

# Implications of Increasing U.S. Crude Oil Production



*By*

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U.S. crude oil production is up dramatically since 2010 and will continue to grow rapidly; this has implications for:

- Refinery operations
- Refinery investment
- Logistics infrastructure investment
- Exports of petroleum products
- Exports of crude oil

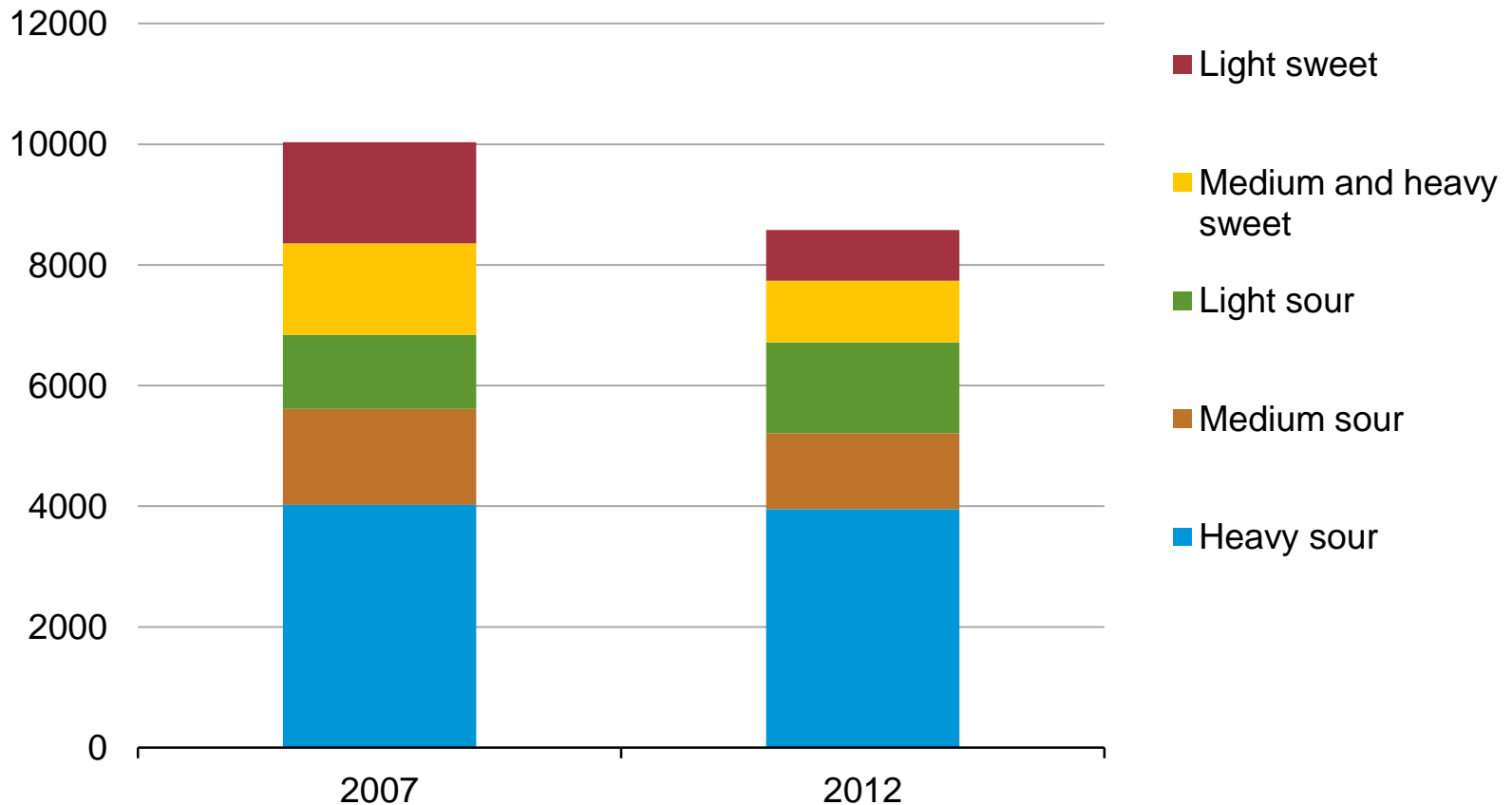
## Increased U.S. crude oil production has resulted in:

