railway-safety-coalition-demanding-action-in-washington/>

In March 2014, New York state representatives held a press conference at the site of a CSX rail crossing in Rockland, New York, after sending a letter to the U.S. Department of Transportation demanding that rail safety improvements be speeded up. At least 14 crude trains pass through the CSX route in New York each week. Local citizens expressed concerns that if a train derailed and spilled into the Hackensack River, the drinking water for hundreds of thousands of residents in New York and New Jersey would be threatened.<sup>34</sup> Their fears were likely reinforced by the April 30, 2014 Lynchburg, Virginia accident in which three tank cars fell into the James River and spilled part of their contents, creating a floating pool of fire.<sup>35</sup>

These citizen-led, local and state government actions have so far proved more potent than any federal government action in holding crude-by-rail shippers

to account and forcing stronger safety regulation on the industry. It remains to be seen if campaigns in Albany and elsewhere can actually stop the terminal expansions.

### West Coast Terminals: A Potential Fast-Track out of North America for Canada's Tar Sands

There are currently 13 crude-by-rail unloading terminals in California, Oregon, and Washington, of which four are currently expanding their capacity. There are also 11 terminals planned or under construction. Many of these are at refineries that, like their counterparts on the East Coast, are looking to take advantage of discounted domestic or Canadian crudes that they have little hope of ever gaining access to via pipeline.

With a larger proportion of refining capacity geared up for heavy tar sands processing than exists on the East Coast, West Coast refineries such as the Valero facility in

Wilmington, California and the Phillips 66 refineries in California and Washington, are keen to rail in tar sands crude.

Accessing these West Coast refineries by rail, as well as the prospect of export terminals in Washington and Oregon, are potentially the tar sands industry's best bet for major market expansion in the face of delays and possible cancellation of the Keystone XL pipeline and pipelines to the Canadian west coast such as the Northern Gateway and Transmountain expansion.<sup>39</sup> These latter projects, which are primarily focused on exporting tar sands crude to Asia, face particularly stiff opposition from coastal communities, both native and settler, that fear the destruction of fisheries and coastal environments from the increased tanker traffic that would ensue.

Given the relative proximity particularly of Washington State refineries and ports to

## Box 4: Exporting North American Crude Oil from the United States

Exporting American crude oil is restricted under export regulations implemented following the 1973 Arab Oil Embargo. Exports are allowed only to Canada and only as long as the oil is refined in Canada, with some rarely-exploited exceptions for Californian and Alaskan oil. Exports to Canada grew sharply in 2013 and reached 245,000 bpd in January 2014.<sup>36</sup> These exports are mostly Bakken oil from North Dakota travelling by train to refineries in Eastern Canada. Some crude has also travelled to Canada via ship from Corpus Christi, Texas to Valero's Jean Guillen refinery in Quebec City.

A major campaign to get the U.S. crude export ban lifted is now underway with Senator Murkowski (R-AK) leading the charge on Capitol Hill and the American Petroleum Institute and major oil companies becoming increasingly vocal on the issue. On May 13, 2014, U.S. Secretary of Energy Ernest Moniz said that the possibility of lifting or relaxing the ban was "under consideration" by the Obama Administration.<sup>37</sup>

While crude oil of U.S. origin is subject to export restrictions, no such restriction applies to exports of Canadian oil through the U.S., as long as it can be shown that no U.S. oil was blended. Shippers wishing to export Canadian oil from U.S. ports still have

to apply for export licenses from the Department of Commerce, but these can and have been granted.

Given the lack of pipeline capacity to Canadian ports, it is attractive for tar sands producers to find ways to get their product to a U.S. port where it can be exported. Crude-by-rail terminals on the West and East Coasts are strategically important as they are closer to Alberta than those on the Gulf Coast and it is therefore cheaper to reach these ports by rail.

However, the first shipment of Canadian tar sands crude to be exported from the U.S. was in fact scheduled to leave from the Gulf Coast for Spain as this report went to press.<sup>38</sup>

Should exports of tar sands from U.S. ports become commonplace, it could lend weight to the push for U.S. crude exports. This adds urgency and importance to local campaigns aimed at stopping export terminals on the West Coast and terminals planning to install tar sands equipment in Albany, New York.

