AFC Process

Transmission Customer Conference 2005

Background

- Blackout and FERC RTO Requirements for Seams Agreements.
  - MISO-PJM
  - NYISO-NE-RTO
  - SPP
- NERC – inter-regional coordination requirements provided in Policy 9.
- TVA-MISO-PJM Data Exchange Agreement.

Key Components of Agreement

- **Exchange of real-time and forward-looking system operating and planning data**
  - Incorporates existing Data Exchange Agreement between parties
  - Ability to accurately model the systems
- **Coordinated Congestion Management**
  - Focuses on key transmission facilities (flowgates) impacted by one or more of the parties
  - Proactive agreement on the respective parties' rights to the available capacity on flowgates, based on historical usage
  - Provide parties with a basis for reducing flows due to market dispatch in the event of emergencies
  - Ability to manage economic market flows as "non-firm"
  - Emergency procedures in accordance with existing NERC policy.
- **Coordinated System Planning**
  - Exchange of system models, interconnection requests, transmission service requests, and transmission system plans
  - Periodic joint planning sessions to study the infrastructure needs of the interconnected systems
  - Coordination of System studies due to new service requests or generator interconnection
    - In accordance with affected party's Tariff or TS Guidelines

Congestion Management

- Provides process to measure and manage untagged market flows on critical flowgates to ensure that reliability is not degraded as a result of market expansion
- Market Flows are defined as flows generated from a Market-Based Operating Entity's dispatch
  - Firm Flows are those serving native load in the market footprint (identified through historic flows)
  - All other flows are economic dispatch and are treated as equivalent to non-firm transmission service
- Studies designed to emulate current IDC NNL & CA-CA TDF calculations and methodologies while using present day Control Area topology
- Process is flexible to allow the inclusion of temporary flowgates or "flowgates on the fly"

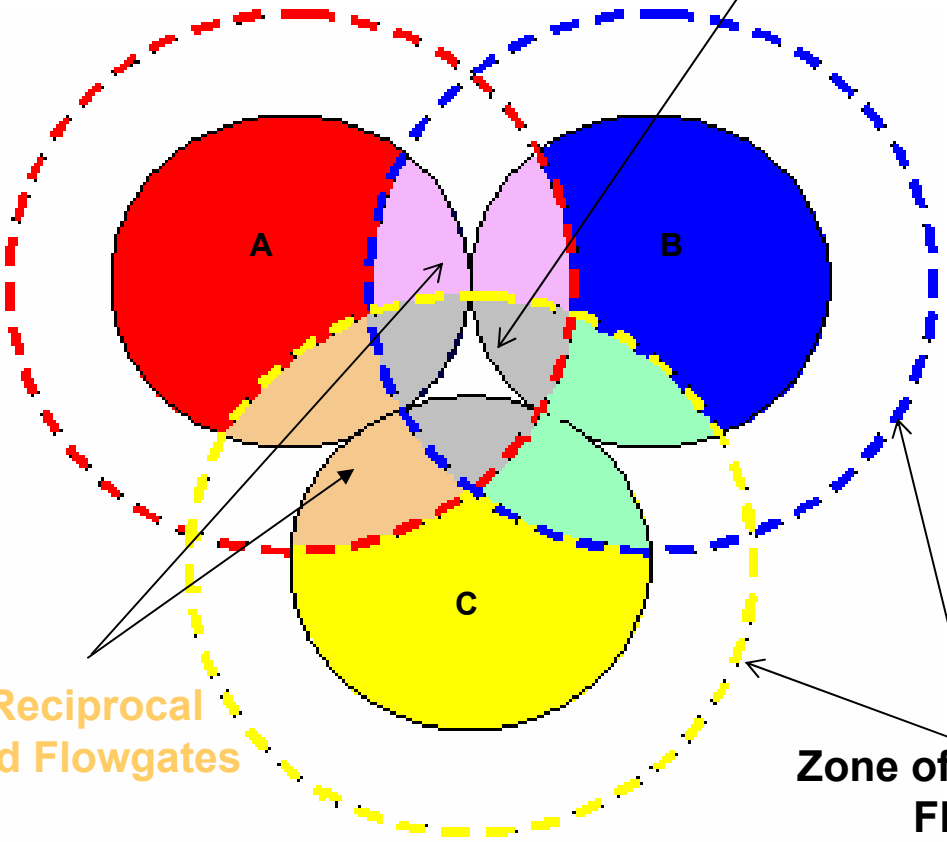
Reciprocal Coordinated Flowgates

Definition:

Coordinated Flowgates that are subjected to more substantial management, including a formal allocation of Available Flowgate capacity among Operating Entities and their agreement to respect that Allocation. Allocations are based on historical flow levels measured as of a specified “freeze date.”

