

# **TVA Reliability Coordinator**

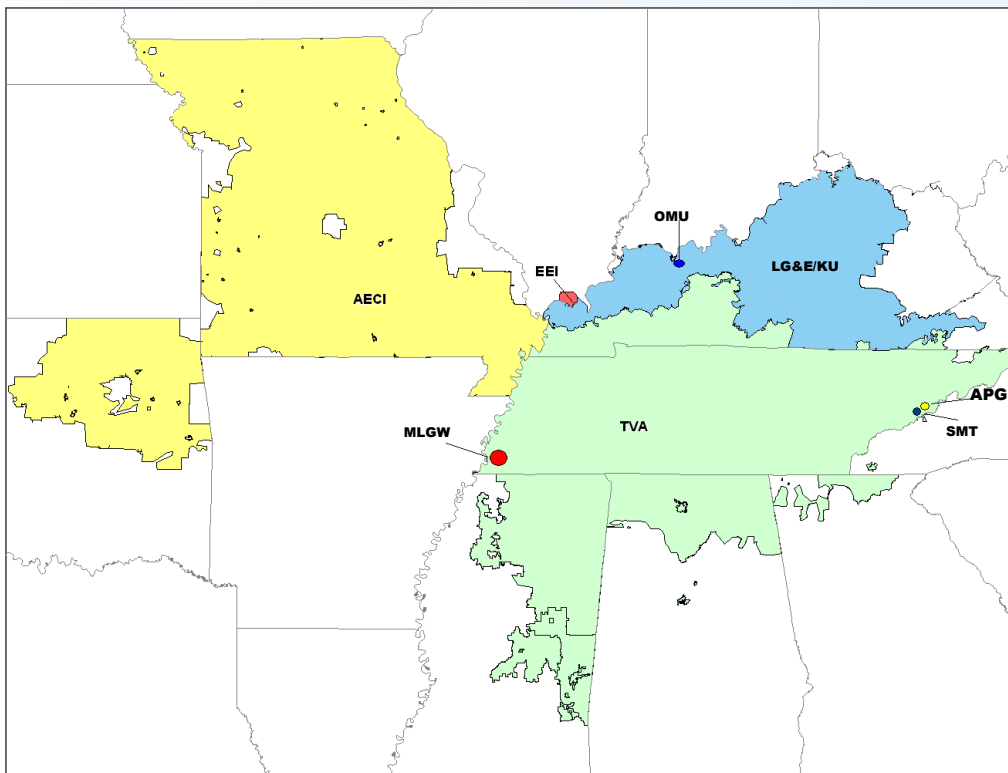
## **LG&E/KU ITO Spring Stakeholder Meeting**

