



Manual 12: Balancing Operations- Updates

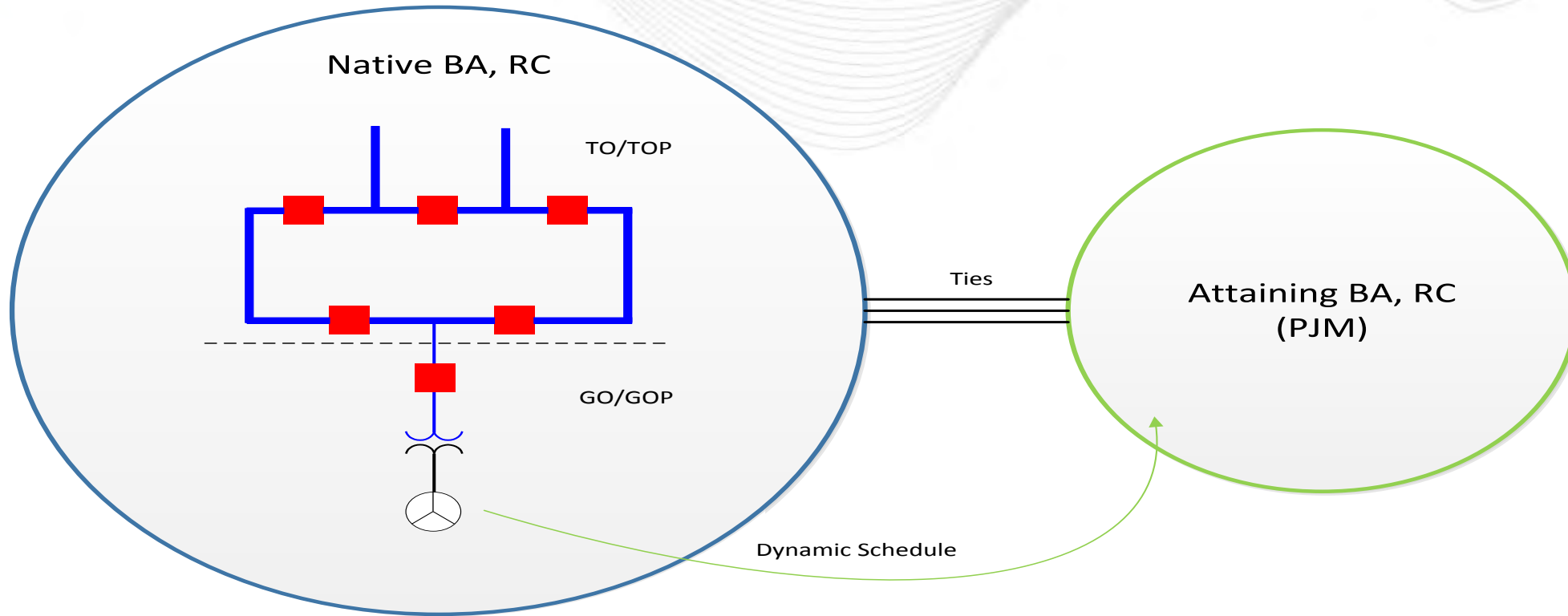
Attachment F: Dynamic Transfers

Sree Yeddanapudi
Sr. Engineer, Generation
System Operations Subcommittee
February 24, 2016

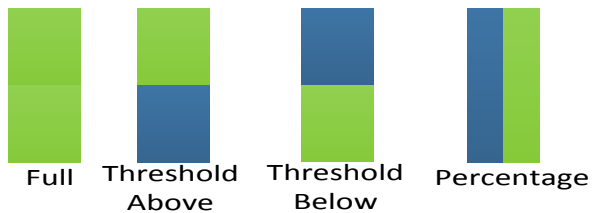
- Current Whitepaper on PJM's position, reviewed at OC, MIC in March 2014
 - to be retired after draft manual changes are endorsed.
- Key drivers for revisions: NERC Standard changes, Capacity Performance, PJM/ MISO coordination efforts
- Proposed inclusion as Attachment F to PJM Manual 12: Balancing Operations
 - Draft redline version of manual provided as first read for review and comment.
 - Draft redline version of OA/ OATT changes provided as first read for review and comment.