- Declines in U.S. crude imports
- Changes to refinery operations
- Logistical constraints in moving crude from production areas to refining areas
- Discounted prices for domestic “landlocked” crude vs. international seaborne crude

U.S. Crude Prices (dollars per barrel)			
	2008	2012	Change
WTI crude (U.S.)	99.67	94.05	(5.62)
Brent Crude (International)	96.94	111.63	14.69
Difference	2.73	(17.58)	(20.31)

# Crude import qualities have shifted as refiners replace imported crude with domestic production

Crude imports by quality  
thousand barrels per day



Source: U.S. Energy Information Administration

## Refiners have increased processing of light sweet domestic tight oil by:

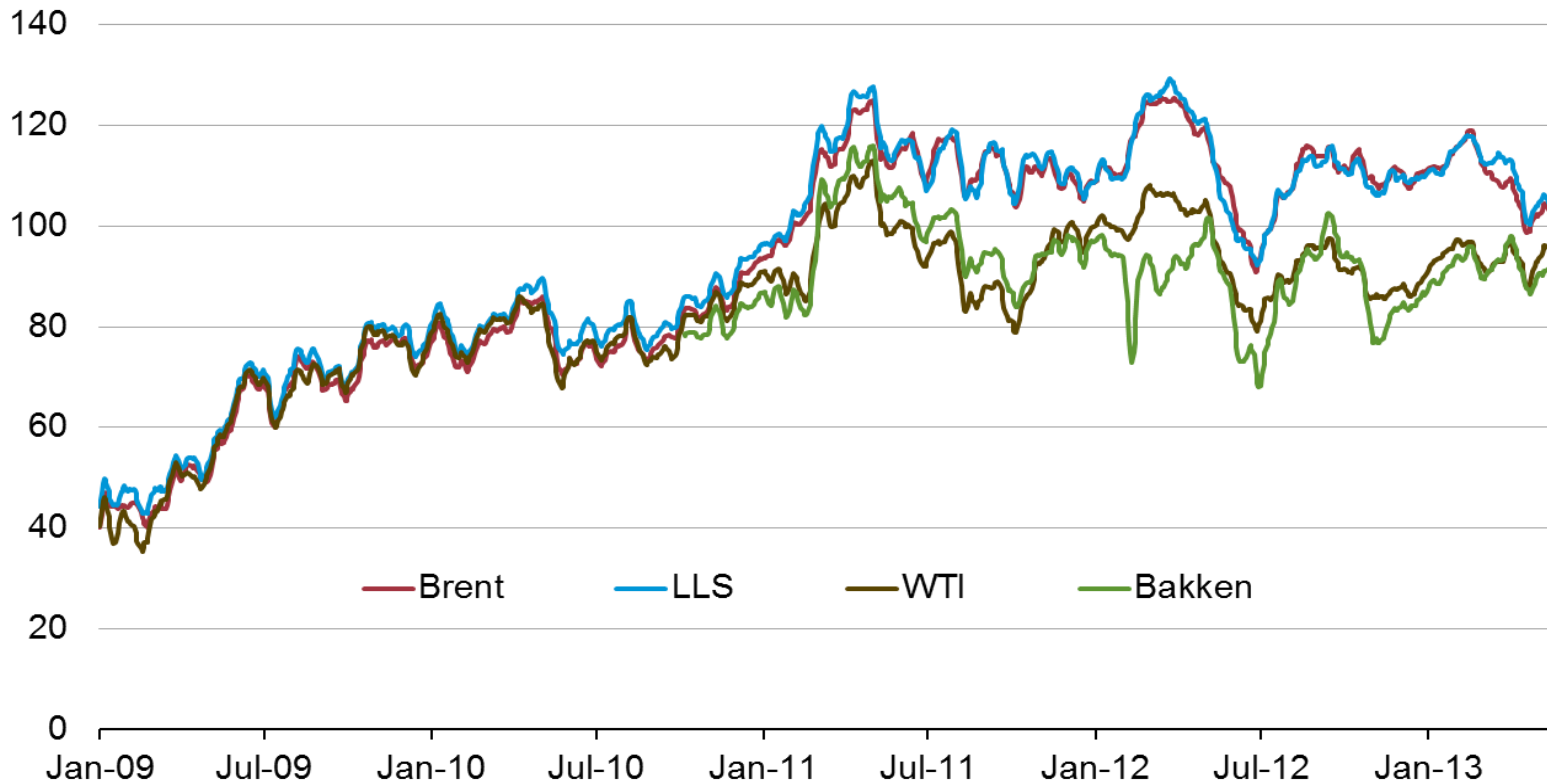
- Increasing crude runs to use any “unused” light sweet capacity
- Backing out imports of light sweet crude
- Blending different qualities of crude
- Depending on relative pricing of different qualities of crude, bypassing units designed to process heavy crude
- Depending on financial incentives, investing in refinery hardware to accommodate more light crude

