

Division of Public Utilities and Carriers
Memorandum

To: Luly Massaro
Commission Clerk

Date: June 17, 2015

From: Stephen Scialabba
Division of Public Utilities

Subject: Gas Procurement Incentive Plan (GPIP). Marcellus Hedge Proposal.
Docket 4520.

On June 2, 2015, National Grid filed a request for approval for changes to its Gas Procurement Incentive Plan (GPIP) that would allow the Company the ability to use Marcellus region locational basis hedges in addition to the NYMEX Henry Hub hedges. The Company believes that this will help ensure that the purchases in the Marcellus region are more effectively hedged through the use of these instruments as opposed to NYMEX Henry Hub hedges. As indicated in the filing letter, NYMEX Henry Hub hedges are losing effectiveness as a hedge against purchases in the Marcellus region. Steve McCauley of National Grid, Division consultant Bruce Oliver and myself engaged in conference calls to discuss this proposal over the past few months. Further, I have asked Bruce Oliver to supply the Division with a memorandum documenting his recommendation relative to the use of hedges from regions other than Henry Hub, Louisiana. His memorandum, dated June 15, is attached to this memo. It recommends approval of the changes in the GPIP that provide the Company with additional flexibility and discretion relative to the use of locational basis hedges. Further, attached to this memo is a recent article¹ on the topic of the diminishing reliability of Henry Hub as a proxy for gas prices in the northeast United States. This provides additional general information on the topic for the Commission. The Division believes that the proposed changes to the GPIP are reasonable and will make the gas purchasing plan more effective in maintaining stable gas prices and recommends approval of the June 2 filing.

¹ From the trade journal Energy Risk, April 21, 2015

MEMORANDUM

TO: Steve Scialabba
Rhode Island Division of Public Utilities and Carriers

FROM: Bruce R. Oliver
Revilo Hill Associates

DATE: June 15, 2015

SUBJECT: Proposed GPIIP Hedging Program Changes

Per your request, I have reviewed National Grid's proposal for changes in the GPIIP as it relates to the use of locational basis hedges for Marcellus region gas supplies. This memo conveys my assessment of those proposed changes.

The Company has demonstrated, and I have independently verified the disconnect that has developed between natural gas prices at the Henry Hub and natural gas prices in the Marcellus shale region. Correlations that formerly existed between Henry Hub and Marcellus region gas prices have been significantly eroded. As a result, NYMEX Henry Hub futures prices may no longer serve as effective hedges for gas procured in the Marcellus region. Furthermore, with the sustained growth in Marcellus region production that has been experienced over the last several years, the volumes of Marcellus region gas, although not as large as the volumes associated with Henry Hub pricing, appear to be sufficient to warrant reliance on Marcellus region hedging transactions as more reasonable and more reliable indicators of prices natural gas for natural gas purchased in that region. National Grid's proposal to allow for locational basis hedges will therefore allow National Grid to more effectively hedge prices of Marcellus region gas purchases and provide greater price certainty for the upcoming winter season, if timely implemented.

As stated in the Company's filing, the use of locational hedges for the Marcellus region will be optional. There are no requirements imposed for specific volumes or specific percentages of National Grid's Rhode Island natural gas portfolio that will be subject to locational hedging. This places an additional measure of discretion in the Company's hands. However, given the forthright nature of National Grid's interactions with the Division on these matters over the last several years and the well-developed analytics that have presented (and I presume they will continue to provide), I have considerable confidence that the integration of locational hedges for Marcellus region gas will benefit Rhode Island's firm natural gas supply service customers. It should also be recognized

that National Grid does not ask for any further participation in sharing based on its use of locational hedges

I encourage the Division to maintain its regular interactions with National Grid and Steve McCauley to monitor the Company's use of locational hedges and their impacts on the overall cost of gas for Rhode Island customers. I will also continue to monitor natural gas pricing in the Marcellus region and its relationship to Henry Hub pricing. However, my expectation is that differences in Marcellus and Henry Hub prices for natural gas, particularly for winter months will remain for at least the next two to three years, and possibly much longer. When or whether Henry Hub and Marcellus region natural gas prices will once again align is at best a matter of speculation. It is possible that with reconfiguration of portions of the U.S. natural gas pipeline system a single price point will once again emerge that will be effective for hedging natural gas prices for most of the U.S. However, that is not a necessary outcome. Due to differences in local market conditions and the overall configuration of natural gas markets in the U.S., pricing differentials between the Henry Hub and the Marcellus region could become a long term characteristic of the U.S. natural gas market. Just as today west coast natural gas prices do not always correlate closely with Henry Hub pricing, northeastern natural gas markets could establish a separate identity and remain disconnected from the gulf coast and west coast markets.

