North American Supply Chain H1 2020: Challenges and the Impact on Crude Quality

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## Oil and Refined Products Services

### ANALYTICS

| Production forecast | Provides forecasts for drilling rig activity and crude oil production. |

### FUNDAMENTAL DATA

| Oil Production | Using a combination of technologies to monitor produced gas, Genscape calculates daily oil production for over 55mn bpd globally |
| Storage | Uses thermal and visual imagery to provide a weekly and bi-weekly view of oil and refined products inventory levels at key trading hubs. |
| Transportation | Using proprietary remote sensors, measures real-time crude oil pipeline, waterborne, and crude-by-rail movements. |
| Oil Refineries | Real-time thermal imagery provides transparency into the operational status of crude and downstream refinery units. |
## Full List of Genscape Oil and Refined Product Services

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<tr>
<th>Product</th>
<th>Frequency (Timing of US ET)</th>
<th>Data available from date</th>
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<td><strong>Storage – Crude</strong></td>
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<td>ARA Crude Storage</td>
<td>Weekly (Mon)</td>
<td>Aug 2012</td>
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<td>Canada Crude Storage</td>
<td>Weekly (Tue, Wed, Thu)</td>
<td>Apr 2011 (June 2011)</td>
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<td>Coaling Crude Storage</td>
<td>Twice Weekly (Mon, Tue, Fri, Sat)</td>
<td>2003 (June 2003)</td>
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<td><strong>Refinery Utilization</strong></td>
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<td>North American Refinery Intelligence</td>
<td>Real-time; twice daily (Mon, Fri)</td>
<td>Apr 2010 (June 2010)</td>
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<td><strong>Transportation – Pipelines &amp; Rail</strong></td>
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<td>U.S. Mid-Continent Crude Pipelines</td>
<td>Real time every 30 days</td>
<td>Jul 2009 (July 2009)</td>
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<td>U.S. Gulf Coast Pipelines</td>
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<td>North American Tanker</td>
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<td>North American Crude Oil Fundamentals</td>
<td>Weekly (Mon)</td>
<td>May 2009 (June 2009)</td>
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**Refinery Utilization**

- **North American Refinery Intelligence**
  - Real-time, twice daily (Mon, Fri)
  - April 2010 to June 2010

**Transportation – Pipelines & Rail**

- **U.S. Mid-Continent Crude Pipelines**
  - Real time every 30 days
  - July 2009 (July 2009)

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**Transportation – Waterborne**

- **North American Tanker**
  - Weekly (Mon)
  - April 2014 to June 2014

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**Supply Chain Monitoring & Intelligence**

- **North American Crude Oil Fundamentals**
  - Weekly (Mon)
  - May 2009 to June 2009
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A Wood Mackenzie Business

Canada
W. Canadian outbound transportation flows fell with production & demand

Canada-to-U.S. Pipeline Capacity Utilization

- 7-Dec-18, 86% Saskatchewan Power Outages
- 8-Feb-19, 95% Keystone Leak; Protesters Shut Mainline
- 18-Oct-19, 95% Keystone Power Outage
- 10-May-19, 95% Mainline Outage
- 1-Nov-19 93% Keystone Leak

Canadian Monthly Rail Loadings (bpd)

- 80%
- 85%
- 90%
- 95%
- 100%
- 105%

Source: Genscape
Canadian crude production declines primary driver of inventory draws

Source: Genscape, Forecast as of May 29

Western Canada Inventories (mn bbls)

Canadian Unblended Production (mn bpd)

- Western Canada Inventories (mn bbls)
- Historical Low Utilization (30%)
- Historical High Utilization (67%)
The Cushing contango/price crash roller coaster

Cushing Stocks (mn bbls)

Source: Genscape

Cushing near maximum capacity in late April (Source: Genscape)

Aerial overview of trailers near NGL Energy Partner tanks.
(Source: May 7 Genscape aerial imagery)

Source: Genscape
Texas
Permian Production: More responsive than expected

Permian Production (mn bpd)

WTI Midland ($/bbl)

Source: Genscape
West Texas inventories hit relative bottom

Source: Genscape
Louisiana inventories: A balance between refining and LOOP Loadings

Source: Genscape
H1 2020 already busiest period for LOOP vessel loadings

**LOOP Vessel Loading Count**

- H1 2018
- H2 2018
- H1 2019
- H2 2019
- H1 2020

**LOOP Loadings (mn bbls)**

- Jan-20
- Feb-20
- Mar-20
- Apr-20
- May-20

Source: Genscape
What does this mean for Crude Quality?
Imports fill the Canadian Gap

U.S. Waterborne Imports by Quality (mn bbls)

Source: Genscape

Medium/Heavy U.S. Imports from Top Origin Countries (mn bbls)

Source: Genscape
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Refineries
COVID-19: North America Refinery Run Reductions

Refinery runs are returning

Source: Genscape
We’ve got to get out of here!

Gasoline Demand (Thousand bpd)

Source: Genscape

Weekly Gasoline Demand 2020 vs. 2019

Source: Genscape
But Wait… There’s More!
Hurricane Season – Heads Up!

**Harvey:** Refinery Demand

**Nate:** Offshore Production

**Florence:** Gasoline Demand

Source: Genscape, NOAA
Hurricane Barry Impacts

- **Hurricane Barry made landfall in Louisiana** on July 13, 2019. The storm was briefly classified as a Category 1 hurricane, before it was downgraded to a Tropical Storm.

- Barry **shuttered oil production in the Gulf of Mexico** as several platforms were evacuated. Storm-related shut-ins reached a peak of **1.159mn bpd** on July 12.

- **Phillips 66 shut their 247,000 bpd Alliance, LA, refinery** July 10 ahead of Barry’s landfall. Most units restarted by July 18.

Source: Genscape, NOAA