

# JEFFERSON ENERGY TERMINAL



***2015 Canadian Crude Marketing-Cost Reduction Congress  
Greg Binion, President-Jefferson Energy Terminal***

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“In the **Beginning**, there is price,  
In the **End**, there is value”.

Options = Value

# Presentation Objectives

- **Reviewing Destinations For Heavy Crudes And Optimizing Blending Strategies To Maximize Netbacks**
- **Identify the optimal destinations** for heavy and blended products, comparing the Gulf Coast with alternative markets
- **What infrastructure is in place for blending of products to ensure commodities can be transported at the most economical price**
- **Comparing the costs and specifications of transporting blended products by rail and pipe to maximize revenue**
- **Calculating the total impact an optimal blending strategy can have on improving revenue and cutting transport costs**

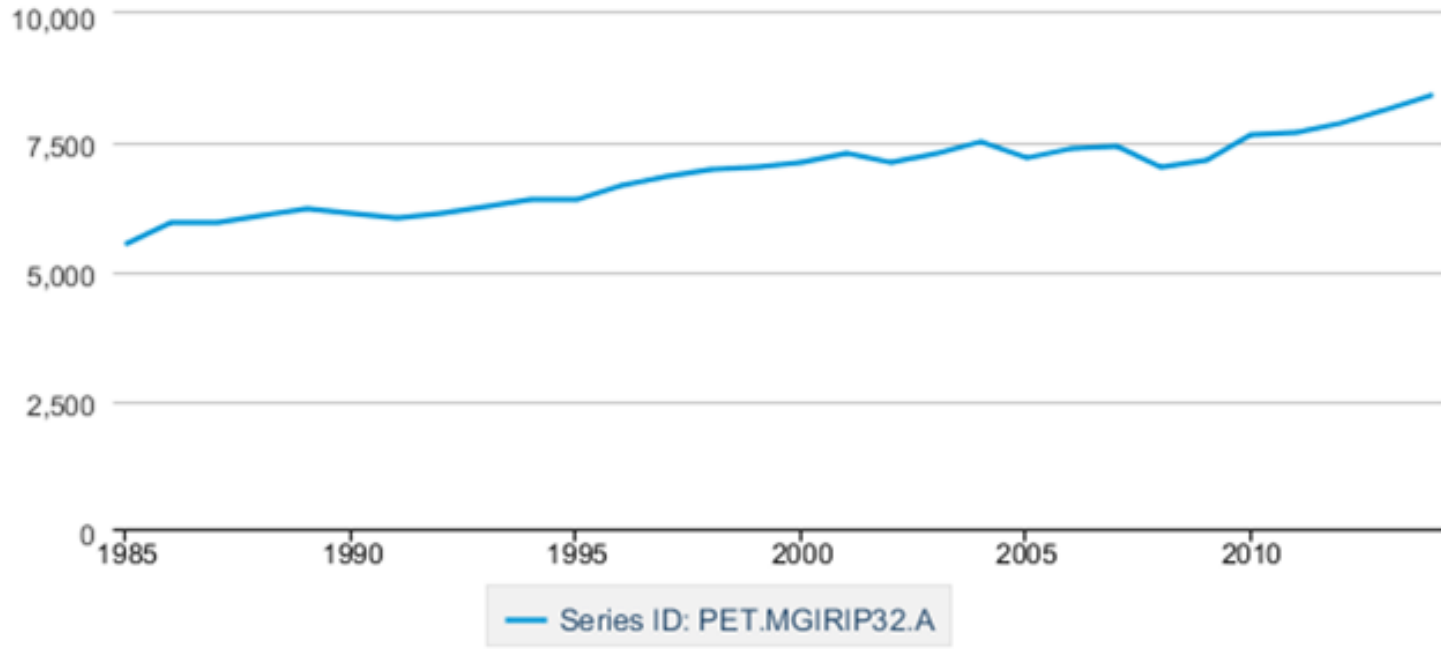
# Characteristics of an Optimal Destination for Canadian Crude Oil

- Large, Growing, Complex Refining Base with global access to world markets
  - Refinery fit with Canadian Crude
- Robust storage and transportation infrastructure
  - Respond to Changing Market Conditions
  - Cost Savings via Modal Optimization
- Access to a variety of blend stocks
  - Optimize crude refining value

# Gulf Coast PADD 3 is Growing Market

**Gulf Coast (PADD 3) Gross Inputs to Refineries, Annual**

Thousand Barrels per Day



Source: Energy Information Administration

# PADD 3 Refining Investment Continues

Table 3.4 Recent and Proposed Refinery Upgrades in PADD III

Operator	Location	Current Capacity (thousand b/d)	Scheduled In-Service	Description
Delek	Tyler, TX	75	Completed Mar 2015	Expansion from 60,000 b/d capacity
Marathon	Garyville, LA	522	2018 (decision in early 2015)	Installation of hydrotreating, hydrocracking, & desulphurization equipment.
Valero	McKee, TX	170	2014	Increase capacity by 25,000 b/d. Expansion will process WTI and locally produced crude oil.
LyondellBasell Industries NV	Houston, TX	268	2015	Increase ability to process heavy crude oil from 60,000 b/d to 175,000 b/d.

Home » Processing News » [ExxonMobil plans capacity expansion at Texas refinery](#)

US refiners continue consolidation, restructuring efforts | Neste advances integration of Finnish refineries

## ExxonMobil plans capacity expansion at Texas refinery

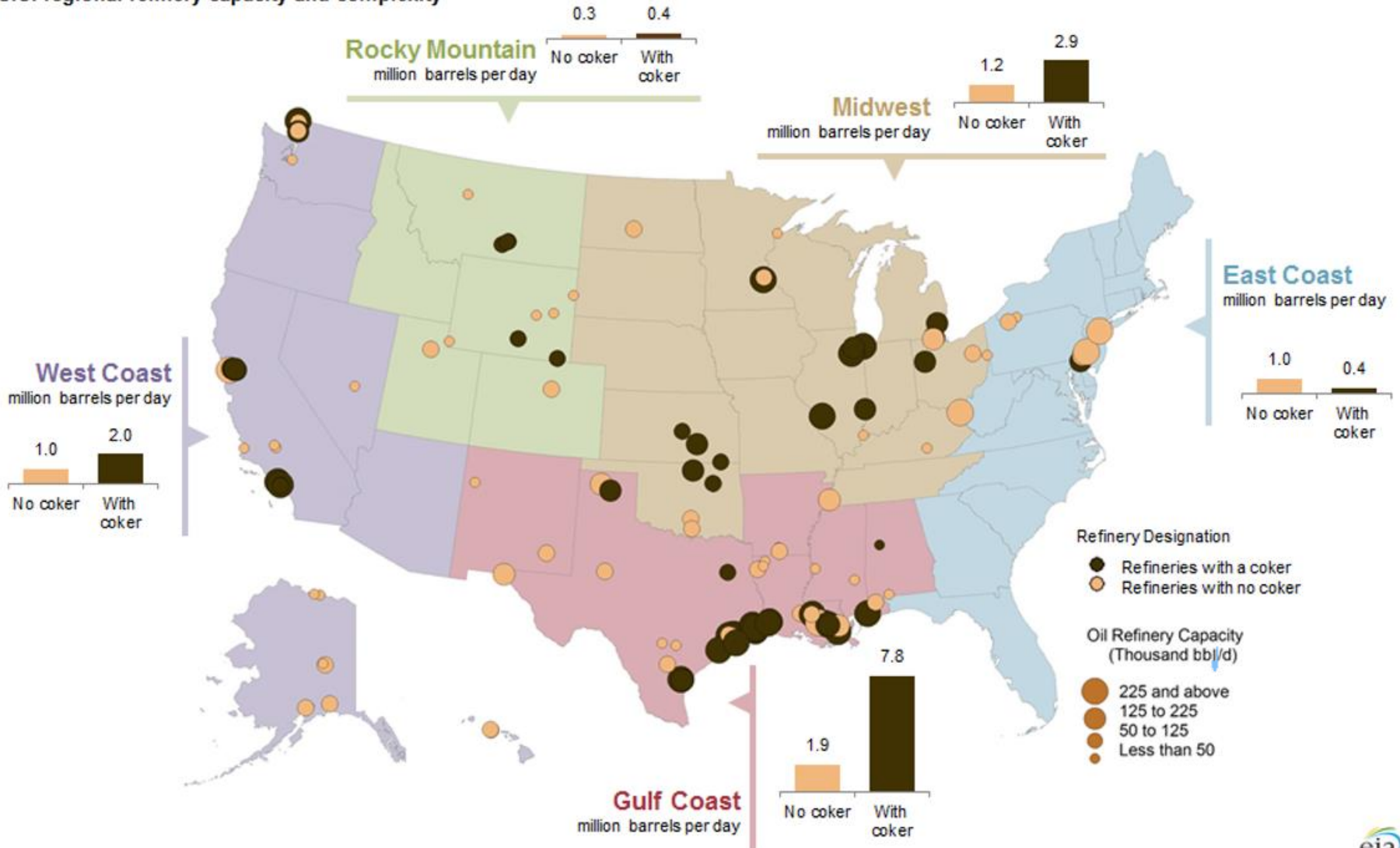
HOUSTON, Aug. 4  
08/04/2015  
By Robert Brelsford  
OGJ Downstream Technology Editor

**ExxonMobil Corp.** is planning a 20,000-b/d capacity expansion at its 345,000-b/d refinery in Beaumont, Tex., to accommodate increased processing of US light crudes.



