Topics

- **Interface Pricing**
- **Circuitous Scheduling**
- **Sham Scheduling**
- **Inefficient Path Scheduling**
- **Proposed Solution**
- **Interface Pricing Point Assignments**

Monitoring Analytics

Interface Pricing

- **Transactions can be scheduled to an interface based on a contract transmission path.**

- **Pricing points are developed and applied based on the electrical impact of the external power source on PJM tie lines, regardless of contract transmission path.**

Monitoring Analytics

Interface Pricing

- **PJM establishes prices for transactions with external balancing authorities by assigning interface pricing points to individual balancing authorities based on the Generation Control Area (source) and Load Control Area (sink) as specified on the NERC Tag.**

Monitoring Analytics

Interface Pricing

- **The current approach will correctly identify the interface pricing point only if the market participant provides the complete path in the NERC Tag.**

- **The current approach will not correctly identify the interface pricing point if market participants submit external energy schedules that are inconsistent with the actual power flow and that result in energy settlements that are inconsistent with the actual power flow.**

Monitoring Analytics

Interface Pricing

- **Scheduling energy inconsistent with power flows creates harmful market inefficiencies, regardless of intent.**

- **Intentionally scheduling energy inconsistent with power flows can constitute prohibited market manipulation.**

Monitoring Analytics

Interface Pricing

- **On July 29, 2014, PJM and the Market Monitor submitted a Joint Statement on Interchange Scheduling to PJM Stakeholders.**

- **The joint statement served notice to the PJM market participants that various forms of scheduling behavior may be subject to referral to the FERC Office of Enforcement.**

Monitoring Analytics

Interface Pricing

- **While this notice has been effective in reducing the volumes of various scheduling strategies in the short term, it has not eliminated such strategies.**

- **Explicit and transparent rules are needed as a long term solution so that all market participants understand clearly what behavior is acceptable and what behavior is prohibited.**

Monitoring Analytics

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Circuitous Scheduling

- **On August 21, 2008, the Commission approved the NYISO's Exigent Circumstances Filing, permitting the NYISO to ban eight identified paths.**

- **NYISO's rule states that NYISO shall not permit market participants to schedule external transactions over the eight defined scheduling paths.**