**Nate Schweighart**

Tennessee Valley Authority

**11/19/15**

# Reliability Coordinator Area



## TVA RC Area Peaks

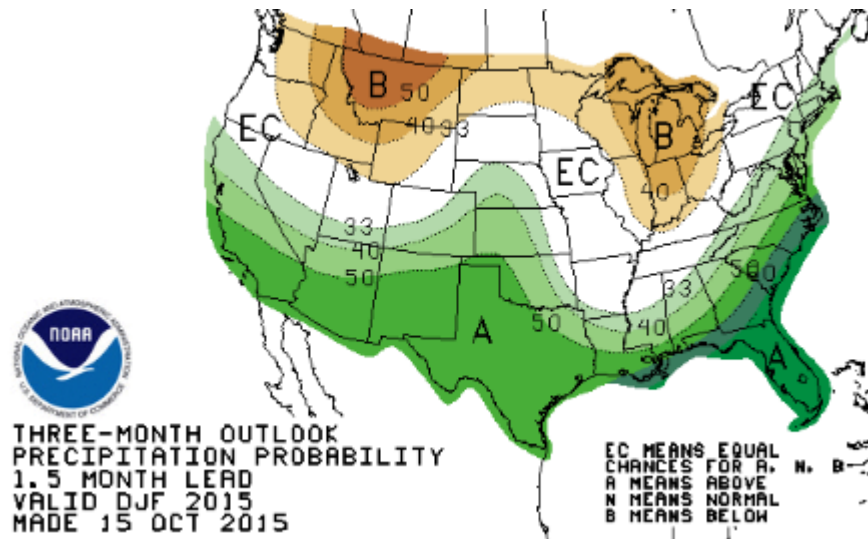
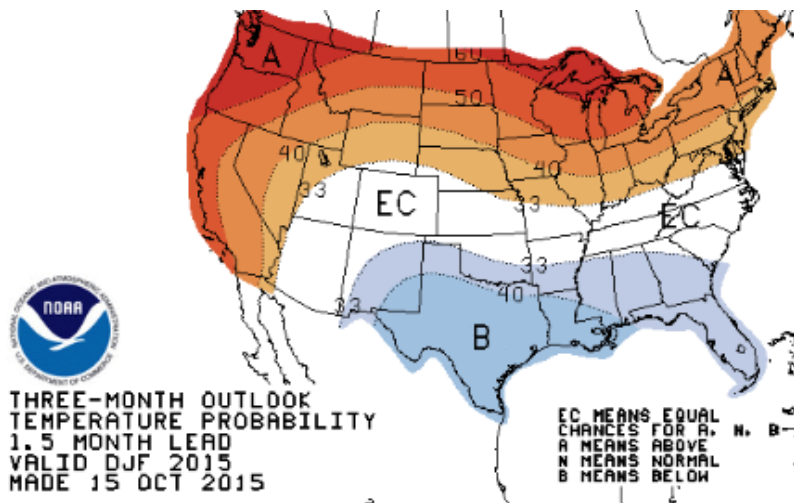
Peak Date	Peak Value
January 08, 2015	43,974 MW
January 24, 2014	44,757 MW
June 12, 2013	39,964 MW
January 03, 2012	38,182 MW

11.2 million customers spanning across  
11 states, 190,000 square miles, and  
31,500 miles of transmission

# Winter Outlook

## Weather

- Winter 2015: NOAA is predicting a normal temperature with normal levels of precipitation



- TVA RC meteorologist:** El Niño will cause cloudy and cold weather but not extremely high peaks. Above normal precipitation.

## Seasonal Assessment

- RC area seasonal assessment is still ongoing though not significant issues predicted.

## Winter Flow Changes for RC Area

- Fossil retirements continue
- Watts Bar 2 coming online in TVA
- Century Aluminum curtailment
- MISO/SPP/JP Settlement



# MISO Settlement Information

Nate Schweighart

Tennessee Valley Authority

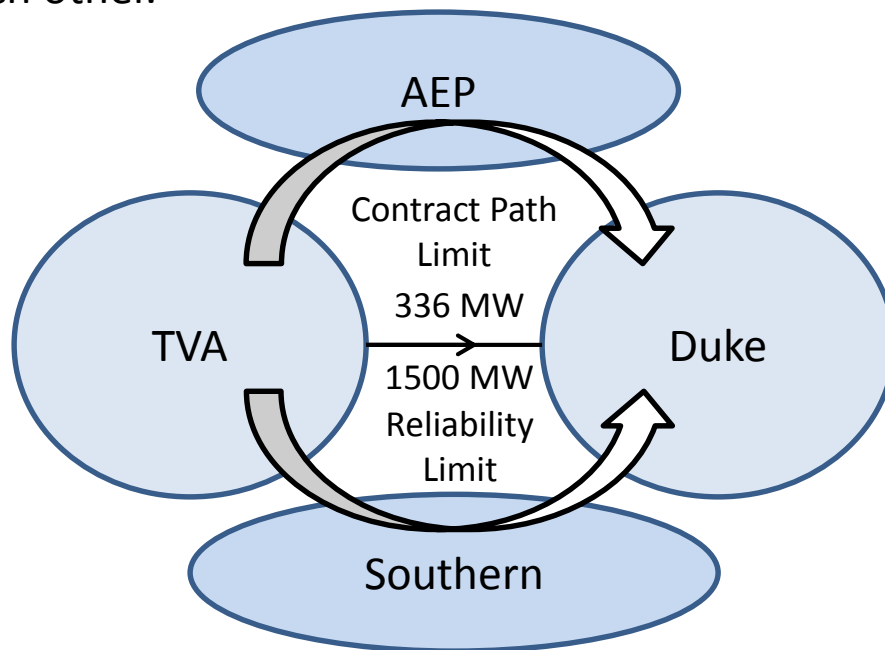
11/19/15

Section 5.2 of the MISO-SPP Joint Operating Agreement states:

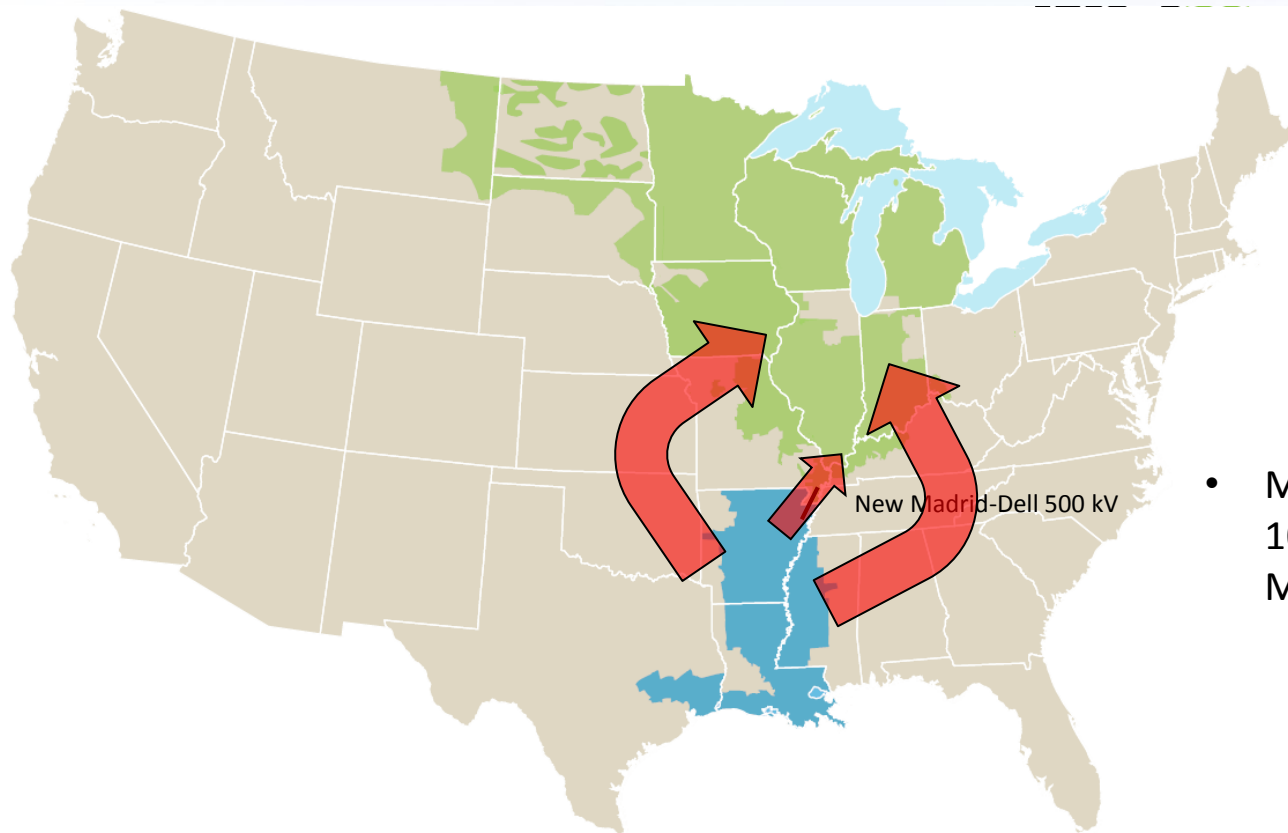
**“If the Parties have contract paths to the same entity, the combined contract path capacity will be made available for use by both Parties.** This will not create new contract paths for either Party that did not previously exist. SPP will not be able to deal directly with companies with which it does not physically or contractually interconnect and the Midwest ISO will not be able to deal directly with companies with which it does not physically or contractually interconnect.”