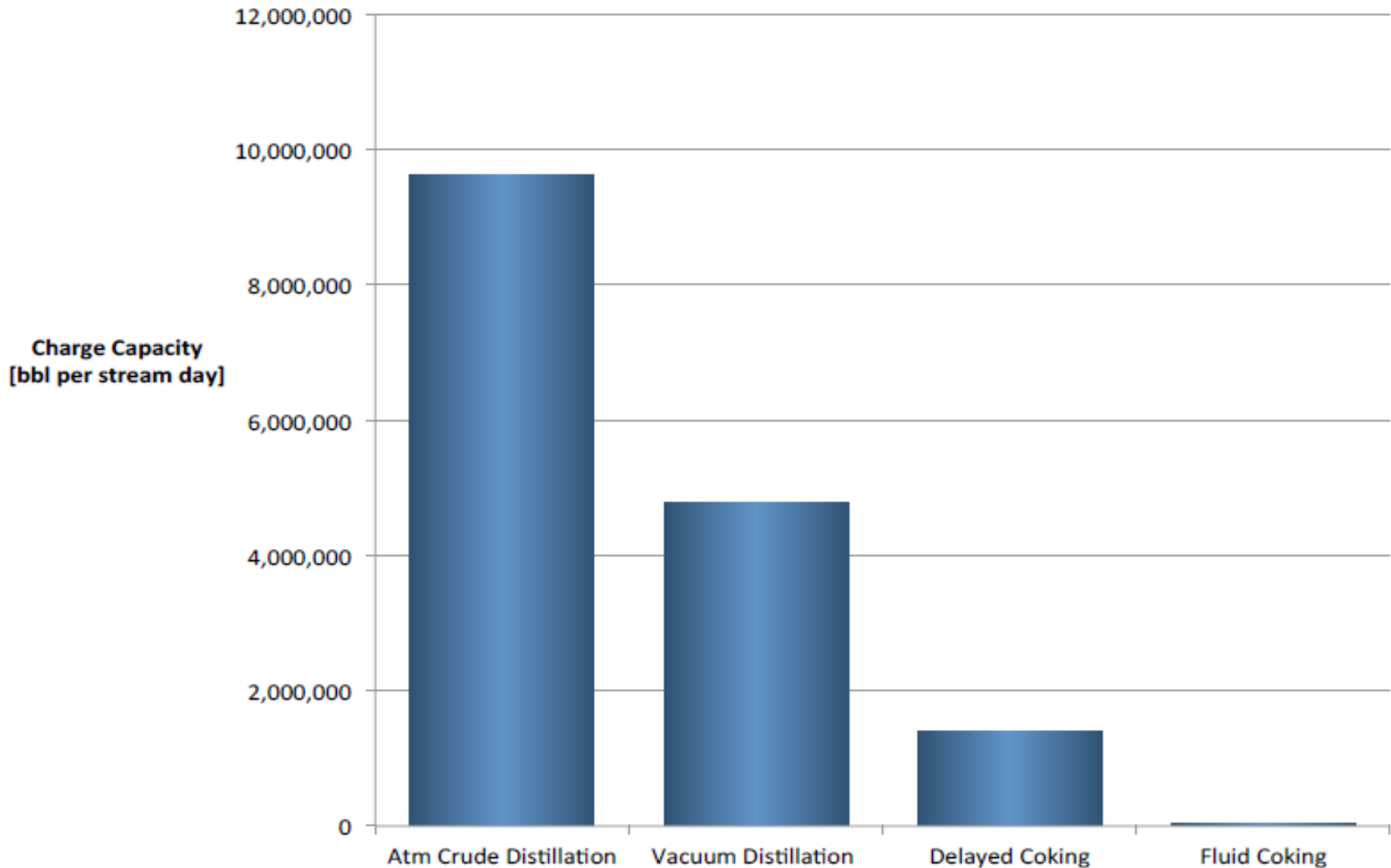
# PADD 3 Refining Complexity

U.S. regional refinery capacity and complexity





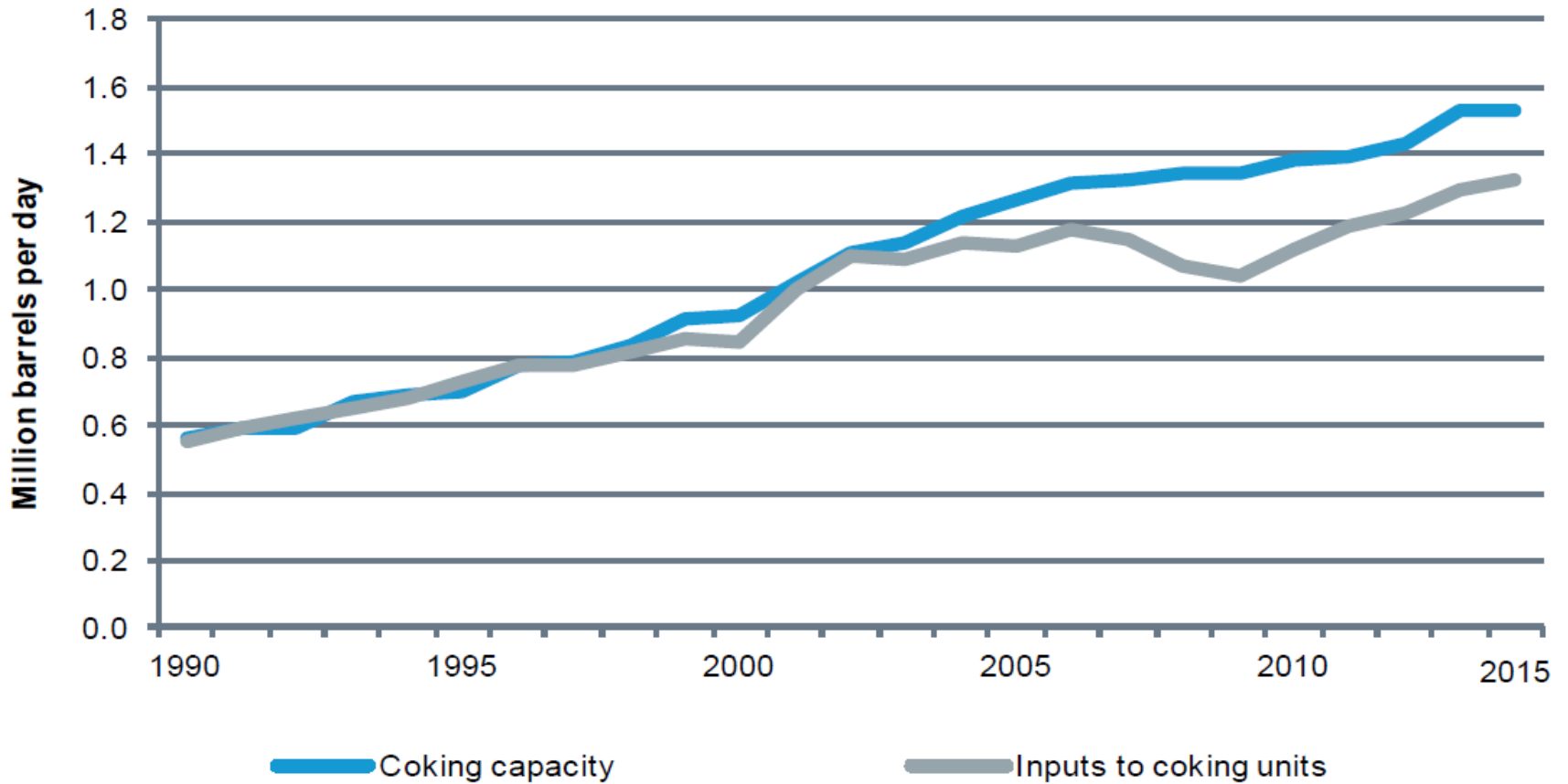
# PADD III Coking Capacity 2015



# PADD 3 Cokers

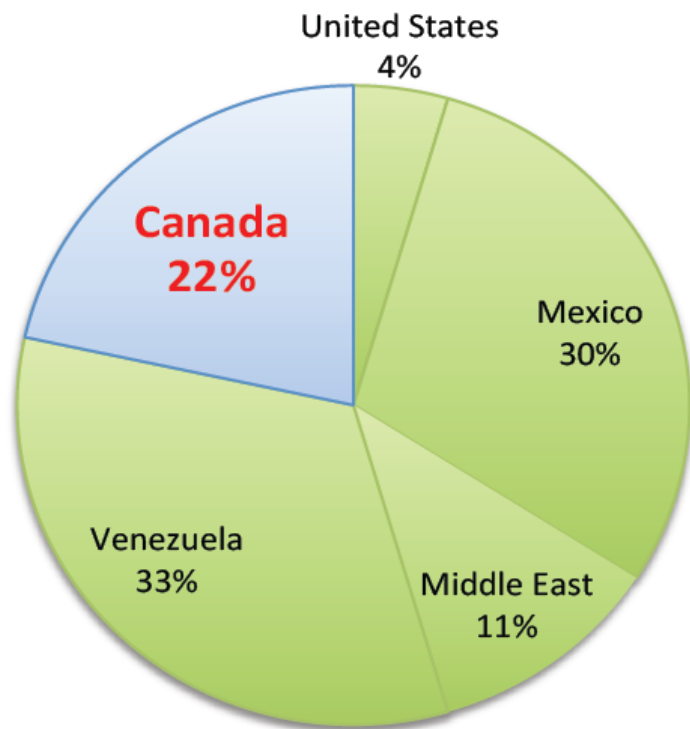
COMPANY NAME	RDIST LABEL	SITE	PADD	PRODUCT	QUANTITY
Chalmette Refining LLC	Louisiana Gulf Coast	CHALMETTE	3	THERM CRACKING, DELAYED COKING	30,000
CHEVRON USA INC	Louisiana Gulf Coast	PASCAGOULA	3	THERM CRACKING, DELAYED COKING	105,000
CITGO PETROLEUM CORP	Louisiana Gulf Coast	LAKE CHARLES	3	THERM CRACKING, DELAYED COKING	110,000
CITGO REFINING & CHEMICAL INC	Texas Gulf Coast	CORPUS CHRISTI	3	THERM CRACKING, DELAYED COKING	44,900
DEER PARK REFINING LTD PARTNERSHIP	Texas Gulf Coast	DEER PARK	3	THERM CRACKING, DELAYED COKING	89,000
DELEK REFINING LTD	Texas Inland	TYLER	3	THERM CRACKING, DELAYED COKING	6,500
EXXONMOBIL REFINING & SUPPLY CO	Texas Gulf Coast	BAYTOWN	3	THERM CRACKING, FLUID COKING	42,000
EXXONMOBIL REFINING & SUPPLY CO	Texas Gulf Coast	BEAUMONT	3	THERM CRACKING, DELAYED COKING	48,000
EXXONMOBIL REFINING & SUPPLY CO	Texas Gulf Coast	BAYTOWN	3	THERM CRACKING, DELAYED COKING	54,000
EXXONMOBIL REFINING & SUPPLY CO	Louisiana Gulf Coast	BATON ROUGE	3	THERM CRACKING, DELAYED COKING	123,500
Flint Hills Resources LP	Texas Gulf Coast	CORPUS CHRISTI	3	THERM CRACKING, DELAYED COKING	15,500
HOUSTON REFINING LP	Texas Gulf Coast	HOUSTON	3	THERM CRACKING, DELAYED COKING	99,500
HUNT REFINING CO	North Louisiana-Arkansas	TUSCALOOSA	3	THERM CRACKING, DELAYED COKING	32,000
MARATHON PETROLEUM CO LP	Texas Gulf Coast	GALVESTON BAY	3	THERM CRACKING, DELAYED COKING	33,000
MARATHON PETROLEUM CO LP	Louisiana Gulf Coast	GARYVILLE	3	THERM CRACKING, DELAYED COKING	93,500
Motiva Enterprises LLC	Louisiana Gulf Coast	NORCO	3	THERM CRACKING, DELAYED COKING	28,500
Motiva Enterprises LLC	Texas Gulf Coast	PORT ARTHUR	3	THERM CRACKING, DELAYED COKING	164,500
PHILLIPS 66 COMPANY	Louisiana Gulf Coast	WESTLAKE	3	THERM CRACKING, OTHER (INCLDNG GAS OIL)	10,600
PHILLIPS 66 COMPANY	Louisiana Gulf Coast	BELLE CHASSE	3	THERM CRACKING, DELAYED COKING	26,000
PHILLIPS 66 COMPANY	Louisiana Gulf Coast	WESTLAKE	3	THERM CRACKING, DELAYED COKING	60,000
PHILLIPS 66 COMPANY	Texas Gulf Coast	SWEENY	3	THERM CRACKING, DELAYED COKING	78,700
PREMCO REFINING GROUP INC	Texas Gulf Coast	PORT ARTHUR	3	THERM CRACKING, DELAYED COKING	99,700
TOTAL PETROCHEMICALS & REFINING USA	Texas Gulf Coast	PORT ARTHUR	3	THERM CRACKING, DELAYED COKING	60,000
VALERO REFINING CO TEXAS LP	Texas Gulf Coast	CORPUS CHRISTI	3	THERM CRACKING, DELAYED COKING	17,000
VALERO REFINING CO TEXAS LP	Texas Gulf Coast	TEXAS CITY	3	THERM CRACKING, DELAYED COKING	53,500
VALERO REFINING NEW ORLEANS LLC	Louisiana Gulf Coast	NORCO	3	THERM CRACKING, DELAYED COKING	84,000
WRB REFINING LP	Texas Inland	BORGER	3	THERM CRACKING, DELAYED COKING	28,380
Total					1,637,280
Total Port Arthur/Lake Charles					542,200