Based on the foregoing, I assess that the GPIP changes National Grid proposes are reasonable and should be supported by the Division.

US shale boom poses challenge to Henry Hub benchmark

Author: Greg Walters

Source: [Energy Risk](#) | 21 Apr 2015

Categories: [Energy](#)



Last year, 1.64 million physical fixed price contracts were traded at Dominion South

Henry Hub, the US natural gas benchmark, is being called a "broken proxy" as the shale revolution boosts production in the northeast US. But potential alternatives, such as Pennsylvania's Dominion South, will find it difficult to seize Henry's crown

For a quarter of a century, an unassuming pipeline junction in Erath, Louisiana, known as the Henry Hub has been the lodestar for US natural gas traders, sending out pricing cues for a vast array of financial products.

But over the past half-decade, the new technologies of hydraulic fracturing and horizontal drilling have redrawn the map of North American gas production. In particular, output has surged in the Marcellus Shale, the gas-rich geological formation spreading across New York, Ohio, Pennsylvania and West Virginia. That has pushed prices in the region well below Gulf Coast prices, prompting a debate about the relevance of Henry Hub for producers and consumers in the eastern US – and leading some analysts to ask whether a rival benchmark could one day emerge as an alternative.

"A year ago I was asking, 'Is Henry Hub a broken proxy?' with a question mark," says Teri Viswanath, a New York-based natural gas analyst at BNP Paribas. "Now it's just, 'Henry Hub is a broken proxy!' with an exclamation point."

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Defenders of Henry Hub say the construction of new pipelines will eventually narrow the price gap and the hub will continue to play a vital role in setting North American gas prices. But others argue the disconnect may be more stubborn than is commonly assumed. Viswanath says the market may even be primed for a paradigm shift, as prices in the eastern US start marching to the beat of their own drum and turn out to be better suited by a different benchmark located closer to home.

"I absolutely see a bifurcated market as a possibility," Viswanath says. "How this might play out is that you might still have a good connectivity between the Rockies, western Canada and Henry Hub. But the eastern half of the US might be dominated by the northeastern basin."

Dominion South

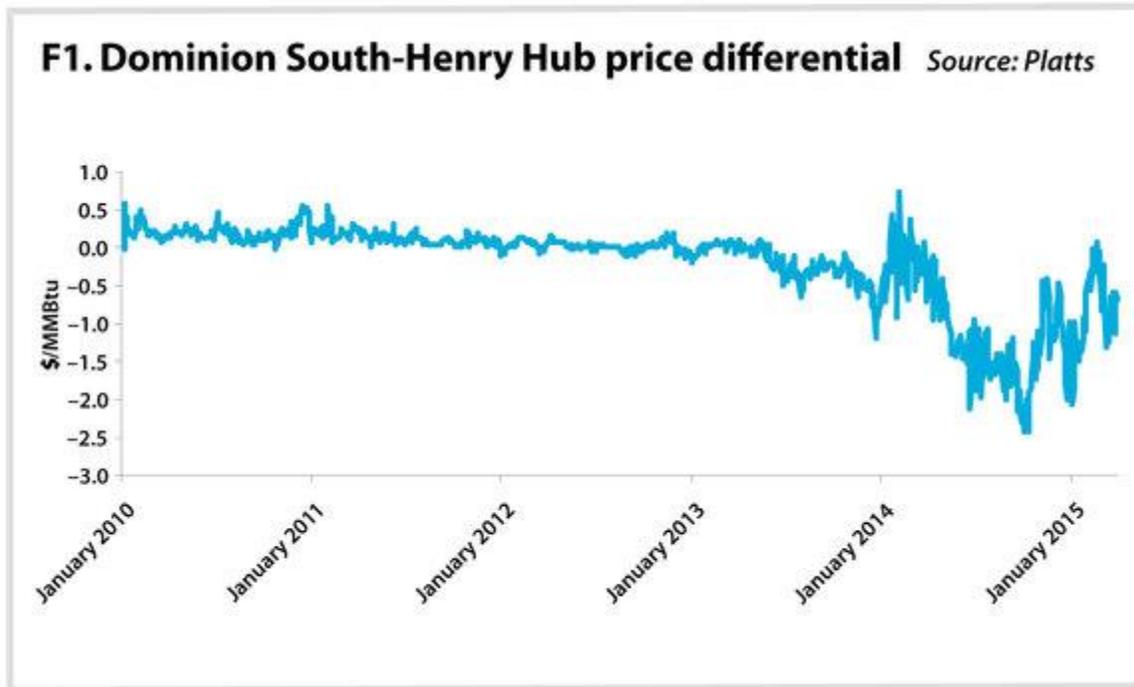
Who might fill Henry's shoes in Appalachia? One location that is the subject of growing buzz is Dominion South, an intersection of pipelines about 40 miles north of Pittsburgh, Pennsylvania, that has already surpassed Henry Hub in physical trading volumes. Last year, 1.64 million physical fixed price contracts were traded at Dominion South, compared with 1.16 million at Henry Hub, according to Atlanta-based Ice. By contrast, in 2009, 1.07 million contracts were traded at Dominion South versus 3.06 million at Henry Hub, Ice data show. Each contract represents 100 million British thermal units (MMBtu) of gas.

