

Puget Sound Energy
Collaborative on Power Hedging and Intra-company Transactions
2020 Power Cost Only Rate Case, Docket UE-200980
February 7, 2022

Introduction

The settlement agreement in the PSE's 2020 power cost only rate case (2020 PCORC), Docket UE-200980, states:

“The Settling Parties agree to participate in a collaborative workshop on electric and natural gas hedging for power cost management and natural gas intra-company transactions.”¹

The rationale for this collaborative was explained in the Commission staff witness Jing Liu's testimony in support of the settlement. The request for the collaborative was prompted by a need on the part of Commission staff for a greater understanding of PSE's intra-company natural gas transactions, gas-for-power hedging, electric hedging practices, and optimization strategy related to natural gas.²

Scope

In September 2021 PSE and Commission staff agreed to the following agenda for the collaborative:

- 1) Energy supply governance, oversight, roles and responsibilities, which pertain to both the power and gas books. The focus of this collaborative will be the application to the power book.
 - a) Energy Management Committee, front, middle & back offices
 - b) Policy and procedures manual and risk policy
- 2) Power hedging and optimization.
 - a) Overview: explain how the process generally occurs. Overview of power and gas-for-power optimization and hedging program
 - b) Sources of natural gas for PSE
 - c) Lacima risk analysis software
 - i) Purpose
 - ii) Use in power and gas-for-power hedging
 - iii) Use in power costs for rates
 - d) Tenors – term, day ahead, hour ahead
 - e) Portfolio hedging program
 - i) Purpose
 - ii) Actively managed and programmatic components
 - iii) Systems-based
 - f) Electric hedging strategy and practices including gas for power. Rationale for executing hedges including gas for power
- 3) Intra-company transactions: explain transactions and rationale.
 - a) Overview: explain how the process generally occurs
 - i) Policies in place
 - ii) Planning and coordination between PSE electric and PSE gas
 - b) Decision making criteria for intra-company transactions

¹ Docket UE-200980 Settlement Stipulation and Agreement, page 6, part III.D.

² Docket UE-200980 Testimony of Jing Liu, pages 25-26.

- c) Pricing of intra-company transactions
- d) Mechanics of transactions with counterparties and between gas and power books
- e) Disclosure requirements/ affiliated transactions.
- 4) Source of natural gas prices used in hedging program, optimization and power cost modeling
- 5) Incorporating hedging and natural gas prices information in power cost projections in Aurora and outside Aurora.
 - a) Overview: how the process generally occurs. Identify and define all information related to natural gas prices and electric hedges as a model input.
 - b) Treatment of front office power and gas-for-power transactions
 - i) Natural gas-for-power transactions
 - ii) Fixed price power transactions
 - iii) Physical transactions priced relative to index
 - c) Natural gas prices as a model input
 - d) Other natural gas information that is used as a model input
 - e) Change in short-term transactions between supplemental and compliance filings in the 2020 PCORC

November 16 Workshop

PSE convened a virtual workshop for two hours on November 16, 2021. All of the parties to the 2020 PCORC settlement were invited. Representatives from Commission staff and Public Counsel participated. The material in the scope was grouped as follows:

- 1) Energy supply governance, oversight, roles and responsibilities
- 2) Power hedging and optimization
- 3) Intra-company transactions
- 4) Source of natural gas prices
- 5) Hedges and natural gas prices in power cost projections.

The slides from the workshop are attached as Appendix A to this report, and materials presented in the workshop are summarized here.

Energy supply governance, oversight, roles and responsibilities

PSE's Energy Management Committee (EMC) oversees energy supply decisions. Energy Supply Merchant (front office), Energy Risk Control (middle office) and Energy & Derivative Accounting (back office) are all responsible to the EMC.

The Risk Policy describes PSE's philosophy of energy supply risk assessment, treatment and mitigations. It includes three risk management objectives:

- Ensure physical energy supplies are available to serve retail customer requirements
- Manage portfolio risks to serve retail load efficiently while limiting undesired impacts or risks
- Optimize the capacity value of PSE energy supply assets.

The Risk Policy identifies five primary risks that are managed to ensure reliability and cost effective service of customer loads.

- 1. Market risk is the risk of increases to portfolio costs resulting from adverse commodity price movements.