# 2015 U.S. GULF COAST COKING: CAPACITY vs. INPUTS

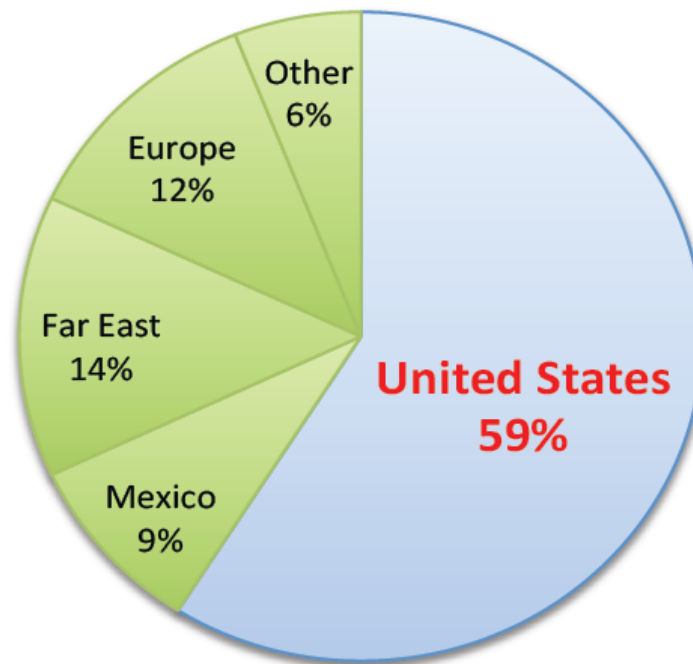


Sources: IHS and EIA

# 2015 GLOBAL HEAVY CRUDE OIL



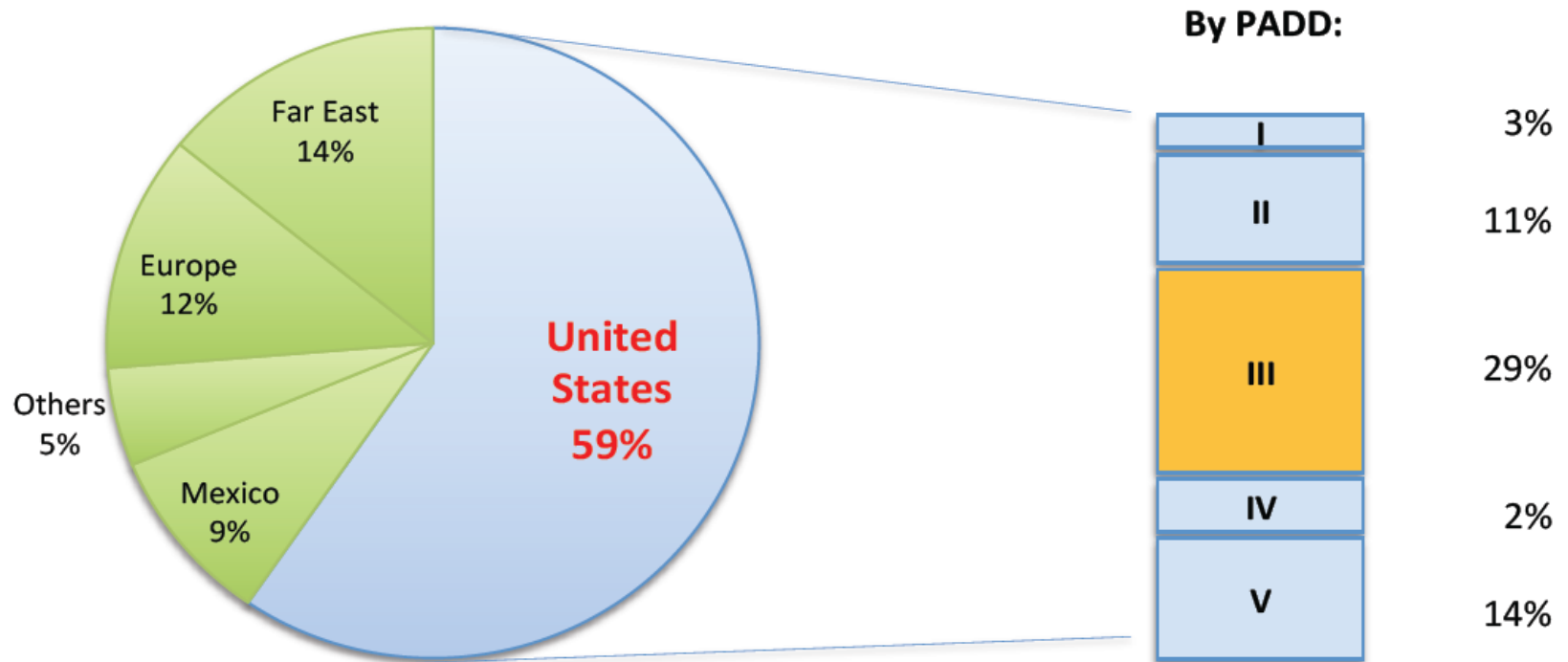
SUPPLY



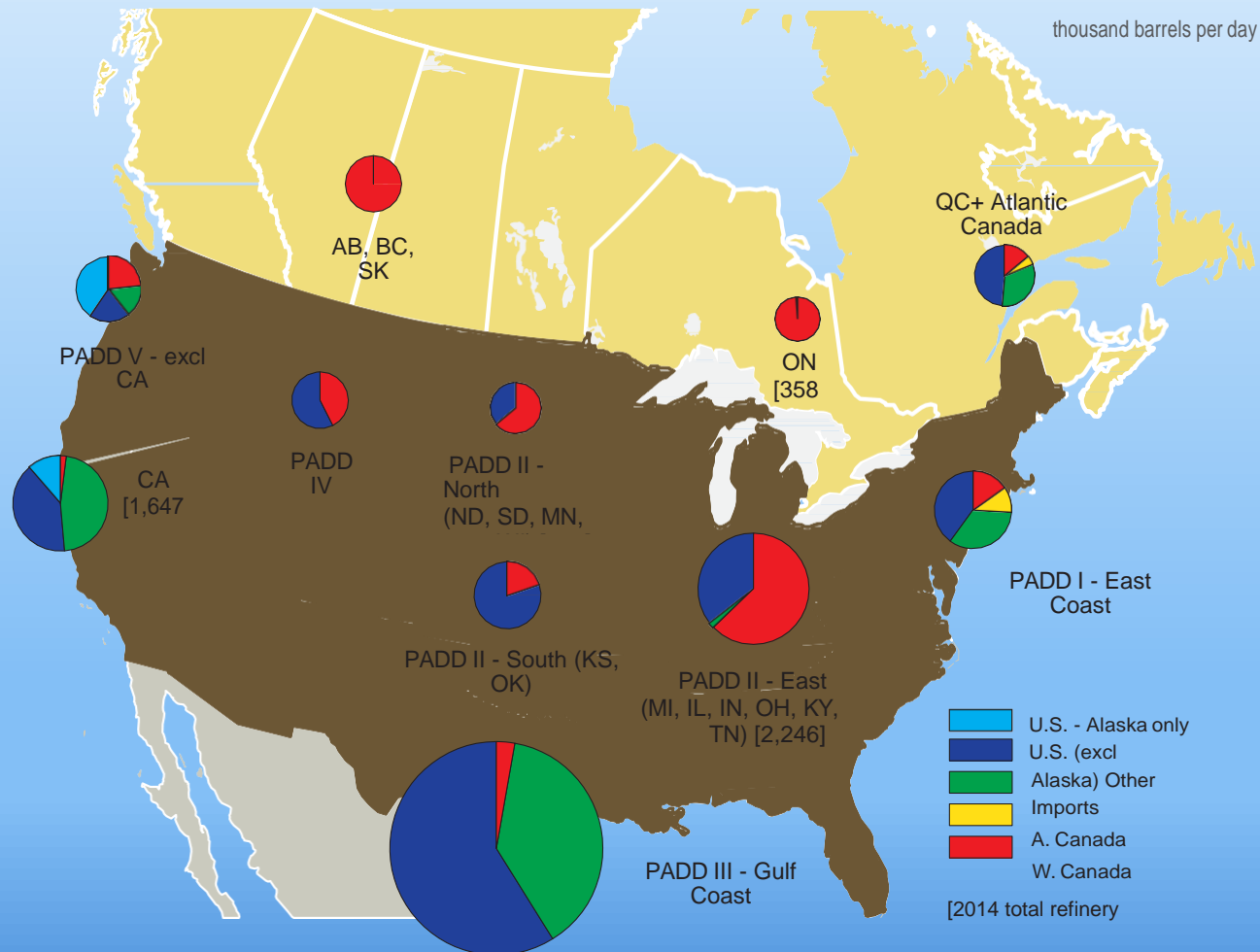
DEMAND



# 2015 U.S. HEAVY CRUDE OIL DEMAND



# Current Western Canadian Crude PADD 3 Consumption is 265kbd



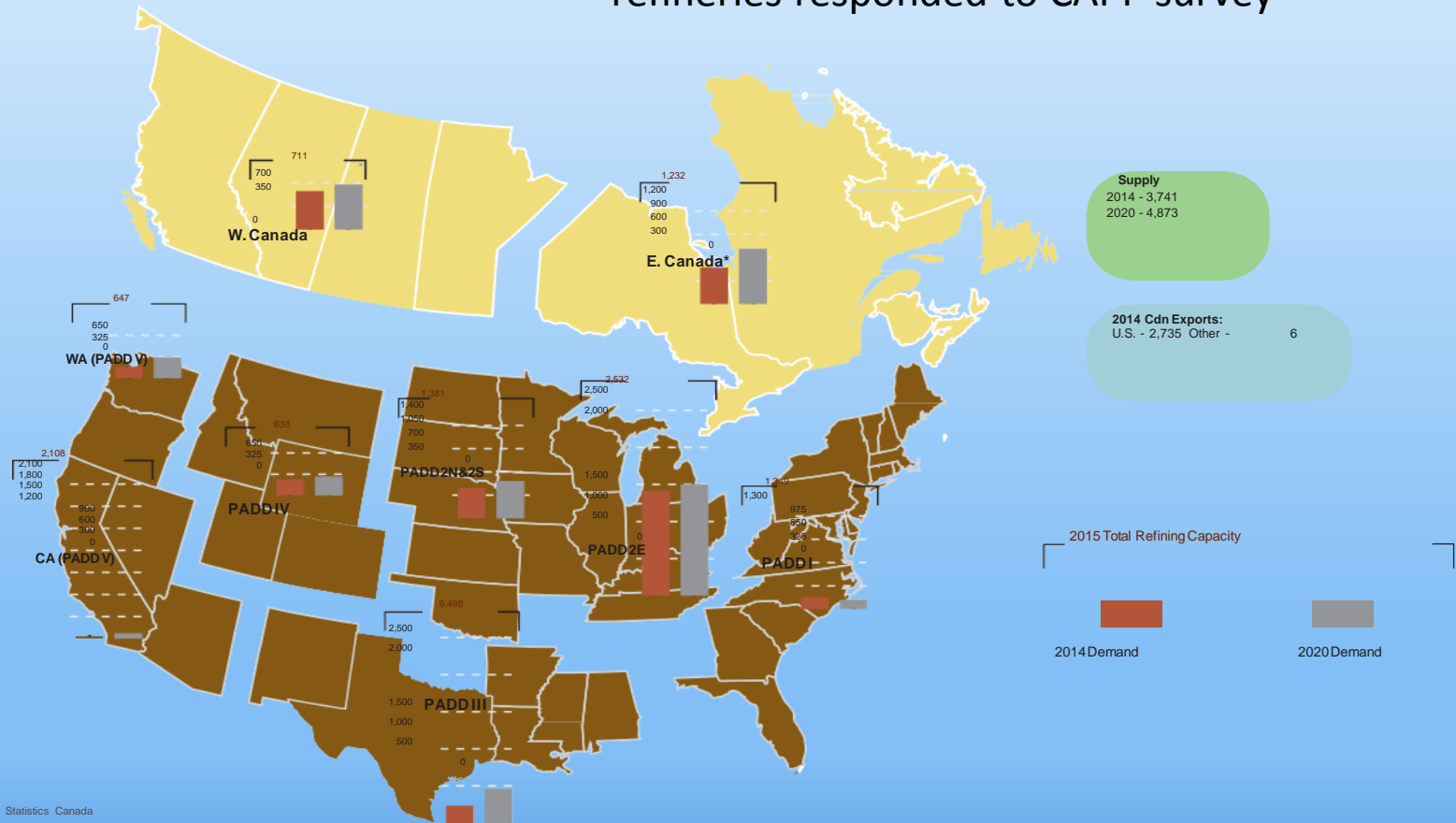
# PADD 3 W Canadian Crude Forecast to Increase from 265 to 486kbd\* by 2020

Figure 3.2 Market Demand for Western Canadian Crude Oil: Actual 2014 and 2020

thousand barrels per day

\*Likely understated as 7 of 50 refineries responded to CAPP survey

Non-US  
6 [unknown]



Sources: CAPP, EIA, NEB, Statistics Canada

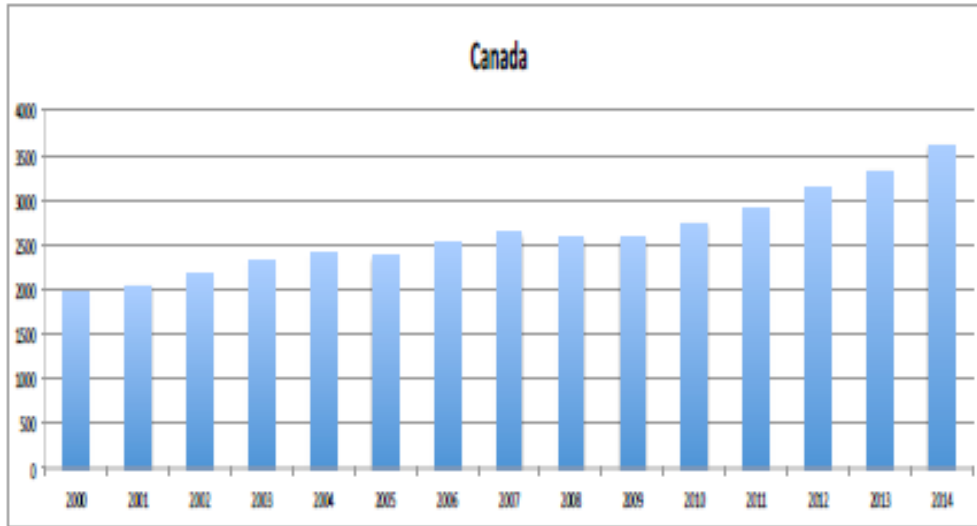
\* E.Canada demand for W. Canadian crude oil in 2014 consisted almost entirely of receipts from Ontario. Projected receipts in 2020 include growth from Québec and Atlantic provinces.

Note: 2014 demand does not equal available supply due to factors including inventory adjustment, timing differences, and the potential for U.S. production transiting in Canada before being refined in the U.S. being reported as Canadian exports.