## Discounted prices for tight oil

- Discounted prices result from lack of logistics infrastructure to move domestic crude to refining centers
- Pipeline capacity increasing but still inadequate: crude is moving via pipeline to the Midwest and the Gulf Coast
- Crude-by-rail is expanding quickly: crude is moving to the Gulf Coast as well as to refining centers on the East and West Coasts

# Discounted prices for “landlocked” domestic tight oil have incentivized refiners

Crude oil prices, rolling 5 day average  
dollars per barrel



Source: Bloomberg

# Logistics infrastructure: rail is expanding to serve the East and West Coasts as well as the Gulf

East Coast rail projects	Location	Operating capacity	Planned capacity	Planned operating
<b>Midstream Terminals</b>		<b>(thousand barrels per day)</b>		
Global Energy Partners	Albany, NY	160		
Buckeye	Albany, NY	130		
Plains All American	Yorktown, VA		130	2013
Sunoco Logistics Eagle Point	Westville, NJ	40		
Eddystone Rail (Enbridge & Canopy Prospecting)	Philadelphia, PA		80	2013
			80	2014
<b>Refinery Terminals</b>		<b>(thousand barrels per day)</b>		
Philadelphia Energy Solutions	Philadelphia, PA		140	2013
PBF Refining	Delaware City, DE	110	40	2013
Phillips Bayway	Linden, NJ		60	Developing
<b>Totals</b>		<b>440</b>	<b>530</b>	