2. Asset operation risk is the risk associated with an asset's inability to perform as planned such as a forced outage or unplanned reduction in capacity.
3. Liquidity risk is the risk of market being or becoming illiquid during periods of heightened market reliance.
4. Operational risk is the risk of losses resulting from inadequate or failed internal processes, people, systems and controls, resulting in inefficiencies.
5. Model risk is the risk that inappropriate actions or decisions are made as a result of model error, misapplication or inadequate management.

The Energy Supply Transaction & Hedging Procedures Manual defines roles, responsibilities and operational controls, and outlines guidelines and processes for transactions and the hedging of PSE's energy portfolio. PSE maintains separate power and gas portfolios for meeting customers' energy demand.

Power hedging and optimization

Term trading's price risk management objective is to reduce price volatility, not to earn trading profits.

- Strategies are developed to reduce price volatility in a regulated electric portfolio
 - Transactions balance to load
 - Resources are optimized to reduce commodity risk between natural gas and power exposure
 - Transactions are executed in the wholesale market at prevailing market prices
- Front office does not enter into risk positions for the purpose of earning trading profits
 - All forward hedging transactions are executed in the Northwest at the Mid-C or locations connected to our system
 - Forward transactions do not include spreads between market hubs.

The power book has a diversified portfolio of natural gas supply. Natural gas is sourced from Alberta and British Columbia supply basins and at the Sumas and Stanfield market hubs.

Lacima is PSE's risk system. It requires inputs and simulates economic dispatch.

- Lacima Analytics is an application used globally to perform valuation, optimization and risk assessment across a whole portfolio of physical assets & complex financial contracts
- Lacima is used for:
 - Modeling, valuation and optimization of physical assets and financial contracts
 - Creating a probabilistic, risk-based view of PSE's portfolio with simulation results
 - Calculation of volumetric and financial portfolio exposure
 - Reporting and ad-hoc analysis

Term trading has a systematic approach to decision making.

- Position output from our risk management system is the benchmark for decision-making
- Volumetric risk is governed by prescribed limits.

The Lacima model is not used for power cost forecasts.

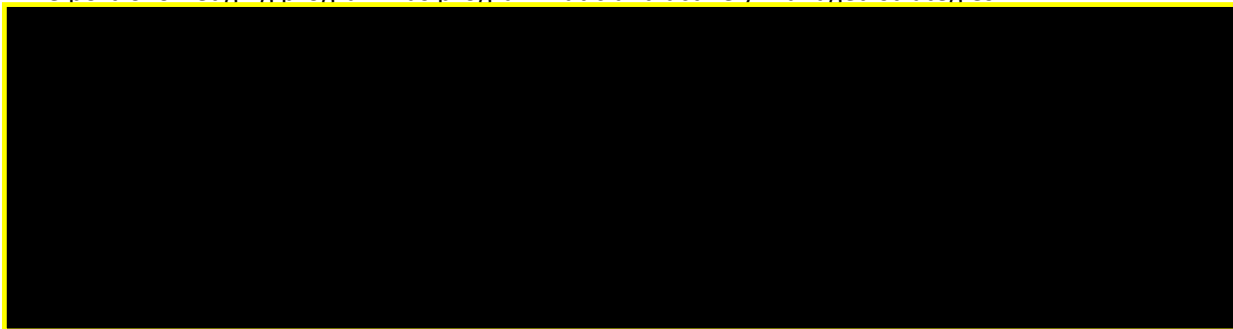
- PSE uses the Aurora model to forecast power prices, resource dispatch, and portfolio costs (including volume and cost of incremental market purchases and sales)
- Existing power and gas-for-power hedges and physical index price supply contracts as of forecast pricing date are the same used in Lacima.

Term trading positions flow into the short term timeframe, which is summarized in Table 1.

Table 1: Short Term Timeframe

	Day Ahead and BOM	Real Time
Time Horizon	From next day through balance of current calendar month (BOM)	Participation in real time hourly market
Role and Function	Prepares the next day generating plan and balances to load in an economic manner. Transacts physical trades in the day-ahead and balance of month to optimize the portfolio.	Manage day-ahead positions as they flow into the hourly market. Responsible for submission of bids into the CAISO EIM Market.

The portfolio hedging program has programmatic and actively managed strategies.



Price discovery helps establish fair market prices.