- NERC Definition Changes (Effective 10/1/2014)
 - Dynamic Schedule, Pseudo-Tie
 - Attaining Balancing Authority, Native Balancing Authority
- Standard INT-004-3.1 — Dynamic Transfers (Effective 1/1/2016)
- Standard BAL-001-1 — Real Power Balancing Control Performance, R3
- Standard BAL-005-0.2b — Automatic Generation Control, R10, R12.3
- Standard BAL-002-1 — Disturbance Control Performance, R2.6
- Standard IRO-006-5 — Reliability Coordination — Transmission Loading Relief, R1

Dynamic Schedule

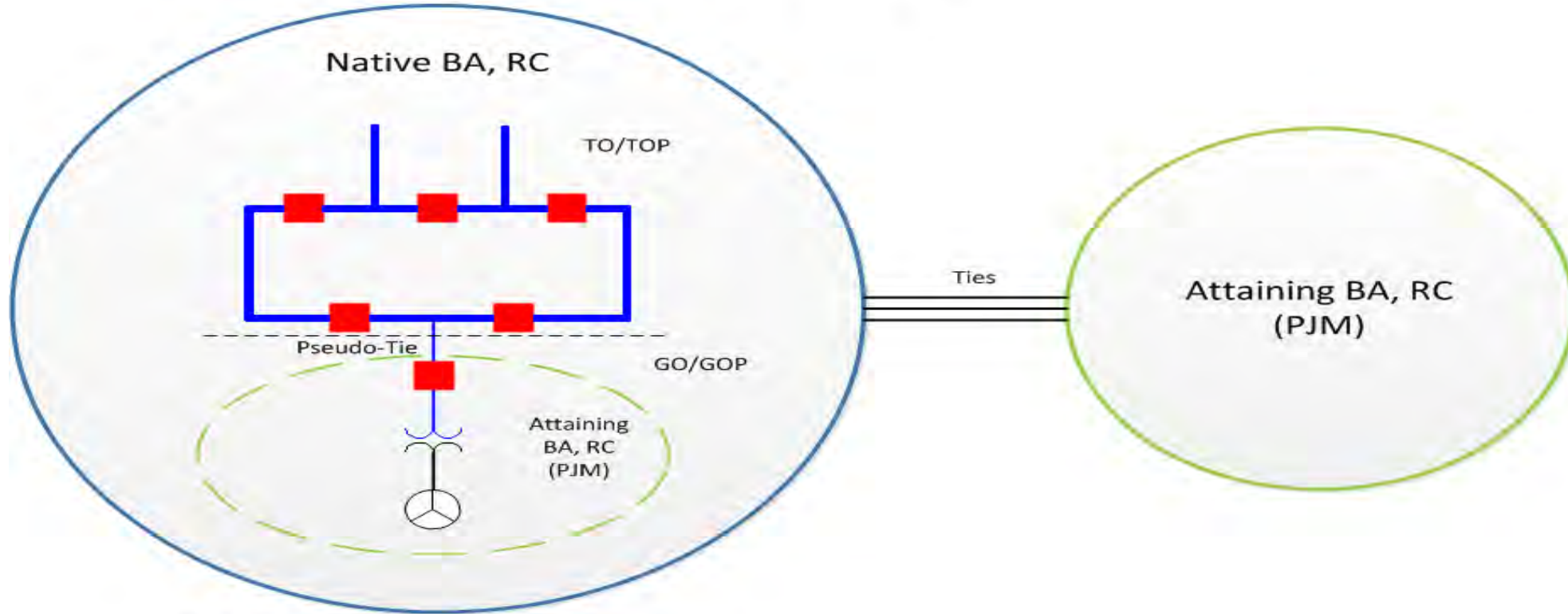


Methods:

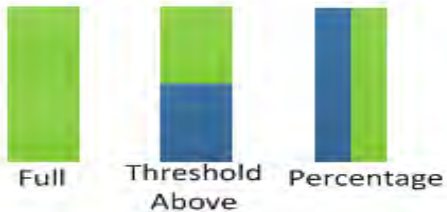


Dynamic Interchange Schedule or Dynamic Schedule: A time-varying energy transfer that is updated in Real-time and included in the Scheduled Net Interchange (NIS) term in the same manner as an Interchange Schedule in the affected Balancing Authorities' control ACE equations (or alternate control processes)

Pseudo-Tie

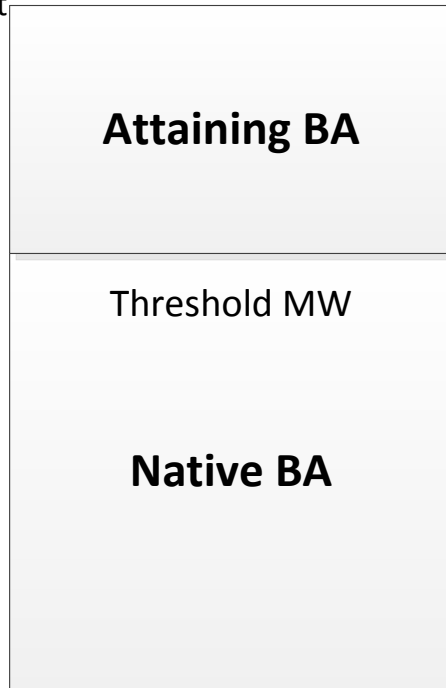


Methods:



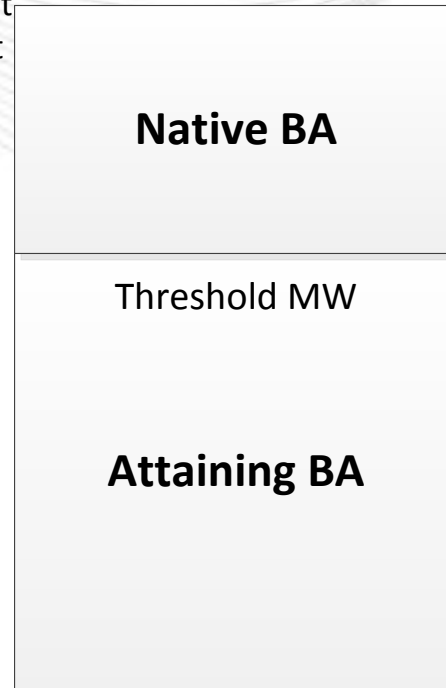
Pseudo-Tie: "A time-varying energy transfer that is updated in Real-time and included in the Actual Net Interchange term (NIA) in the same manner as a Tie Line in the affected Balancing Authorities' control ACE equations (or alternate control processes)"

Full unit output



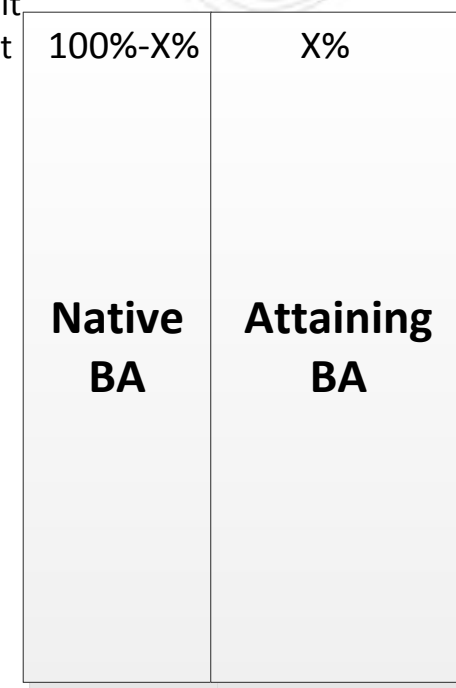
Dynamic Transfer of unit's output above a Threshold value
(Pseudo-Tie and Dynamic Schedule)

