

2018 Northwest Natural Comprehensive Annual Hedging Plan

Overview

In 2017 the Washington Utilities and Transportation Commission (WUTC) issued a Policy Statement requiring, among other things, that the natural gas local distribution companies (Companies) submit in 2018, along with their Purchased Gas Adjustment (PGA) filings, “annual comprehensive hedging plans that demonstrate the integration of risk responsive strategies into the Companies’ overall hedging framework.” Northwest Natural Gas (NW Natural) is submitting this document in order to communicate the objectives and goals, risk management strategies, current year hedge plan execution, retrospective assessment, oversight and control as well as additional work remaining for NW Natural.

Goal

In response to the Commission’s policy statement, NW Natural’s goal is to have a risk-responsive hedging program that is economically effective and efficient for Washington customers implemented during the 2019-2020 PGA year.

Retrospective Assessment of the Hedge Program

For the 2017-18 PGA year, NW Natural maintained its existing hedging strategy while we continued to pursue the development of a new risk-responsive strategy for our Washington portfolio and to examine the impacts to our operations. With Washington customer demand at only 10% of total NW Natural gas demand, the Company continued to combine WA and OR into a single portfolio for gas purchases and hedging.

NW Natural took the following steps over the past year in preparation for implementing a new hedge strategy:

- a. Added an analyst to its gas supply team to focus on analysis and planning for hedging and supply portfolio decisions.
- b. Implemented a new Energy Trading Risk Management (ETRM) system (Allegro) which incorporates the Front, Middle and Back office functions on one platform and is a key prerequisite necessary to implement the planned changes.

Throughout 2018, two analytic strategies were employed in order to inform decisions around NW Natural’s hedging program:

- a. Prompt Year Cost Avoidance Strategy

Weather forecasts coupled with overall market conditions were considered in the assessment for hedging in the prompt year. SENDOUT modeling as well as assessments of recent historical volatility were both performed to assess asymmetric risk to customers. These assessments were applied differently between the heating and non-heating seasons due to the differences in how the markets operate and are detailed below.

i. Heating Season

For the prompt winter, the Company's strategy was to attempt to lock in prices when they have the highest probability of being lowest cost.

Weather assumptions were incorporated in the forward prices for the prompt winter and account for the most significant aspect of volatility.

Historical data has shown that the major drivers to forward price shifts occurs during the winter months after storage levels and other factors become certain.

ii. Non-Heating Season

1. Hedges placed for the non-heating season (April-October) were not subject to weather considerations. While the summer months may cause spikes in natural gas prices as cooling demand increases in the power industry, the magnitudes and swings are not as severe. As opposed to weather being a primary driver of shifts in winter months, market fundamentals have a much larger impact on both cost and volatility.

2. In the context of the non-heating season, recent volatility was assessed at each basin to determine whether or not the risk to customers associated with additional hedging was neutral or was asymmetrically skewed. Basins demonstrating neutral risk or price risk skewed to the downside did not justify additional hedges, while basins showing asymmetric price risk increasing were hedged.

b. Year-to-Year Rate Stability

Year-over-year rate stability was another factor considered. For the current year the Company reduced its overall multi-year hedging targets (2+ years) by eliminating internal policies regarding minimum hedge percentages set previously for programmatic hedging. After this elimination of the programmatic constraints, multi-year hedges have fallen from ~24% of expected demand hedged for 2018-2019 to ~19% of expected demand hedged for 2019-2020.

Investigation continues into the use of multi-year hedges for winter price mitigation as well as long term rate stability and will be expanded in next year's plan.

The strategies developed during 2018 were then applied to the placement of hedges:

1. Prompt year hedging volumes – the factors and decision criteria illustrated above were applied with the following findings:
 - a. Warm weather has been consistently forecasted for the winter of 2018-2019, suggesting increased hedging during the heating season.
 - b. Recent Canadian market volatility was assessed and showed price risk asymmetry on the upside, therefore, AECO and Station 2 were hedged at higher volumes during the summer.
 - c. During the summer of 2018, the Rockies was determined to no longer have price risk asymmetry to the upside during the non-heating season, causing a strategy change to remove additional hedges from the hedging plan.
2. Hedge Timing – hedge timing remains spread across March to October based on recommendations from prior analysis. A lower amount of hedges were placed in the summer months as the prior assessment has indicated price spikes in the summer time may cause forward prices to rise as well.
3. Hedge Duration – hedges beyond the prompt year have reduced slightly in magnitude compared to the prior year, falling from 24% of hedged expected demand for 2018-2019 to 19% of expected demand for 2019-2020. We are continuing to examine longer-term durations and will continue to adjust the strategy going forward with additional analysis.
4. Credit Risk – the Middle Office worked to approve sufficient counterparties for both our physical gas purchases as well as our financial hedges. This complements the current practice of separating transactions into physical supply linked to an index and financial swaps linked to the same index.