- PSE’s trading program transacts in the wholesale market
- Natural gas spot and forward prices are traded through bilateral counterparties and on the ICE platform allowing price discovery for both buyers and sellers
- Price discovery helps establish whether the market price is fair for both sellers and buyers

Intra-company traders transact with each other when it is mutually beneficial for both the buyer and the seller. Gas (PSEG) and power (PSEE) traders share open, transparent communication in the department.

Intra-company transactions

Accounting for intra-company transactions is consistent with accounting for transactions with other counterparties.

Intra-company transactions are not affiliated transactions.

- PSE's Energy and Derivative Accounting reviews monthly deal reports and ensures intra-company purchases and sales between gas and power books net to zero before closing the books
- The gas and power books are not legal entities and therefore are not qualified as affiliates of PSE. There is no requirement for disclosure of intra-company transactions by Generally Accepted Accounting Principles (GAAP) or the Federal Energy Regulatory Commission (FERC).

Source of natural gas prices

PSE relies on forward market natural gas prices for hedging decisions and power cost forecasts.

- Forward prices are obtained via subscription with S&P Global Platts
- PSE's Energy Supply Merchant does not create, subscribe to or use any forecast of natural gas prices
- Near term gas for power transactions and resource dispatch decisions rely on actual spot market gas prices (not necessarily "forwards").

Forward natural gas prices and executed contracts are inputs to PSE power cost forecasts.

- Three-month average forward natural gas prices as of a pricing cut-off date are used as the forecast of rate year gas prices
 - Input to Aurora model as price of gas at various hubs throughout the Western Electric Coordinating Council (WECC) region.
 - Used outside of Aurora model to calculate "mark-to-model" value of existing gas-for-power contracts
- All previously executed hedges (fixed-price) and physical supply (index-price) contracts as of the same pricing date are included in power cost forecasts
 - The type of contract (gas-for-power vs power, fixed-price vs index-price) determines how it is included in the forecast (input to Aurora model or added as an adjustment outside of the model).

The Aurora model uses gas price inputs as the price of fuel for gas-fired power plants.

- PSE inputs three-month average forward gas prices for key hubs throughout the WECC
 - WECC-wide Aurora model dispatch is used to determine forecasted power prices in PSE's zone
- The dispatch of PSE's gas-fired resources and resulting Aurora model fuel costs are based on gas price inputs for Sumas and Stanfield hubs
 - Aurora fuel cost outputs assume all gas-for-power purchases are executed at the input gas prices
 - The prices of any previously executed gas-for-power contracts are not the same as the model input gas prices, so adjustments are needed outside of the model to account for these transactions.

Hedges and natural gas prices in power cost projections

Fuel cost from Aurora is adjusted to align with the actual cost of executed gas-for-power contracts.

- Outside the model adjustments ensure power cost forecasts reflect the known and measurable costs PSE will pay for existing gas supply contracts
- A calculation of mark-to-model cost or benefit relative to rate year gas prices accounts for the actual cost of fixed-price gas-for-power contracts. For example:
 - Executed purchase of 1,000,000 MMBtu @ Sumas in December for \$2.50/MMBtu
 - December Sumas rate year price: \$3.00/MMBtu
 - $1,000,000 \times (\$3.00 - \$2.50) = \$500,000$ reduction to December fuel costs
- For index-priced contracts, we assume the index price will be the rate year gas price, so the adjustment equals only the incremental cost or benefit relative to index. For example:
 - Executed purchase of 1,000,000 MMBtu @ Sumas in May for index + \$0.02/MMBtu
 - $1,000,000 \times \$0.02 = \$20,000$ increase to May fuel costs.

Fixed-price power contracts are an input to the Aurora model.

- Existing fixed-price power contracts (hedges) are input to the Aurora model at the actual prices and quantities of the contracts
- Aurora treats contracts as firm portfolio resources which, in general, displace spot market purchases or sales that otherwise would have been calculated by the model
- The cost and volume of fixed-price power contracts are included in Aurora model output and any mark-to-model costs or benefits are implicit in total portfolio cost results

Incremental cost or benefit of index-price power contracts is added outside of the model.

- For index-priced power contracts, we assume the index price will be the Aurora-determined rate year power price, so the outside of model adjustment equals only the incremental cost or benefit relative to index. For example:
 - Executed contract for 1,000 MWh in May for index + \$1.00/MWh
 - $1,000 \times \$1.00 = \$1,000$ increase to May purchased power costs
- Index-priced contracts do not mitigate exposure to market price changes, they are used to ensure firm delivery of physical supply
- PSE enters these contracts relatively close to the date of delivery (generally less than one year in advance).