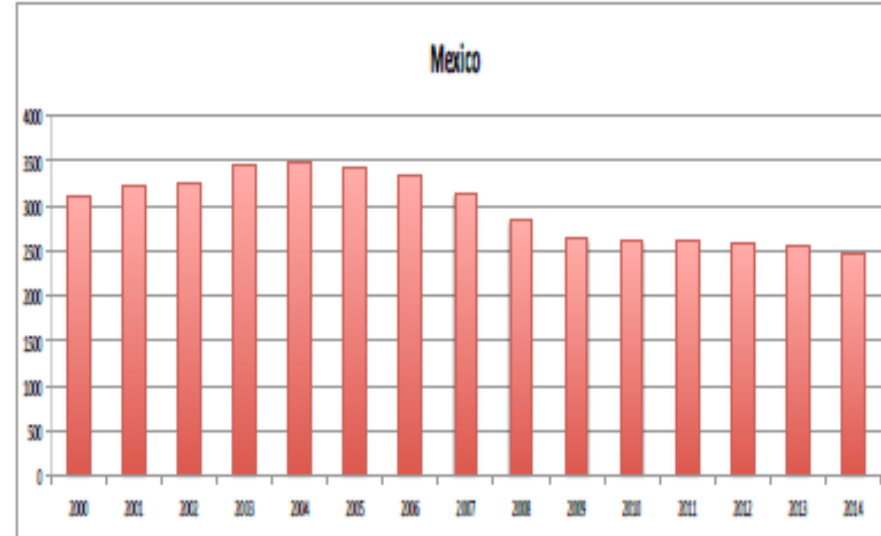
# HEAVY CRUDE OIL PRODUCTION

2000 - 2014

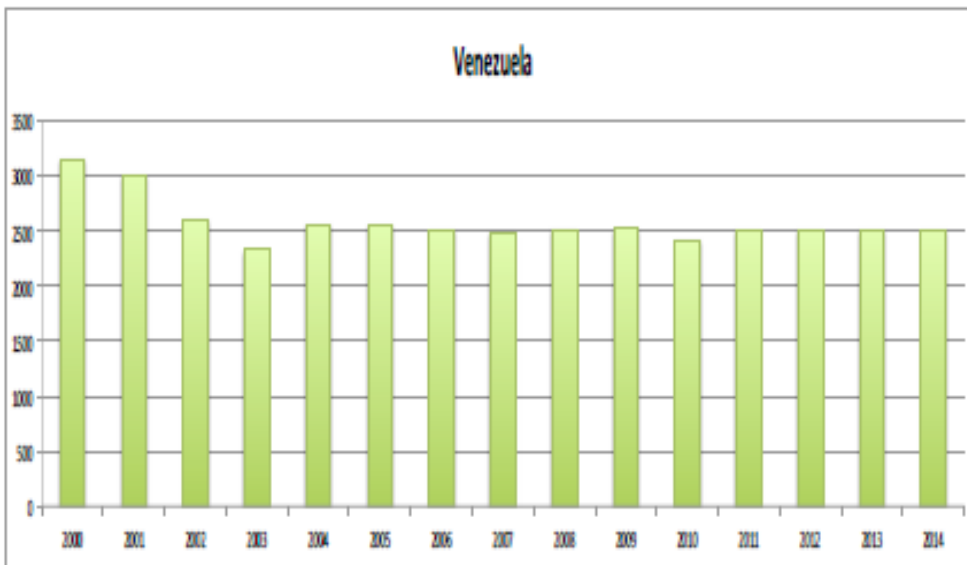
### Canada



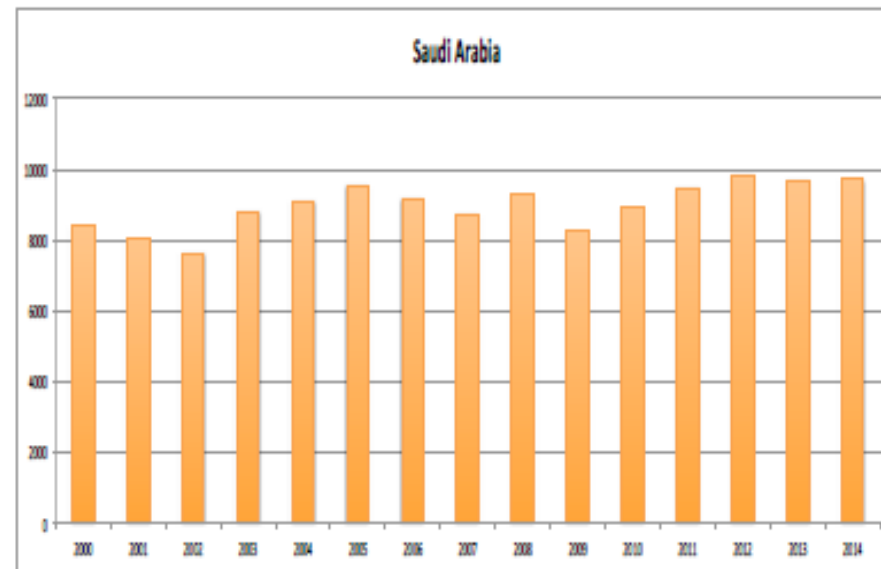
### Mexico



### Venezuela

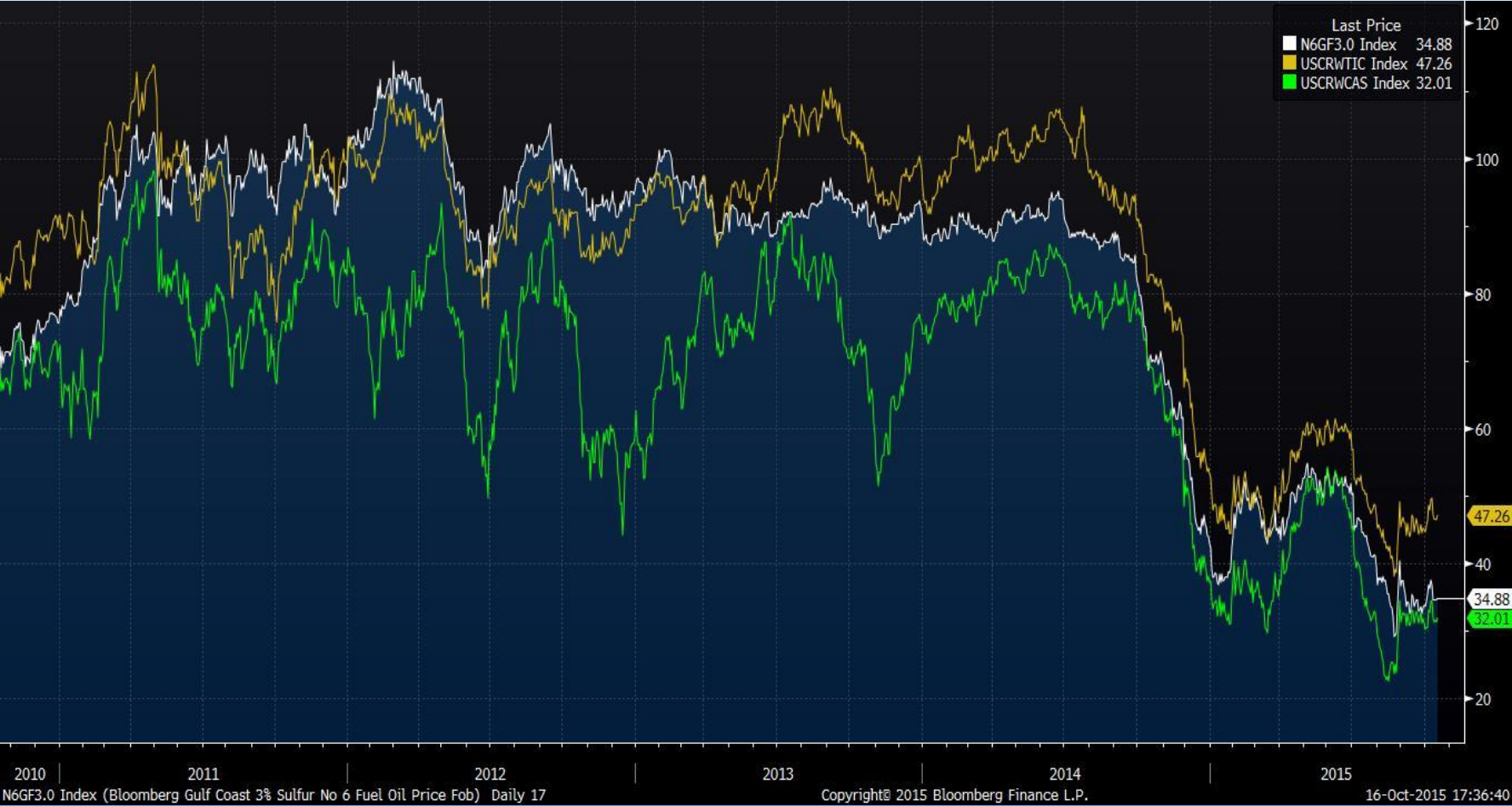


### Saudi Arabia





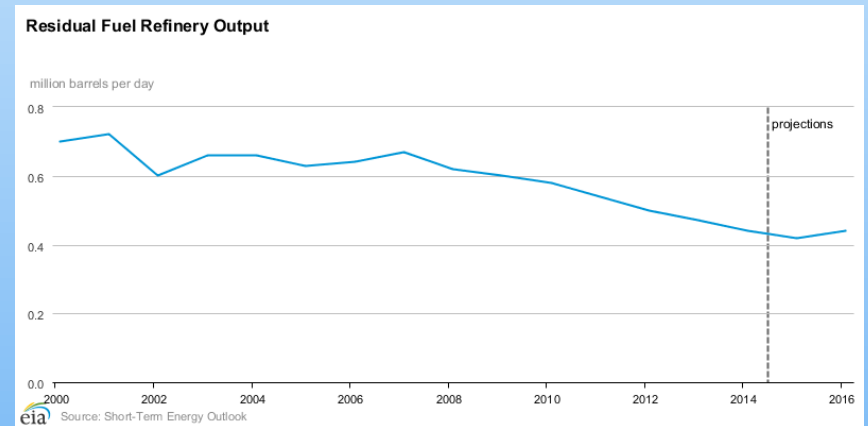
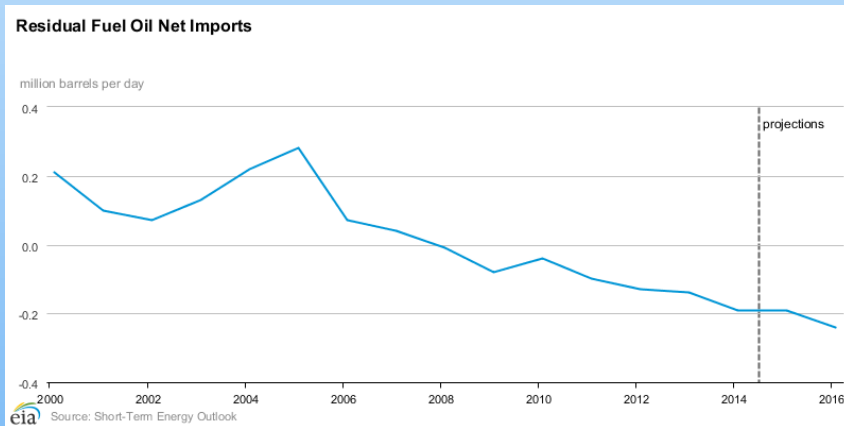
# #6 Fuel Oil vs WTI Historical Price Relationship



# Declining Traditional Coker Feed Sources

**US is a net Exporter of Residual Fuel Oil**

**In an environment of production decline**



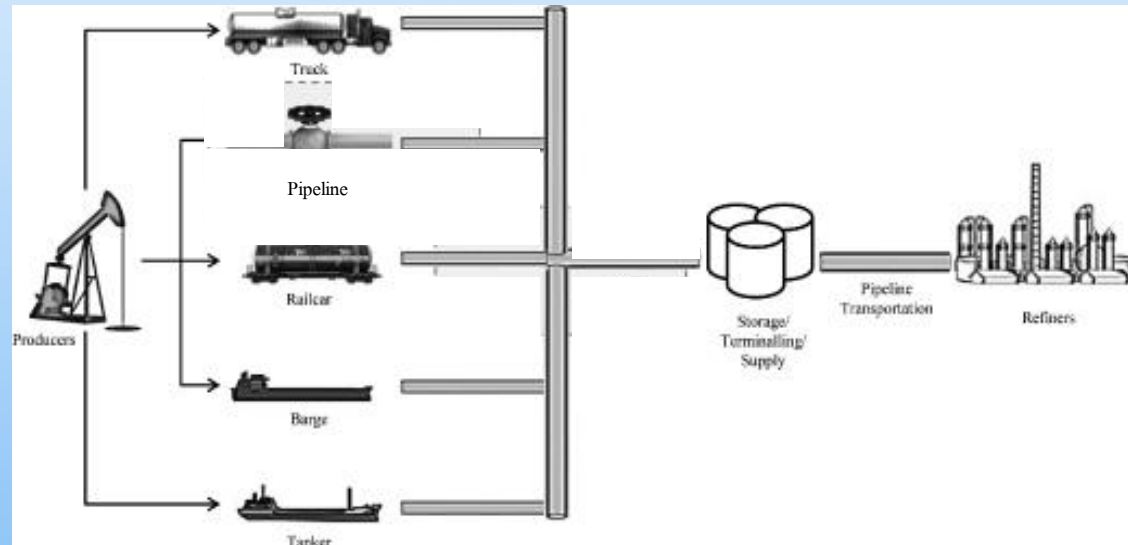
# Summary PADD 3 as Optimum Canadian Heavy Crude Destination

- Large Growing Complex Refinery Base
- Declining Traditional Crude Volumes
- Declining Traditional Coker Feedstock Volumes

