

## The Heart of the Matter: Everything You Need to Know About the Cushing Oil Hub

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Cushing. This small town in central Oklahoma is the center of the U.S. crude oil universe, with prices at the Cushing hub serving as the reference price for all of the crude produced in the U.S. — and given the role that U.S. oil has assumed on the global stage, one of the most important determinants of *global* crude oil pricing. Considering the hub's significance, it's frequently surprising to industry veterans just how misunderstood Cushing can be. Like, for example, how SHOCKED the world was when Cushing prices dropped below zero back in April. Cushing traders had seen that coming for weeks — the only surprise to them was how far the price plunged that crazy Monday morning. It's easy to see how something as enigmatic and complex as Cushing might be misunderstood — or underestimated — if you're not familiar with its history, its inner workings, and its many crucial roles in both the physical and financial crude oil markets. It's also tempting to think you can get by with only a passing knowledge of Cushing and how it operates. Au contraire! Cushing really matters, and market participants ignore it at their peril. The good news is that there's finally a combo encyclopedia and user's manual for "The Pipeline Crossroads of the World." Today, we examine the hub's significance to producers, refiners, midstreamers, marketers, and traders, and discuss highlights from RBN's new *Cushing Playbook*.

*In observance of the holidays, we've given our writers a break and are revisiting a recently published blog detailing our New Cushing Playbook. If you didn't read it then, this is your opportunity to see what you missed! Happy Holidays!*

To truly "get" what Cushing is all about, you really need to consider the hub from several perspectives. The simplest to begin with is its physical infrastructure, including:

- The amazing 93 MMbbl of crude oil storage capacity in about 350 aboveground tanks, all sited within less than 10 square miles of the central Oklahoma prairie.
- The arrays of inbound pipelines from Western Canada, the Bakken, the Niobrara, the Permian, and SCOOP/STACK, and outbound pipes to inland refineries and Gulf Coast refineries and export terminals.
- The maze of interconnecting pipes *within* Cushing, which help to give the hub's owners and operators degrees of flexibility and optionality unavailable in any other crude oil market center.

Another way to look at Cushing is to consider who controls and operates all of that storage capacity. Ownership of the hub's storage capacity is highly concentrated, with more than 60% held by three companies: Plains All American, Enbridge, and Magellan Midstream Partners. Another 27% is held by four others: Energy Transfer (through its Rose Rock Midstream and Sunoco Logistics subsidiaries), Blueknight Energy Partners, NGL Energy Partners, and Deeprock Energy Resources. As for the remaining storage at Cushing, its owners include such well-known midstream companies as TC Energy and Enterprise Products Partners. But ownership is only part of the story. More than 75% of the storage capacity at Cushing is leased to others.

Most important to know, perhaps, is how the entities that control the storage (either the owner or the lessee) *use it* for either operational or commercial purposes, or a combination of the two. To help wrap your head around the multiple ways that Cushing storage is used — and why that's so critical — it helps to know that storage users generally fit into one of six categories: (1) refiners, (2) refiners/marketers, (3) producers, (4) producers/marketers, (5) pipelines/midstream companies, and (6) marketers. The colored bar segments in Figure 1 show, in a general way, the degree to which

each category (refiners, refiners/marketers etc.) uses its storage for operational purposes (gray bar segments), commercial purposes (green bar segments), or for leasing to others (blue bar segments).