Illustration: Coordinated and Reciprocal Coordinated Flowgates

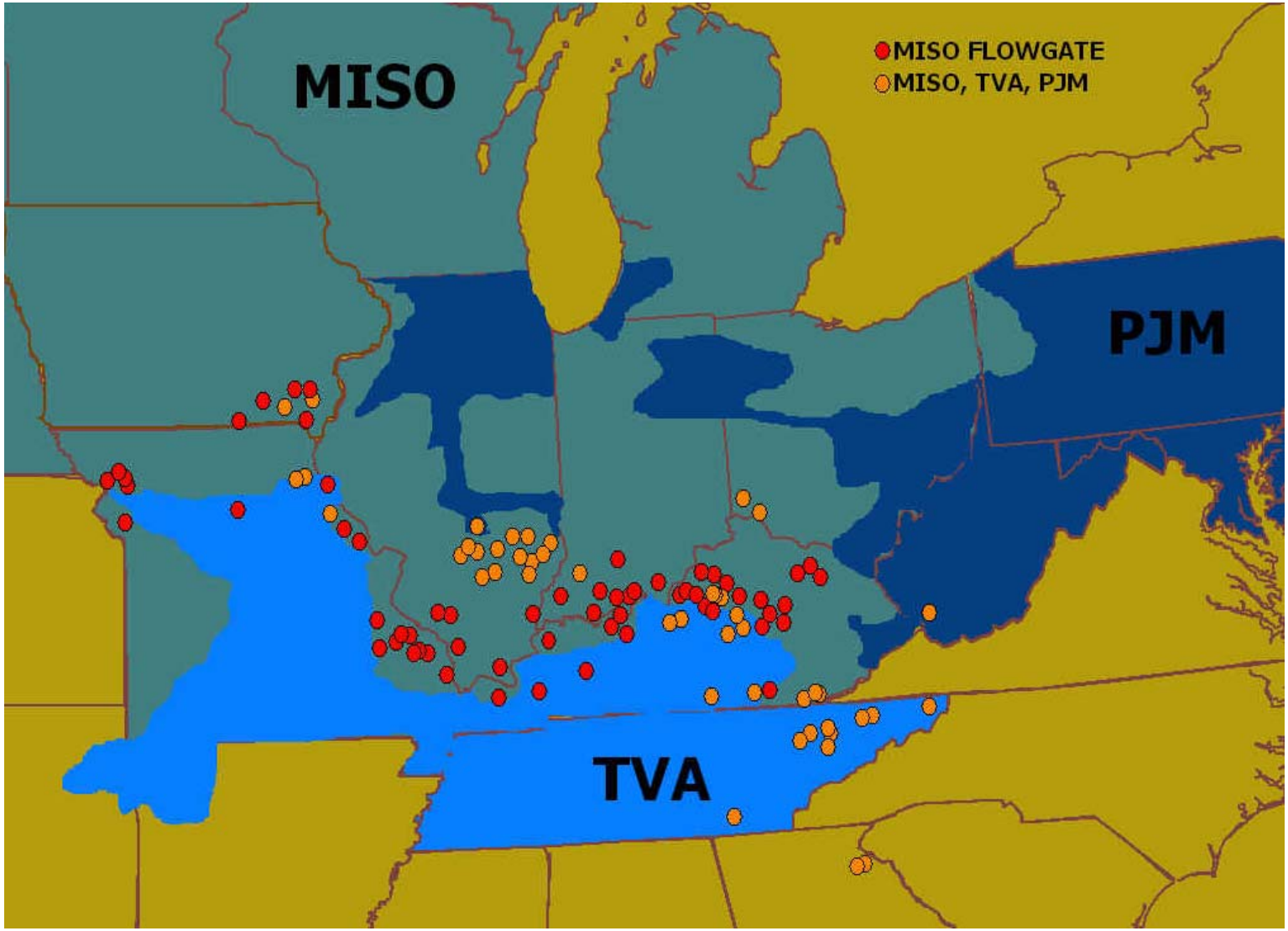
Operating Entity A, B, & C



Assignment of Flowgate Rights Under Reciprocal Coordination Agreements

- Steps:
  - Identify a flowgates Total Capability
  - Discount any Appropriate Margins
  - Estimate Historical Flows of the Flowgate
  - Allocate Capacity to Accommodate Historical Flows (pre market implementation)
  - If Capacity Remains, split it based on the amount of the “fair share”
  - The “fair share” plus any extra becomes the allocation or assigned rights
- This process occurs periodically on a forward basis to reflect topology changes and more accurate load estimates
- Goals
  - To recognize the impact of parallel flows associated with the bulk transmission system
  - To limit the impact of one party’s transmission sales on another party’s system