We made small adjustments to our hedging program for the 2018-19 PGA year and analyzed options for dynamic hedges during the year, but have not yet implemented the full dynamic hedging program which we continue to develop. [START CONFIDENTIAL]

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Risk Management Strategies

Historically, NW Natural has maintained one gas hedging portfolio for its Oregon and Washington service territories. Based on the determination to implement a risk-responsive hedging program for NW Natural's Washington customers, it will be necessary to separate the NW Natural's Washington customer gas hedging portfolio from NW Natural's Oregon customer gas hedging portfolio. This is because the timing

and allocation of dynamic hedges in a combined portfolio, where programmatic hedges are the largest portion of the portfolio, conflict with and dilute the results achieved.

Additionally, NW Natural has not received similar guidance in Oregon as it has in Washington concerning risk-responsive hedging strategies, and NW Natural believes further process and discussion with our Oregon stakeholders would be necessary before we made such a significant change to our practice in Oregon as those contemplated in the Commission's policy.

Separation of the portfolios will involve identifying and creating separate processes and systems for each portfolio. In addition, creating two separate portfolios may generate incremental transactions that will need to be processed internally and with counterparties which will increase the volume of records along with the additional workload. NW Natural will continue to estimate a cost to implement two separate portfolios and track the economic effectiveness for Washington gas customers.

NW Natural intends to develop a portfolio structure which includes the following risk responsive dynamic hedging strategies and objectives for the 2019-20 Washington PGA:

1. Dynamic Hedging – Determine acceptable risk levels and monitor using at-risk and other metrics as needed. Models and metrics will help inform defensive hedges through time. Monitor the risk of customer rates increasing above a defined percentage from one year to the next. Monitor price volatility and assess when risk is determined to be asymmetric. We expect to monitor about 65% or 5.5 Bcf of our portfolio in this category; however, we would not expect to fully hedge these volumes.
2. Storage – Our storage facilities are filled each year in anticipation of operational needs and act also as an option type hedge to mitigate against daily price volatility. Our current storage portfolio is set at or around 15% of our portfolio, which equates to about 1.3 Bcf of storage withdrawals.
3. Programmatic Hedges – Set at or around 20% of portfolio which equates to about 1.7 Bcf of our gas purchases. We use various metrics which inform changes in market fundamentals in our programmatic hedging approach, but focus mainly on the timing and location of these hedges. Some of these factors include:
 - a. Weather – This is regarded as the primary driver for gas prices¹ (particularly during the heating season).
 - b. Production – This is regarded as the secondary driver for gas prices²

¹ Opinion of Wells Fargo and Bank of Montreal after verbal discussions

² Opinion of Wells Fargo and Bank of Montreal after verbal discussions

- c. Other tertiary factors (such as national gas storage levels, etc.) may also be considered.

Implementation Plan

We are currently working through the following steps in our implementation process:

- The following are one time implementation efforts that are currently underway:
 - Front Office
 - Define scope for and update systems (SENDOUT and Microsoft SQL server) that support the hedging analyses in order to support separate Oregon and Washington hedging objectives
 - Identify requirements for, locate and implement specific data sources that are sufficient to provide the inputs for quantitative risk responsive modeling
 - Assess the ability and need to track state imbalances in a reporting system and develop processes
 - Modify existing Allegro reports to allow for single state portfolio reporting
 - Middle Office
 - Implement an additional system or system upgrades to Allegro in order to support risk metrics, calculations, reporting, and validation of the Front Office model
 - Determine appropriate specific data sources that are sufficient to provide the inputs for quantitative risk responsive modeling and validation.
 - Review and update Gas Supply Risk Management Policies to incorporate the bifurcated portfolio approach and to ensure that risks are being properly mitigated
 - Back Office
 - Scope, cost, plan and implement Allegro system improvements to support the separation of Washington and Oregon hedging including tools to properly track and account for the gas cost PGA deferrals within a Washington specific portfolio
 - Integrate changes in tracking gas purchases, hedges, and storage in the SAP general ledger system and reports
 - Gas Control
 - Scope, cost, plan and implement modifications to the SCADA programming and added telemetry site equipment needed to provide Gas Control with demand forecasts broken out by state.
 - Modify the existing forecasting application
 - Analyze available historical demand data to support individual state information and create a model that draws on this data to support forecasting by state