# Contract Path

**Contract Path** is the total amount of power entities can transfer between each other limited by the capacity of their physical interconnection. This value is independent of the amount of power each entity can reliably transfer to each other.



# Dispatch Flow



- MISO's contract path is 1000 MW on the New Madrid-Dell 500 kV line



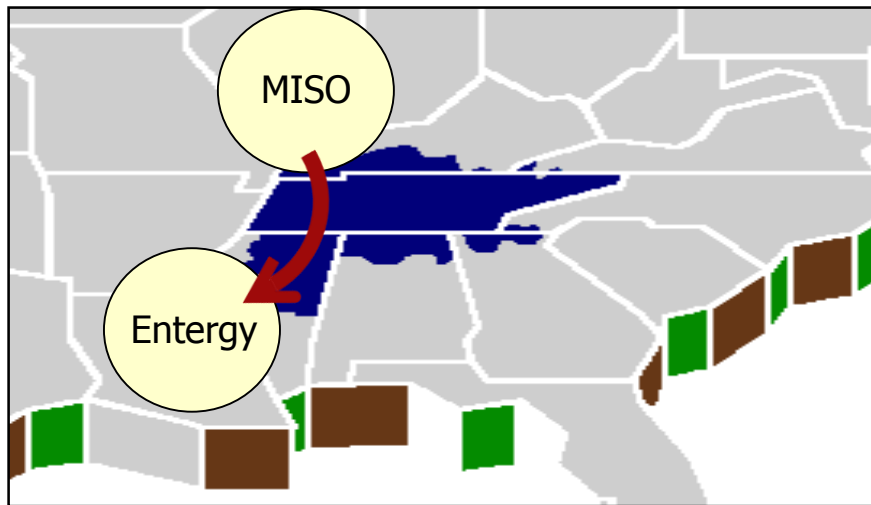
**Settlement parties:** MISO, SPP, AECI, Southern Companies, TVA, LG&E/KU, PowerSouth, NRG Energy.

1. Withdrawal of all outstanding complaints associated with integration
2. Removes MISO hurdle rate for flows between regions
3. Retires temporary Operations Reliability Coordination Agreement (ORCA)
4. Allows for the usage of SPP and JP systems to transfer energy between regions (Dispatch Transfer)
5. Reliability limits on Dispatch Transfer (Dispatch Flow)
6. Compensates SPP and Joint Parties for usage
7. Five year period with evergreen yearly extensions

# Available System Capacity Usage

**MISO is granted the ability to use on a non-firm, as-available basis, available system transmission capacity of other Parties' systems.**

- Creates term Available System Capacity Usage or ASC Usage



**Recognizes MISO Contract Path Capacity of 1000 MW between MISO South and MISO Midwest**

- Creates a mechanism for MISO to increase or decrease the contract path

# Regional Directional Transfer Limit



## North to South: 3000 MW limit

- AECI and SPP seems to be the most impacted by these flows

## South to North: 2500 MW limit

- TVA seems to be the most impacted by these flows

**Note:** RDTL cannot be lower than contact path.  
RDTL can be temporarily increased or decreased  
in an emergency with RC approval

# Compensation

## **Compensation Phase I – January 29, 2014-January 31, 2016**

\$8,000,000 per year (\$16,000,000 total)

Due November 16, 2015

Split 60/40 between SPP and JPs

## **Compensation Phase II – February 1, 2016-January 31, 2017**

\$16,000,000 total with a true-up for capacity factor greater than 20%.