# PADD 3 Infrastructure

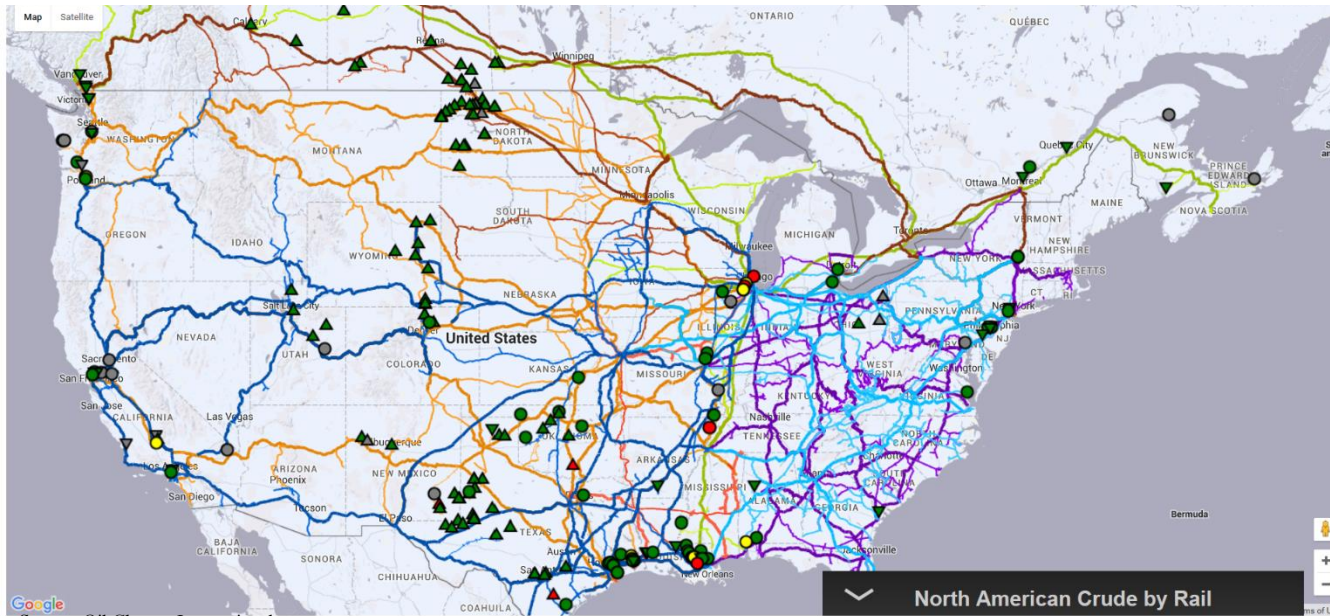
## Keys to Cost Reduction

- Rail
- Pipeline
- Marine
- Terminal
- Trucking

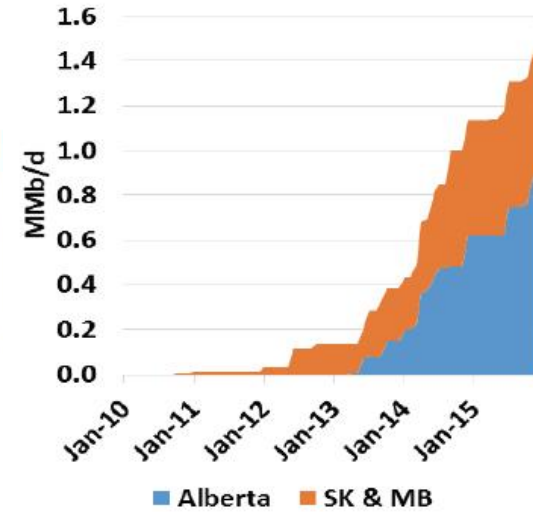




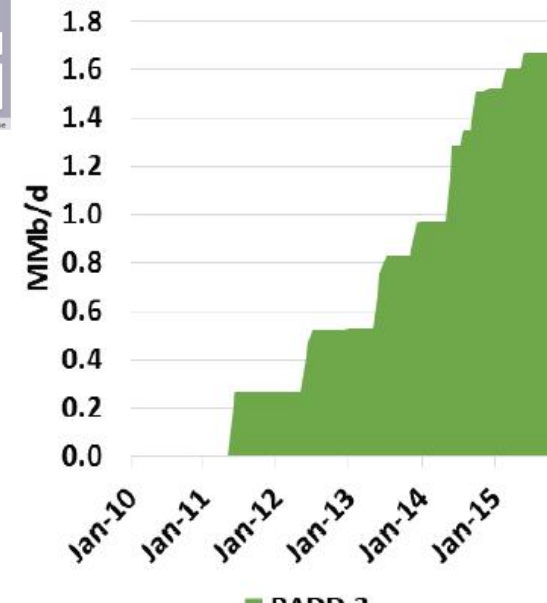
# North American Rail and Crude by Rail Origination and Destination Terminals



Western Canadian Crude by Rail Loading Capacity



US Gulf Coast Crude by Rail Unloading Capacity



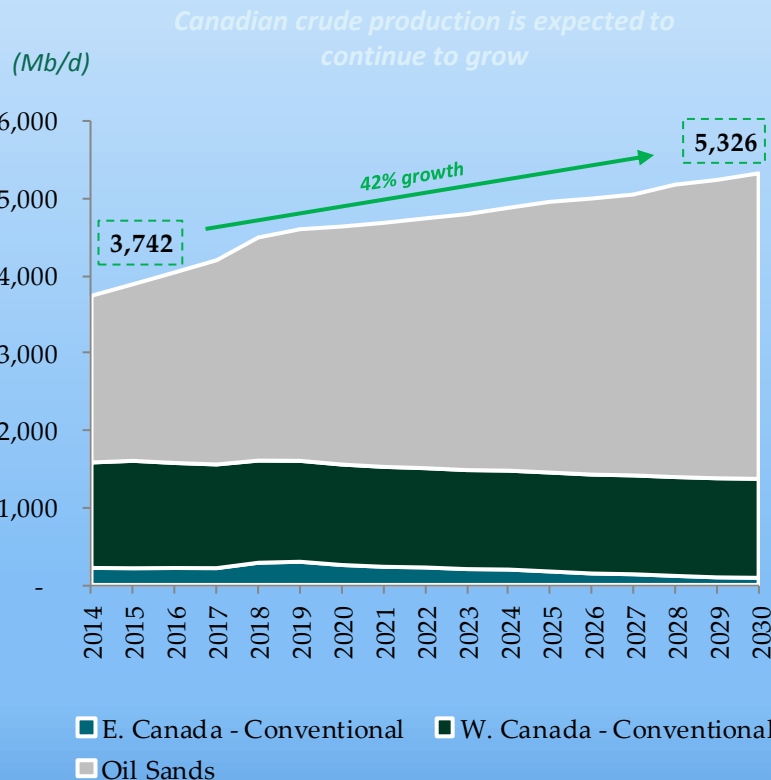
Source: Oil Change International

Source: Oil & Gas Journal 2015

# Canadian Production and Terminal Loading Capacity

- Bitumen production requires significant upfront cost (~40% of total, according to industry sources), which has largely already been invested by oil majors
- ~1.5 million barrels per day of rail-loading capacity operational or under construction in western Canada
- Canadian production is expected to increase by 1.6 million barrels / day (42%) over the next 16 years <sup>(1)</sup>

## Canadian Crude Oil Production <sup>(1)</sup>



## Western Canadian Terminals <sup>(1,2)</sup>

No.	Company	Location	Unit Trains?	Mb/d	
				Today	Future
1.	Torq Transloading	Kerrobert, SK	✓	168	168
2.	Gibsons/USDG	Hardisty, AB	✓	120	120
3.	KM/Imperial	Strathcona Count, AB	✓	100	210
4.	Canexus	Bruderheim, AB	✓	100	150
5.	Global Basin Transload	Stampede, ND	✓	80	80
6.	Tundra	Cromer, MB		60	60
7.	Crescent Point	Stoughton, SK		45	45
8.	Keyera/KM	Edmonton, AB		40	120
9.	Pembina	Edmonton, AB		40	40
10.	Torq Transloading	Unity, SK		36	66
11.	Ceres Global	Northgate, SK		35	70
12.	Keyera/Enbridge	Cheecham, AB		32	32
13.	Altex	Lashburn, SK		30	90
14.	Crescent Point	Dollard, SK		27	27
15.	Torq Transloading	Lloydminster, SK		22	22
16.	Altex	Falher, AB		20	20
17.	Altex	Lynton, AB		20	20
18.	Gibsons	Edmonton, AB		0	60
19.	Plains Midstream Canada	Mitsue, AB		0	30
20.	Altex	Reno, AB		0	24
<b>Total</b>				<b>975</b>	<b>1,454</b>

(1) Source: 2015 CAPP Report.

(2) Source: Oil Change International (as of December 2014).

# PADD 3 CBR Destination Terminals

*Jefferson operates in an area with a large number of refineries and a limited number of multi-modal terminals*

Houston / Texas City

Beaumont / Port Arthur /  
Lake Charles

Lower Mississippi River

## Potential Customers:

No. refineries	9	7	10
Mb/d	2,075	2,195	2,505

## Competition:

Terminals	Houston / Texas City			Beaumont / Port Arthur / Lake Charles			Lower Mississippi River					
	No.	Company	Mb/d	Heavy Capability	No.	Company	Mb/d	Heavy Capability	No.	Company	Mb/d	Heavy Capability
	1.	KM Watco KW Express	140	✓	1.	Jefferson Energy	240	✓	1.	NuStar / EOG Resources	280	
	2.	Texas International	90		2.	GT OmniPort	100		2.	Genesis Energy (Natchez)	140	✓
	3.	CIMA	65		3.	Valero (Lucas Station)	68		3.	Plains All American	130	
	4.	Vopak Terminals/Magellan	72		4.	Sunoco Logistics	20		4.	Murex	120	
	5.	BOSTCO - Kinder Morgan	6		5.	Global Partners	120	✓	5.	Valero (St. James)	20	
									6.	Crosstex Energy	15	✓
									7.	LBC Tank Terminals	10	✓
									8.	Wolverine Terminals	10	
									9.	Canal Refining	5	
									10.	Petroplex	70	✓
									11.	Genesis Energy (Baton R.)	65	✓
	<b>Total (Current)</b>		295	1	<b>Total (Current)</b>		428	1	<b>Total (Current)</b>		730	3
	<b>Total (Future)</b>		373	1	<b>Total (Future)</b>		548	2	<b>Total (Future)</b>		865	5
	Rail capacity as % of refinery capacity			18%	Rail capacity as % of refinery capacity			25%	Rail capacity as % of refinery capacity			35%

Note: Grayed font indicates facilities proposed or under construction. Capacity and capability for facilities proposed or under construction according to plan.  
Source: Oil Change International (as of December 2014).

# Pipeline vs. Rail Blend stocks

## **W Canadian Pipeline Blend stock**

- Required for pipeline movement
- Limited Choices
- Limited supply = Higher Costs
- Blend stocks can compound oversupply of light crude

## **Gulf Coast Blend stock**

- None are required
- Virtually unlimited choices
- More supply = Lower costs
- Delivered by multiple modes
- Optimized to refinery needs



# Inland Marine-Jones Act Fleet

- 3750 Inland and Tank Barges\*
  - Approximately 4 times US refining Capacity
  - Batch Size 45-50kbbbls
  - Sailing speed 5-6 MPH
  - At peak 2014 - 500 barges in crude oil trade
  - Heated Barges – In transit heating of cargoes with flash above 150F.
    - Substantial savings over steam
      - Cost of Heat
      - Demurrage
  - Flexible Last Mile Delivery to refiners
  - Active spot market

## An "Inland Marine Highway" for Freight Transportation



Our “inland marine highways” move commerce to and from 38 states throughout the nation’s heartland and Pacific Northwest, serve industrial and agricultural centers, and facilitate imports and exports at gateway ports on the Gulf Coast.