The growth in physical volumes at Dominion South stems from skyrocketing production in the Marcellus Shale, which surrounds the hub. Over the past decade, estimates of natural gas reserves and production volumes from the region have repeatedly outpaced expectations, beating even optimistic forecasts by the US Energy Information Agency (EIA) and surprising geologists. In 2002, the US Geological Survey estimated the Marcellus Shale might hold 2 trillion cubic feet (Tcf) of undiscovered natural gas. By 2012, the EIA estimated the region could hold 141 Tcf of recoverable reserves, equal to roughly six years of total US consumption.

Shale production is expected to keep growing. In its latest [Annual Energy Outlook, released on April 14](#), the EIA forecast that production of natural gas from shale and tight oil formations in the lower 48 states would increase 73% from 2013 levels by 2040. With rampant supply growth in the Marcellus, the differential between Henry Hub prices and regional prices, known as the 'basis', has fallen dramatically for regional hubs in Appalachia. "Production has grown faster than the infrastructure can connect it to the market," says Sam Andrus, North Carolina-based director of the North American natural gas group at energy consultancy IHS Cera. "There is a huge discount in the daily cash index price reflecting the constraints."

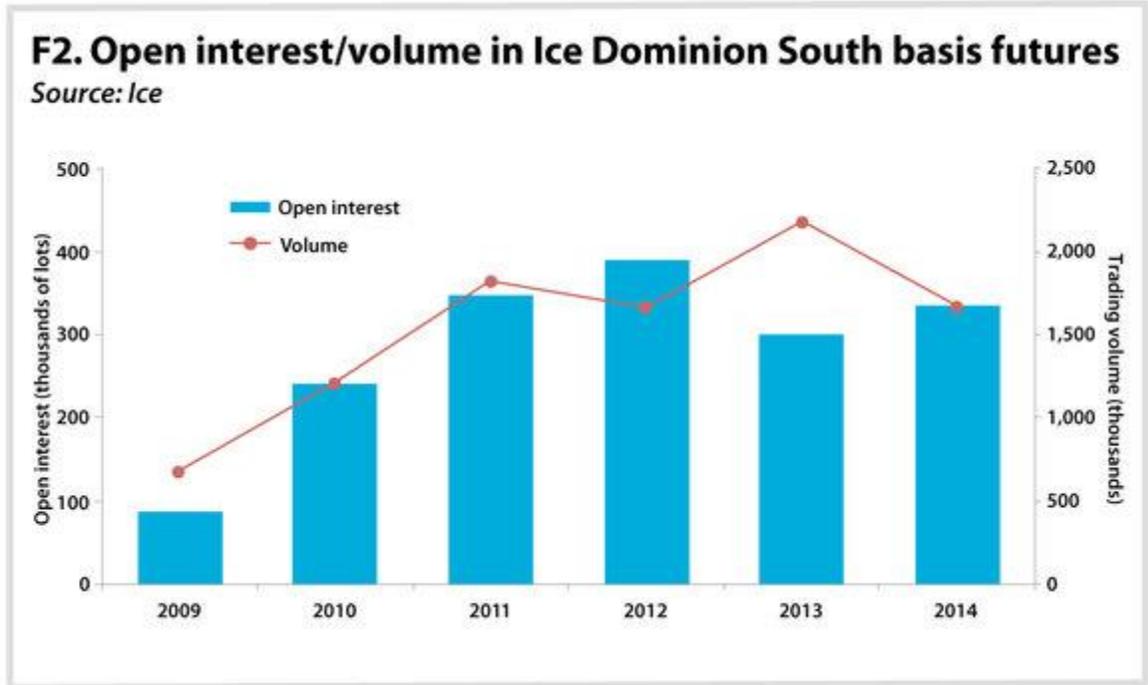
Data from Platts, the New York-based price reporting agency, shows how the gap between Dominion South and Henry Hub has widened (see figure 1). In 2008, before the shale revolution,