## **Compensation Phase III – February 1, 2017+**

\$16,000,000 with 20% Capacity Factor or less

\$27,000,000 with 20-70% Capacity Factor

\$38,000,000 for a greater than 70% Capacity Factor



Compensation split 50/50 between SPP and Joint Parties  
Joint Parties split based on flow impact

# Compensation Increases/Decreases

## Compensation adjustments for Contract Path Changes

Increases in Contract Path reduce payment by  
\$667/MW-month

Decreases in Contract Path increase payment by  
\$667/MW-month

## Compensation adjustments for Regional Directional Transfer Limit

Increases in RDTL increase payment by \$667/MW-month

Decreases in RDTL decrease payment by \$667/MW-month



# Firm Point-to-Point Transmission Service

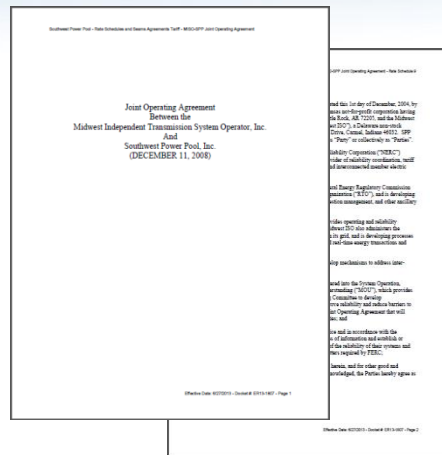
- MISO sold long-term transmission service to NRG Entergy above and beyond their contract path
- MISO agreed to discontinue selling long and short term firm service above their contract path
- In exchange for the settlement parties not disputing the validity or effectiveness of the firm transmission service, NRG agreed to pay SPP and the JP for the firm use of their system.
- NRG has the right to reduce their firm reservations with 6 month notice for 2016, 2017, 2018 delivery years

Delivery Year	Total Firm Reservations	MW over Contract Path	NRG Monthly Rate	NRG Total Yearly
2015/2016	1849	849	\$730	\$7.4 million
2016/2017	1624	624	\$730	\$5.5 million
2017/2018	1516	516*	\$3,066	\$19 million
2018/2019	1304	304*	\$3,066	\$11.2 million

\*Increase MISO Contract Path, monthly credit of \$667 from MISO to NRG apply

# Changes to the MISO-SPP JOA

- Section 5.2 remains in effect allowing Contract Path sharing
- Adds Section 5.3 requiring compensation negotiations with Contract Path sharing
- Adds Section 5.4 on dispute resolution



The settlement also requires that potentially affected Joint Parties must have an opportunity to evaluate the impacts on their system from the use of combined contract path capacity under Section 5.2 of the MISO-SPP JOA. **SPP or MISO would be responsible for remedying any identified agreed-upon adverse impact prior to such use.**

# Special Flowgate Considerations

For flowgates with very significant MISO market flow impacts due to Dispatch Transfer. MISO agreed to directly manage non-firm market flow to preclude a TLR 5.

- Palmyra 345/161 kV transformer (AECI)
- Idalia-Essex 161 kV line (AECI)
- Old Maries 161/138 kV transformer (AECI)

MISO will bind on the flowgates in their SCED in order to manage Market Flow impacts.



# Term and Termination

The initial term of the Settlement: January 29, 2014 – January 31, 2021

Annual 12 month extensions unless a 12 month prior written notice.

Survive termination of the agreement:

- Article V Amendments to the JOA

- Article VI Coordination with the Joint Parties

- Article IX Dispute Resolution

- Article X Term and Termination

If the settlement agreement terminates, **“MISO shall have no rights to usage of the transmission systems of any of the other Parties to the Settlement Agreement and cannot exceed the MISO Contract Path Capacity that exists at the time of termination.”**

