Sour crude diet: Venezuela production decline shifts lighter crude slates for heavy refiners

25 October 2018
Global heavy sour crude production
Thousand barrels per day

North America
- United States
- Canada

Europe

CIS

Latin America
- Venezuela
- Colombia
- Mexico
- Other

Africa

Mideast
- Saudi Arabia
- Iraq
- Iran
- Other

World
- North America
- Latin America
- CIS
- Africa
- Europe
- Mideast
Global crude runs by region and quality
Thousand barrels per day

North America

Europe

CIS

Latin America

Africa

Asia
Latin offshore production will drive new capacity additions

Latin America terrain in 2017

Onshore 49%
Offshore 51%

Percent

Source: IHS Markit
© 2018 IHS Markit

Latin America terrain in 2030

Onshore 34%
Offshore 66%

Percent

Source: IHS Markit
© 2018 IHS Markit

Latin America crude oil production changes

Million barrels per day

Others
Mexico
Colombia
Venezuela
Argentina
Brazil

2030/2017
2040/2030

Source: IHS Markit
© 2018 IHS Markit
Latin American crude output will shift increasingly sweet as Brazilian production increases

### Latin America crude quality in 2017

- **Light Sweet**: 9%
- **Light Sour**: 10%
- **Medium Sweet**: 28%
- **Medium Sour**: 12%
- **Heavy Sweet**: 9%
- **Heavy Sour**: 31%
- **Segregated Condensate**: 1%

Source: IHS Markit  © 2018 IHS Markit

### Latin America crude quality in 2030

- **Light Sweet**: 19%
- **Light Sour**: 5%
- **Medium Sweet**: 45%
- **Medium Sour**: 5%
- **Heavy Sweet**: 2%
- **Heavy Sour**: 23%
- **Segregated Condensate**: 1%

Source: IHS Markit  © 2018 IHS Markit
Latin American crude and condensate production

Major Latin American country crude and condensate production

- Brazil
- Mexico
- Venezuela
- Colombia
- Argentina
- Other

Source: IHS Markit

Sour crude diet: Venezuela production decline shifts lighter crude slates for heavy refiners / COQA October 25, 2018
Latin American oil production decline continues, driven by Mexico, Venezuela, and Colombia

Latin American crude and condensate production outlook

<table>
<thead>
<tr>
<th>Year</th>
<th>Base</th>
<th>Sanctioned</th>
<th>Unsanctioned</th>
<th>Segregated Condensate</th>
<th>Yet-to-find</th>
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</tbody>
</table>

Source: IHS Markit

Sour crude diet: Venezuela production decline shifts lighter crude slates for heavy refiners / COQA October 25, 2018
The path to self destruction: Recap of Venezuela’s struggle

Fleeing population
Since 2014, approximately 2 million Venezuelans have fled the country due to failing economy, lack of basic goods (food, water, medical equipment), and jobs.

Refinery runs:
2017: 629 kbd
2018*: 366 kbd

Western Division (Maracaibo)
• 2017: 363 kbd
• 2018*: 298 kbd

Orinoco Belt
• 2017: 1,048 kbd
• 2018*: 826 kbd

Eastern Division
• 2017: 524 kbd
• 2018*: 320 kbd

Crude exports
2017: 1.55 MMb/d
2018*: 1.15 MMb/d

Quality to US:
2017: 17.81° API
2018*: 17.18° API

Currency devaluation
• Venezuela issues new currency which devalues bolivar by 96%

Inflation
• Expected to reach 1.5 million % by end of 2018

Major Events
Aug. 2017: U.S. sanctions on Venezuela blocking the country and PDVSA from issuing new debt.
Nov. 2017: PDVSA put under military control.
May 2018: ConocoPhillips seizes PDVSA storage facilities and terminals in the Caribbean islands.
Aug. 2018: President Maduro releases new ‘sovereign bolivar’ tied the petro, an oil-backed cryptocurrency.
Aug. 2018: President Maduro announces that PDVSA and foreign companies will be exempt from the 50% petroleum income tax.

