Transmission Penalty Factors

Market Monitoring Unit Advisory Committee

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Shadow Price

- **In the linear constraint optimization, only one of the following three possibilities can occur**
  - **nonbinding (shadow price = 0)**
  - **binding (shadow price < marginal value limit)**
  - **violated (shadow price = marginal value limit)**
- **If the transmission constraint is binding, the shadow price is a linear function of marginal units' offer prices**

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Marginal Value Limit or Transmission Constraint Penalty Factors

- **In the PJM dispatch model, transmission constraints are allowed to be violated under some conditions; flow is allowed to exceed the specified line limit**

- **Violated transmission constraints have defined penalty factors (marginal value limits)**

- **LMPs are affected by the penalty factors**

- **LMPs reflect the local scarcity**

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Constraint Relaxation Logic

- **The shadow price of a violated constraint should equal the transmission penalty factor**

- **PJM uses a method called "constraint relaxation logic" to affect shadow prices of violated transmission constraints**

- **The logic typically results in reducing the shadow prices to be slightly below the defined constraint violation penalty factor**

- **LMP is not related to marginal unit offers**

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MMU Recommendations

- **The MMU recommends that PJM explicitly state its policy on the use of transmission penalty factors including: the level of the penalty factors; the triggers for the use of the penalty factors, the appropriate line ratings to trigger the use of penalty factors, the allowed duration of a violation, and when the transmission penalty factors will be used to set the shadow price.**

- **The MMU recommends that PJM explicitly state its policy on the use of constraint relaxation logic and price setting logic.**

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