Monitoring Analytics

Circuitous Scheduling

- **The eight paths are:**
  - **NYIS-ONT-MISO-PJM**
  - **NYIS-PJM-MISO-ONT**
  - **ONT-MISO-PJM-NYIS**
  - **PJM-MISO-ONT-NYIS**
  - **PJM-NYIS-ONT-MISO**
  - **MISO-ONT-NYIS-PJM**
  - **ONT-NYIS-PJM-MISO**
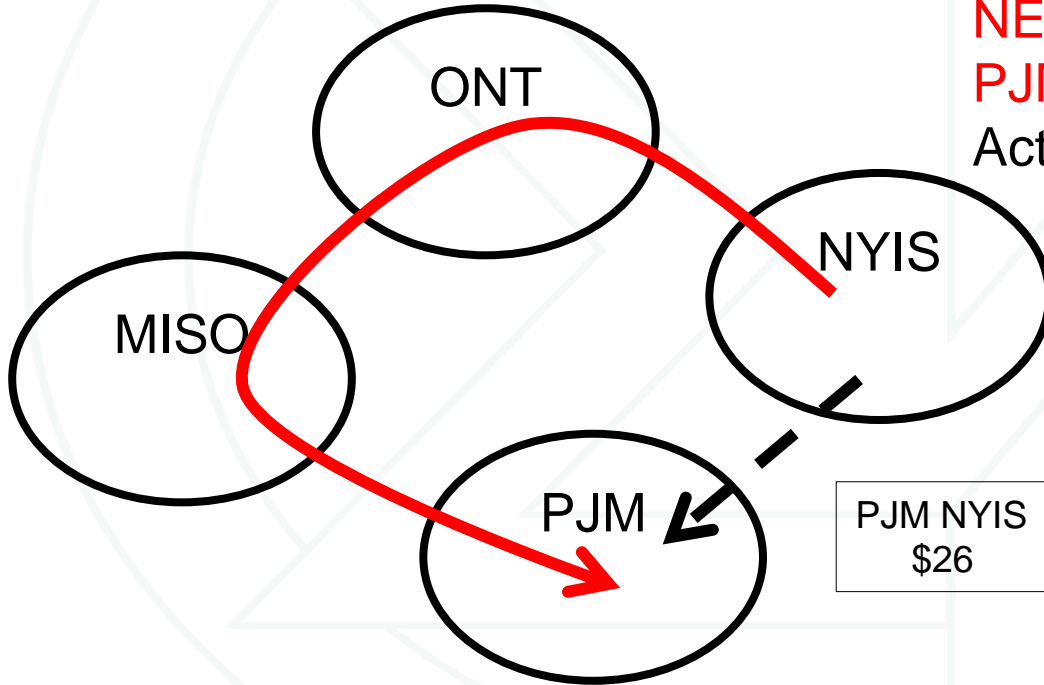 - **MISO-PJM-NYIS-ONT**
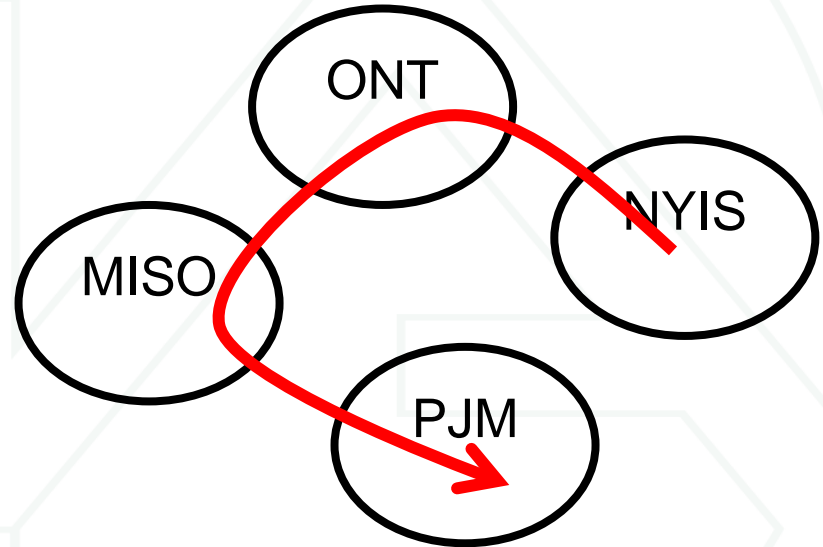
Circuitous Scheduling

- **For each of the eight banned paths, there is a more direct scheduling path available for market participants to use that is consistent with the actual flow of power between the identified source and the sink points.**
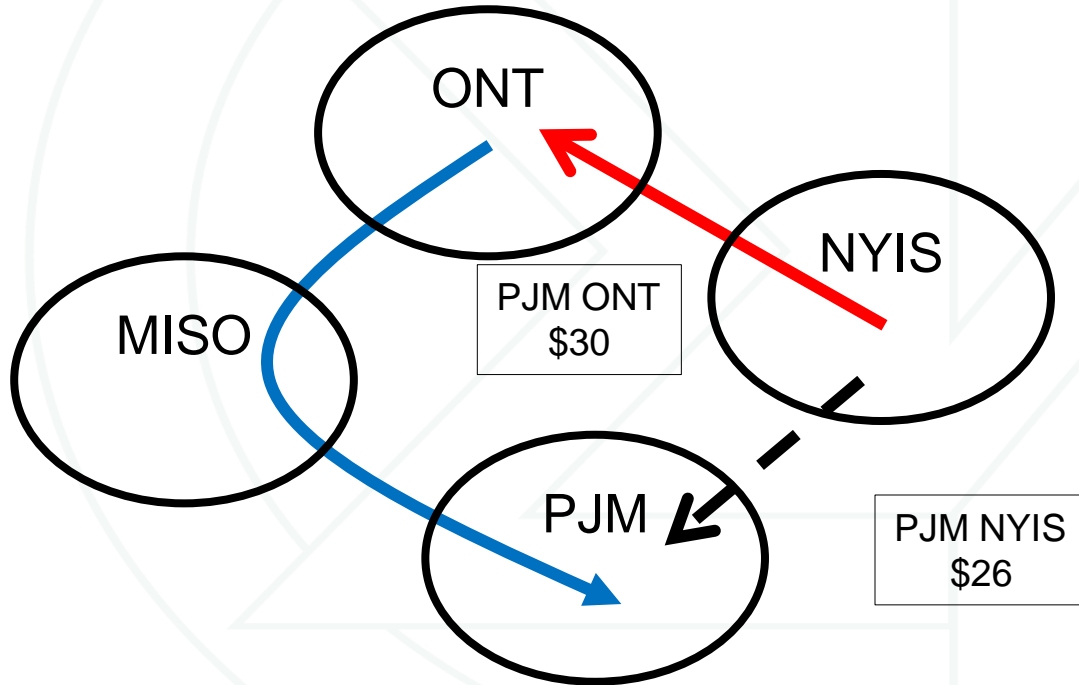
Monitoring Analytics