For more information on the push for U.S. crude oil exports see: <http://priceofoil.org/?s=crude+exports>

34 Khurram Saeed "Fast-track oil train standards, Rockland officials say" LoHud, The Journal News, March 17, 2014. <http://www.lohud.com/story/news/local/rockland/2014/03/17/officials-demand-better-oversight-crude-oil-trains/6534571/>

35 Ralph Vartabedian and Paresch Dave "Oil train derailment in Lynchburg, Va., raises safety questions" L.A Times, April 30, 2014. <http://www.latimes.com/nation/la-na-0501-train-derail-20140501-story.html>

36 EIA Crude Oil Exports by Destination. [http://www.eia.gov/dnav/pet/pet\\_move\\_expc\\_a\\_EPC0\\_EEX\\_mbbldp\\_m.htm](http://www.eia.gov/dnav/pet/pet_move_expc_a_EPC0_EEX_mbbldp_m.htm) Accessed on 3/31/2014

37 Laura Barron-Lopez, "Energy secretary: US considering crude oil exports" The Hill, May 13, 2014. <http://thehill.com/policy/energy-environment/205998-energy-secretary-us-considering-crude-oil-exports>

38 John Kingston "Exporting Canadian oil to Spain, and a possible impact on Keystone XL" Platts, "The Barrel" May 13, 2014. <http://blogs.platts.com/2014/05/13/canada-oil-exports-keystone-xl/>

39 Forest Ethics, "Off the Rails: the Fossil Fuel Takeover of the Pacific Northwest" March 2014, <http://forestethics.org/news/report-rails> And Sightline Institute, "The Northwest's Pipeline on Rails: Crude oil shipments planned for Puget Sound, the Washington Coast, and the Columbia River" Updated February 2014. <http://www.sightline.org/research/the-northwests-pipeline-on-rails/>

Alberta's tar sands fields, these terminals offer oil companies a potential solution to the transportation bottlenecks that are threatening the viability of tar sands production growth. At least three proposals in southern Washington State have the potential to unload tar sands crude from trains and load it onto tankers for export to Asia or transport to refineries along the California coast. These terminals also plan on handling Bakken and other U.S. fracked crudes.

However, these terminals are also being challenged by local citizens concerned about the huge increase in rail traffic, the risk of crude oil train accidents, and air pollution, as well as the increase in tanker traffic that these terminals would cause.

In November 2013, the Washington Shorelines Hearings Board revoked permits for two crude-by-rail terminals in Grays Harbor, Washington that would have served as a transfer point to ocean-going tankers for Bakken crude as well as Canadian tar sands.<sup>40</sup> The Board ruled in favor of a coalition of opposing groups challenging the permits, which had been issued by the City of Hoquiam and the Washington Department of Ecology, to Westway Terminal Company and Imperium Terminal Services without full environmental reviews. The Board found that the permitting process had violated the State Environmental Policy Act (SEPA), and raised skepticism of the City and Department of Ecology's conclusion that the major increase in crude-by-rail and tanker traffic that would result from the proposed terminals would not have a significant environmental impact. The Board went on to identify "troubling questions of the adequacy of the analysis done regarding the potential for individual and cumulative impacts from oil spills, seismic events, greenhouse gas emissions, and impacts to cultural resources."<sup>41</sup>



Tesoro's proposed 380,000 bpd terminal in Vancouver, Washington has also faced stiff opposition, with the majority of the city's council opposed.<sup>42</sup>

Citizen groups are also challenging terminals in California. Valero's plan to build an unloading terminal at its Benicia refinery, near San-Francisco was delayed after the city decided that a full environmental impact study was required.<sup>43</sup> A massive terminal planned near the East Bay town of Pittsburg, California is also facing vociferous opposition from the local community.<sup>44</sup> The Berkeley City Council unanimously passed a resolution to oppose plans by Phillips 66 to transport crude oil by train through the city to reach its refinery in Los Angeles.<sup>45</sup>

These challenges to the expansion of crude-by-rail facilities in Washington and California are crucial battles in the fight to rein in reckless crude-by-rail expansion.