  - To proactively reduce the number of TLR 5s called on various flowgates by more granular management of congested flowgates

Reciprocal Coordinated Flowgates



AFC Coordination

- Load Flow Model Creation
  - Create hourly models for next 1-168 hours
  - Create daily models for next 8-35 days
  - Create monthly models for next 2-18 months
- AFC Calculation
  - Calculate AFC for all flowgates for periods defined above.
- ATC Calculation
  - Calculate ATC for all flowgates for periods defined above.
  - Provide TDF information for further TSR approval

AFC Coordination

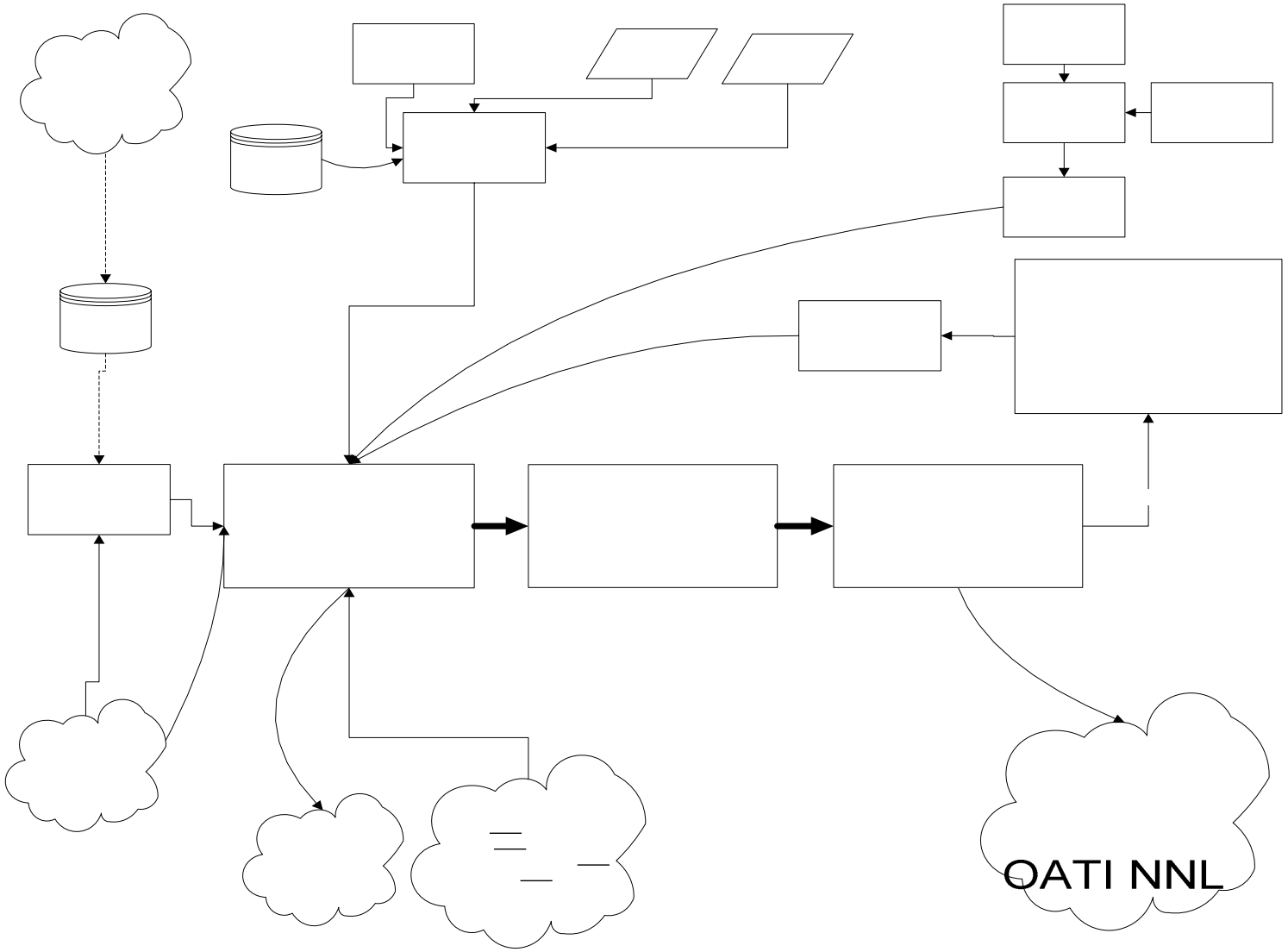
- Respect flowgate limits on other reciprocal parties systems
- Honor ASTFC and NNL/Allocation as defined in Congestion Management Process
- Interface with existing OASIS system