Circuitous Scheduling

Transaction: NYIS-ONT-MISO-PJM
NERC TAG POR: NYIS
NERC TAG POD: PJM
PJM Pricing Point = NYIS
Actual Flow: NYIS-PJM

Path banned by NYISO

PJM NYIS
$26

Monitoring Analytics

Circuitous Scheduling

Transaction1: NYIS-ONT
Transaction2: ONT-MISO-PJM
NERC TAG POR: ONT
NERC TAG POD: PJM
PJM Pricing Point = ONT
Actual Flow: NYIS-PJM

Exploited banned path

ONT

NYIS

MISO

PJM ONT
$30

PJM

PJM NYIS
$26

Monitoring Analytics

Circuitous Scheduling

- **Engaging in circuitous scheduling avoids the validation checks performed by the NYISO for the eight banned paths.**

- **Circuitous scheduling hides the actual source of generation from the load balancing authority.**

- **When unable to identify the source of the energy, the load balancing authority does not know how the power will flow to the load.**

  - **This creates loop flows and inaccurate pricing for transactions.**

Monitoring Analytics

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Monitoring Analytics

Sham Scheduling

- **Sham Scheduling refers to a scheduling method under which a market participant submits external energy schedules in a manner that results in energy settlements inconsistent with the actual power flow.**
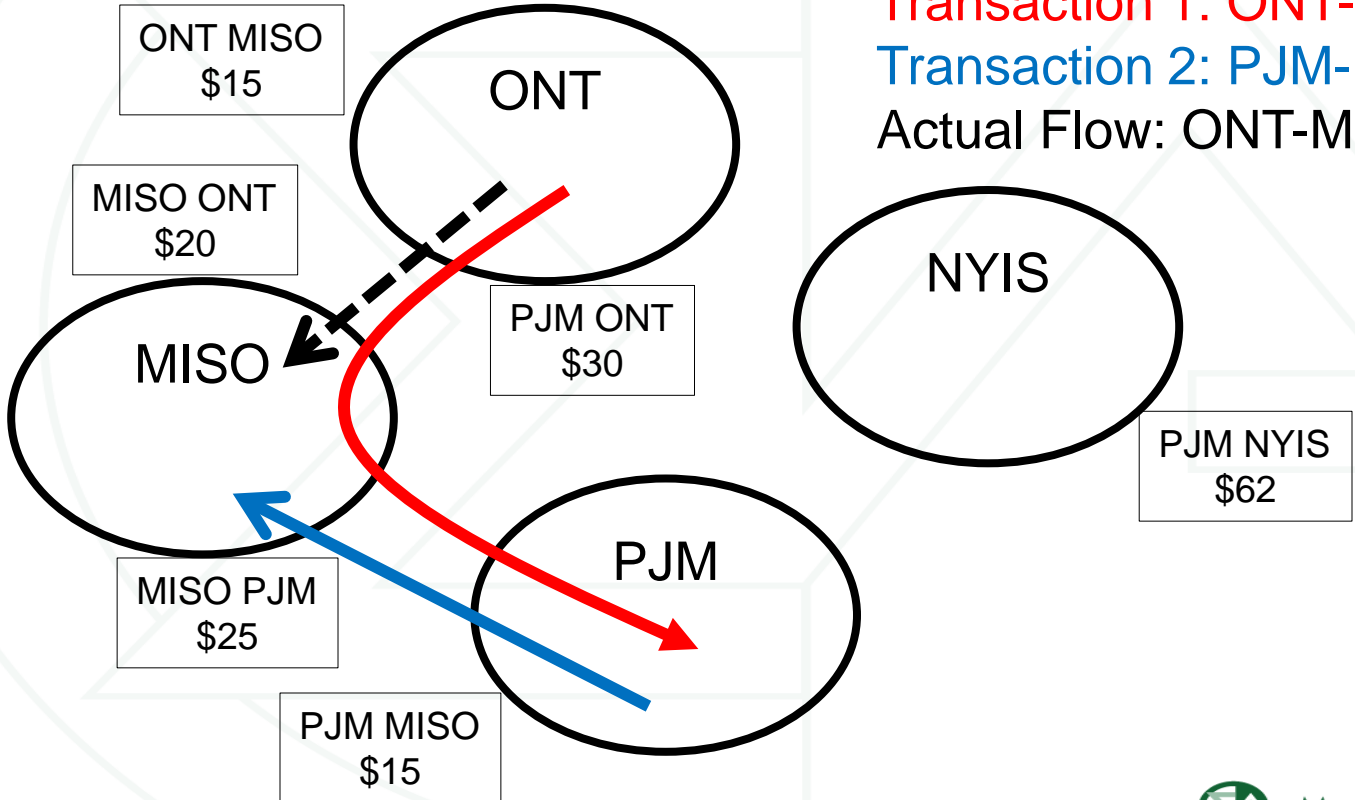
Sham Scheduling