Map 7: West Coast Midstream & Downstream Terminals

40 Earthjustice, "Grays Harbor Crude Oil Terminals Blocked," November 13, 2013, <http://earthjustice.org/news/press/2013/grays-harbor-crude-oil-terminals-blocked>  
 41 Washington Shorelines Hearing Board, Order on Summary Judgment and the Partial Concurrence and Dissent of the Shorelines Hearing Board for Quinalt Indian Nation and Friends of Grays Harbor, Sierra Club, Surfrider Foundation, Grays Harbor Audubon, and Citizens for a Clean Harbor v. City of Hoquiam, Ecology and Westway Terminal Co. LLC and Imperial Terminal Services LLC, November 12, 2013, <http://earthjustice.org/sites/default/files/files/Grudebyrail.orderonsummaryjudgment.pdf>  
 42 Aaron Corvin and Stephanie Rice, "Majority of Vancouver City Council against oil plan" March 19, 2014, The Columbian, <http://www.columbian.com/news/2014/mar/19/majority-of-council-against-oil-plan/>  
 43 Tony Burchyns "Benicia calls for more review of Valero's plan to ship crude oil by railcar" August 8, 2013. Times-Herald. [http://www.timesheraldonline.com/ci\\_23823107/benicia-calls-more-review-valeros-plan-ship-crude](http://www.timesheraldonline.com/ci_23823107/benicia-calls-more-review-valeros-plan-ship-crude)  
 44 Eve Mitchell, "WesPac crude oil storage and transfer project faces scrutiny at community forum" November 20, 2013. Contra Costa Times. [http://www.contracostatimes.com/contracosta-times/ci\\_24565499/wespac-crude-oil-storage-and-transfer-project-faces](http://www.contracostatimes.com/contracosta-times/ci_24565499/wespac-crude-oil-storage-and-transfer-project-faces)  
 45 Angel Grace Jennings, "City Council votes to oppose rail transport of crude oil through Berkeley" April 1, 2014. The Daily Californian. <http://www.dailycal.org/2014/03/30/city-council-votes-oppose-rail-transport-crude-oil-berkeley/>



# THE COMPANIES BLAZING THE CRUDE-BY-RAIL TRAIL

## TERMINAL COMPANIES

There are over 100 companies operating crude-by-rail terminals in North America. These companies include some oil producers, such as EOG Resources in North Dakota, and refiners such as Valero, Tesoro, and Phillips 66 among others. Companies like these are operating

terminals to serve their main businesses, either oil production or refining.

But the majority of crude-by-rail terminals are operated by midstream companies that concentrate on providing transport and storage services for crude oil and petroleum products. Some of the biggest

North American midstream companies are pipeline and oil terminal companies such as Plains All American Pipeline and Kinder Morgan (see Table 2).

There are also a large number of small to mid-sized companies that provide services such as trucking, storage, waste

**Table 2: Top 10 North American Crude-by-Rail Terminal Companies by Planned Future Capacity**

Company	Existing Capacity (thousand bpd)	Future Total Capacity (thousand bpd)	Number of Existing Terminals	Number of Planned Terminals
Plains All American Pipeline	579	749	8	1
Kinder Morgan	205	561	3	3
EOG Resources	545	545	6	0
Genesis Energy	261	492	5	1
Watco	271	476	8	0
Global Partners	375	375	4	1
Torq Transloading	151	319	6	1
Enbridge	220	300	4	0
Jefferson Refining	0	300	0	1
Valero	60	290	2	3

management, and local short-distance pipelines that are also entering the crude-by-rail space, and substantially growing their business as a result.

Table 2 shows the top ten terminal operators ranked by total planned capacity. Pipeline giants Plains All American and Kinder Morgan top the list. Some companies such as EOG Resources operate both loading and unloading terminals.