spot prices at Dominion South averaged \$9.33/MMBtu versus \$8.89/MMbtu at Henry Hub – a 5% premium at the Pennsylvania hub. In 2014, by contrast, Dominion South spot prices averaged \$3.32/MMBtu compared with \$4.35/MMBtu at Henry Hub – a 23% discount.



Moreover, the abundance of trapped gas supplies in the Marcellus has contributed to volatility in regional prices. Appalachian spot prices can "drop by as much as \$1/MMBtu on moderate temperature days when northeast demand is low", the EIA wrote in a report in October 2014.

All this has increased demand for financial derivatives tied to basis prices at Dominion South and other northeast trading hubs. The volume of Dominion South basis futures traded on Ice grew from 682,000 contracts in 2009 to 1.668 million contracts in 2014. Meanwhile, open interest increased from 87,000 contracts to 334,000 contracts over the same period, according to the exchange (see figure 2).



But that is still a drop in the ocean compared with the vast amount of financial trading tied to Henry Hub prices. Some 146 million of Ice's benchmark Henry Hub futures contracts were traded in 2014, according to the exchange, which means volumes in Dominion South basis futures were just over 1% of volume in Henry Hub futures. Moreover, backers of Henry Hub argue the price divergence between the Gulf Coast and northeast US will eventually ease, thanks to new pipeline capacity coming online. And that, in turn, would reinforce the role of Henry Hub as a US gas benchmark.

"If you look at the projects that are coming, they are significant," says Justin Leonard, BP's Houston-based global commodity head for natural gas. "It is reasonable to think that through time and capacity, the disconnect is going to close again."

Redrawing the map

Before the meteoric rise of the Marcellus, US natural gas was largely produced in Texas, Louisiana, Oklahoma and offshore in the Gulf of Mexico before being transported north and east over the Mississippi River. The country's pipeline infrastructure still largely reflects that map of production and consumption. But now, production is rising in the northeast, and new demand for gas is coming from the southeast, explains BNP Paribas's Viswanath. "What we're working with is a system that was developed over 100 years," she says. "If that system had to be completely redeveloped today, it would just be too costly. So we're looking at how the system might be re-envisioned to meet the existing geography of supply."

Companies are already racing to redraw the map to meet the new reality. At the beginning of this year, 40 new pipeline projects were being developed to transport gas from the Marcellus and the adjacent Utica Shale, representing more than 33 billion cubic feet (bcf) per day of transport capacity and a total investment of \$20 billion, according to Black & Veatch, a Kansas-based consultancy specialising in energy infrastructure. About 4 bcf per day of transportation capacity should come online this year alone, the firm says. In some cases, pipes once meant to carry gas supplies north from the Gulf Coast have been reversed to send gas from the Marcellus southward.

Still, those efforts have not yet caught up with the Marcellus production boom. "We've seen an increase in pipeline additions in the last two years," says Aaron Calder, a Houston-based senior market analyst with energy consultancy Gelber & Associates. "But that hasn't been enough because the Marcellus has just been incredibly prolific. They're adding as much pipe as they can, but the drillers continue to outpace them."