Full unit output



Dynamic Transfer of unit's output below a Threshold value
(Dynamic Schedule Only)

Full unit output



Dynamic Transfer of a percent of unit's output
(Pseudo-Tie and Dynamic Schedule)

- Clarify definition for the use of Percentage method in daily operations- **Revised Definition**
 - Fixed percentage value used to determine unit limits in both BAs.
 - Dispatch direction from both BAs does not need to be held at same percentage within dispatchable range.
- Ancillaries for Percentage method- **Revised**
 - Regulation and Spin allowed in one agreed upon BA.
 - Requires agreement from all Market Participants and BAs for a minimum 1 year
 - Market Participants need to agree on calculation methods and ensure accuracy
- Clarify definition for the use of Threshold MW method in daily operations- **No change needed**
 - Fixed Threshold MW value used to determine unit limits in both BAs.



Dynamic Transfer Requirement Summary- 1

Market Service	Requirement	Pseudo-Tie			Dynamic Schedule			
		<i>Entirely</i>	<i>Above Threshold</i>	<i>Percentage</i>	<i>Entirely</i>	<i>Above Threshold</i>	<i>Below Threshold</i>	<i>Percentage</i>
Capacity	Transmission Service	Firm/Network External Designated (NED) >= RPM/ FRR Committed ICAP						
	NERC Tagging	May be required*			Required			
	Letter of Non Recallability	Required						
	Product Type	All Product Types including Capacity Performance (and associated obligations)			No Capacity Performance. All Dynamic Scheduled Capacity resources have a sunset date of 06/01/2020			
	Day Ahead	Must Offer >= RPM/FRR ICAP Committed						
	Outage Reporting	eDART & eGADS Required; Update eMKT parameters to reflect outage						
Energy	Transmission Service	Firm/Network External Designated (NED)			Firm/Network External Designated (NED) /Non Firm			
	NERC Tagging	May be required*			Required			
	Outage Reporting	eDART Required & eGADS Requested; Update eMKT parameters to reflect outage						
	Nodal Representation- EMS, LMP	Yes			Interface Pricing Only. No nodal representation			
	Self-Scheduled Gen (move up/ down)	20 min notice						
	Start up and No Load Costs	Eligible if entire unit is transferred, called on by PJM						



Dynamic Transfer Requirement Summary- 2

Market Service	Requirement	Pseudo-Tie			Dynamic Schedule			
		Entirely	Above Threshold	Percentage	Entirely	Above Threshold	Below Threshold	Percentage
Ancillary Services (Regulation, Contingency Reserves)	Transmission Service	Firm			Not Eligible			
	NERC Tagging	May be required*						
	Outage Reporting	Notify PJM Dispatch immediately						
	Regulation Qualification & Scoring	Same as PJM internal resources. Percent Method limited to offer only in 1 agreed upon BA for minimum of 1-year.						
	Synchronized Reserves	Eligible if meets PJM Criteria. Percent Method limited to offer only in 1 agreed upon BA for minimum of 1-year.						
	Non-Synchronized Reserves	Eligible if meets PJM Criteria						
Day Ahead Scheduling Reserve [xiii]	Reserve Credits	Eligible						
Other Requirements	eMeter Checkout				Required			
	Redundant Path Telemetry				Required			
	Time Frame for Implementation	12-30 Months			3-6 Months			
	Cost of Implementation	Borne by Resource Owner			None			
	Transmission Reservation (Firm/Non-Firm) Interruptions due to TLR.				Notify PJM Dispatch immediately			

- Capacity
 - Whitepaper: Both Dynamic Schedules and Pseudo-Ties can be used to meet capacity obligation.
 - Manual: Capacity Performance resources need to be pseudo-tied. Effective 6/1/2020, Dynamic Schedules cannot provide capacity.
- Energy
 - Whitepaper: Dynamic Schedules and Pseudo-Ties can receive Economic Basepoints depending on modeling.
 - Manual: Dynamic Schedules will only receive interface pricing. No unit specific Economic Basepoints.