The list is also populated by much smaller companies that have emerged as major players in the crude-by-rail space. This is a result of the relatively low capital requirements of building rail terminals. Torq Transloading is one such company that has emerged from being a regional oilfield fluids haulage company to become the operator of soon-to-be seven rail terminals in Alberta and Saskatchewan that will load Canadian tar sands and conventional heavy and light crudes.<sup>46</sup>

### TAX-FREE STATUS

Many midstream companies operate as Master Limited Partnerships (MLPs). These are publically traded companies that operate under a favorable tax code that allows them to avoid corporate level income taxes entirely, as well as distribute cash to shareholders on a tax-deferred basis.

The list of MLP companies is heavily dominated by the fossil fuel sector, particularly midstream oil and gas companies. In the last few years, as the North American oil and gas boom has gathered pace, the value of fossil-fuel assets placed into this tax-free bracket has mushroomed. A 2013 Oil Change International & Earthtrack report put the value of these assets at about \$385 billion in March of that year.<sup>47</sup> This figure is likely to have increased as many of these companies are growing, particularly through the expansion of crude-by-rail.

As an increasing number of oil and gas assets are being moved from standard corporate status to MLP status, the U.S. Treasury is relinquishing a substantial amount of tax revenue that it could be deriving from the ongoing oil and gas boom.<sup>48</sup> This includes potential revenue from the crude-by-rail boom. The continuation of this favorable tax status for these highly profitable companies is thus a substantial subsidy to the crude-by-rail business and the oil and gas sector more generally.

### RAILROADS

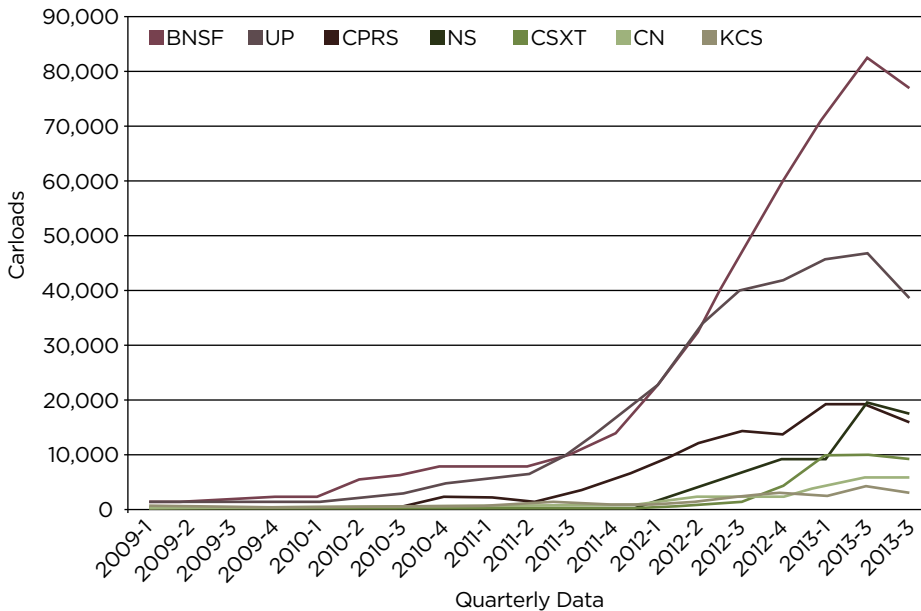
There are seven major railroad companies in North America that operate the main rail routes through the continent, classified as Class 1 Railroads. All of them are hauling crude oil today.