Most market observers agree that the bonanza of new pipeline construction will go a long way towards alleviating the pricing dislocation between Henry Hub and the Marcellus. But exactly how that will take place remains an open question. "If you look at the rate of pipeline additions and add them up, and compare them to the rate of supply growth, it looks like the rate of pipeline additions may indeed exceed the rate of supply growth, although the exact timing is still unclear," says John Joncic, BP's Houston-based head of market analysis for natural gas, power and natural gas liquids.

Denny Yeung, a Houston-based principal with Black & Veatch's natural gas and power fuels group, expects the basis between Appalachian hubs and Henry Hub to narrow over the next five years, but says it will stop short of reaching parity. "I think Dominion South will still be traded at a discount to Henry Hub in the long term," he says. "But we will see a narrowing of that basis closer to the year 2020 as new pipeline projects get built over the next three or four years and more of that gas moves south."

Others say the impact of the new pipelines may be felt sooner. "I'm thinking that in 2017 or 2018, you'll see the effects of the infrastructure coming on," says IHS Cera's Andrus.

Long live King Henry

When natural gas futures trading began on the New York Mercantile Exchange in 1990, Henry Hub was the natural choice for the benchmark. Located in the heart of the US gas producing region, the hub joins over a dozen intrastate and interstate pipelines and features large underground storage facilities in salt caverns. Given the new pipeline plans, many observers believe Henry Hub's role as the national benchmark will continue, and that the dislocation in the Marcellus will eventually fade away.

Other factors working against the emergence of Dominion South as a new financial trading hub include its low prices and abundant supplies. That makes the Pennsylvania hub an attractive pricing point for buyers but not for sellers, notes Gelber & Associates's Calder. "In some ways, Henry Hub has become somewhat diminished, but I do think that in the future it is going to continue to be key," Calder says.

The geography of the Marcellus may also resist letting any single point establish itself as the definitive new regional benchmark. Besides Dominion South, the region features such trading hubs as Tetco M3 and Transco Zones 5 and 6. Black & Veatch's Yeung argues that if a new Marcellus shale benchmark were to emerge, it would most likely be an amalgam of different points in the region. "The sheer size [of production volume] ought to lead you to believe that a secondary index originating in Marcellus ought to develop and be an alternative to Henry Hub," he says. But such a proxy "will likely be a group of points, rather than one".

BP's Leonard notes that Dominion South's usefulness as a proxy for prices in the region depends on the time of year. "In the summers, Dominion is taking the centre of gravity in Appalachia," he says. "It would be accurate to say Dominion South could be seen a good proxy for the majority of the region in the summer. But in the winter, that relevance kind of goes away, because you still run the risk of your peak-day loads within markets like M3, Zone 5 and Zone 6."

Leonard believes Henry Hub will retain its relevance to the market as new pipelines come online. In the meantime, though, he expects the pricing disconnect to create opportunities for natural gas basis traders. "Whenever markets are in a state of dislocation and moving towards resolution, things get interesting from a trading perspective," he says. "I started trading in the northeast when Dominion was a positive basis of 30 to 40 cents. It had a significant amount of storage, and it wasn't all that exciting. And then all of a sudden, it's minus \$2, and there exists a significant amount of volatility. It is going to be interesting to see how Dominion trades as capacity comes online."

Another factor that could cement Henry Hub's mastery over the natural gas universe is the looming prospect of liquefied natural gas (LNG) exports from the US, many of which are expected to depart from the Gulf Coast. Houston-based Cheniere Energy is building the first LNG export facility in the lower 48 states at Sabine Pass, on the border of Texas and Louisiana, a facility set to begin shipping LNG as early as 2016, with other LNG projects expected to follow. In recent years Asian consumers have been eager to sign contracts to [buy LNG from the US under agreements tied to Henry Hub prices](#), instead of contracts indexed to the price of crude oil, the more traditional arrangement.

That means Henry Hub could expand its reach globally. Anthony Yuen, a New York-based natural gas analyst at Citi, thinks Henry Hub will evolve into a pricing point for international exports rather

than just a proxy for US domestic supplies. That will put the Louisiana hub in a far better position than rivals like Dominion South, which – being landlocked – cannot be export hubs. "Effectively, Henry Hub will be a good benchmark for international terminals," Yuen says. "If your export terminals are mostly on the Gulf Coast, then what's the closest, most liquid benchmark on the Gulf Coast? Still Henry Hub."