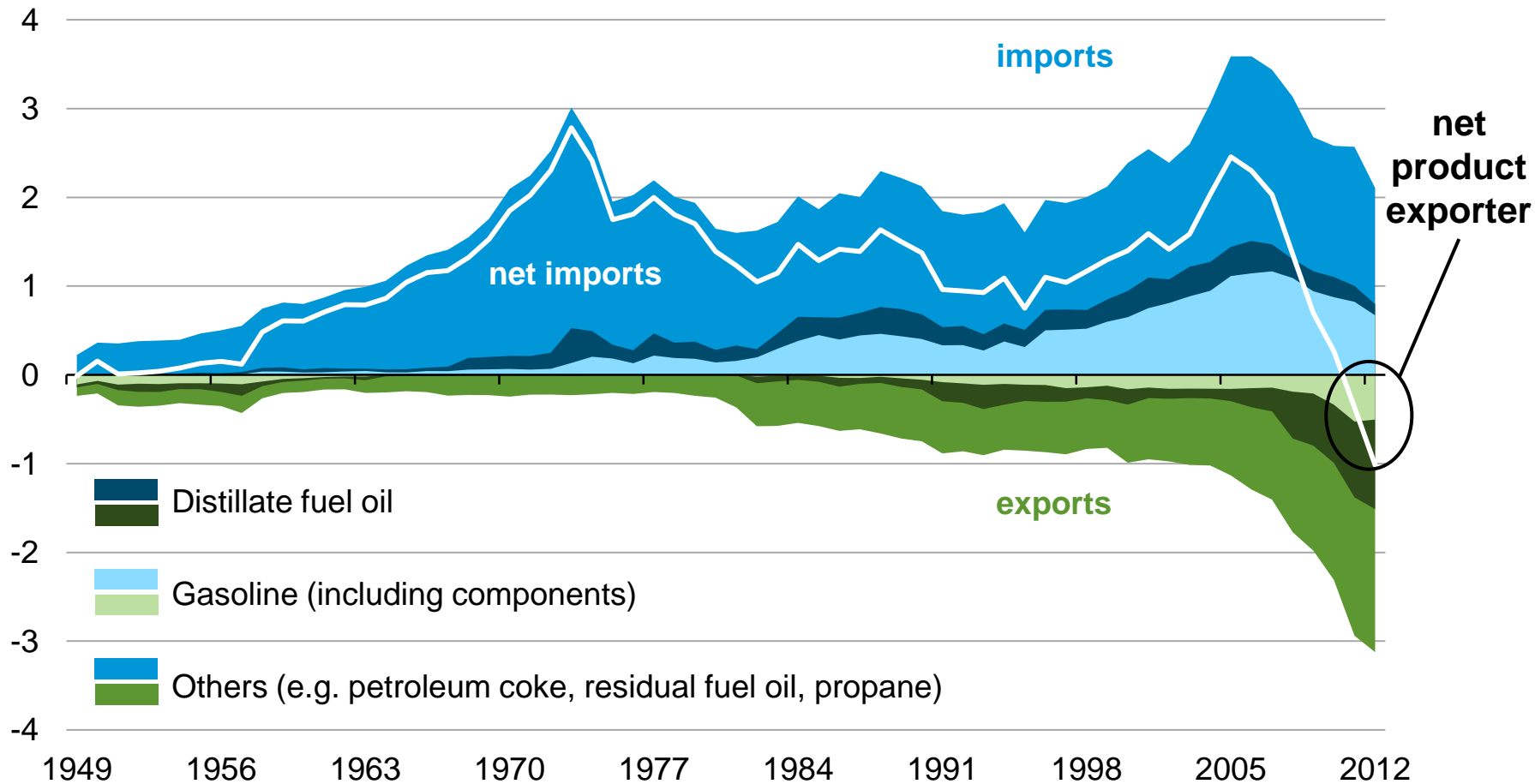
Source: Industry announcements



# Discounted crude prices and low natural gas prices have supported product exports

Annual U.S. net imports of total petroleum products, 1949 – 2012

million barrels per day



Source: EIA, Petroleum Supply Monthly and Annual Energy Review

## How much more tight oil can be absorbed by changing refinery operations and blending different crude oil qualities?

- Varies by refinery
- Light end processing capability could be stressed
- Heavy end processing units could be underutilized
- Total crude processed could decline
- Product yields could shift - more gasoline / less diesel

## Will market conditions support capital investment?

- What about capital investment to increase light crude processing capability?
  - Some refiners have announced capital investment plans to support processing additional light crude
  - Decision to invest depends upon expectations about duration and magnitude of economic incentives and access to tight oil
  - Varies by refinery
- Will discounts for “landlocked” crude persist?
  - Price discounts will vary as infrastructure bottlenecks come and go
  - Pipeline projects to expand capacity will be completed but tight oil production will increase
  - Rail projects will continue but unclear whether long term rail will be competitive
  - Impacts incentive for upstream investment