Table 2 summarizes the four types of forward transactions included in PSE's power costs.

Table 2: Four Types of Forward Transactions in Power Costs

	Power	Gas-for-power
Fixed-price hedges	1. The actual cost and volume of fixed-price <u>power hedges</u> are included in the Aurora model	2. Outside the model adjustment accounts for difference between actual prices of <u>gas-for-power hedges</u> and model gas price inputs
Index-price physical supply	3. The incremental cost (premium or discount) relative to index is added outside the model for <u>index price physical power supply contracts</u>	4. The incremental cost (premium or discount) relative to index is added outside the model for <u>index price physical gas-for-power supply contracts</u>

Costs of natural gas transportation contracts are included in PSE’s power cost forecast.

- PSE contracts with pipeline operators to provide transportation of natural gas between gas supply hubs and from hubs to PSE’s gas-fired power plants
- Variable transport costs are added to the price input in Aurora for each PSE plant
 - Plants are dispatched based on this total delivered gas price
 - Aurora cost outputs include variable transport costs plus commodity fuel costs
- Fixed costs of gas transportation contracts are added outside of the Aurora model

Benefits of natural gas transportation contracts are also included in PSE’s power cost forecast.

- Benefits of pipeline capacity between supply hubs are calculated outside the Aurora model based on price differentials between hubs. For example:
 - PSE Station 2 to Sumas capacity: 80,000 MMBtu/day
 - Station 2 price in June: \$2.00 ; Sumas price in June: \$2.50
 - $80,000 \times (\$2.50 - \$2.00) = \$40,000/\text{day}$ or \$1.2 million reduction to June fuel costs

PSE added additional power hedges between supplemental and compliance filings in the 2020 PCORC. A comparison of power and gas-for-power hedges in the supplemental and compliance filings was presented.

- Volume of hedges increases as the rate year approaches, consistent with PSE’s hedging strategies

PSE added index-price physical supply contracts between supplemental and compliance filings in the 2020 PCORC. A comparison of these values in the supplemental and compliance filings was presented.

- Volume of index-priced physical power supply contracts increased as the delivery period approached
- Higher index premiums were driven by tighter supply and demand conditions, especially during Q3 2021.

Data Requests

At the workshop, Commission staff requested that PSE provide additional information and data regarding the tenor of intra-company transactions. On December 6 PSE provided the requested data for the 2020 PCORC test year, which was the 12 months ended June 30, 2020, in a spreadsheet. The spreadsheet, which is attached as Appendix B to this report, was accompanied by the summary below via email:

As indicated by PSE staff during the meeting, the majority of intra-company transactions – 86.3% of test year intra-company purchases and 86.5% of test year intra-company sales— are executed during the day-ahead trading interval. Since day-ahead transactions are executed only for relatively short delivery periods (typically one to three days), they account for lower proportions of intra-company gas transaction volume and intra-company gas transaction costs. The attached file includes all PSE intra-company natural gas transactions for the 2020 PCORC test year (12 months ended June 30, 2020). The tab “Summary intra-PSE transactions” includes summaries of test year intra-company transactions, volumes, and costs executed during day-ahead, balance-of-month, and term trading intervals.

All intra-company natural gas transactions during the test year were for physical gas supply (no intra-company financial hedges). Intra-company transactions made up 25.4% of total test year physical gas-for-power purchases accounting for 24.5% of total physical purchases volume and 29.4% of total physical purchases cost. Intra-company transactions made up 12.7% of total test year physical gas-for-power sales and accounted for 29.5% of total physical sales volume and 28.9% of total physical sales revenue.

On December 20, 2021 Commission staff sent PSE additional questions and comments via email. PSE replied to those questions on January 25, 2022. The questions and responses are included as Appendix C to this report.

Conclusion

This collaborative originated in a PCORC settlement, and the purpose was to provide information with respect PSE’s power hedging program and intra-company transactions related to natural gas. The information provided in the November 16 workshop and summarized in this report contained the information included in the agenda that had been agreed upon by PSE and Commission staff prior to the workshop. PSE provided additional information on December 6, and responded to additional requests on January 25, 2022. The requirement to provide information for the knowledge of PCORC parties has been satisfied.