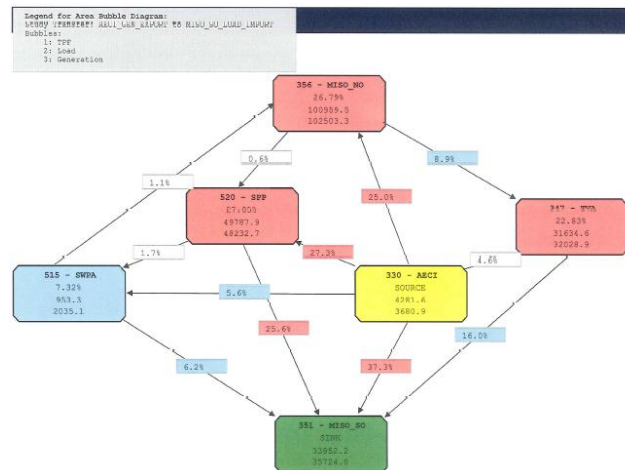
# Regional Transfer Manual

The Regional Transfer Manual outlines how the Dispatch Transfer value and Regional Transfer value is calculated. MISO must keep the Dispatch Transfer value below the Dispatch Transfer Limit and Regional Transfers below the Regional Transfer Limit.

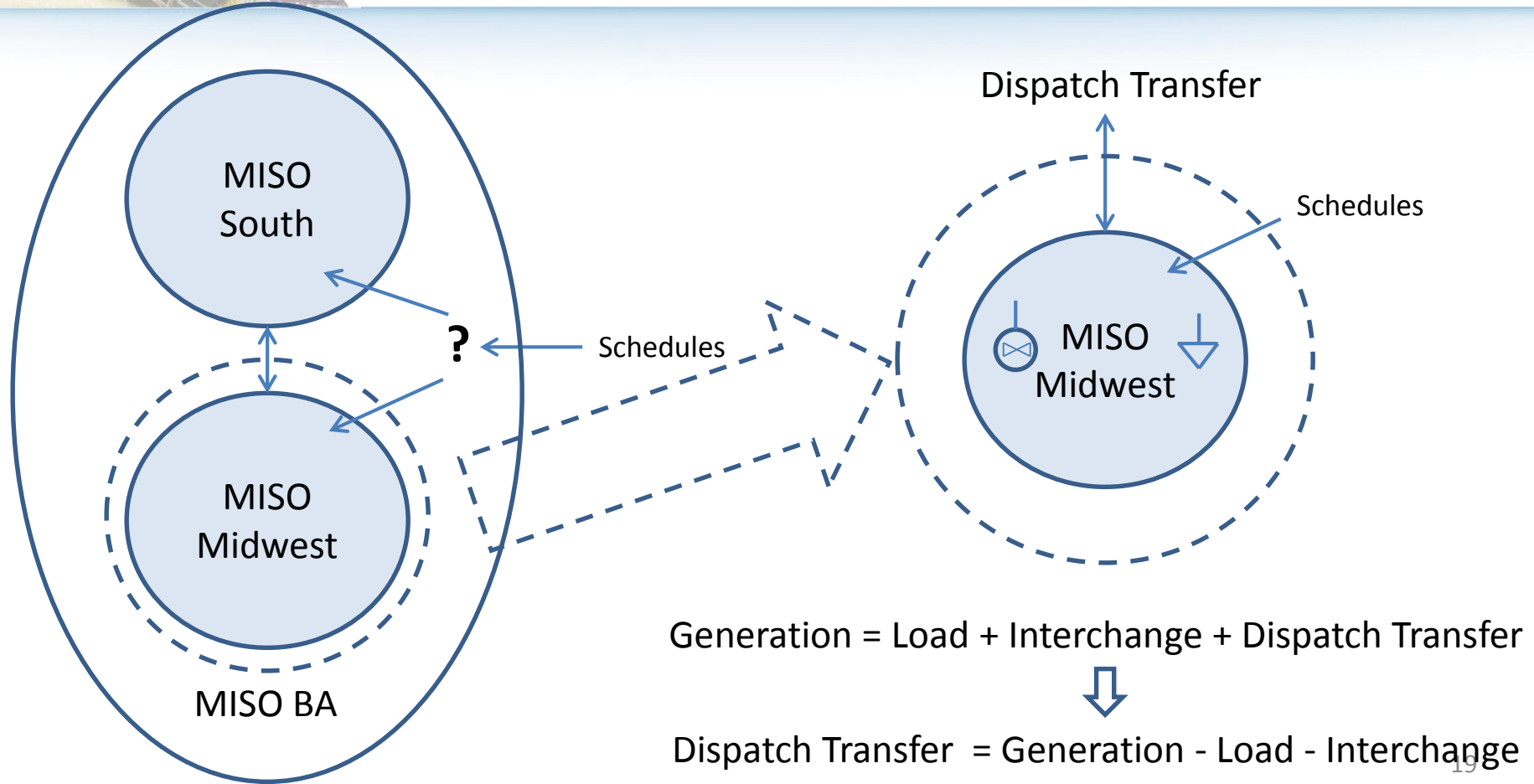
**Regional Transfer = MISO Dispatch Transfer + Regional Pseudo-tie Impacts**

