

The Evolution of the Brent–WTI Price Differential

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The oil and gas production boom in the United States tends to assume a smooth-flowing infrastructure that in a few years will seamlessly deliver the country's growing hydrocarbon wealth to world markets. However, the investment needed to deliver that infrastructure will be enormous. Craig Pirrong, a professor at the University of Houston who specialises in markets and who has taken particular interest in petroleum, spoke at a Platts conference in early 2012 and tried to estimate what the value of that investment would be.

To do this, he took the prevailing Brent–WTI spread both at present and several years out the curve, where it was much narrower, and then looked at the two big projects planned to drain the US Midwest crude glut and ship some of it to the Gulf Coast: the Keystone XL Pipeline and the reversal of the Seaway Pipeline. Simplifying his methodology somewhat, he took the number of barrels planned by the reversals, ran a formula with those barrels and the Brent–WTI spread out along the curve, and calculated that the planned investments were worth approximately \$10 million per day.

About a year later, he updated his numbers. Given the increase in the number of projects on the drawing board since that time, one might assume that the per diem figure would decline. It didn't. The growth in the spread of the Brent–WTI spread, despite the reversal of Seaway having begun in the interim, had blown out to \$17.82 million per day (\$6.5 billion per annum).

As he said in his blog: 'Big numbers' (<http://www.cmegroup.com/education/files/craig-pirrong-2013-02-13.pdf>):

'It is possible to calculate a similar number for pipeline capacity going into the U.S. Midcontinent. EIA reports that 1.19 million barrels a day of capacity from Canada to the Midcontinent is planned. Western Canadian Select quotes are available via CME only through February 2015 and are under –\$20 a barrel for the entire two-year period: the nearby number is –\$26 a barrel. I'll make a guess as to what the spread should be once the transport bottleneck is eliminated (because there are quality differences, and the distances are substantial, I don't know off the top what that should be). My

guess is \$5 a barrel. That gives us (.5) (\$26+\$5) (1.19mm) – (\$5) (1.19mm), which equals \$12.5 million a day. That number swings (.5) (1.19mm) for every dollar change in my guess.'

They had become bigger because in early 2012, when Pirrong had made his first estimate, the spread between WTI and the Platts dated Brent assessment tracked near \$10–\$12. A year later, when the first barrels of the Seaway reversal were a mere drip compared to the one-year surge in US production and the fact that a lot of it was parked in Cushing, Oklahoma, finding it tough to find a home, that spread had blown out to the \$20 level. (By late April, at the time of this writing, it had taken a drop down toward the \$10 or less level, tightening as Seaway ramped up further and the surge in rail transport of crude, which by earlier this year was hauling close to 60 percent of all North Dakota crude output of 700,000 b/d, with takeaway capacity approaching 1 mb/d.)

It isn't clear whether the many companies that have planned significant capital projects to move US crude ran the same numbers as Pirrong, but they certainly

acted that way. Pirrong's two big projects in his 2012 calculations – Keystone XL and Seaway – have lots of company, which have been assumed by Pirrong in his early 2013 calculations.

- There's the Enbridge-Energy Transfer Partners' plan to take the giant south-to-north Trunkline natural gas pipeline and convert part of it to shipping crude in the opposite direction from Illinois to the eastern Gulf of Mexico. Its crude supply will come off Enbridge's existing line from Canada, and its capacity could be as high as 660,000 b/d.
- Another big project that won't even touch the USA but could divert significant amounts of Canadian crude from the glutted Midwest would be TransCanada's project to switch yet another natural gas pipeline – its need all but eliminated by the surge in output from the Marcellus Shale in the US Northeast – to shipping crude. That line runs from Alberta to Quebec, and TransCanada also plans to build an additional 870-mile line from Montreal, to New Brunswick in the Canadian Maritimes. Estimated capacity is 850,000 b/d.
- Then there are the projects that await the decision by the US State Department on whether to allow that portion of the Keystone XL pipeline that crosses the US–Canadian border to be built. (The portion between the NYMEX hub of Cushing, Oklahoma and Nederland, Texas, near Houston, is expected to be completed late in 2013, with capacity that could exceed 800,000 b/d). The Capline that sits woefully underutilised between the US Gulf and the Chicago area could be reversed. There are consultant reports suggesting a pipeline from the oil sands to the Canadian shores of Lake Superior, feeding a fleet of smaller tankers that could move oil around the Great Lakes and what one analyst estimated is 2 mb/d of refining capacity on or near the lakes' shores.

That's the thing about the booming US oil supply scenario: you can float an idea about moving oil from where it's plentiful to where it's needed, and almost anything seems possible. The explosion in rail traffic

alone would have been inconceivable 4–5 years ago.