However, one company hauls a lot more crude oil than the others. Burlington Northern Santa Fe Railway (BNSF), which is owned by Warren Buffet's Berkshire Hathaway Inc., transports about 70 percent of the one million barrels per day of crude oil loaded onto North American railroads today, a figure set to grow substantially over the next year (see Figure 12).<sup>49</sup>

At the end of 2013, 700,000 barrels of crude oil were loaded onto trains on the BNSF rail network each day. The vast majority of this crude oil – about 550,000 to 600,000 barrels per day, is Bakken oil loaded in North Dakota. BNSF plans to spend up to \$500 million in 2014 on crude-by-rail capacity expansion, focusing on projects in North Dakota, Montana, Washington State, and the Gulf Coast. The company expects that more than one million bpd will be loaded onto its network before the end of the year.<sup>50</sup>

Other Class 1 railroad companies are planning substantial growth in crude oil shipments in the coming year. The CEO of CSX, Michael Ward, told analysts in January that the company plans to grow its crude oil business by 50% in 2014.<sup>52</sup>

Figure 12: Crude Oil Carloads by Railroad



Source: PLG Consulting<sup>51</sup>

46 See <http://torqtransloading.com/about.cfm>  
 47 Doug Koplow, "Too Big To Ignore: Subsidies to Fossil Fuel Master Limited Partnerships" July 2013, Oil Change International and Earth Track Inc. [http://priceofoil.org/content/uploads/2013/07/OCI\\_MLP\\_2013.pdf](http://priceofoil.org/content/uploads/2013/07/OCI_MLP_2013.pdf)  
 48 Ibid.  
 49 Jeff Stagl, "BNSF banks on crude oil, domestic intermodal to build rail traffic and raise revenue," Progressive Railroading, January 2014, [http://www.progressiverailroading.com/bnsf\\_railway/article/BNSF-banks-on-crude-oil-domestic-intermodal-to-build-rail-traffic-and-raise-revenue--39008?source=pr\\_digital01/15/2014&usedate=01/15/2014&email=ian@thegoodman.com&cid=15480](http://www.progressiverailroading.com/bnsf_railway/article/BNSF-banks-on-crude-oil-domestic-intermodal-to-build-rail-traffic-and-raise-revenue--39008?source=pr_digital01/15/2014&usedate=01/15/2014&email=ian@thegoodman.com&cid=15480)  
 50 Jeff Stagl, "Large freight railroads will rely on crude oil, domestic intermodal and grain shipments to offset weak coal and international container traffic in 2014," Progressive Railroading, December 2013, [http://www.progressiverailroading.com/union\\_pacific/article/Large-freight-railroads-will-rely-on-crude-oil-domestic-intermodal-and-grain-shipments-to-offset-weak-coal-and-international-container-traffic-in-2014--38676](http://www.progressiverailroading.com/union_pacific/article/Large-freight-railroads-will-rely-on-crude-oil-domestic-intermodal-and-grain-shipments-to-offset-weak-coal-and-international-container-traffic-in-2014--38676)  
 51 Graham Brisben, Presentation at Railtrends Conference, New York, NY, November 21, 2013, <http://plgconsulting.com/20131122railtrends/>  
 52 Selam Gebrekidan, "CSX train carrying oil derails in Virginia in fiery blast" Reuters, April 30, 2014, <http://www.reuters.com/article/2014/04/30/railway-accident-virginia-idUSL2N0NM25220140430>

## FORTHCOMING ANALYSIS

This report has detailed the reckless growth of the crude-by-rail trade in North America and described where and how this trade is operating, as well as future plans for the industry. For the past five years, the oil industry has charged forward with this mode of transport without any regard for the safety of the communities it passes through.

While the most recent figures for actual crude-by-rail shipments suggests that some one million bpd of crude oil is loaded and unloaded to and from trains every day in North America, the capacity of the system is already over three times that, and could grow to over five times today's traffic. This threatens thousands of communities across North America with the specter of exploding trains and spilling oil.

In the coming months, Oil Change International will publish further analyses of the crude-by-rail industry. Future reports in this series will look in more detail at the safety and regulatory issues as well as the economics of crude-by-rail and its climate change implications.

Smoke rises from railway cars that were carrying crude oil after derailling in downtown Lac Mégantic, Quebec, Canada, Saturday, July 6, 2013. 47 people were killed in the incident and up to 1,000 were evacuated from the town.  
(©AP Photo/The Canadian Press, Paul Chiasson)









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