Specifies how the Dispatch Transfers are calculated in order to limit the impacts of the inter-region flows on the Joint Parties.

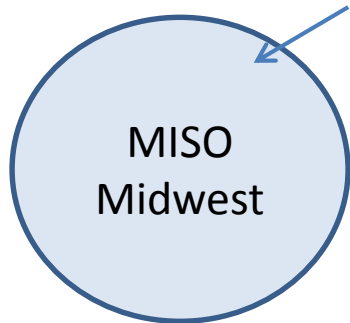
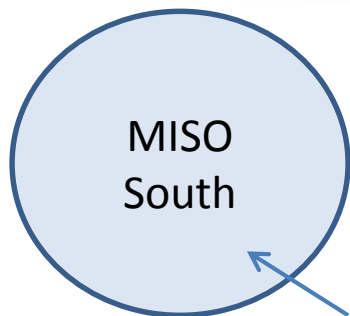
**Helps maintain our reliability.** Uses a impedance-plus calculation method.



# Dispatch Transfer Calculation



# Schedules to/from dually connected



?

← Schedules

## Reliability Manual

Schedules to/from dually connected entities are split between the regions based on generation/load in each region and impedance of the path used. Attempts to split schedules by how the power would actually flow.

## Compensation Manual

Schedules to/from dually connected entities are split between the regions based on the region specified in the tag and, if none is specified, the region that is short for imports and long for exports (reduces Dispatch flow) up to contract path limits.

The Compensation Manual specifies the process and calculations for the determination of Available System Capacity (ASC) Capacity Factor used to set the compensation level as specified in the Settlement Agreement.

a. If the net of unknown transactions from an entity is import, then:

$$MSITU_{BalImport} = - \sum_{Entity} \text{Min} (|MITU_{Entity} - MSITU_{RequiredEntity}|, MSACP_{SouthEntity} - |MSITU_{RequiredEntity}|), \text{ or}$$

b. If the net of unknown transactions from an entity is exports, then:

$$MSITU_{BalExport} = \sum_{Entity} \text{Min} (MITU_{Entity} - MSITU_{RequiredEntity}, MSACP_{SouthEntity} - MSITU_{RequiredEntity}), \text{ then}$$

$$MSITU_{Bal} = MSITU_{BalImport} + MSITU_{BalExport}$$

c. Allocate the remaining unknown transactions if adjusted "South Balance" is reduced:

If  $South\ Balance_{Adj} < 0$  and  $MSITU_{Bal} < 0$ , then

$$MSITU_{Remaining} = \text{Max}(South\ Balance_{Adj}, MSITU_{Bal}), \text{ else } 0, \text{ or}$$

If  $South\ Balance_{Adj} > 0$  and  $MSITU_{Bal} > 0$ , then

$$MSITU_{Remaining} = \text{Min}(South\ Balance_{Adj}, MSITU_{Bal}), \text{ else } 0$$

The complex equations and alphabet soup of acronyms only serve to assign the schedules that don't have a specific MISO region source or sink in a way that minimizes dispatch flow.

# Summary

1. Joint Parties will see higher loop flows after the agreement goes in to effect on February 1st
2. Those loop flows will be limited to reliable levels
  - 2500 MW South to North
  - 3000 MW North to South
3. Joint Parties will be compensated for the use of our system
4. The agreement is good for five years and renews yearly until someone withdraws from the agreement

# Hard work by many!



# Questions?