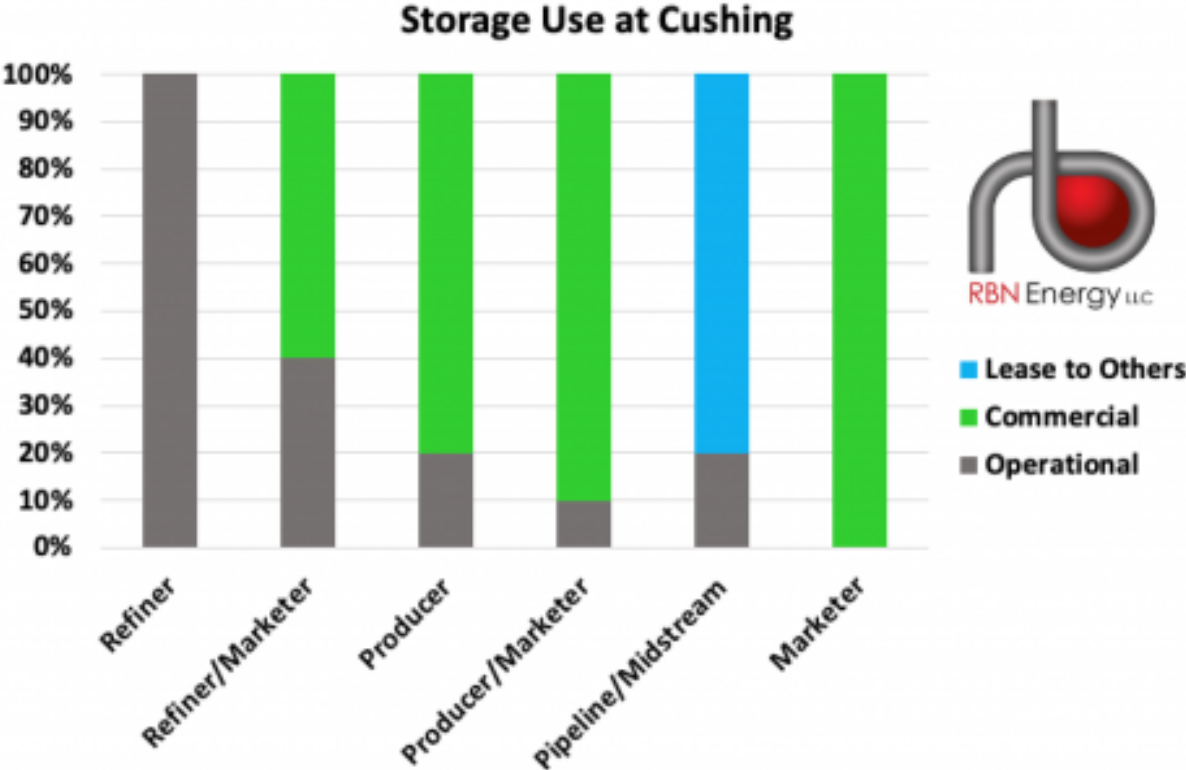


Figure 1. Storage Use by Controlling-Entity Type. Source: RBN

Operational purposes, we should note, include balancing receipt and delivery volumes between the upstream and downstream — refiners do this day-in/day-out. Commercial operations, in turn, encompass the use of storage (primarily by producers and marketers) to take advantage of market opportunities around the timing, volume, or quality of crude from producer to refiner.

And then there’s the critically important function that puts Cushing’s crude oil price on the tongue of every trader, newscaster, and investor who has any interest in energy markets countless times each day: Cushing is the delivery point for the CME/NYMEX futures contracts for West Texas Intermediate (WTI) — the most widely and actively traded physical commodity futures contract in the world. (More on this in a moment.) One more thing: while some companies utilize storage for a single purpose, many take a more integrated approach, using one aspect of storage to benefit another, directly or indirectly, such as commercial functions to support operations or vice versa.

Which brings us to a we-can’t-emphasize-this-enough point, namely that Cushing is not a single, monolithic storage tank with capacity available to anyone for the asking. Instead, the control of its 350-odd tanks is divided among a multitude of owners and lessors, each of which determine how best to use their storage capacity and pipeline connections at the hub to their best advantage. For a refiner, for example, its storage capacity at Cushing is likely used to manage and balance the inbound flow of crude from production areas and the outbound flows to its refinery or refineries — and to do some crude blending to match the refinery’s crude slate. For a producer or marketer seeking to take advantage of a contango market (in which the price of crude in a few months or a year from now is higher than the current price), storage capacity at Cushing might be used to squirrel away oil for delivery in the future.

Knowing all this, it goes without saying — but we'll say it anyway, to drive home the point — that the storage situation at Cushing is in a *constant state of flux*. Crude is always coming in, always flowing between tanks and terminals, and always going out, even during a contango (or *super-contango!*) market, when some mistakenly believe crude oil is only flowing into Cushing until all its tanks are filled. Maybe the best way to think of how Cushing works is to compare it a hotel ballroom filled with dozens of cast-iron bathtubs, each with its own faucet and drain. The level is some of the tubs — like those used by refiners, for example — is frequently rising or falling, while other tubs — like those used to store oil to take advantage of a contango market — remain full-to-the-brim for weeks or months on end, and still others sit empty. Of course, total crude oil inventories at Cushing are a closely watched barometer of U.S. and global oil markets, but to fully understand their significance you need to understand the hub's complex nature.

We'll discuss a few recent examples of Cushing inventory ups and down in the next episode in this series, but for now we'll turn to summarizing why you need to know more about Cushing, then to explaining how RBN's newly released [Cushing Crude Oil Playbook](#) and [Cushing Playbook Package](#) help you learn everything you need to know about the crude oil hub.

### **Why Does Cushing Matter?**

A unique combination of attributes gives Cushing several advantages that are likely to ensure its role as the dominant hub for the foreseeable future. In addition to its high connectivity with many production areas, refining centers, and export facilities, the hub is highly concentrated, which reduces costs to move barrels within the Cushing complex and ensures that a Cushing price for a given grade of crude oil is consistent across the hub. Cushing's second major advantage is its role as delivery point for the CME/NYMEX futures contract for WTI. Not only is this futures contract the most liquid energy commodity futures contract in the world, its price is the benchmark underpinning most physical U.S. crude oil purchase and sales contracts. A third advantage is Cushing's physical location in the middle of the country, which puts it in position to act as a funnel, aggregating crude supplies from the north (Canada, Bakken, Rockies, etc.), staging the volumes for further transportation, and then acting as the dispatch point for crude movements south to the Gulf Coast. Finally, Cushing's massive storage capacity and internal interconnectivity provides operators maximum flexibility to maintain the quality of crude received and delivered. The hundreds of aboveground storage tanks at Cushing allow operators to segregate dozens of different grades of crude oil, and provide opportunities for blending to meet the needs of refinery buyers both within the U.S. and overseas markets.