- Develop reporting of actual daily sales demand for Washington customers
- The following ongoing efforts will be required:
 - Front Office
 - Bifurcate, analyze and prepare annual and monthly gas acquisition for each state including financial hedge plans and physical baseload plans
 - Run SENDOUT separately for Washington portfolio for integration of forecasted storage activity and WACOG into PGA and company forecasting models
 - Analyze demand forecasts by state, account for state and pipeline imbalances, incorporate PGA assumptions and allocate spot purchases and storage injections/withdrawals to each state
 - Coordinate a separate set of transactions in the daily scheduling process between NW Natural staff and our optimization partner
 - Daily tracking and adjustments to the related purchasing strategy for each state to track state related gas imbalances
 - Develop a process to track storage inventory by state for each storage facility
 - Execute deals separately for each state, which will increase the volume of transactions negotiated and the related deal entry time for all transaction types (financial hedges, physical baseload, physical spot, etc.
 - Assess current staffing levels to determine if additional headcount is needed to manage added workload and complexity.
 - Middle Office
 - Bifurcate portfolio for risk and compliance assessment and reporting daily, monthly, quarterly and annually.
 - Insure daily data streams are fed into system and provide separate mark-to-market valuation and risk analytics.
 - Track, confirm and review executed Washington transactions for compliance with Company policy
 - Assess current staffing levels to determine if additional headcount is needed to manage added workload and complexity.
 - Back Office
 - Track, reconcile, value and record commodity costs and imbalances by state
 - Enhance existing model for calculating monthly gas cost deferrals.
 - Assess current staffing levels to determine if additional headcount is needed to manage added complexity in processes
 - Gas Control

- Prepare daily demand forecasts broken out by state which will require Gas Control time each day at multiple points throughout the day as an input into the Front Office gas acquisition function, daily balancing, and system management requirements
- Rates and Regulatory
 - Separate annual PGA filing preparation processes and filings
- Governance
 - Separate review and approval process for the gas acquisition and hedging plan for Washington including review of ongoing metrics, and approval of transactions

We anticipate that we will begin the dynamic hedging portion of our Washington portfolio during the 2019-2020 PGA; however fully implementing our plan described above will take additional time, and therefore, we expect that the risk-responsive portion of our hedging strategy will be implemented after the Company needs to begin hedging for the 2019-2020 PGA year. After we fully implement our plan, we will begin building in risk-responsive hedging during the 2019-2020 PGA year. We expect to fully adopt our strategy for the 2020-2021 PGA. In the event that there are any changes to this timeline or to the implementation our plan, we will update the Commission of these matters. If the Commission would prefer to have additional regular updates as we implement our hedging plan, we can provide those as requested by the Commission.

Oversight and Control

The gas procurement process utilizes the industry standard Front, Middle and Back Office structure. The revised hedging strategy will be analyzed and executed by the Front Office, which is the Gas Supply department for physical and financial transactions related to the gas commodity itself. The Middle Office provides compliance oversight of physical and financial transactions with policy and procedures on a daily basis, as well as calculates risk exposures and position Mark-To-Market. The Back Office records transactions in the Company's financial accounting records, and initiates the payment process to vendors.

Recommendations presented by the Front Office (Gas Supply) will be reviewed by the Gas Acquisition Strategy and Policies (GASP) committee. GASP is comprised of senior company management and acts as the governing body for hedge strategy approval, execution and policy setting.

Reporting

Reporting will be developed so that the Front Office can assess the risk of the portfolio against the established boundaries and action plan within the hedging policy. GASP will routinely receive and review the current hedging risk report to assess the need for alterations to the hedging policy.

Reporting would include, but not be limited to:

1. Current hedges in place compared to the market (mark-to-market)
2. Portfolio risk at different intervals of the risk distribution
3. Customer risk at different intervals of the risk distribution (i.e. risk of customer rate movement)
4. An assessment of prompt year hedges including what has already been hedged
5. An assessment of prompt year hedges regarding basin diversity

Conclusion

Over the past year, NW Natural began working to restructure its hedging plan and thoroughly assess the economic effectiveness of dynamic hedging for its Washington customers. NW Natural plans to bifurcate the system-wide hedge portfolio into Washington and Oregon portfolios to align our gas procurement for Washington customers with the Commission's Policy Statement.

Over the next year, NW Natural will continue to revise the hedging strategy by implementing the approaches discussed above with a partial implementation expected in the 2019-20 PGA and full adoption by the 2020-21 PGA.