- 12,000 miles of commercially navigable channels
- 192 lock sites





Port of Beaumont  
Jefferson Transload Railport  
Orange County, TX



# Coastwise Jones Act Fleet

- Articulated Tug Barge Units
  - 269 Units less than 195kbbbl\*
  - 16 Large (>200kbbbl) Units\*\*
  - About 2/3 in Atlantic Basin
- 43 Ships \*\*\*+
  - Atlantic Basin
    - 14 Crude Service
    - 12 Products Trade
    - Mid-Range size – 46kt\*\*\*
  - 15 Ships on order\*\*\*
- Atlantic Basis Batch Size 50-340kbbbls
  - Sailing speed 7-15 Kts
  - Significant new capacity coming into service
  - Typically 3-5 year Charter required, spot market access via relets

+17 on West Coast  
11 Crude  
6 Products

\*Kirby Corp Road Show  
\*\*L & R Midland  
\*\*\*ColtonShipbuilding/Argus/R  
BN Reports



# Crude Terminals

- 300 Million barrels of Working Capacity on US Gulf Coast
- Announced projects -adding 30 million barrels
  - PADD 3            300 million
  - PADD 2            140 million
  - Cushing            71 million
  - PADD 5            64 million
  - PADD 1            19 million
  - PADD 4            19 million
  - SPR                727 million



# Jefferson Energy Terminal

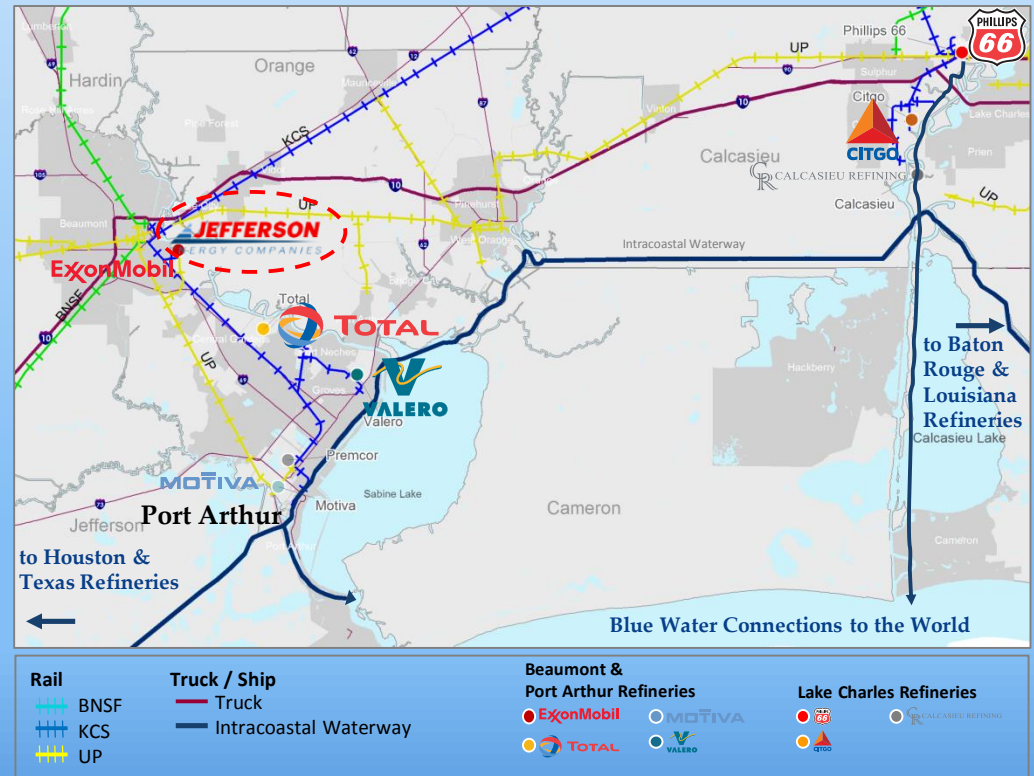
## Strategic Location

- The Gulf Coast (PADD III) is home to over 50% of U.S. refining capacity
- Jefferson Terminal is within 15 miles of 4 major refineries with 1.5 million barrels / day of refining capacity



## Multi-Modal Connectivity

- **Rail:** Direct connections to three Class I railroads
- **Truck:** Off-ramp from I-10
- **Ship:** 40' water depth capabilities (up to Aframax-size vessels)
- **Barge:** Access to Port Arthur and Lake Charles refineries, and beyond via 12,000 miles of Intracoastal Waterway
- **Pipeline:** Direct pipeline connections to major oil refineries and terminals at full build out



Beaumont / Port Arthur / Lake Charles  
has over 2.2 million bbls/day of  
refining capacity

1. Source: 2014 CAPP Report.

# Development plans to Increase Capacity and Capabilities

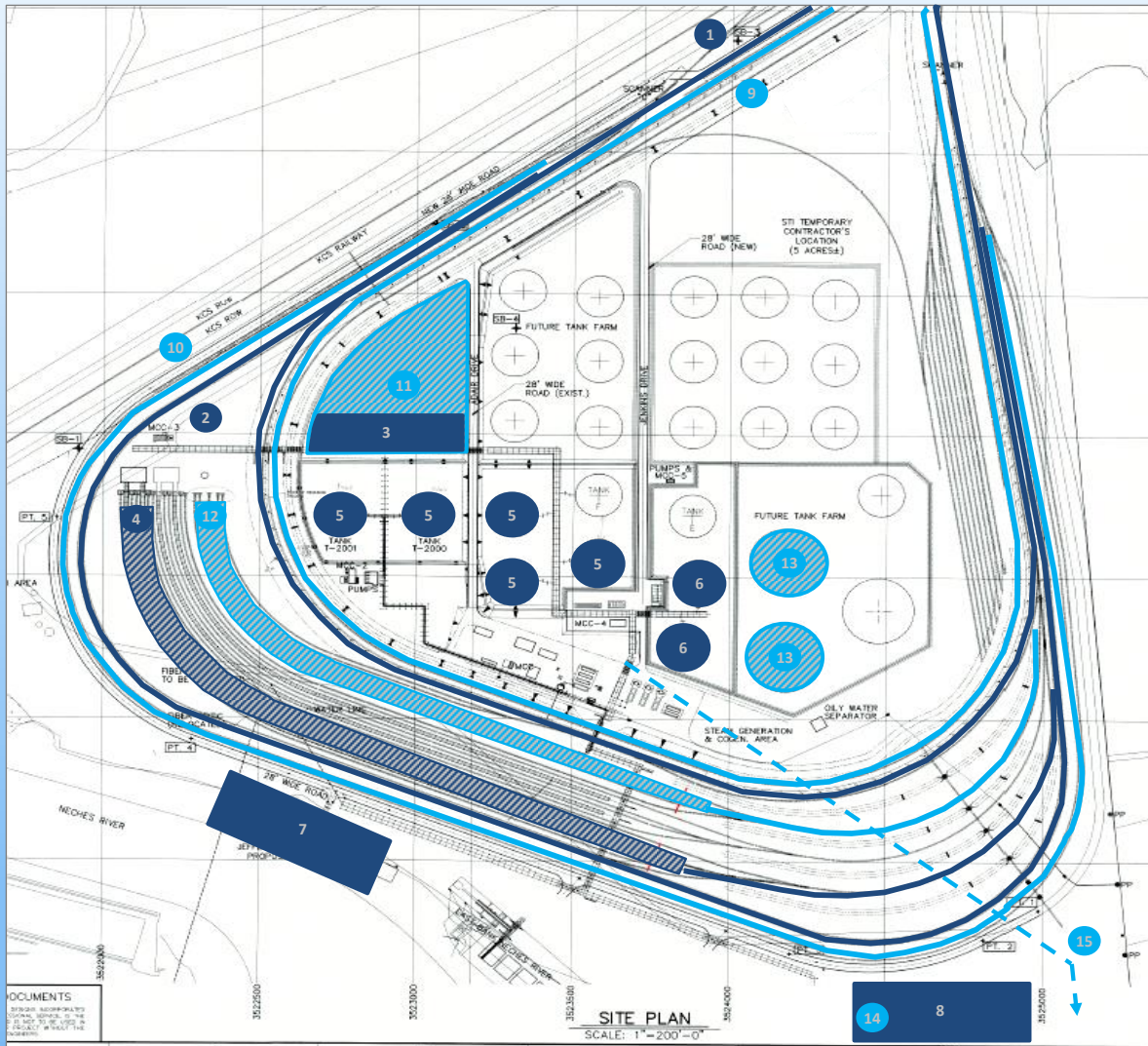
## Terminal Build-Out (By Phase)

### Phase I:

- 1 Free-flowing crude unloading track 1
- 2 Staging loop track
- 3 Truck unloading bays
- 4 4x heated unloading ladders (30 cars each)
- 5 5x floating roof, unheated tanks (100k bbls each)
- 6 2x fixed roof, heated tanks (100k bbls each)
- 7 Barge dock
- 8 Barge/ship dock

### Phase II:

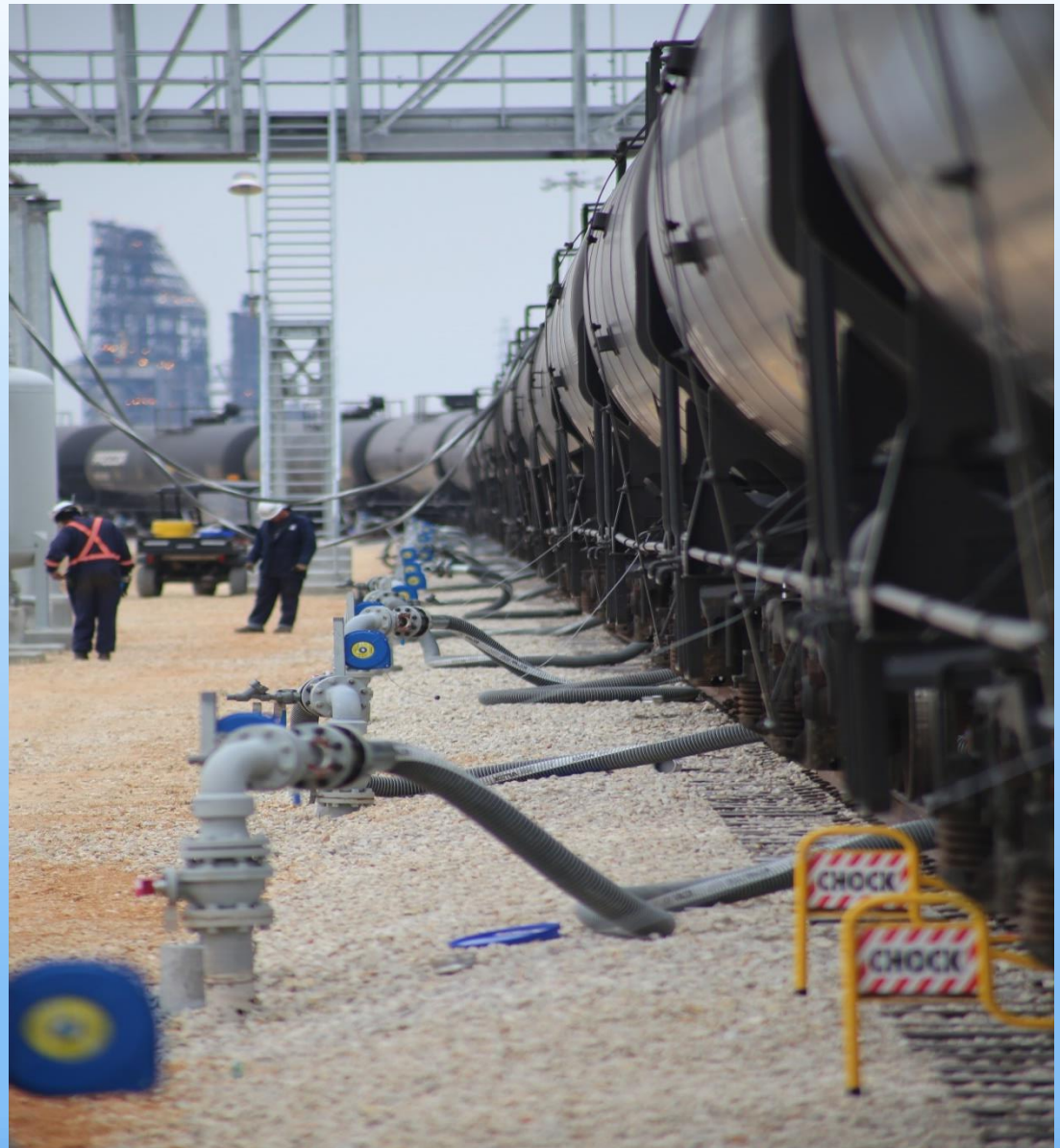
- 9 Free-flowing crude unloading track 2
- 10 Staging loop track
- 11 Truck unloading area expansion
- 12 4x heated unloading ladders (30 cars each)
- 13 2x floating roof, heated tanks (200k bbls each)
- 14 Loading arm
- 15 12" pipeline to Exxon refinery