TVA AFC/ATC Process

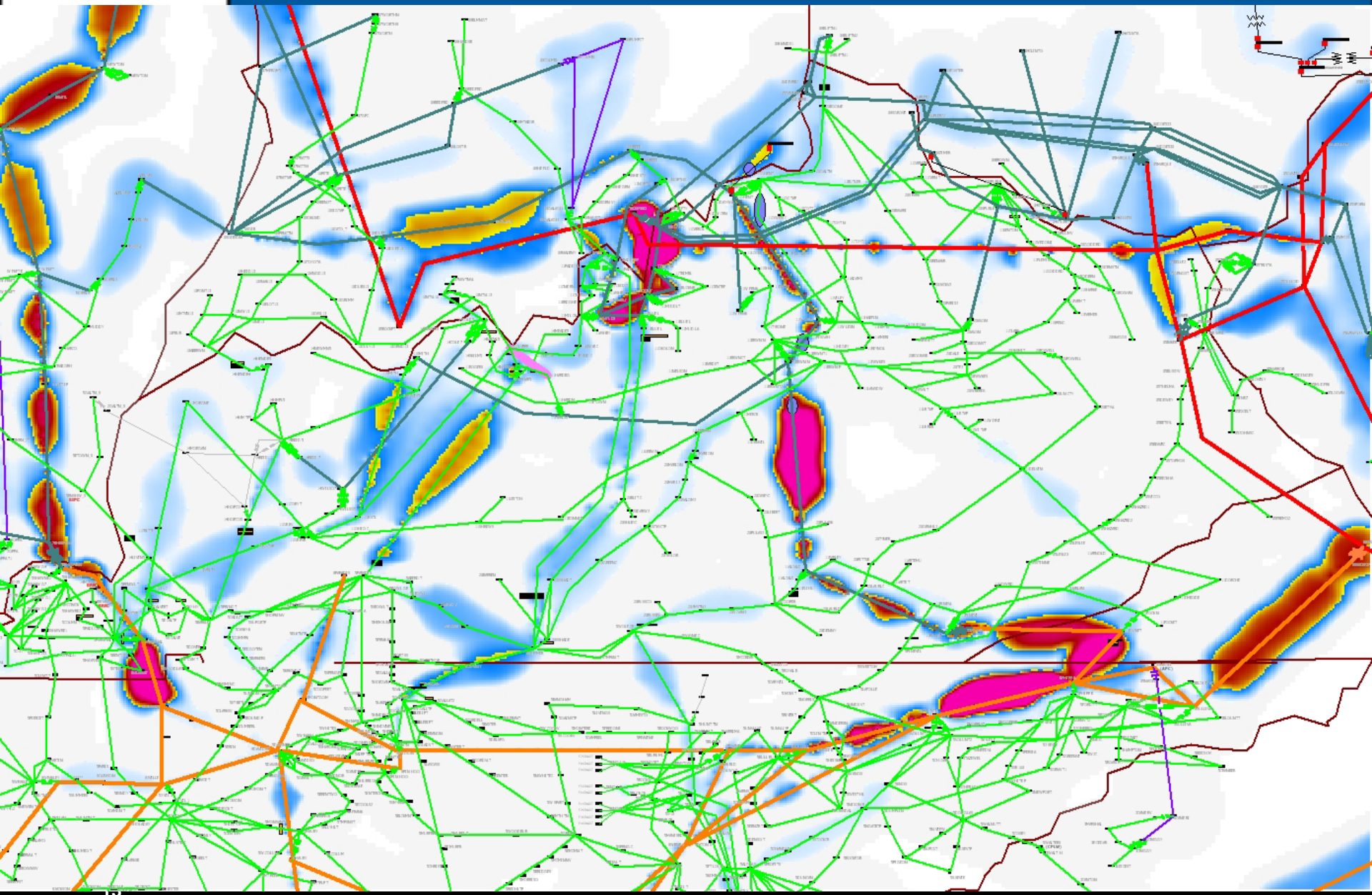
- Utilize MUST AFC engine to calculate AFC for each time period.