- **Sham Scheduling can be achieved by**
  - **Breaking a single transaction, from generation to load, into artificial segments for the purpose of receiving higher prices than are consistent with the actual complete transaction and inconsistent with the actual power flow (e.g. Circuitous Scheduling).**

Monitoring Analytics

Sham Scheduling

- **Sham Scheduling can also be achieved by:**
  - **Submitting individual simultaneous transactions, each with a separate Tag, that together form a complete path, from generation to load, that results in receiving higher prices than are consistent with the actual complete transaction and inconsistent with the actual power flow.**
  - **Submitting multiple transactions that are in the opposite direction of a portion of a larger transaction schedule so as to cancel out the physical flow that would otherwise occur.**

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Sham Scheduling

Transaction 1: ONT-MISO-PJM
Transaction 2: PJM-MISO
Actual Flow: ONT-MISO

ONT MISO
$15

MISO ONT
$20

ONT

PJM ONT
$30

NYIS

MISO

PJM NYIS
$62

MISO PJM
$25

PJM

PJM MISO
$15

Monitoring Analytics

Sham Scheduling

Transaction 1:

ONT: Pay $15 for export to MISO

MISO: Receive $20 for import from ONT

MISO: Pay $25 for export to PJM

PJM: Receive $30 for import from ONT

TOTAL: -$15 + $20 - $25 + $30 = $10
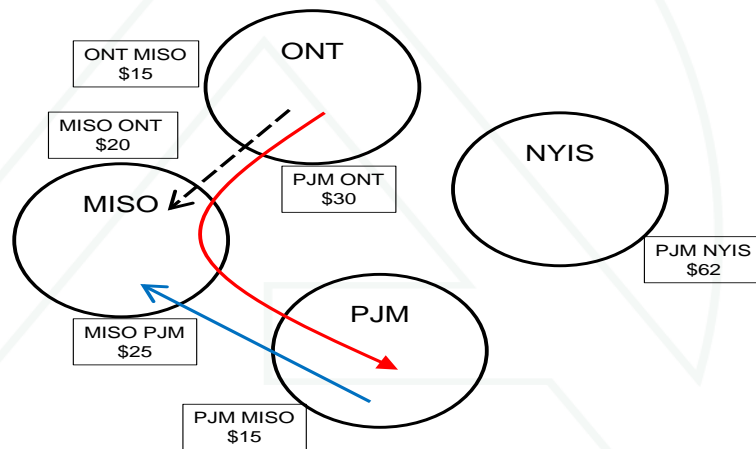
Transaction 2:

PJM: Pay $15 for export to MISO

MISO: Receive $25 for import from PJM

TOTAL: -$15 + $25 = $10

TOTAL for Both Transactions:

$10 + $10 = $20

ONT MISO $15

MISO ONT $20

PJM ONT $30

MISO PJM $25

PJM MISO $15

PJM NYIS $62

ONT

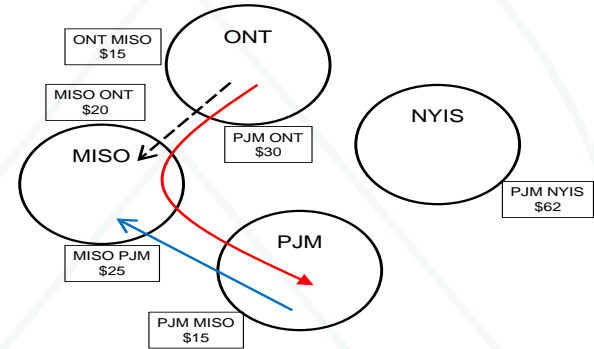NYIS

MISO

PJM

Monitoring Analytics

Sham Scheduling

The resulting interchange is an import to MISO from ONT. Without Sham Scheduling, the settlement would be:

ONT: Pay $15 for export to MISO
MISO: Receive $20 for import from ONT
TOTAL: -$15 + $20 = $5

- **Scheduled flows do not match actual flows**
- **No change in generation in PJM, yet settlements occur**
  - **Similar to Southeast / Southwest interface issue, where market participants took advantage of price differences at interfaces**
- **No additional transmission charges**
  - **Already pay for the ONT-MISO transmission**
  - **No MISO charge either way: SPOT_IN or RTOR**
  - **No PJM charge: RTOR**

ONT

ONT MISO
$15

MISO ONT
$20

PJM ONT
$30

MISO

NYIS

PJM NYIS
$62

MISO PJM
$25

PJM

PJM MISO
$15

Monitoring Analytics

Sham Scheduling

- **Sham scheduling allows market participants to exploit the discrepancy between scheduled and actual power flows.**

- **Sham scheduling hides the actual source of generation from the load balancing authority.**

- **When unable to identify the source of the energy, the load balancing authority does not know how the power will flow to the load.**

  - **This creates loop flows and inaccurate pricing for transactions.**

Monitoring Analytics

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Monitoring Analytics

Inefficient Path Scheduling

- **Inefficient Path Scheduling refers to a scheduling method under which a market participant chooses a contract path that unnecessarily wheels through a balancing authority when a more direct scheduling path could be used.**

- **Similar to the Sham Scheduling and Circuitous Path Scheduling methods, market participants can schedule transactions on inefficient market paths to take advantage of interface price differences.**

 Monitoring Analytics

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Monitoring Analytics

Proposed Solution

- **Explicitly ban the breaking of transactions into segments, or submitting individual simultaneous transactions, that result in different interface pricing points than would have been received on a continuous transaction.**

- **Explicitly ban market participants from submitting multiple transactions in the PJM Energy Market that represent offsetting segments, in part or in whole, during the same interval.**

Proposed Solution

- **Explicitly prohibit market participants from submitting transactions in the PJM Energy Market on inefficient paths, where a more direct market path is available.**

Monitoring Analytics

Proposed Solution

- **Require market participants scheduling in the PJM Energy Market to schedule energy on market paths that correspond to the interface pricing point they will receive in real time based on the expected power flows as identified by the GCA and LCA on the NERC Tag.**

- **This can be determined using the "Pricing Point Calculator."[1]**

[1] https://exschedule.pjm.com/exschedule/pages/public/pricing-point-calculator.jsf

Monitoring Analytics

Proposed Solution

- **If the contract path does not correspond to the appropriate interface pricing point, PJM would deny the transaction on an ex ante basis.**

Monitoring Analytics

Proposed Solution

- **Implement after the fact adjustments to ensure that market participants cannot benefit from the identified behavior:**