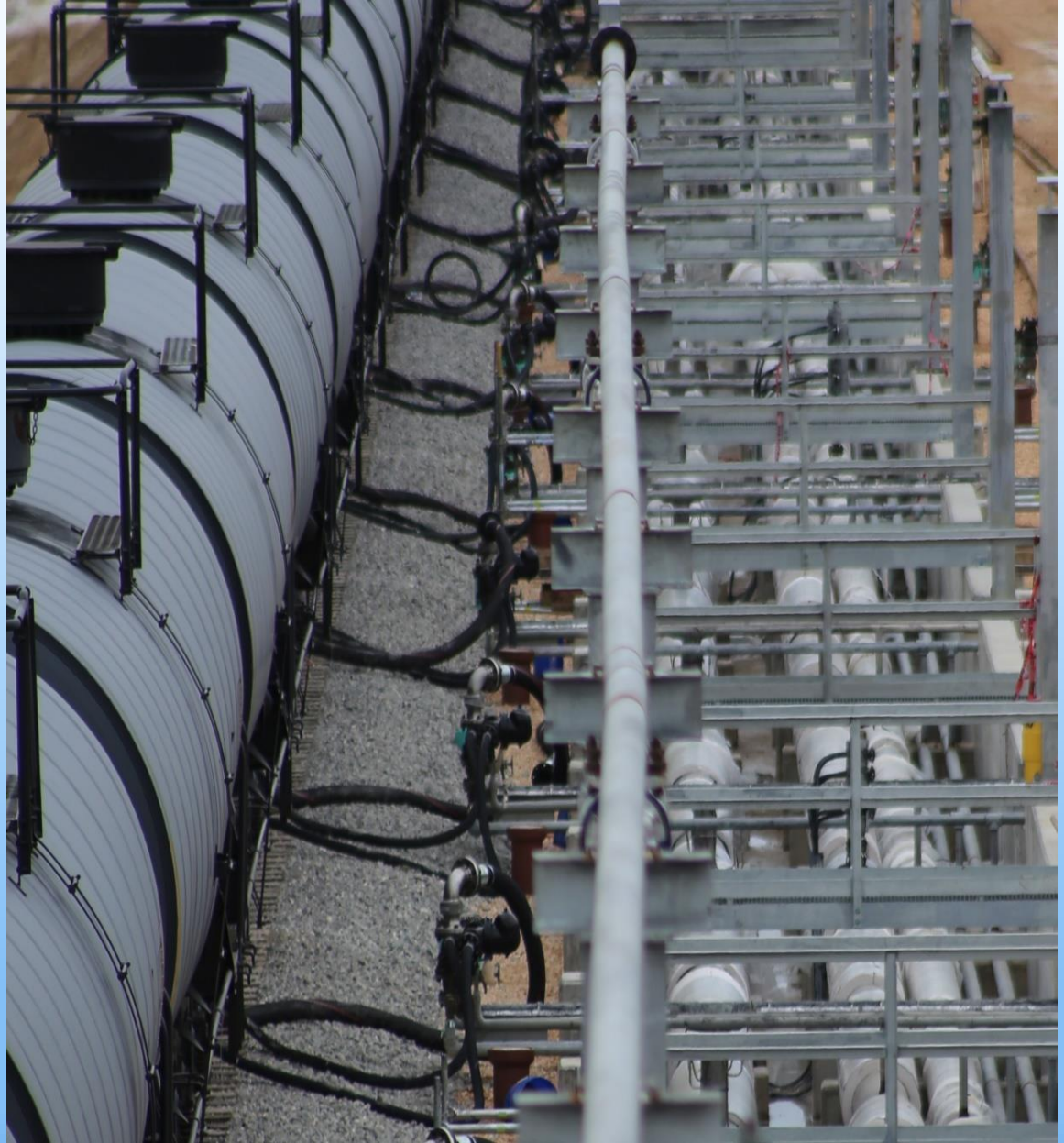
# Free Flow Unloading

- Current capacity - 1 unit train of 120 free flowing crude oil rail cars in approximately 15 hours



# Heat Assist Heavy Crude Unloading

- Asphalt Capable from:
  - Rail Unloading
  - Measurement
  - Tankage
  - Pipelines
  - Barge Dock
- Currently capable of heating and unloading one unit train of up to 120 C & I rail cars of heavy crude oil in under 24 hours









# Boilers

- Two 2,500 horsepower boilers and one 300 horsepower boiler produce steam to heat, unload and store a full range of heavy crude oils such as bitumen and waxy crudes





# Storage Tanks

- Total current gross storage capacity of over 700,000 barrels comprised of 7 – 100,000 barrel floating and fixed roof tanks
- Two Tanks are Heated and Insulated, with both dual paddle mixers, and educator heating
- Five ambient IFR's, paddle mixer capable.



# Barge Dock

- Inland barge dock capable of loading/unloading four 30,000 barrel barges simultaneously
- Heated and Insulated Line to dock.
- Equipped with vapor recovery and thermal oxidizer for emissions control





# Ship Dock

- Marine dock capable of Aframax Tankers and inland barges (40 feet of water depth)
- Equipped with vapor recovery and thermal oxidizer for emissions control



# Pipeline Connectivity

- Jefferson Energy has designed and is developing inbound and outbound pipeline connections to major oil refineries and pipeline hub terminals.



# Truck Unloading

- Ramp access from Interstate 10 into the Terminal is under construction
- Two unloading stations able to accommodate up to four tank trucks per hour
- Total unloading capacity of over 8,500 barrels per day





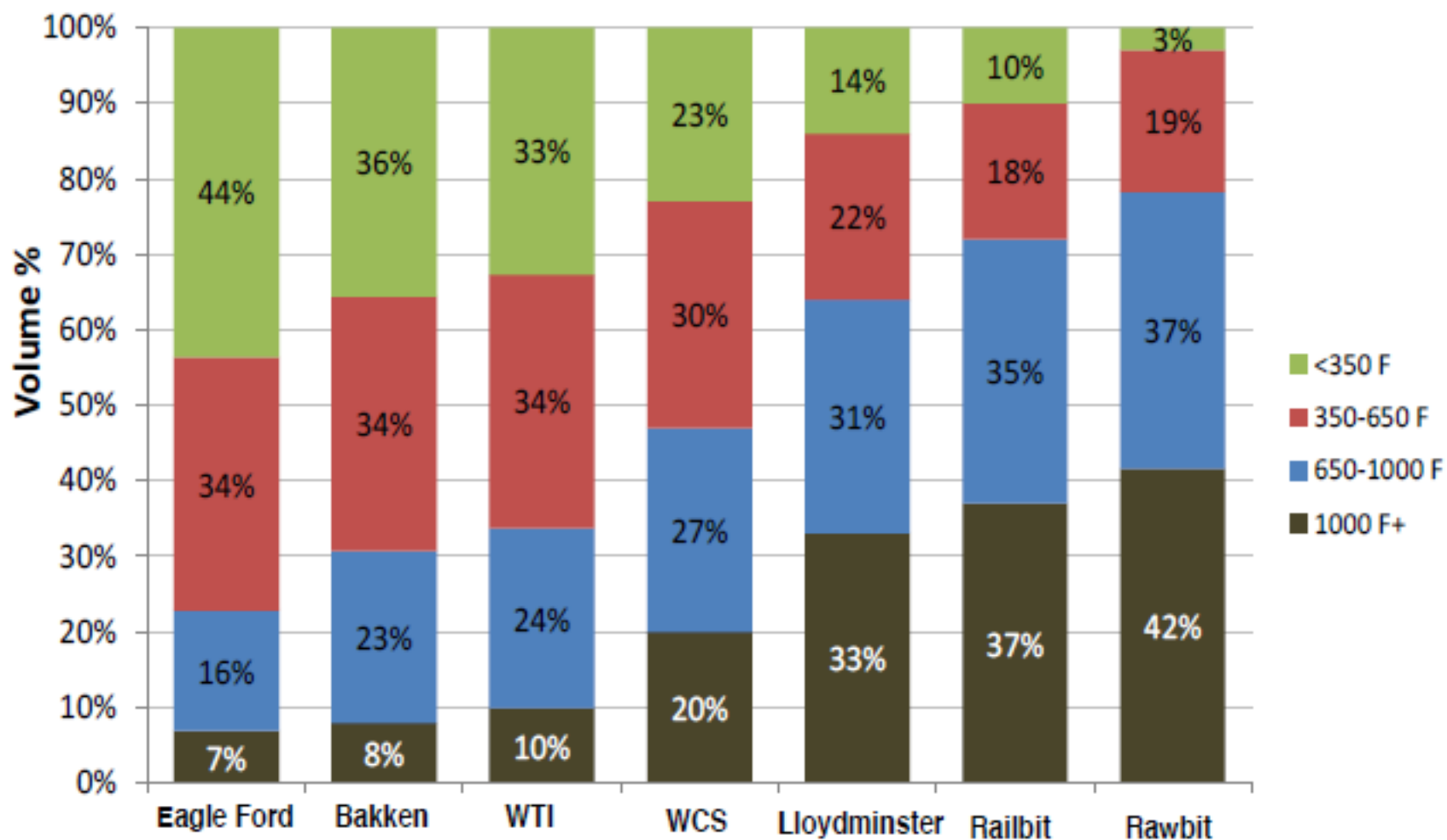
# Blending to Customer Specifications

- Inputs
  - Canadian Heavy/Bitumen
  - Blendstocks from any mode
- Outputs
  - What is most valuable to Refiner



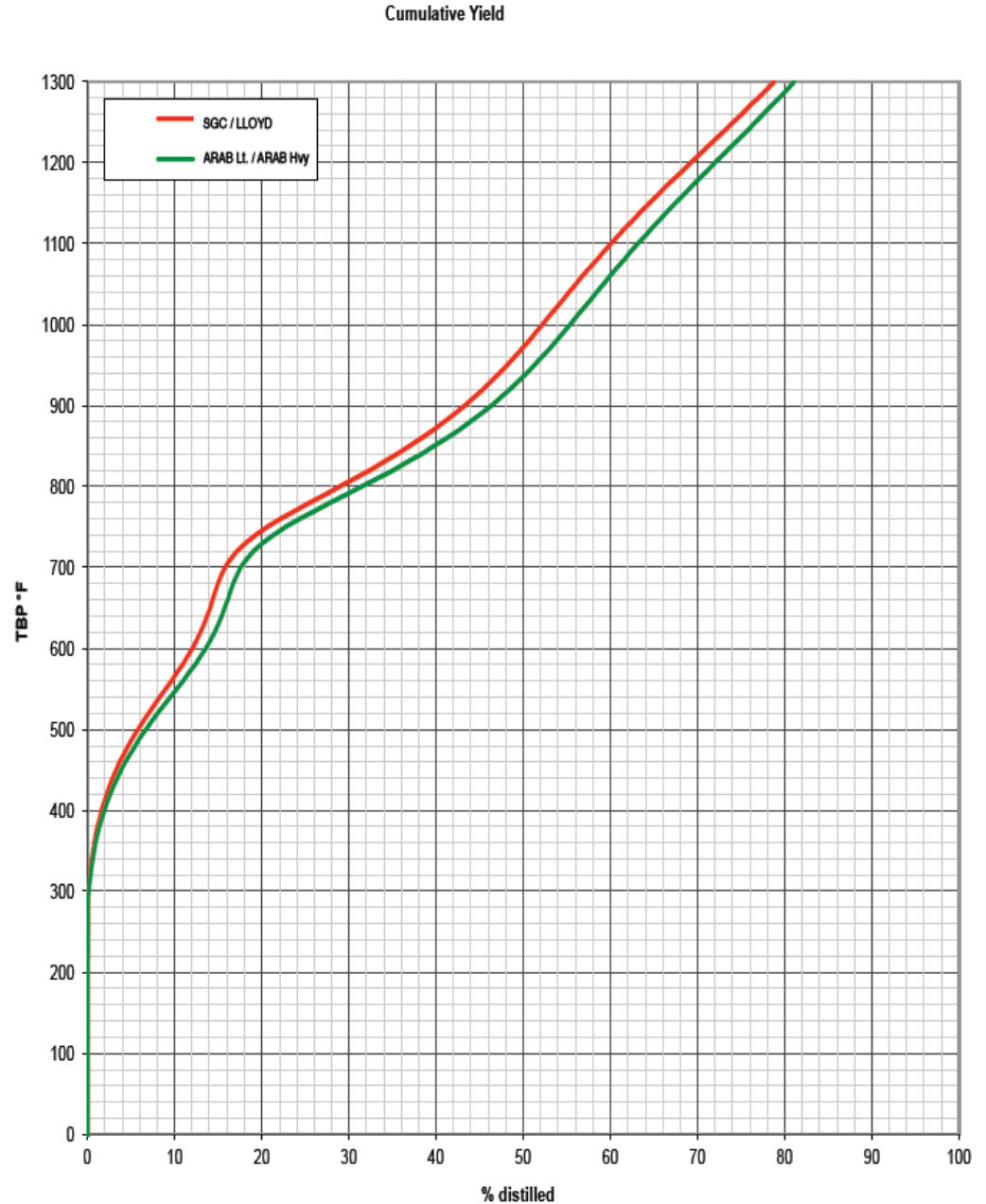
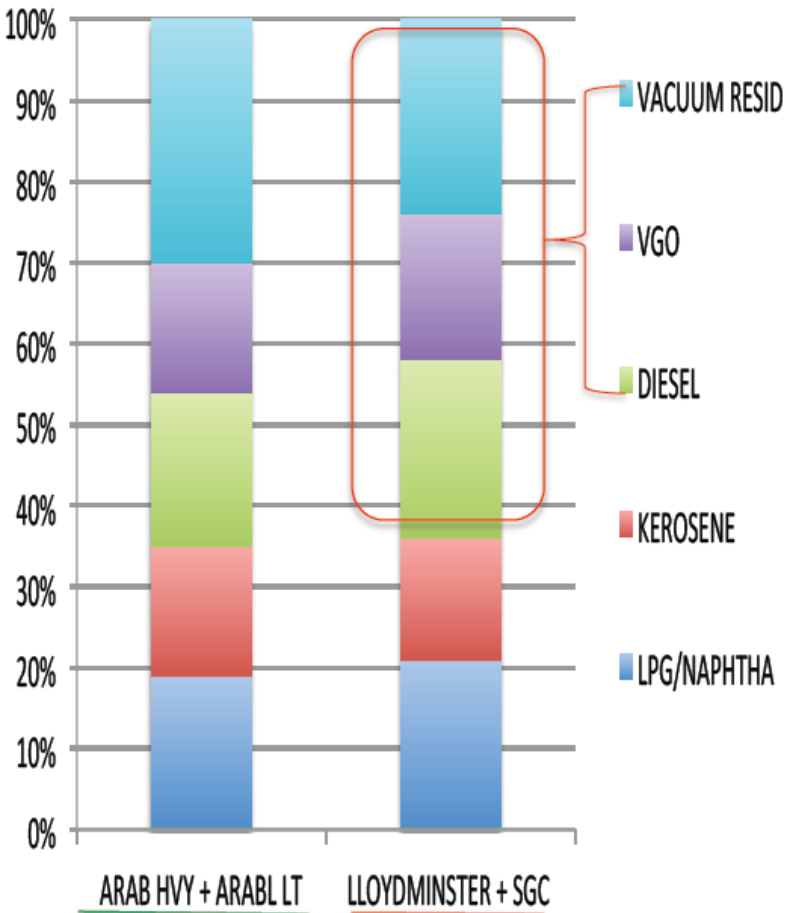
Refineries designed to process medium and/or heavy crude oils often cannot handle the naphtha and lighter material (<350°F)