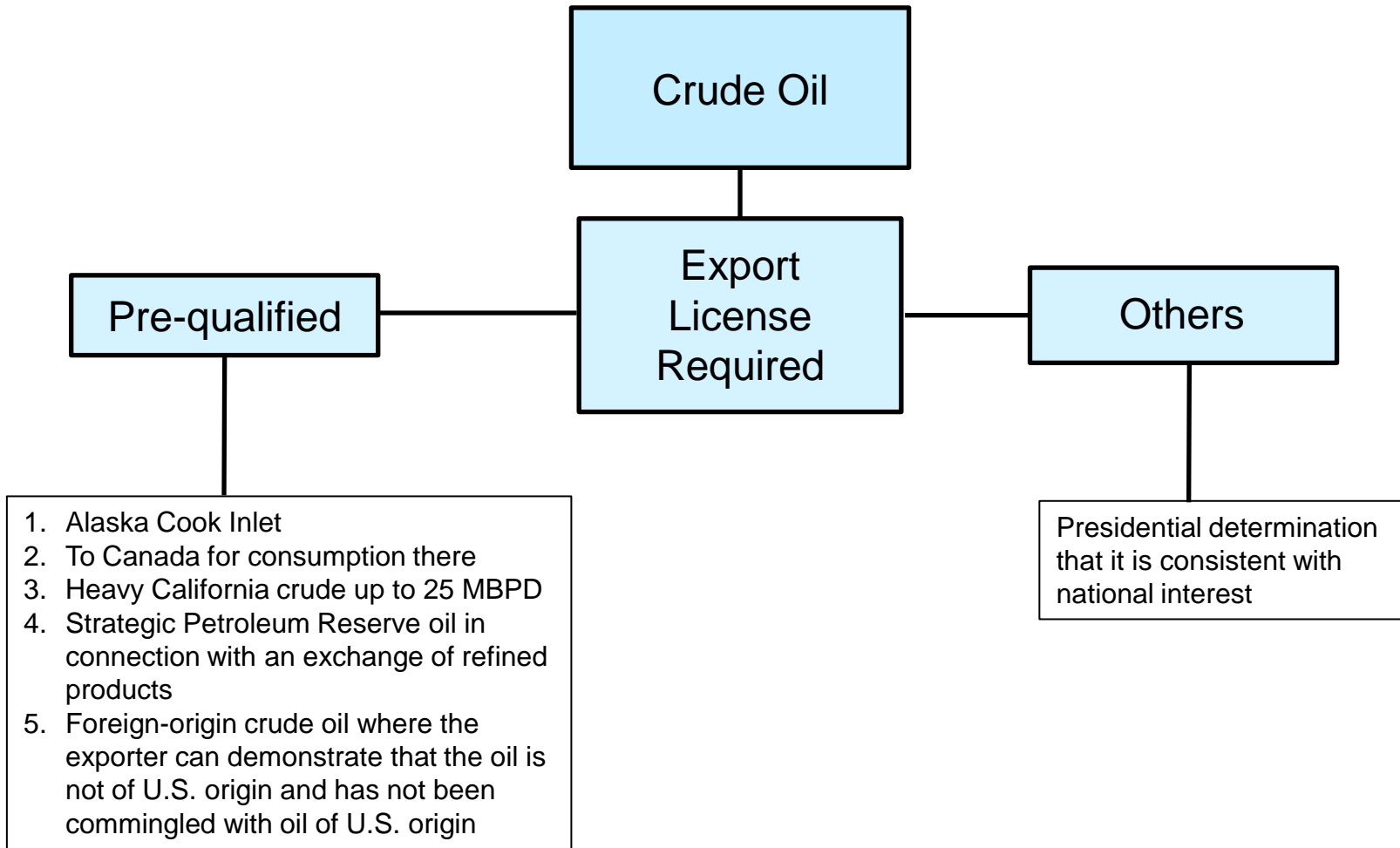
## Will the export market for petroleum products continue to absorb U.S. refinery production?

- Exports principally supply Latin America and Europe
- Projected growth in Latin American gasoline and diesel demand could be supplied by increased local refinery production, limiting growth in U.S. supply to the region
- European demand projected to slow
- U.S. refineries not currently competitive to supply Asia with diesel and gasoline