- Utilize PAAC ATC engine to apply business rules and calculate ATC per path
  - Based on most limiting flowgate and TDF on a path
  - Honors JRCA AFC's and NNL/Allocations
  - Creates output for OASIS ATC update

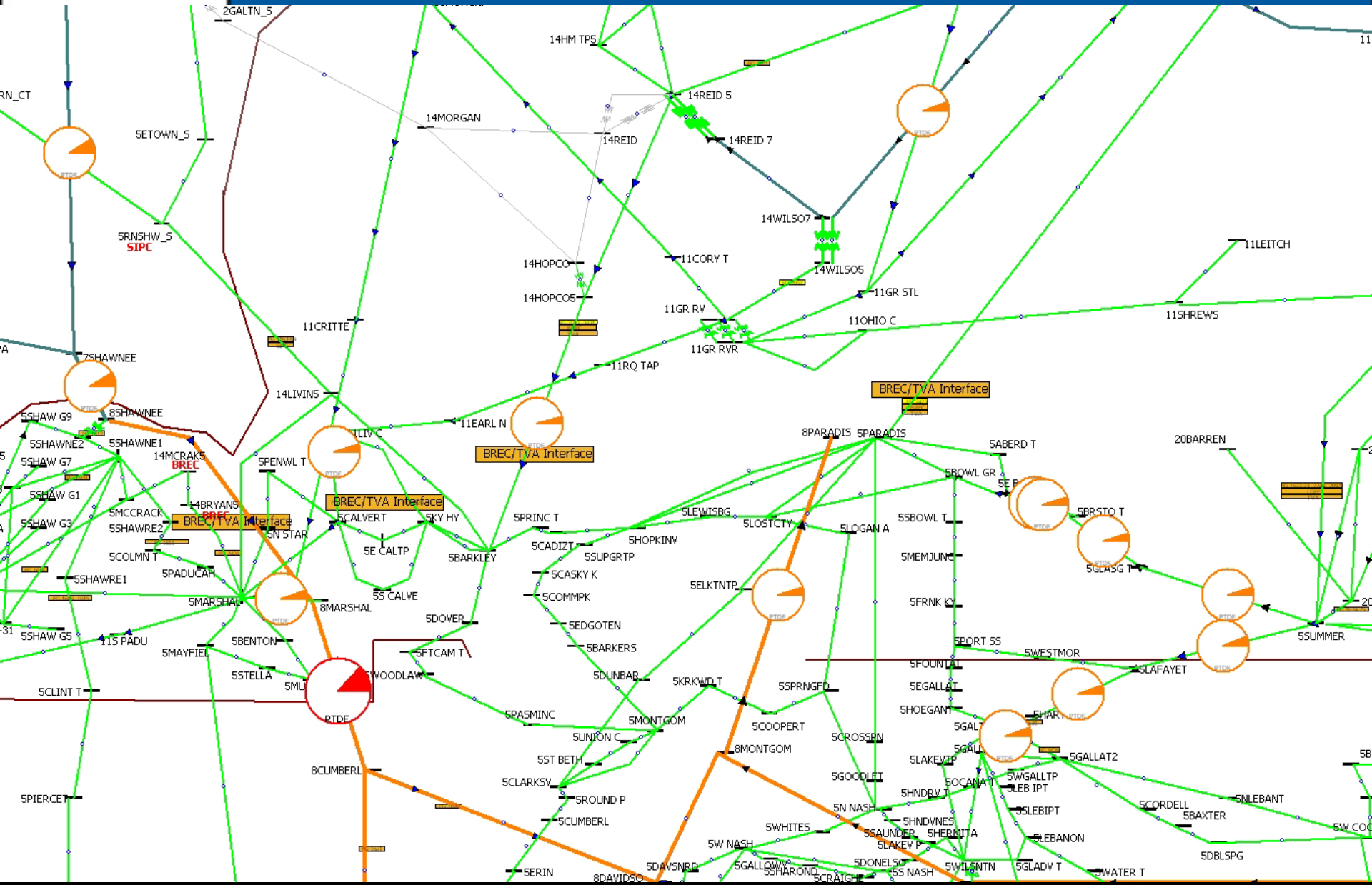
AFC Process Overview



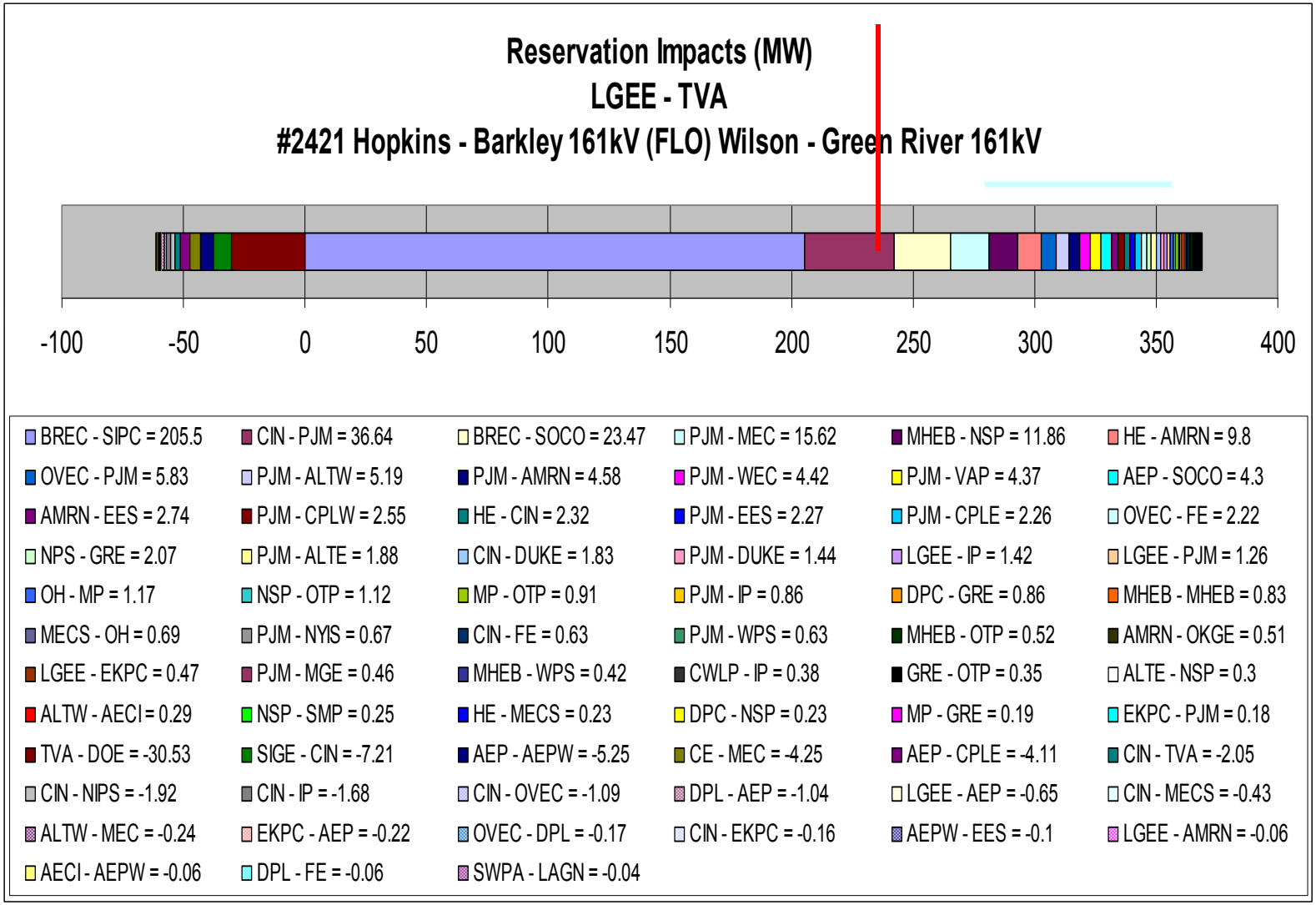
Example: LGEE/TVA TDF



LGEE/TVA Transfer
Impact on BREC/TVA Interface



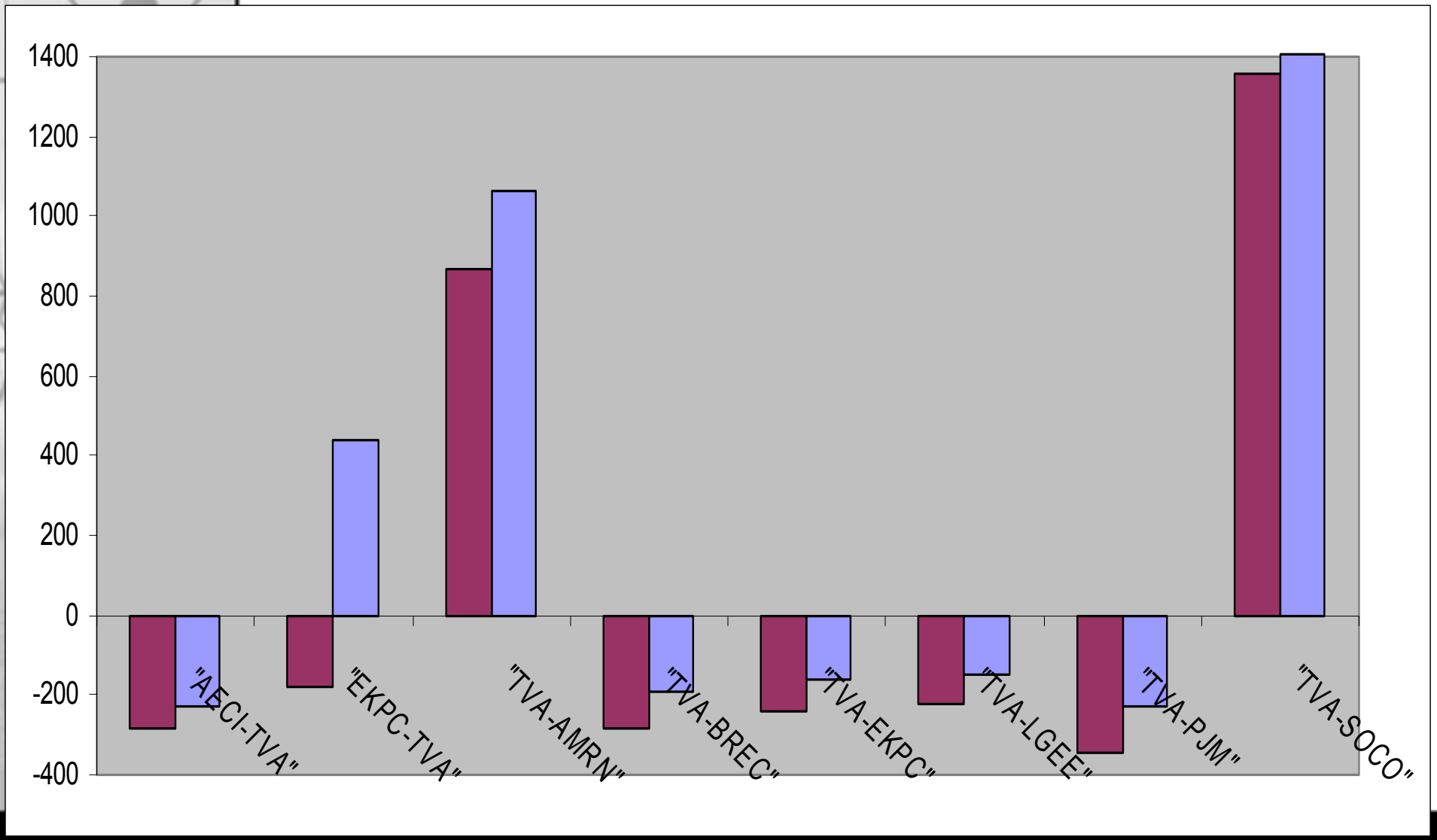
AFC Process: Reservation Impact



Impacts on multiple interfaces:
200MW TVA->AMRN

"PathName"	ATC	FgateName	ATC	Flowgate Name
"AECI-TVA"	-285.15	"3138: MONTGMRY-GUTHRIE+MONTGMRY MC"	-228.38	"3138: MONTGMRY-GUTHRIE+MONTGMRY MC"