### Crude Oil Distillation Yields

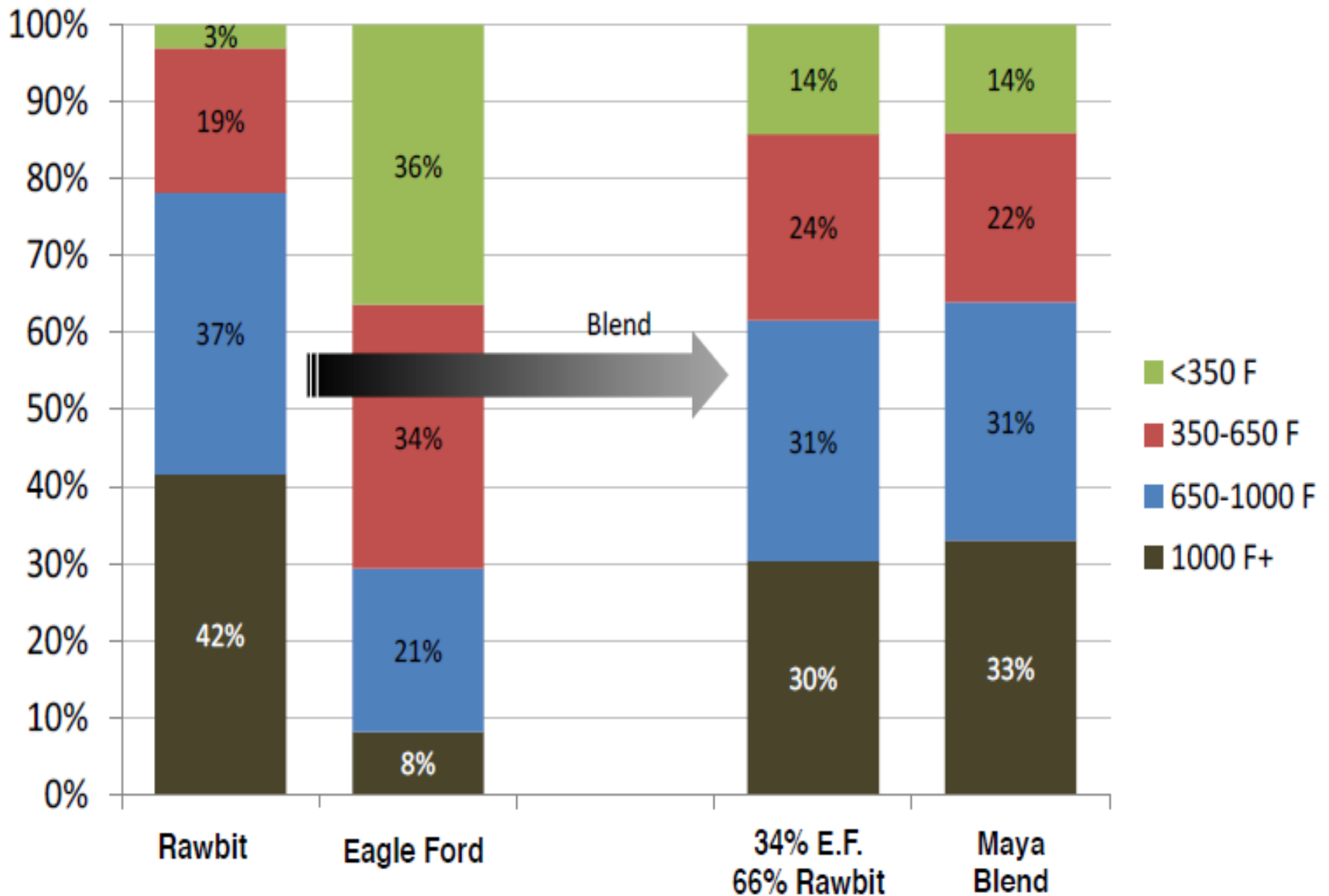




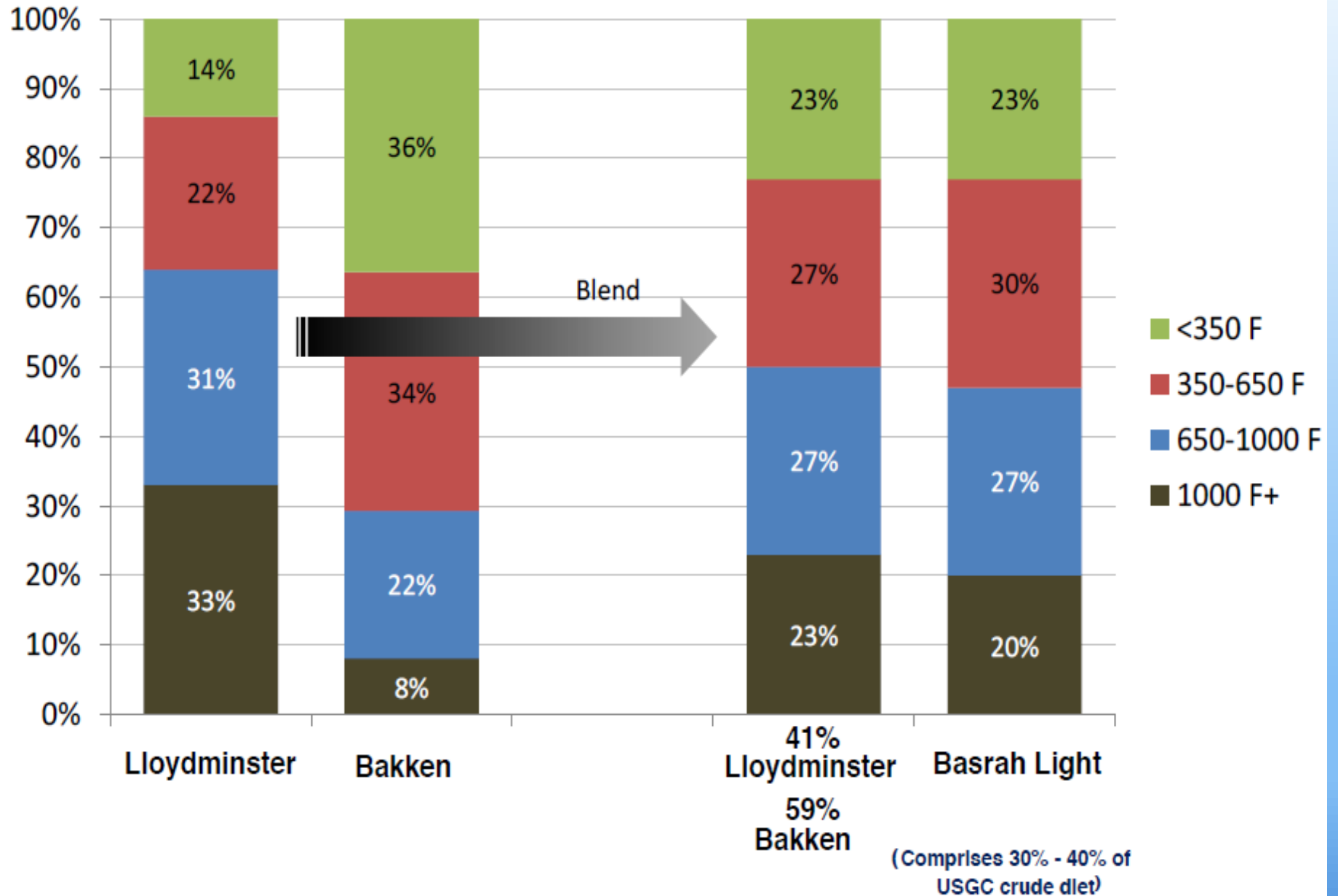
# “LOOK A LIKE” BLENDING



# Distillation Yields, vol %



# Distillation Yields, vol %



# Transportation Rail vs Pipe

## Illustrative Economics (Canadian Crude Delivered to JET vs. Pipeline):

<i>\$ in USD</i>	Pipeline	Rail at various purchase prices				
WCS price/bbl 10/7/15	\$32.81	\$32.81	\$32.81	\$32.81	\$32.81	\$32.81
(-) Lloyd Heavy discount to WCS (est.)		(\$1.00)	(\$1.50)	(\$2.00)	(\$2.50)	(\$3.00)
<b>Price of Lloyd Heavy bbl (est.)</b>		<b>\$31.81</b>	<b>\$31.31</b>	<b>\$30.81</b>	<b>\$30.31</b>	<b>\$29.81</b>
<u>Transportation costs:</u>						
Pipeline to Port Arthur	\$11.00	-	-	-	-	-
Rail loading <sup>(1)</sup>	-	\$1.75	\$1.75	\$1.75	\$1.75	\$1.75
Rail transportation <sup>(2)</sup>	-	9.60	9.60	9.60	9.60	9.60
Railcar lease <sup>(3)</sup>	-	0.60	0.60	0.60	0.60	0.60
Rail unloading <sup>(4)</sup>	-	2.20	2.20	2.20	2.20	2.20
Barge transportation <sup>(5)</sup>	-	-	-	-	-	-
<b>Subtotal transportation costs</b>	<b>\$11.00</b>	<b>\$14.15</b>	<b>\$14.15</b>	<b>\$14.15</b>	<b>\$14.15</b>	<b>\$14.15</b>
Quality discount / diluent penalty	\$3.00	-	-	-	-	-
<b>Cost of delivered barrel</b>	<b>\$46.81</b>	<b>\$45.96</b>	<b>\$45.46</b>	<b>\$44.96</b>	<b>\$44.46</b>	<b>\$43.96</b>
Rail premium / (discount) to pipeline	-	(\$0.85)	(\$1.35)	(\$1.85)	(\$2.35)	(\$2.85)
Premium / (discount) to Maya	\$8.74	\$4.89	\$4.39	\$3.89	\$3.39	\$2.89

(1) Lloydminster area

(2) \$5,500/car (CN), 570 bbls/car

(3) \$650/car/month (Genscape); 2 trips/mo.

(4) Heat assist unloading to barge

(5) \$9.5k/day; 2.5 day trip

# Value is Maximized by Using the Lloyd/GOM Blend in Complex Refinery

Netback Values										October 2015	
US GULF Coast, \$/bbl	Spot Price	REFINERY GATE VALUE					NETBACK VALUE				Complex Refinery Utilization %
		Simple Yield	Complex Yield	Freight			Simple Yield	Refining Value	Complex Yield	Refining Value	
WCS	32.06	45.53	51.52	11.00	*	34.53	2.47	40.52	8.46	68%	
Lloydminster	31.32	49.30	63.59	14.15	**	35.15	3.83	49.44	18.12	51%	
Maya	37.26	46.25	52.38	1.00	***	45.99	8.73	51.38	14.12	71%	
GOM Crude	43.06	53.12	63.96	1.00	***	52.12	9.06	62.96	19.90	85%	
50% Lloyd / 50% GOM	36.76	58.99	68.13	7.58		51.42	14.66	60.56	23.80	92%	

\*Pipeline transport Cost from West Alberta, FOB USGC    \*\* Rail transport cost, FOB USGC    \*\*\* Local transport

REFINERY GATE VALUE FOR SIMPLE AND COMPLEX YIELDS PER ASPEN HYSIS OCT 2015 VALUES

NETBACK VALUE FOR SIMPLE AND COMPLEX YIELDS = REFINERY GATE VALUE - FREIGHT

REFINING VALUE = NETBACK YIELD - SPOT PRICE

Price Sources: ARGUS & OPIS, October 2015; Refining Value determined by ASPEN HYSIS v.

8.1



Questions?



***2015 Canadian Crude Marketing Cost Reduction Congress  
Greg Binion, President Jefferson Energy Terminal***