* 2018 data is recorded from January to July
Despite announcements of new funding and joint drilling agreements, Venezuela’s production continues to fall

Venezuelan crude production

Source: IHS Markit  © 2018 IHS Markit

Venezuela crude distillation capacity utilization

Source: IHS Markit  © 2018 IHS Markit
Crude-by-rail and the timing of the Line 3 project are critical to Canadian price recovery, but the larger Keystone XL project will still be needed.
Canadian heavy sour crude share of USGC market is growing
2018 major importers from Venezuela

China crude oil imports by country

India crude oil imports by country

U.S. crude oil imports by country
Global crude slate changes: Past, mid term, and long term

Sour crude diet: Venezuela production decline shifts lighter crude slates for heavy refiners / COQA October 25, 2018

Note: SEG COND = segregated condensate, LSW = Light sweet, MSW = Medium sweet, LSR = Light sour, MSR = Medium sour, HSR = Heavy sour, HSW = Heavy Sweet
US and CIS average crude qualities shifts lighter over time, Canada & Middle East shifts heavier

Global crude quality trends: Change from 2017-2030

Source: IHS Markit
Note: Grey filled bubbles indicates negative production.

Sour crude diet: Venezuela production decline shifts lighter crude slates for heavy refiners / COQA October 25, 2018
Latin American crude exports to Asia have risen by 700,000 b/d compared with 2012

Total Latin American export = 4,470,000 b/d

Total Latin American export = 4,620,000 b/d

Note: Units are in thousand b/d. Flows less than 100,000 b/d are omitted.
Source: IHS Markit

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Venezuelan exports remained stable compared to the previous 3 months, supported by large shipments to China and India

**Venezuela exports to major countries**

- United States
- China
- India
- Spain
- Malaysia
- Other

**Notes:** Only US and China have import data from Venezuela in November and December of 2017

**Source:** IHS Markit © 2018 IHS Markit

**Venezuela exports to US and China**

- United States
- China

**Source:** IHS Markit © 2018 IHS Markit
US refiners have reduced significant import volumes in recent months

Jan-Feb 2017 average Latin American exports to major importers

Jan-Feb 2018 average Latin American exports to major importers

Source: IHS Markit, SIAVI © 2018 IHS Markit
Latin crude oil exports: 2017 versus 2018 (Jan-Feb month average)

Latin American crude exports to major regions

2017

Total Latin American export = 5,060,000 b/d

2018

Total Latin American export = 4,430,000 b/d

Note: Units are in thousand b/d. Flows less than 100,000 b/d are omitted.
Source: IHS Markit

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Global heavy sour crudes

Global HSR exports, 2017 versus 2030

Major HSR crude flows in 2017

Major HSR crude flows in 2030

Note: Units are in thousand b/d. Flows less than 200,000 b/d are omitted.
Source: IHS Markit

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Appendix I: Links to IHS Markit Oil Markets, Midstream & Downstream resources

IHS Markit Webinars and Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Details</th>
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<tr>
<td>IHS Markit Event: CERAWeek 2019</td>
<td>(11-15 March 2019)</td>
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<tr>
<td>IHS Markit Event: Latin American LPG Seminar &amp; Workshops</td>
<td>(6-8 November 2018)</td>
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<tr>
<td>IHS Markit Webinar Vaca Muerta: Shaping Argentina's Oil Markets</td>
<td>(September 2018)</td>
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<td>IHS Markit Webinar The Rule of 3: Global oil market outlook</td>
<td>(September 2018)</td>
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<tr>
<td>IHS Markit Webinar Reinventing the Truck</td>
<td>(August 2018)</td>
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<td>IHS Markit Webinar IMO 2020 – The Biggest Ever “Planned Disruption”</td>
<td>to the Oil Markets?</td>
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Recent IHS Markit sources

- IHS Markit Infographic [Navigating Choppy Waters: Marine Bunker Fuel in a Low Sulfur, Low Carbon World](October 2018)
- IHS Markit Article [Commercial Vehicle Market Dynamics Evolve Over Time to Include Electrification, Yet Diesel Remains Dominant](September 2018)
- IHS Markit Article [Crude quality and trade](September 2018)
- IHS Markit Infographic [Third Quarter Oil Supply Review](September 2018)
- IHS Markit Insight [Jet Fuel Demand Flies High, but Some Clouds on the Horizon](September 2018)
- IHS Markit Article [Venezuela production decline threatens to starve heavy refiners](August 2018)
- IHS Markit Interview [Trends in Global Oil Supply](July 2018)
- IHS Markit Insight [Uncertainties continue to weigh on the oil sands growth story](July 2018)