  - **For scheduling activity that results in an import to PJM, an after the fact adjustment will be made to adjust the settlement price for the transaction to be the lowest of: $0; the interface price assigned as a result of the scheduling activity; or the interface price that would have been assigned if the complete path were submitted as a single transaction.**

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Proposed Solution

- **For scheduling activity that results in an export from PJM, an after the fact adjustment will be made to adjust the settlement price for the transaction to be the higher of: the interface price assigned as a result of the scheduling activity; or the interface price that would have been assigned if the complete path were submitted as a single transaction.**
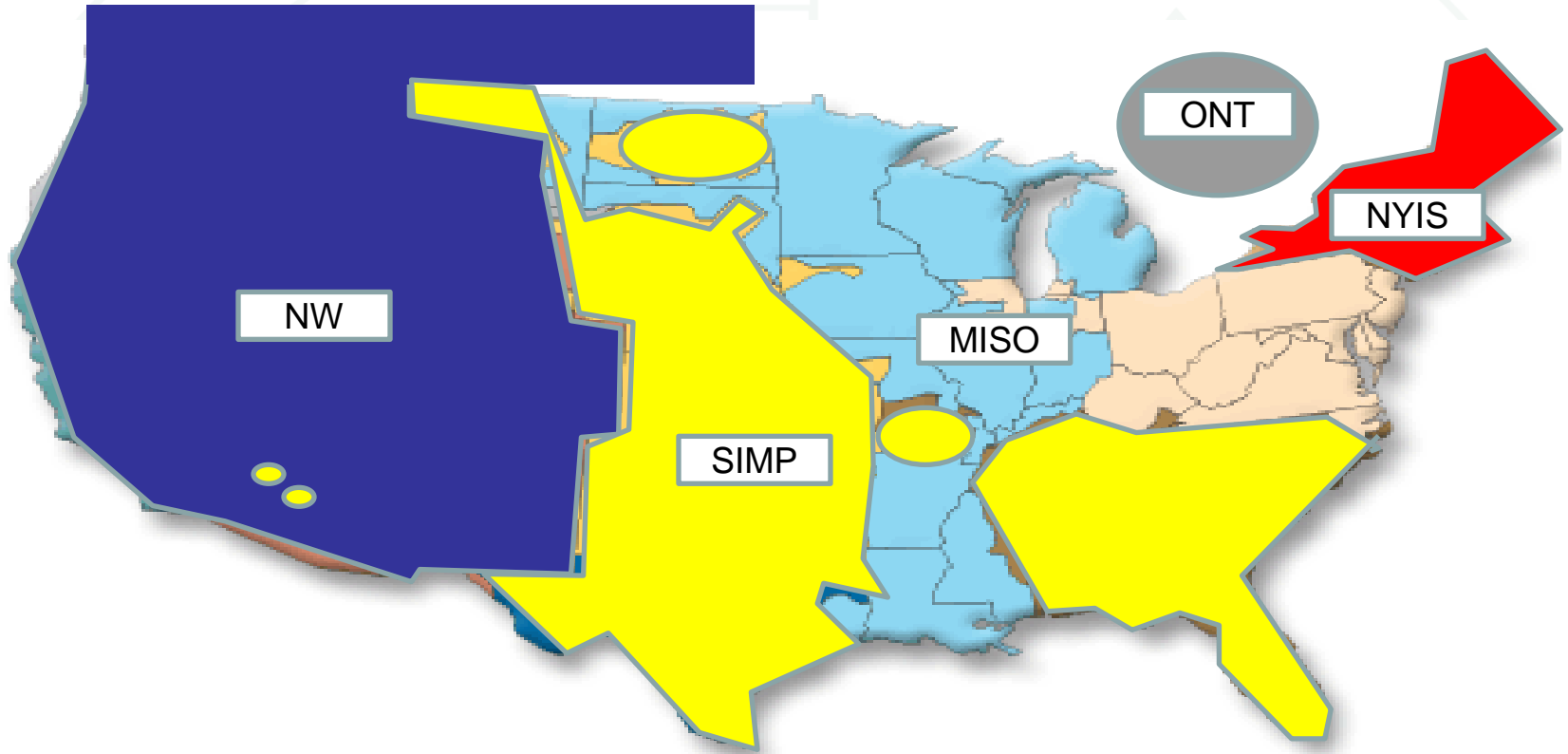
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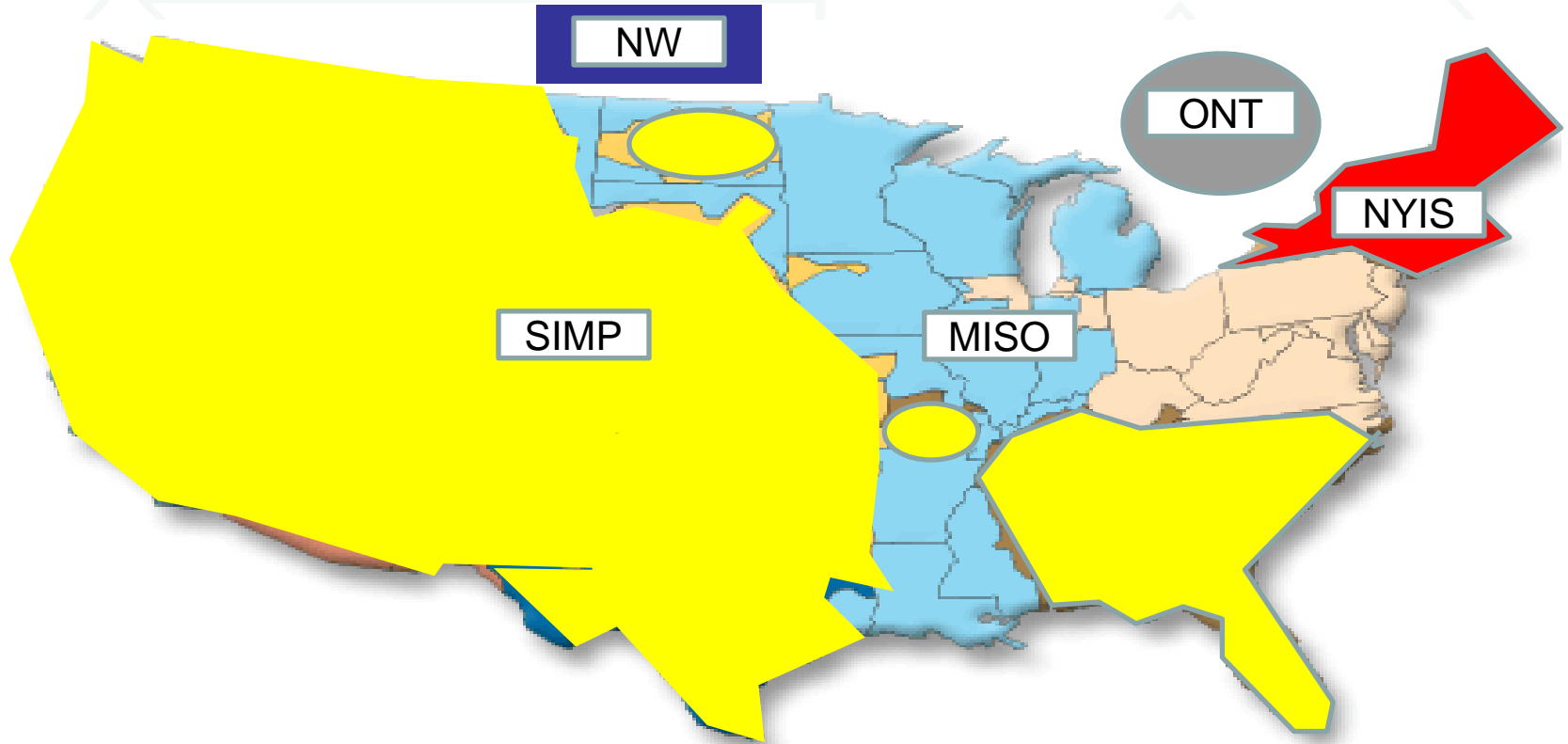
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Interface Pricing Point Assignments

- **Current interface pricing assignments should be reviewed and modified as necessary to ensure that prices reflect the expected actual flow of energy.**

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Interface Pricing Point Assignments

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Interface Pricing Point Assignments

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