But once the supply gets out of the glutted areas and into the 'short' regions, that's where the US oil boom could begin to have an impact beyond the realignment of crude and some product shifts that already have occurred. For example, while rail has started to move Bakken crude to the beleaguered East Coast refinery sector, which underwent a wave of closings just a few years ago, a more permanent pipeline solution will probably be necessary for its long-term success. If all the pipeline projects discussed here come to fruition and the Brent–WTI spread gets down in the low single digits, the economics of rail may still work for some places, but they aren't going to work everywhere.

So, for example, one scenario sees the Enbridge plan to reverse its so-called Line 9 to take crude up from Chicago into the Montreal region as a possible first step toward also reversing the Portland Pipeline, which could then take crude off Line 9 to the US Atlantic coast port of Portland, Maine. From there, shipments to the East Coast by Jones Act tanker or ocean-going barge could give those East Coast refineries the steady supply of crude not priced off the Brent benchmark they will need to compete in the Atlantic Basin market. And then they suddenly become a revived competitor to Europe's industry, which already can generously be referred to as 'beleaguered'.

California also may be able to take advantage of the boom. While Bakken crude has mostly skipped the California refining sector, rail transport of it has made an impact in the refineries around Puget Sound in the state of Washington. But Bakken isn't the only booming production area in the country; the once-declining Permian Basin has surged as well, taking crude production in Texas that was less than 1.1 mb/d in 2004–2005 to more than 2.2 mb/d by the start of this year.

So with that in mind, Kinder Morgan is considering a plan to convert a portion of its El Paso Natural Gas pipeline system to take crude from the Permian Basin to southern California, a possibility that was raised by the company's president, Richard Kinder, in an earnings call earlier this year. He projected that maybe 300,000 to 400,000 b/d of crude would move if the project became reality.

US imports of crude oil into PADD 5 – the US West Coast – remains the one supply line of the country that hasn't seen a significant plunge, because the output surge in North Dakota and Texas, as well as other places, has no easy way to get there. Total crude imports into PADD 5 were solidly above 1 mb/d through 2012, not far off from historical averages. A pipeline from the Permian Basin to the Golden State would change that.

The totality of the shifts in the US import position were probably most stark when EIA monthly data came out in late February, on its usual two-month lag, for December US production, imports and exports. It showed that US net imports of crude and products had fallen to 5.987 mb/d, the first time they'd been under 6 mb/d since early 1991, and a staggering drop of about 7.3 mb/d from the all-time high in October 2005 of 13.354 mb/d. (Subsequent months after December showed an increase, proving if nothing else that upward and downward trends may be firmly in place, but the lines do have bumps).

And what happens to the NYMEX crude benchmark at Cushing in the midst of all this activity? It isn't fair to say any longer that it's completely landlocked; the reversal of the Seaway pipeline jumped to a capacity of 400,000 b/d in early January. Still, that's a drop in the bucket compared to the crude stocks at Cushing in excess of 50 million barrels, a number that would be a lot higher if not for the rail explosion.

But a new facility near Houston could be lining up to be the industry's next significant benchmark: ECHO. ECHO doesn't have a lot of storage, but it's at the crossroads of the new American crude oil picture. In fact, its initial storage was only 750,000 barrels. What it does have though is a direct tie to the rising output of the Eagle Ford crude in south Texas, plus a spur from the Seaway line, so barrels from Cushing can get into ECHO. So right there, you've got two key supply sources into that terminal, both of them light sweet crudes. Additionally, two planned projects that will take Permian crude away from Cushing and straight to the Gulf – Sunoco Logistics Partners' Permian Express Pipeline and Magellan's Longhorn reversal pipeline project – add more supply potential to the crude being stored at ECHO, or at least the highway to Gulf Coast refineries that runs through ECHO.

Should there be adequate takeaway capacity from Cushing on pipelines with fixed pipeline tariffs, that ECHO-Cushing spread – which would reflect the value of a new hybrid Gulf Coast light that would be distinct from the mishmash of light crudes that is still called WTI at Cushing – could become a new benchmark.

Toss in the possibility of the USA becoming a crude exporter – and the

legalities of that are still to be resolved – and maybe the Gulf Coast market will start to claw back some of the benchmark status it has lost to Brent.

Craig Pirrong said much the same thing in his speech to the Platts conference last year. Looking at the fact that the WTI benchmark was bedeviled by the lack of takeaway capacity – but with economics that put up big dollar signs in

front of those who might develop it – but also noting that Brent was suffering from declining North Sea output, he asked rhetorically: What is it easier to build.... North Sea production capacity, or North American pipeline capacity?

Given the projects on the board that already have impacted the market, and will do so in the future, the answer is fairly clear. ■