- Regulation
 - Whitepaper: Allow both Dynamic Schedules and Pseudo-ties if capable
 - Manual: Pseudo-ties with entire unit output and **above** threshold to participate only in Attaining BA. **Pseudo-ties using Percentage option allowed with additional criteria.**
- Synchronized Reserve
 - Whitepaper: Allow both Dynamic Schedules and Pseudo-ties if capable
 - Manual: Allow Pseudo-ties with entire unit output and **above** threshold to participate. **Pseudo-ties using Percentage option allowed with additional criteria.**
- Non- Synchronized Reserves
 - Whitepaper: Allow both Dynamic Schedules and Pseudo-ties if capable
 - Manual: Allow Pseudo-ties with entire unit output only in Attaining BA

- Whitepaper: Allow changes to Threshold or Percentage prior to 0000 hrs. of an Operating Day.
- Manual:
 - For Dynamic Schedules, Threshold or Percentage changes to be submitted and approved before Day-Ahead markets for both BAs are executed. Change made effective 0000 hrs. of Operating Day.
 - Pseudo-Ties can only change Threshold or Percentage after confirmation of additional Firm Transmission Service for a minimum term of 1-year
 - Requires approval from all BA/RCS

- Minimum term of a Dynamic Transfer is one year
- May need BA - BA agreement / Joint Operating Agreement if Native BA needs to operate a Pseudo-Tied resources to serve its needs.
- A generating unit can only use one Dynamic Transfer method: Pseudo-Tie or Dynamic Schedule.
- Day-Ahead Scheduling Reserve Credit eligible when entire unit output is Pseudo-tied.
- PJM may require to model a Dynamic Schedule instead of Pseudo-Tie depending on modeling efforts/ congestion modeling limitations.
- Response to TLR curtailments and coordination responsibilities to GO/Market Participant.

- Added definitions to OA and OATT
 - Pseudo-Tie, Dynamic Schedule defined same as NERC definitions.
 - Dynamic Transfers defined as both Pseudo-Tie and Dynamic Schedule.
- OA, Section 1.12, OATT Attachment K Section 1.12 :
 - Dynamic Schedules cannot do ancillary services. Only Pseudo-Ties allowed to provide services identified in PJM Manuals
 - Replaced Dynamic Scheduling with Dynamic Transfers where applicable.
 - Clarified Dynamic Transfers are not eligible for providing Reactive services

- OATT, Attachment M:
 - Replaced use of “Dynamic Scheduling” with Dynamic Transfer
 - OA, Section 1.10
 - OA, Schedule 1, Section 3.2
 - OA, Schedule 1, Section 2.6A
 - OATT, Attachment K, Section 1.10
 - OATT, Attachment K, Section 3.2
 - OATT, Attachment K, Section 2.6A
 - OATT, Attachment K, Section 1.7

- First Reads, Second Reads:
 - SOS: **January 27, 2016**, February 24, 2016
 - OC: **February 8, 2016**, March 8, 2016 (**Endorsement**)
 - MIC: **February 9, 2016**, March 9, 2016
 - MRC, MC: March 31, 2016, April 28, 2016 (**Endorsement**)
- OATT/ OA Revisions FERC filing - May 1, 2016
- July 1, 2016 implementation - Targeted

- Manual Changes
 - Sree Yeddanapudi
 - sree.yeddanapudi@pjm.com, phone: 610-666-8991
 - Dave Souder
 - david.souder@pjm.com, phone: 610-666-4795
- Dynamic Transfer Request Form
 - <http://pjm.com/about-pjm/member-services/member-forms/dynamic-transfers.aspx>
 - PJM Member Services/Client Manager, phone: 610-666-8980