### **What Is the Cushing Crude Oil Playbook?**

First of all, we call it the *Playbook* because it describes the assets, capabilities, and strategies of each Cushing player, from midstreamers to refiners, from producers to traders. Just like the playbook for a football team, the *Cushing Playbook* shows the moves for each player, and what each play is trying to achieve. The *Playbook* begins with a history and overview of Cushing, including why it developed, how it evolved over the years, and the role that it now serves in today's crude oil market. We also highlight the major players, including the way they operate their facilities.

Then, in Section Two, the *Playbook* focuses on the terminal operators and their assets, including tankage (how many of each size), external connectivity (inbound/outbound pipes with capacities), and internal connectivity (direct pipeline connections to other terminals within the hub). There is a sub-section for each of the 14 major terminals with aerial photographs and pipeline schematics.

Section Three in the *Playbook* details the 19 major inbound pipelines, and includes the history of each pipeline's development, a pipeline map, basic statistics for the pipe (capacity, diameter, length, origin, destination within Cushing), and the quality of crudes it transports. There is also a development timeline showing major milestones, along with other relevant information about the pipeline's operations.

Major outbound pipelines are described in Section Four, again including a map of the pipe and other vital statistics: capacity, diameter, length, origin, destination, quality of crudes, and other factors. We wrap things up with an addendum containing late-breaking developments and a glossary of terms.

### **The Cushing Playbook Package**

But there is more than just the *Playbook*. Our *Cushing Playbook Package* also includes RBN's *Cushing Large-Format Wall Map*, a comprehensive color-coded map of the crude tank farms and long-haul pipeline infrastructure in and around Cushing. The map is available in both physical and digital formats, so you can get a clear, concise view of the geographic distribution and interconnectivity of the midstream assets at Cushing. And you gain access to RBN's *Cushing Online 'MIDI' Mapping App*, a web-based, interactive tool that allows you to drill down on specific operators' assets and save your custom views of the hub. (MIDI stands for Midstream Infrastructure Database Interface.) The online MIDI map also provides as-it-happens updates based on M&A activity, storage tank additions, and project announcements.

Together with the *Playbook*, these resources provide a tutorial on Cushing, a ready reference for Cushing's capability and capacities, and a roadmap for the interconnectivity within Cushing that makes the hub work so effectively. The RBN *Cushing Playbook Package* provides all the data and information you need to understand how Cushing operates, and why it will continue to be the most liquid, highly traded, and fully functional crude oil trading hub in the U.S.

To learn more about the *Cushing Playbook* and *Playbook Package*, [click here](#).

"The Heart of the Matter" was written by Mike Campbell, Don Henley, and J.D. Souther. It appears as the 10<sup>th</sup> song on Don Henley's third solo studio album, *The End of the Innocence*. Released as the album's third single in January 1990, it went to #2 on the Billboard Mainstream Rock Tracks, and #21 on the Billboard Hot 100 Singles chart. Personnel on the record were: Don Henley (lead vocals), Mike Campbell (guitar, keyboards), Larry Klein (bass), Stan Lynch (drums, percussion), and Carmen Twillie, Julia Waters, and Maxine Waters Andrews (backing vocals).

*The End of the Innocence* was recorded over 1987-89 at A&M Studios and The Complex in Los Angeles. It was produced by Don Henley, Mike Campbell, John Corey, Bruce Hornsby, Danny Kortchmar, and Stan Lynch. Released in June 1989, the album went to #8 on the Billboard Top 200 Albums chart, and has been certified 6X Platinum by the Recording Industry Association of America. The LP won a Grammy Award for Best Male Vocal Performance in 1989. Four singles were released from the album.

Don Henley is an American singer, songwriter, musician, record producer, and a founding member of The Eagles rock band. As a solo artist, he has released five studio albums, two compilation albums, and 27 singles. As a member of The Eagles, he has released seven studio albums, two live albums, 10 compilation albums, and 30 singles. The Eagles have sold more than 150 million records worldwide. As a solo artist, Henley has won two Grammy Awards and two MTV Video Music Awards; he also is a member of the Songwriters Hall of Fame, and was named the MusiCare Person of the Year in 2003. As a member of The Eagles, Henley has won six Grammy Awards, is a member of the Rock and Roll Hall of Fame and the Vocal Group Hall of Fame, and is a recipient of Kennedy Center Honors. Henley continues to record and perform.