## Export licenses not generally required for petroleum products

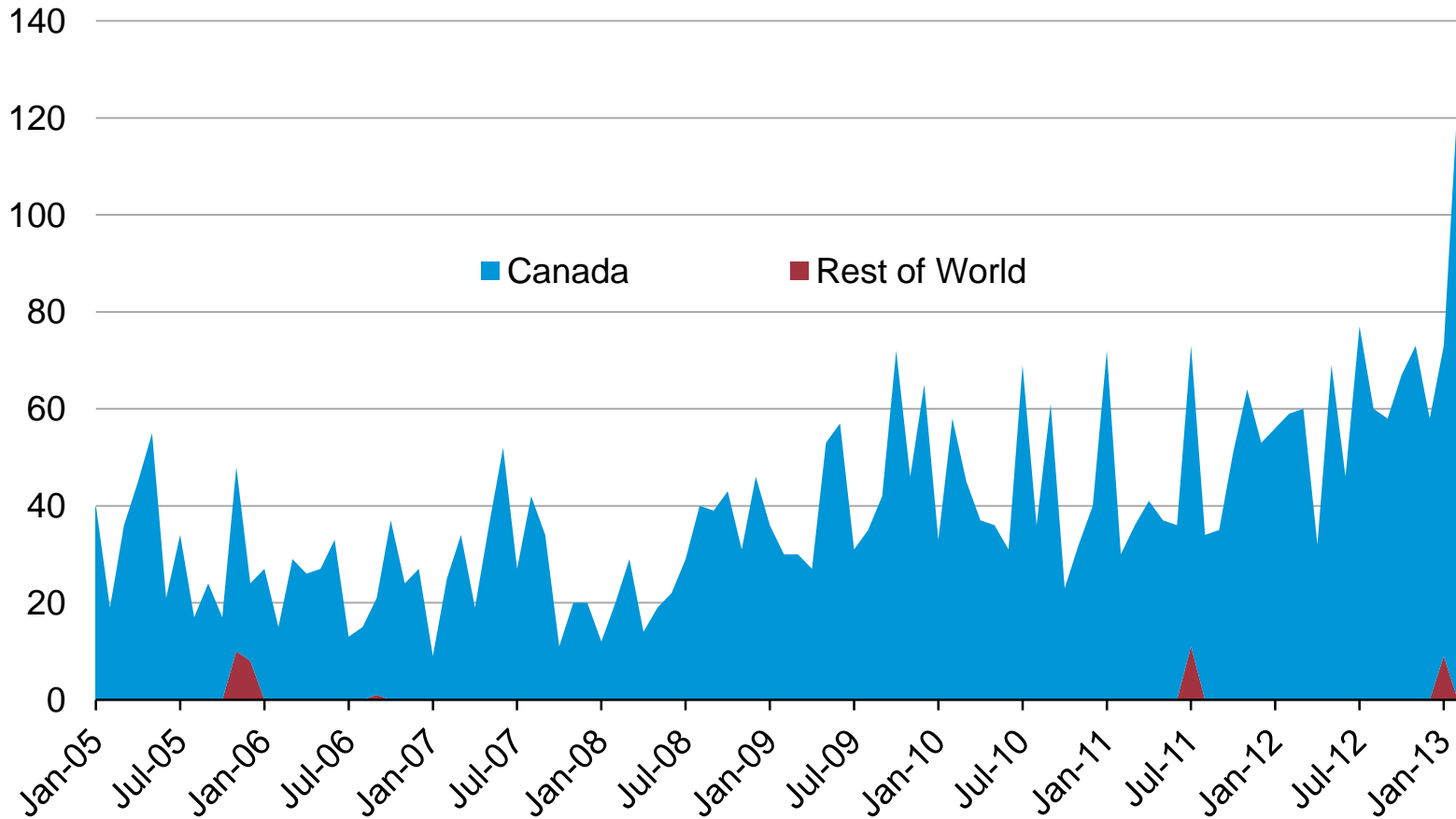
- Petroleum products include both finished products and intermediates
  - Finished products include motor gasoline, diesel fuel, jet fuel, etc.
  - Intermediates include naphtha, reformate, vacuum gasoil, etc.
- Petroleum products include topped/split crude
- Condensate is subject to Commerce Department export licensing rules
  - Note: EIA treats condensate as a natural gas liquid, which is considered a petroleum product

# Crude oil exports require licenses



# U.S. crude exports to Canada have doubled since 2005 and could continue to increase as pipeline and rail capacity expands