"EKPC-TVA"	-180.72	"2277: Avon-Loudon 138 (flo) Ghent-"	440.77	"2209: W.Lex-E.W.Brown345 (flo) Bak"
"TVA-AMRN"	865	SchedLimit	1065	SchedLimit
"TVA-BREC"	-284.89	"1624: Summer-SShadt&Summer-Sshade"	-189.46	"1624: Summer-SShadt&Summer-Sshade"
"TVA-EKPC"	-242.29	"1624: Summer-SShadt&Summer-Sshade"	-161.13	"1624: Summer-SShadt&Summer-Sshade"
"TVA-LGEE"	-221.64	"1624: Summer-SShadt&Summer-Sshade"	-147.39	"1624: Summer-SShadt&Summer-Sshade"
"TVA-PJM"	-341.87	"1624: Summer-SShadt&Summer-Sshade"	-227.35	"1624: Summer-SShadt&Summer-Sshade"
"TVA-SOCO"	1359.5	"1539: RockSprings-E.Dalton 230 flo"	1404.59	"1539: RockSprings-E.Dalton 230 flo"

200MW TVA->AMRN



AFC Over rides

- Per JRCA each party will use the flowgate owners calculation of AFC on their flowgate.
  - Example: If MISO flowgate is limiting flowgate on the TVA->BREC path. TVA will use MISO's calculated value for AFC.
- Differences in business practices require "constant coordination" of other parties AFC values

Limiting Flowgates

ATC	FgateName	Dfact	AFCnet	Override	AFCInit	ReserImp	FgateRating
-4568.78	"2421: Hopkin Co.-Barkley 161 (flo)"	0.0351	-160.4	NA	227.3	385.9	265
-3541.73	"3405: BUNSONVILLE-EUGENE + BREED-C"	0.0417	-147.7	NA	504.3	652	937
-1769.32	"3167: St. Francois - Lutesville 34"	0.047	-83.2	NA	665.5	748.7	949
-1434.94	"2245: Blue Lick-Bullitt Co 161 (fl"	0.0402	-57.7	NA	71.1	128.8	235
-1219.11	"2884: Green River Steel-Cloverport"	0.0406	-49.5	NA	47.5	97	209
-1017.83	"2488: Blue Lick-Bullet Co.161 (flo"	0.0411	-41.8	NA	83.1	124.9	235
-674.2	"2102: 14HOPCO5 161 5BARKLEY 161 1"	0.0334	-22.5	NA	282.4	294.3	265
-575.29	"2096: Blue Lick-Bullitt County 161"	0.0711	-40.9	NA	69.2	110.1	235
-415.04	"2198: Blue Lick 345/161 XFMR-Baker"	0.0402	-16.7	NA	112.1	128.8	276
-381.79	"2196: Blue Lick 345/161 XFMR"	0.0374	-14.3	NA	102.4	116.7	240

OASIS Administration

- Existing ATC methodology only decrements interface based on contract path, i.e. only decrements the interface involved in the TSR.
- AFC process calculates new interface AFC/ATC after each TSR is approved. This includes impacts on ALL interfaces.
- OASIS will require enhancements to handle new ATC decrementing.