



PART II

Summary of Enhancements to the Price Determination Methodology



PART II SUMMARY OF ENHANCEMENTS TO THE PRICE DETERMINATION METHODOLOGY

This Part presents the enhancements and revisions made to the Price Determination Methodology that was earlier submitted for consideration of the Commission.

The enhancements include clerical corrections and improvements in the format of the document itself, as well as revisions in the mathematical representations for locational marginal pricing, transmission loss factor and trading amounts.

1. Revision of mathematical representation

- **Locational Marginal Price (LMP)**

In the original filing, the adjustment due to congestion was not reflected in the formula. The application of transmission loss factor was also enhanced to segregate the mathematical representation into the summation of marginal generation cost plus transmission cost plus cost of congestion.

This is discussed in greater detail in Section 4.7, Part III, The Price Determination Methodology.

- **Transmission Loss Factor**

The mathematical representation "*LFi*" in the section on Loss Factors and Reference Bus of the original PDM filing was revised for clarity and conform to the revised mathematical representation of the *locational marginal price*. The said section was also renamed as *Transmission Loss Factors* to focus the section on *transmission loss factors* only.

The term "reference bus" is no longer used in the PDM document.

The *transmission loss factor* is discussed in the Section 4.8, Part III, The Price Determination Methodology.

- **Determination of Ex-Ante Trading Amount**

Additional details in the calculation of the ex-ante quantity of energy scheduled for injection by a generator was provided. The details of the formulation are in Section 12.1, Part III.



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- **Determination of Ex-Post Trading Amount**

The details of the revised formulation are in Section 12.2, Part III.

The original formula provided for the netting out of the bilateral contract quantity also for the ex-post calculation which is consistent with WESM Rule clause 3.13.7.¹ This clause states that an ex-post adjustment is to be carried out for bilateral contracts.

However, based on ex-post settlement calculation this bilateral adjustment has no effect, as shown below.

$$\begin{aligned} \text{EPETA (for Generator)} &= (\text{EPESP} \times [\text{AQEI} - \text{BCQ}]) - (\text{EPESP} \times [\text{EAQSI} - \text{BCQ}]) \\ &= (\text{EPESP} \times \text{AQEI}) - (\text{EPESP} \times \text{BCQ}) - (\text{EPESP} \times \text{EAQSI}) \\ &= \text{EPESP} \times (\text{AQEI} - \text{EAQSI}) \end{aligned}$$

Where:

EPETA	= Ex-post energy trading amount
EPESP	= Ex-post energy settlement price
AQEI	= Ex-post quantity or the actual quantity of energy withdrawn by the customer
EAQSI	= Ex-ante energy quantity
BCQ	= Bilateral contract quantity

The ex-post bilateral contract quantities are netted out as the ex post bilateral quantity has not changed from the ex-ante bilateral contract quantity.

2. Clerical Corrections

The text and nomenclature used for the various formula and narrative description in the PDM were changed for clarity and for consistency with the other documents being submitted with this filing. Specifically changes were made on:

- Objective Function
- Required inputs to the MDOM
- Output of the MDOM

¹ WESM Rules clause 3.13.7 reads as follows -

For settlement purposes, the ex-ante energy settlement quantity and the ex-post energy settlement quantity for any market trading node in any trading interval shall be determined by the Market Operator by adjusting the gross ex-ante energy settlement quantity or gross ex-post energy settlement quantity, as appropriate, for that market trading node and any trading interval, as measured in accordance with clause 3.13.5 or estimated in accordance with clause 3.13.6, for bilateral contract quantities notified to the Market Operator under clause 3.13.1.1, or inferred by the Market Operator under clause 3.13.1.1 and accepted as valid under clause 3.13.1.2 by:

- a) subtracting all bilateral sell quantities notified for that node in that trading interval from the measured or estimated gross energy settlement quantity for that node in that trading interval; and
- b) Adding all bilateral buy quantities inferred for that node in that trading interval to the measured or estimated gross energy settlement quantity for that node in that trading interval.



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- Determination of Dispatch Schedule
- Determination of Nodal Prices
- Price Adjustment to reflect transmission and congestion
- Transmission Loss factors

3. Presentation Format

The format of the document was also revised for clarity. Specifically, the algorithm is presented in the first part of the document, while related concepts are discussed in the latter parts.

4. Incorporation of additional explanations and references

The following additional explanations and references were added to the revised PDM document (Part III).

- Additional details on the MDOM formulation (Appendix III-1, Part III).
- Example to illustrate policy on tie-breaking or handling of equivalent offers (Appendix III-2, Part III)
- Footnotes, which includes reference for WESM Rules clause
- Glossary of Terms