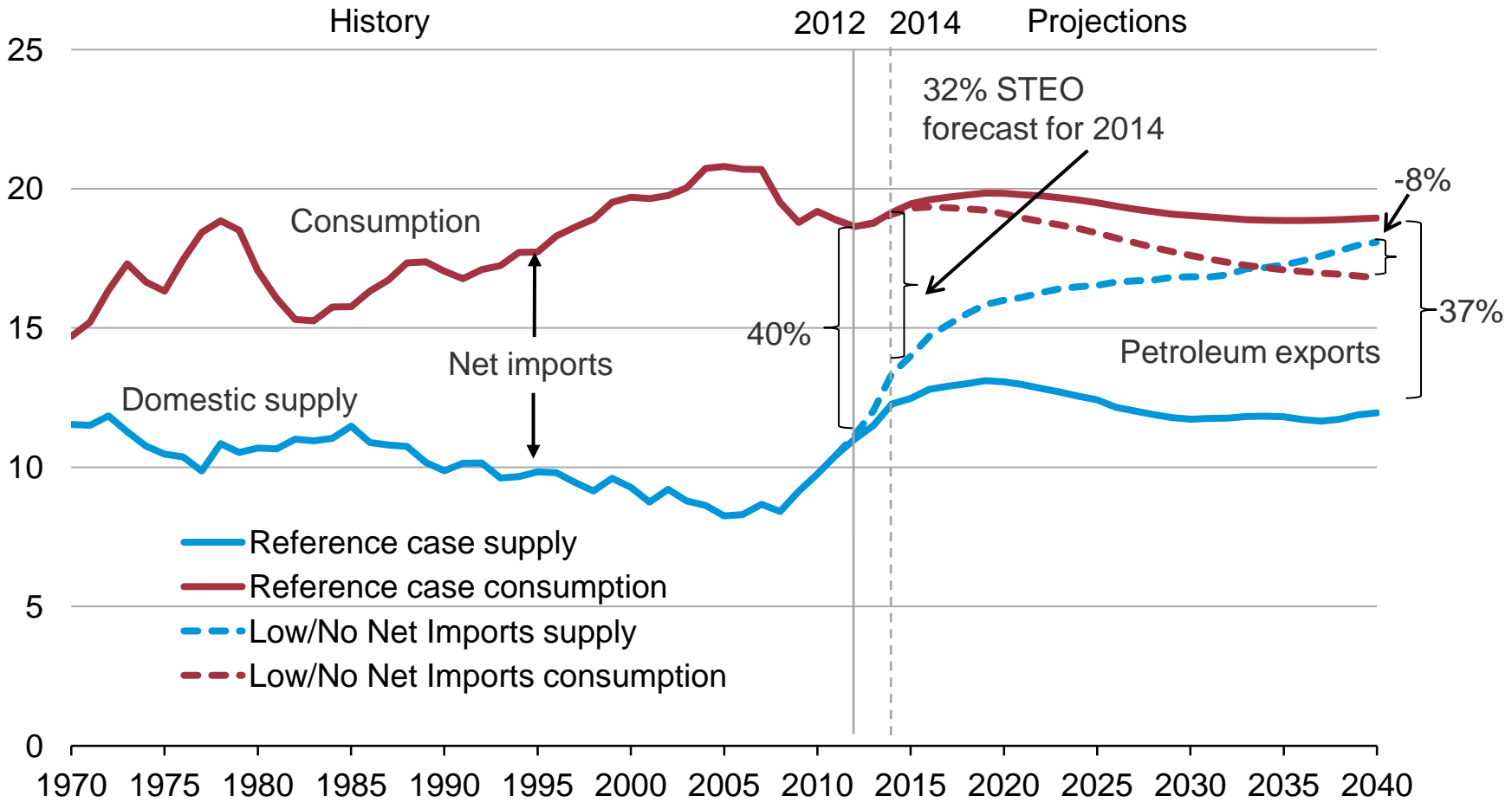
Monthly U.S. crude oil exports to Canada and rest of world  
thousand barrels per day



Source: U.S. Energy Information Administration

# U.S. dependence on imported liquids depends on both supply and demand

U.S. liquid fuel supply  
million barrels per day



Source: EIA, Annual Energy Outlook 2013 and Short-Term Energy Outlook, April 2013



## For more information

U.S. Energy Information Administration home page | [www.eia.gov](http://www.eia.gov)

Short-Term Energy Outlook | [www.eia.gov/steo](http://www.eia.gov/steo)

Annual Energy Outlook | [www.eia.gov/aeo](http://www.eia.gov/aeo)

International Energy Outlook | [www.eia.gov/ieo](http://www.eia.gov/ieo)

Monthly Energy Review | [www.eia.gov/mer](http://www.eia.gov/mer)

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